

# Boulder County Mobile Home Park Analysis

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## **Abstract**

Affordable housing in Boulder County has reached high demands in recent years as an influx of city residents has boosted the need for neighborhoods that low-income individuals can occupy. Mobile home communities have gained much attention under these circumstances as the the county has allocated many resources towards building and devising policy that supports these neighborhoods. Despite efforts to make mobile home parks as livable as possible, concerns about the quality of energy efficiency has brought interest to the county's leaders in environmental design and policy. This paper provides an in depth look into the features of mobile home parks within Boulder County that offer potential ways of improving energy efficiency and overall occupancy. This analysis is intended to act as a guidance tool for devising ideas of how city planners and policy makers can make mobile home parks more energy efficient resulting in a decline of the carbon footprint that affordable housing causes.

# 1. Introduction

Mobile home parks have been recognized as an important living option for low-income citizens in Boulder County for over 30 years, as city officials have worked to incorporate them into legislation and housing programs alike (City of Boulder Study Session, 2015). The county has seen an increase of nearly 25,000 residents since 2010 (United States Census Bureau, 2015) and will continue to see growth as Boulder remains one of the most desired places to live in the country. This growth will increase the demand for affordable housing in Boulder County and will require strategic planning in order to meet the needs of many residents while avoiding any environmental or social consequences.

This study that we are conducting is concerned with strategically finding ways that we can improve mobile home parks in Boulder County. This includes, but is not limited to, improving the energy efficiency of these parks by considering green infrastructure techniques, renewable energy installation opportunities, and improving housing insulation. In addition to improving energy efficiency, we also looked at other features of each mobile home park that either offer an opportunity to improve community engagement, practicality of location and use of alternative transportation, or features that compromise the well-being of the residents that live there. This particular paper focuses on the basic features of each mobile home park that was examined in an effort to create a basis that environmental design experts and Boulder County policy makers can use to develop strategies in response to the negative or positive observations that this study highlights.

There were some limitations to the gathering of data as the techniques that were used did not provide exact information, but rather estimates that effectively deliver the essential information regardless. For instance, measuring the open space around each mobile home park was done using Google Earth which made it near impossible to get the exact area in acres. Nevertheless, the estimates that were recorded do show that there is either a large amount of open space surrounding each park or very little. This data is still important for devising strategies that look at essential uses for the open space.

Part of this research involved phone interviews with the managers of each mobile home park. The combination of self-observations and interviews with people directly involved with each park allowed for a complete set of data that contains the perspective of two separate parties involved in mobile home park development. We were able to record the concerns and suggestions that park managers wanted to express during the interviews. This developed a more personal relationship with each manager and led to constructive conversations about the future of each mobile home park.

Mobile home parks provide an essential service to Boulder County. They provide affordable living for low-income families and foster a community full of age and race diversity. Improving the quality and interconnectedness of these parks should remain a top priority since mobile home parks contribute significantly to the overall stature of a city. The hope is that affordable housing can be viewed as a best case scenario for low-income individuals and that the composition of each reflects the views of environmentalists and social justice visionaries.

## **2. Methods**

We chose seven parks to do our research. Five of the parks are located in Boulder and the other two are located in Lafayette; all seven are located in Boulder County. Half of our research consisted of phone interviews with park managers and half were done using Google Earth. The parks were selected based on the lack of research that had previously been done regarding our interests. After finding the names of each park that was selected, I searched for their addresses and phone numbers so that I could continue my research.

### **2.1 Google Earth**

We wanted to identify many of the basic features of each mobile home park using Google Earth. These features include the following: area of the park in acres, number of homes, density of houses per acre, the area occupied by each home, road size and surface, open space within the park and outside the park (within .6 km), the number of road entrances and the number of non-road entrances, private lawn characteristics, number of bus stops within the park and outside of the park (within .6 km), the distance to the nearest amenities, the connectivity to surrounding areas, vegetation within the park, park enclosure and sprawl, as well as additional notes and observations. These characteristics were recorded one park at a time and were based off of estimates.

To record the area of each park I simply used Google Earth's polygon measurement tool that recorded the area that was drawn in acres. The number of homes was recorded by counting each home by eye. The density of each park was figured out by dividing the number of homes by the area. To determine the area occupied by each house I measured the length of the longest house and the shortest house, as well as the width using Google Earth's line measurement tool. The results were measured in feet. The road size was also recorded using the line measurement tool although only the width of each road within the park was recorded. The road surface was described using Google Earth's Street View which gave me an accurate assumption of whether the roads were concrete or dirt.

Open space within the park was measured using the polygon tool and was measured in acres. We defined open space as land that had not been developed (no buildings or infrastructure) and was accessible to the public. Figuring out the amount of open space outside of the park was a little more complicated. We wanted to know how much open space was located outside of the park within a proximity of .6 kilometers (km). To do this I used the line measurement tool to draw eight radial lines that protruded .6 km outwards from the park in each direction (north, northeast, east, southeast, south, southwest, west, and northwest). After establishing this area, I used the polygon measurement tool to measure the open space (in acres) that fell within the range of the radial lines.

The number of road and non-road entrances were simply counted using Google Earth's Birds Eye View and Street View. The private lawn characteristics were primarily recorded using the Street View. These characteristics included the following: bare, xeriscape, trees, gravel, grass, and patchy grass. The results were estimated percentages of the amount of houses where the lawn consisted of one of these characteristics.

The number of bus stops within and outside of the park was simply counted by eye. This was not a challenge since Google Earth lists every bus stop when the user is in Bird's Eye View. Bus stops recorded outside of the park all fell within .6 km of the park. The distance to the nearest amenities was recorded using Google Earth's line measurement tool. These amenities include: nearest bus stop, restaurant, grocery store, school, and park. The names of each amenity was included and the distance was measured either in km or feet (ft) depending on the distance.

The connectivity to surrounding areas was not recorded using any of Google Earth's tools, but more so as observations from the Bird's Eye View and Street View. For instance, it was observed that some parks were very fenced in compared to others which limited their accessibility to surrounding areas. Vegetation was also recorded using observation skills. If there seemed to be a lot of trees or bushes within the park then it was recorded saying "many trees" or "few bushes" rather than counting each individual piece of vegetation.

Enclosure was recorded using a similar technique as connectivity, in that it was also based on observations about the level of isolation that each park was subject to. Sprawl was based on the perceived density of each park as well as its intrusion into open space. Additional notes and observations were composed of other interesting features or ideas that were not already recorded.

## **2.2 Phone Interviews**

In an attempt to answer some of the questions that we had regarding the mobile home parks selected that we could not answer using Google Earth, we conducted a phone interview with each park's manager. The interview consisted of 13 questions as follows: How many homes are in the park? What is the average cost of each home? Have there been any weatherization activities conducted? What are the general demographics (young vs. old)? What is the average cost of water and electricity? What is the primary language spoken? Was there any damage done by the flood in 2013 and has there been any mitigation techniques conducted since? What is the average age of the homes? Have there been any recent home improvements and who is responsible? What is the average rent? What is the average space per home and is there a limit? Who maintains each property? Is there a mobile home association that is independent of the park? The answers to each question was written down and inserted into a table that made it easier to compare the answers from different parks.

## **3. Results**

### **3.1 Ponderosa**

Ponderosa mobile home park, located at 4475 Broadway Avenue in Boulder, has an area of about 5.08 acres and contains 68 homes. This makes the park's density about 13.38 homes per acre. The average area occupied by each mobile home is about 60-80 feet (ft.) long and 20-30 ft. wide. The roads are about 18-25 ft. wide and are all dirt. There are zero acres of open space

within the park and about 109.68 acres outside, but within a proximity of .6 kilometers (km) from each direction around the park.

Ponderosa has two road entrances and four non-road entrances. Its private lawn characteristics include roughly 25 percent of the houses bare, zero percent xeriscape, five percent trees, 10 percent gravel, zero percent grass, and 60 percent patchy grass. There are zero bus stops within the park and 14 bus stops within .6 km. The nearest bus stop is a Skip stop which is located 326 ft. from the park. The nearest restaurant is the North Boulder Cafe which is located 192 ft. from the park. The nearest grocery store is Lucky's Market which is located .92 km from Ponderosa and the nearest public park (Foothills Community Park) is located 289 ft. from Ponderosa. The nearest school is Shining Mountain Waldorf (348 ft.) and the nearest public school is Crest View Elementary (.9 km).

Ponderosa is not very isolated in terms of its connectivity to the surrounding areas. There are several roads and bike paths that connect to other neighborhoods, parks, and shopping centers. Despite its decent connectivity, a long fence still separates it from surrounding areas. There is some vegetation in the park including some trees and bushes, but overall there is not a huge amount. It is a densely packed neighborhood, but does not intrude much into the surrounding open space. Additional notes about Ponderosa include rooftops that have high sun exposure, and the comparison of Ponderosa's dirt roads compared to the concrete roads that surround it.

The park manager estimated that the cost of each home ranges from \$5000 - \$20,000. They said that some Catholic charities have helped with weatherization, but generally it is up to the tenant to improve the quality of the house. They were not sure about the demographics, but guessed that it was a mix of younger and older families. They said that the cost of water was included in the rent and electricity ranged from \$40 - \$300 per month. They said that half of the home owners are hispanic and half are caucasian, but about 2/3 of residence speak Spanish since the hispanic families tend to be larger.

The flood of 2013 did some damage to the properties and flood mitigation practices have been implemented since. They said that the city made Four Mile creek wider and deeper and dug out pools around it to capture excess water. Most of the homes were built in the 50s, 60s and 70s and a few were built in the 80s. Ponderosa's park manager said that they have improved the roads, water and sewage system, but most of the home improvements are the responsibility of the tenant. The average rent is \$500 per month and will increase to \$530 per month in 2016. The park manager also said that the Rocky Mountain Home Owners Association is a mobile home owners association that is independent of the park.

### **3.2 Boulder Meadows**

Boulder Meadows mobile home park, located at 4500 19th Steet in Boulder, has an area of about 85.64 acres and contains 587 homes. This makes its density 6.85 homes per acre. Each property is about 60-80 ft. long and 20-40 ft. wide. The roads in the park are 30 ft. wide and are made of concrete. There is 7.26 acres of open space within the park and 164.16 acres outside, but within .6 km spanning in each direction. There are four road entrances and 1 non-road entrance. Private lawn characteristics include roughly 20 percent of homes that have bare lawns, 15

percent that have xeriscaped lawns, five percent that have trees, 10 percent that have gravel, 10 percent that have grass lawns, 40 percent that have patchy grass lawns.

Boulder Meadows has three bus stops located within the park and 18 located outside the park, but within .6 km. The nearest bus stop (Skip) is located about .25 km from the park and the nearest restaurant (Family Emergency Assistance Food Bank) is located 85 ft. from the park. Another close restaurant is called The North Boulder Cafe and is located .21 km from the park. The nearest grocery store (Lucky's Market) is located .94 km from the park. The nearest school (Crest View Elementary) is located .39 km from the park and the nearest public park (Crest View Park) is located .3 km away, although there are a couple public parks within Boulder Meadows.

Boulder Meadows has very good connectivity in that there are several roads connecting it to surrounding areas. It does not seem to be as isolated from surrounding areas as most parks. There are many trees within the park and a lot of open grass areas. This park is densely packed, but it does not intrude into any open space at all. It is very large compared to other parks that were part of this study. Additional notes about Boulder Meadows include the presence of many rooftops that are shaded, only concrete roads, and the existence of a community center within the park.

The manager of Boulder Meadows said that there are 587 homes and 638 lots within the park. The average cost of each home ranges from about \$40,000 - \$80,000. Some charities have helped with weatherization, but overall it is the tenant's responsibility to improve their homes. The manager was not allowed to disclose the demographics of the park, the primary language spoken, or the cost of water and electricity. The flood of 2013 did some damage to the park and various charities and programs assisted the families that were impacted. The manager did not know the general age of the homes, but mentioned that there were many that were built recently.

### **3.3 Mapleton**

Mapleton mobile home park, located at 2635 Mapleton Avenue, has an area of about 13.45 acres and contains 135 homes making its density about 10.03 houses per acre. Each property is about 60 - 70 ft. long and 20 - 25 ft. wide. The roads are about 30 ft. wide and are both concrete and dirt. There is about .13 acres of open space within the park and about 22.62 acres outside, but within .6 km spanning in each direction. There are five road entrances and two non-road entrances. Private lawn characteristics include roughly 5 percent of homes that have bare lawns, five percent that have xeriscaped lawns, 10 percent that have trees, 10 percent that have gravel, 70 percent that have grass lawns, 10 percent that have patchy grass lawns.

Mapleton mobile home park has zero bus stops located within the park and 19 located outside the park, but within .6 km. The nearest bus stop (Bolt) is located about .19 km from the park and the nearest restaurant (Dot's Diner) is located about .28 km from the park. The nearest grocery store (Safeway) is located about .6 km from the park and the nearest school (Columbine Elementary) is located about .61 km from the park. The nearest public park (East Mapleton Ball Fields) is located about .45 km from the park.

Mapleton mobile home park is very connected to the surrounding areas as several road entrances and bike paths provide efficient ways to travel to nearby areas. It is not very enclosed

because there are no fences that separate it from surrounding areas and it sort of blends into the neighboring areas. There are many trees and bushes, and a little bit of open space. A creek also runs through the park. It is not abnormally dense and it does not intrude into any surrounding open space. Additional notes include the sheer quality of the park. It seems to be a well designed and managed park from the looks of it.

Mapleton's park manager said that the average cost of each home is about \$29,000. They said that they do not know of any recent weatherization activities that have been conducted, but they do let the tenants know that there are programs that exist. The demographics are very diverse as far as age. There are many older families that have been there for years and younger families that are recently moving there. They were not sure about the cost of electricity and water. The primary language spoken at Mapleton is English. There was some damage done by the flood of 2013, but various programs helped repair damaged homes. Most of the homes were built in the 60s and 70s. Rent is income dependent with a maximum of \$516 per month and a minimum of \$354 per month. The average rent ranges from \$354 - \$458 per month. The average income of the home owners ranges from about \$20,000 - \$40,000 per year. The home owners are responsible for maintaining their properties and there is a Home Owners Association of which the tenants are in charge.

### **3.4 Orchard Grove**

Orchard Grove mobile home park, located at 3003 Valmont Road in Boulder, has an area of about 32.53 acres and contains 216 homes making its density about 6.64 houses per acre. Each property is about 60 - 90 ft. long and 20 - 30 ft. wide. The roads range from 30 - 35 ft. wide and are all concrete. There is about 4.94 acres of open space within the park and about 16.2 acres outside, but within .6 km spanning in each direction. There are three road entrances and one non-road entrance. Private lawn characteristics include roughly 20 percent of homes that have bare lawns, zero percent that have xeriscaped lawns, five percent that have trees, 25 percent that have gravel, 25 percent that have grass lawns, 25 percent that have patchy grass lawns.

Orchard Grove has zero bus stops within the park and 28 bus stops outside of the park, but within .6 km. The nearest bus stop (208) is located 70 ft. from the park. The nearest restaurant (Deli Zone) is located about .18 km from the park and the nearest grocery store (Safeway) is located .58 km from the park. The nearest school (Columbine Elementary) is located about 1.35 km from the park and the nearest public park (Howard Hueston Park) is located about 163.5 ft. from the park.

Orchard Grove does not have very good connectivity to the surrounding areas. Most of the park is surrounded by a fence that separates it from any of the surrounding areas. There are only three road entrances that all lead onto the same street (Valmont) making Orchard Grove a very enclosed neighborhood. There is decent vegetation as many trees and bushes are present as well as one open grass area. It is an average sized park that is quite dense and it does not intrude into any surrounding open space. Other observations include the convenience of its location since it is near many amenities. It is also located near a bike path and many bus stops. The open space within the park does not seem like it is being put to good use.

The park manager said that the cost of each house ranges between \$40,000 - \$50,000. They do not know if there has been any recent weatherization activities since that responsibility falls on the owner of the house. The demographics are very diverse as many older families have lived in Orchard Grove for 10 plus years and a lot of middle age families continue to move there. Tenants pay about \$50 per month for water. The cost of electricity was not known. The manager said that the primary language spoken is English and they did not know the average age of the houses. The flood of 2013 did do some damage to the park's infrastructure and various Christian charities helped restore it. Rent is \$635 per month and they were not sure what the average space per property is. The tenants are responsible for any home improvements and there is a Home Owners Association, although the manager is not sure who is responsible for it.

### **3.5 San Souci**

San Souci mobile home park, located at 1561 S Foothills Highway in Boulder, has an area of about 8.64 acres and contains 62 homes making its density about 7.18 homes per acre. The area occupied by each property is about 50-70 ft. long and 30-40 ft. wide. The roads are about 20-25 ft. wide and are both concrete and dirt. There is about 3.15 acres of open space within the park and about 248.23 acres of open space outside, but within .6 km spanning in each direction. It has three road entrances and one non-road entrance. Private lawn characteristics include roughly 10 percent of homes that have bare lawns, five percent that have xeriscaped lawns, 10 percent that have trees, 5 percent that have gravel, 10 percent that have grass lawns, 60 percent that have patchy grass lawns.

San Souci has zero bus stops within the park and two bus stops outside of the park, but within .6 km. The nearest bus stop (GS) is located about .28 km away. The nearest restaurant (Southern Sun) is located about 3.14 km away and the nearest grocery store (King Soopers) is located about 3.14 km away. The nearest school (Fairview High School) is located about 1.79 km away from San Souci and the nearest public park (Shanahan Ridge Park) is located about 1.7 km away.

San Souci is very isolated as it is surrounded by mostly open space and a few other neighborhoods. It is one of the more rural mobile home parks in this study and is disconnected from any urban areas in general. It is surrounded by a fence that separates it from the surrounding open space making it moderately enclosed. There are few entrances which also makes it seem more enclosed, but there are a few hiking trails near it. There is a little bit of open areas within the park and a few trees, but nothing spectacular as far as vegetation. It is pretty dense and takes up a small portion of the surrounding open space. Further expansion would intrude into open land. Additional observations include the inconvenience of its location. It is quite far from any amenities except for a near by gas station (Eldorado Corner Market). The large amount of open space that surrounds it acts as flood mitigation. There is a creek that runs near it and a lake (Marshal Lake) that is located about 1.48 km away.

The park manager said that the older homes cost about \$1000 and the newer homes range anywhere from \$15,000 - \$50,000. They are not aware of any recent weatherization activities that have been conducted since that responsibility falls on the tenants. The demographics are very diverse. Some families have lived there for 40 years and some families are a lot younger



and some are in-between. They said that electricity costs about \$50 per month and water costs are included in the rent. The primary language that is spoken is English. The flood of 2013 did not do any damage to the park since the open space around it acted as a natural flood mitigation feature. They said that some of the homes are brand new and some have been there since the 50s. The tenants are responsible for any home improvements and the average rent is \$390 per month although it is increasing to \$410 per month in May. There is no Home Owners Association that is related to this park, but there is a state wide mobile home park association called the Mobile Home Park Owners Association of Colorado.

### **3.6 Lafayette Gardens**

Lafayette Gardens mobile home park, located at 11700 E South Boulder Road in Lafayette, has an area of about 17.27 acres and contains 135 homes making its density about 7.82 homes per acre. The area occupied by each property is about 60-80 ft. long by 15-30 ft. wide. The roads are all about 25 ft. wide and are all made of concrete. There are zero acres of open space within the park and about 71.78 acres of open space outside, but within .6 km spanning in each direction. It has 2 road entrances and 2 non-road entrances. Private lawn characteristics include roughly five percent of homes that have bare lawns, 15 percent that have xeriscaped lawns, 10 percent that have trees, five percent that have gravel, 35 percent that have grass lawns, 30 percent that have patchy grass lawns.

Lafayette Gardens has zero bus stops within the park and five bus stops outside of the park, but within .6 km. The nearest bus stop (Dash/Jump) is located about 74.61 ft. away. The nearest restaurant (Goodtimes) is located about 1.47 km from the park and the nearest grocery store (Vitamin Cottage) is located about .9 km away. The nearest school (Justice High School) is located about .11 km away and the nearest public park (Lamont Does Memorial Park) is located about .1 km away.

Lafayette Gardens is close to many important amenities and urban areas, but it is mostly fenced off from those areas and only has 4 total entrances. You can only enter the park via a road on the south side. Overall it is very enclosed. There is a good amount of trees in the park and many healthy looking grass lawns. The park has an average density and it does not intrude into nearby open space. Additional observations include the presence of a manufacturing site right next to it that most likely produces noise and particle pollution. This could be an issue of environmental justice. Despite this concern, Lafayette Gardens is located near many important amenities, although it does seem quite disconnected from the surrounding neighborhoods.

The manager of Lafayette Gardens said that she did not know the cost of each home and that weatherization activity was the tenant's responsibility. She was unaware of any recent weatherization activity that had been conducted. The demographics included mostly elderly couples with some younger families. Water cost is based on usage and electricity costs are independent of the park. The primary language spoken at Lafayette Gardens is Spanish. She could not disclose the average age of the homes and was not sure about the average area of each property. Rent is \$485 per month and does not include water or sewage. Any home improvements are the tenant's responsibility and she was unaware of any mobile home owners association that is independent of the park.

### **3.7 Boulder Ridge**

Boulder Ridge mobile home park, located at 11990 S. Boulder Road in Lafayette, has an area of about 37.09 acres and contains 241 homes making its density about 6.49 homes per acre. Each property is about 50-80 ft. long and 15-35 ft. wide. The roads are about 20-50 ft. wide and are all concrete. There is about 3.96 acres of open space within the park and about 209.03 acres of open space outside, but within .6 km spanning in each direction. It has 2 road entrances and 1 non-road entrance. Private lawn characteristics include roughly five percent of homes that have bare lawns, five percent that have xeriscaped lawns, 10 percent that have trees, five percent that have gravel, 40 percent that have grass lawns, 35 percent that have patchy grass lawns.

Boulder Ridge has zero bus stops within the park and six bus stops outside the park, but within .6 km. The nearest bus stop (Dash/Jump) is located about .25 km away. The nearest restaurant (Goodtimes) is located about 1.68 km from the park and the nearest grocery store (Vitamin Cottage) is located about 1.12 km away. The nearest school (Justice High School) is located about .21 km from the park and the nearest public park (Lamont Does Memorial Park) is located about .32 km away.

Boulder Ridge is located near many important amenities and urban areas, but it is almost entirely fenced off and has only two road entrances that are both on the south side. It does have one non-road entrance that is a trail that connects to a nearby soccer field. In general it is very enclosed with little connectivity to surrounding neighborhoods. There are a good number of trees, some healthy looking lawns, and a large grass park located inside it. It has average density and it intrudes a little bit into the nearby open space. Additional observations include the fact that it is located right next to Lafayette Gardens so it is similar in that it is near many amenities. It also has a large park located inside it that promotes outdoor and community activities. However, it is also located near manufacturing sites that are likely to produce noise and particle pollution. This could also be a case of environmental injustice.

The manager of Boulder Ridge said that the cost of each home ranges anywhere from \$500 - \$47,000. They said that in the last few years a program has come through and educated tenants about weatherization and provided some with free services. The demographics are said to be all over the place in terms of age. Water costs \$30 per month and electricity costs are unknown since it is provided independently by Excel. They said that the primary languages are a combination of Spanish and English. There was no real damage done by the flood of 2013. They said that some of the houses were built in the 50s, but also in each succeeding decade leading up to the present. As far as recent home improvements, they said that it is the tenants' responsibility and they are not sure what has been done. Rent is \$525 per month for single wide homes and \$535 a month for double wide homes. The manager also said that there is no mobile home owners association that is independent of the park.

## **4. Discussion**

### **4.1 Limitations**

Despite the many limitations in gathering 100 percent accurate data regarding the various features of these mobile home parks, the research did produce a set of results that can provide insight into the basic characteristics that can assist policy makers and designers in attempting to improve them. Google Earth only does so much as far as measuring the area or length of features to pinpoint accuracy. Every measurement that was conducted using Google Earth's measuring tools was close to the exact area or distance, but not exact. This should not be looked at as a significant flaw to this study, since the important information that comes out of this study is estimates that allow for comparison of mobile home parks as well as a general sense of the advantages and problems of each park. For instance, it was recorded that Boulder Meadows has about, but not exactly, 7.26 acres of open space within it, a figure that tells us that there is some open space that could potentially accommodate solar panel infrastructure.

Furthermore, private lawn characteristic percentages were rough estimates that were based on observations conducted using Google Earth's Street View. Limitations to the accuracy of this data came with the inability to see every single lawn because of fences or hedges. This data is only supposed to inform the reader if there is an existence of a particular lawn characteristic and, if there is, tell whether there is a lot of it, a little, or in-between. For instance, if there was no observed xeriscaped lawns then researchers can conclude that xeriscaping should be the focus of that particular park. Understanding these limitations and how estimates are still effective to work with will lead to further analysis into the areas of each park that need improvement.

### **4.2 Density**

Ponderosa mobile home park and Mapleton mobile home park seem to be the only two parks that are significantly more dense in terms of homes per acre. Neighborhood density can have its benefits, such as housing affordability, improved security and reduced area development (Kackar & Preuss, 2003), but also can degrade the livability of a neighborhood if homes are too close and create a feeling of claustrophobia. Neighborhood architects should take these factors into account when designing sustainable neighborhoods. In some cases, such as highly urbanized areas, denser neighborhoods could be ideal as they save space and promote alternative transportation. However, in other instances, denser neighborhoods could lead to rapid decline in community happiness, degrading community connectedness and well-being.

### **4.3 Roads**

Most of the parks that we researched only had roads that were concrete and most of them were about 20-30 ft. wide. These characteristics do not set off any alarms that improvement is

necessary. However, three of the parks (Ponderosa, Mapleton, and San Souci) at least partially have dirt roads. This can be hazardous for the residents of these parks as dirt roads tend to produce particle pollution that decreases air quality. This is especially worrisome for Ponderosa mobile home park since all of the roads in that neighborhood are dirt. What is interesting, yet unsettling, is that all of the neighborhoods around Ponderosa have concrete roads so it seems as though the well-being of Ponderosa residents is being neglected to an extent. Re-doing the roads in these neighborhoods should be heavily considered if we want to improve the livability of these areas.

#### **4.4 Open Space**

Open space, both within the parks and outside of the parks, should be a huge focus for planners that want to make improvements in these neighborhoods. Open space can be looked at as an area that could be used for environmentally productive infrastructure or as an area that should be conserved for a variety of different reasons. Open space within each mobile home park is commonly used as a park for recreation and the existence of playgrounds. This is a quality use of open space, as recreational parks generally promote an active lifestyle, community engagement and overall improved well-being. In these cases no changes should be considered as long as the recreation park is well maintained and safe. In other cases, the open space found within some parks looks like it is not being used to its full potential. It is these instances where planners should consider the use of this space for environmentally productive infrastructure, such as renewable energy infrastructure, e.g. solar panels or wind turbines. Five of the seven parks that were part of this study contain enough open space within each park to make renewable energy infrastructure a possibility, something that should be looked into.

Open space outside of the mobile home parks has similar benefits. Open space often contains hiking trails and public parks, or provides an opportunity to expand the park if density becomes an issue or if the park owners want to add any infrastructure upgrades. However, conservation of the open space around the park should be promoted since it still has its benefits even if there is no added infrastructure. San Souci is surrounded by open space which contains hiking trails, parks and Marshal Lake. All of these features improve the overall well-being of the park's residents as it provides them with various outdoor activities that promote physical and mental health. In addition to the benefits of an active lifestyle that open space provides, San Souci also avoided any serious damage from the flood of 2013 because of the mass amount of grassland around it that was able to soak up much of the excess water from the nearby creek. These are some of the reasons why we should always consider conserving open space around neighborhoods.

#### **4.5 Connectivity**

This study brought to light the differences in connectivity among mobile home parks in Boulder County. For instance, Mapleton mobile home park has five road entrances and two more non-road entrances that are located on multiple sides of the park, whereas Orchard Grove contains only one non-road entrance and three road entrances that are all located on the south

side. Connectivity to surrounding areas improves the quality of the park as it makes travel more convenient for the residents and guests, and eliminates any feeling of isolation from the surrounding community. Affordable living will become more compelling for Boulder County residents as the population increases and the desirability of living in the area will increase rent. Because of this, it is important that mobile home parks be as desirable to live in as possible and connecting them to the surrounding communities is one way of doing this. Not only should we maximize the number of road and non-road entrances that exist at a mobile home park, but also make sure that there is at least one entrance located on each side of the park, assuming there are no restrictions in doing so.

#### **4.6 Private Lawn Characteristics**

Private lawn characteristics proved to be the most difficult data to capture, but we were able to get an idea of what kind of improvements need to be considered regarding this topic. There were only two parks that seemed to have a significant number of xeriscaped lawns. Xeriscaping is ideal as it provides tenants with a beautiful lawn, but also uses less water and resources. Regular grass lawns, which were abundant in three of the parks that were studied, are important for the well-being of each tenant, but require a lot of water and maintenance. Bare lawns or lawns that are made from gravel are good in that they do not require many resources, but do decrease the well-being of the tenants in most cases. Emphasis should be put on creating more xeriscaped lawns if improvements are to be made, whether that responsibility falls on the park owner, the tenants or city programs.

#### **4.7 Amenities**

Location of the nearest amenities drastically dictates the quality of each park. Many of the parks studied were located in areas that had some of the most important amenities in walking distance. We concluded that .6 km was a good figure for what many people would consider walking distance, which is why so much of our data included .6 km as the limit for what we were measuring. For instance, Orchard Grove has twenty-eight bus stops located within .6 km of it, or within a walking distance. Twenty-eight was by far the most bus stops located within .6 km of a park, but none of the parks that were studied were bus stop deficient. This is important as we look to promote alternative transportation around the community. The other amenities that we wanted to include were grocery stores, schools, restaurants, and public parks. San Souci was the only mobile home park that was located far from most of these. This translated into it having the lowest average rent of any of the parks in this study, as location tends to play a big role in cost of living.

#### **4.8 Additional Points of Interest**

Since the main point of interest for this study was to seek ways of improving energy efficiency within mobile home parks, emphasis was put on investigating previous improvements made regarding weatherization or renewable energy infrastructure. What was found was that

there had been minimal efforts made towards weatherization and none of the parks had explored the possibility of renewable energy infrastructure. Every park manager that we talked to emphasized the point that it is the responsibility of the tenant to improve home energy efficiency. This can be problematic since many tenants are unaware of the financial and environmental benefits that come with weatherization, which gives them little incentive to invest in it. There were some cases where weatherization program managers came to educate the residents about the benefits that come with improved insulation and tightly sealed doors and windows. In some cases these programs even conducted weatherization activities free of charge, but given the fact that there are two large weatherization programs within Boulder County that offer free services, we expected more mobile home parks would be subject to this than what we found.

All of the mobile home parks in this study contained at least some trees. Trees are a form of green infrastructure of their own, as they provide shade for houses that get very warm in hot summer days. If there is a significant amount of shade in a neighborhood, it can significantly decrease the need for energy-intensive air conditioning. On the other hand, exposure to sun promotes the existence of solar panels on residential roofs which will also lead to significant benefits achieved in terms of energy use. If solar panel installment is something that is to be considered, then the existence of a large amount of trees in a neighborhood should be looked at as a problem. There needs to be a balance between shade and sun exposure to maximize energy efficiency within a park.

## **5. Bibliography**

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