Re-Storing River Road:
Exploring Residents' Preference for a New Grocery Store

by

CASEY KLEINHENZ

AN EXIT PROJECT

Presented to the Department of Planning, Public Policy and Management
in partial fulfillment of the requirements for the degree of
Master of Community and Regional Planning

"Re-Storing River Road: Exploring Residents' Preference for a New Grocery Store," is an exit project prepared by Casey Kleinhenz in partial fulfillment of the requirements for the Master of Community and Regional Planning in the Department of Planning, Public Policy and Management. This exit project has been approved and accepted by:

_____

Bob Parker, Chair of the Examining Committee

_____

Date

Committee in Charge:

Bob Parker, Chair

Marc Schlossberg

ABSTRACT

Since 2002, the City of Eugene has been promoting a nodal development in the River Road neighborhood. The current development proposal includes 250 residential units and 60,000 square feet of commercial space on a 15 acre site. Residents prefer a neighborhood scale supermarket as the anchor commercial tenant for the River Road nodal development. This study explores the shopping and travel patterns of current residents and identifies some of the variables that make residents of the River Road neighborhood more or less interested in shopping at the proposed supermarket.

CHAPTER 1: INTRODUCTION

In his book, "Design Charrettes for Sustainable Communities," Patrick Condon describes the primary consideration for reshaping urban communities as follows:

"Most residential areas have little or no commercial space within or near them. Conversely, commercial space is often oversupplied within some driveable distance. This distribution eventually creates landscapes that are entirely auto dependent . . . Making more sustainable urban landscapes requires a redistribution of commercial space more broadly in the [neighborhood] . . . The largest single user of this neighborhood commercial space would be one or more supermarkets."

The separation between residential and commercial space that Condon describes is a defining characteristic of "urban sprawl." Urban sprawl is the unplanned, uncontrolled spread of urban development along the edge of a city (Gale 2009). Sprawling development can decrease housing costs and facilitate home ownership, but it also places a significant burden on the public sector by inefficiently allocating resources, and increasing travel costs.

"Smart growth" is a land use concept that has emerged in opposition to sprawl. It maximizes infrastructure investments and reduces travel costs by promoting development at a high density with a mix of land uses within the city. The realization of smart growth often occurs in the form of nodal developments. TransPlan, the regional transportation planning and development guide for the Eugene-Springfield, Oregon Metropolitan Area (the location of this study), defines nodal development as "a mixed-use, pedestrian-friendly land use pattern that seeks to increase concentrations of population and employment in well-defined areas with good transit service, a mix of diverse and compatible land uses, and public and private improvements designed to be pedestrian and transit oriented."

The most desired commercial tenants of nodal developments are supermarkets. A supermarket is a full line, self service grocery store with over two million dollars in annual sales. Supermarkets are considered the traditional grocery retailing format. However, the past 20 years has seen the growth in popularity of new store formats. Walmart, Costco, and Market of Choice all represent new store formats. The retail grocery industry as a whole has been characterized by a trend of consolidation. From the 1970's to the late 1990's the number of retail grocery stores decreased, while the size of stores increased. Today, the number of grocery stores in the US is back to the level it was at in the 70's, but the small "mom and pop" corner supermarkets is no longer common. Many residents find themselves living in "food deserts," where there is no easily accessible grocery store, and other residents now consider a grocery superstore over 40,000 sq.ft. as their "corner store."

The retail grocery store proposed for the River Road nodal development in Eugene is presented as an opportunity to bring back the corner supermarket and promote an alternative to shopping at a supercenter. The proposed store would be about 20,000 square feet and help provide current

residents with quick convenient access to healthy food. The store will also support the goals of the TransPlan by encouraging walking and biking, and providing an on-site shopping destination for future residents of the nodal development.

Background

Oregon's emphasis on nodal development planning began in 1974 when the Department of Land Conservation and Development adopted the statewide land use planning goal on transportation, Goal 12 (OAR 660-015-0000(12)). In 1991, the objectives of Goal 12 were further defined by the Transportation Planning Rule, which clarified transportation planning requirements in local jurisdictions (OAR 660-012). One requirement of the Transportation Planning Rule is that jurisdictions within a Metropolitan Planning Organization must adopt a Transportation System Plan. Lane Council of Governments serves as the Metropolitan Planning Organization for the Eugene-Springfield area of Oregon. The Transportation System Plan for the area is called TransPlan.

The goal of TransPlan is to "provide an integrated transportation and land use system that supports choices in modes of travel and development patterns that will reduce reliance on the auto and enhance livability." TransPlan promotes nodal developments as one method of increasing travel mode choices and decreasing auto dependence.

Lower River Road was identified as a potential nodal development area in amendments to the Eugene-Springfield Metro Plan as well as in TransPlan by 2002. The process of promoting the Lower River Road nodal development has primarily been funded by the Transportation and Growth Management Program (TGM), a special program of the Department of Land Conservation and Development.

In August 2007, TGM funded a market evaluation for the Lower River Road nodal development. The development option in this evaluation that neighborhood residents found most desirable included a 20,000 sq.ft. grocery store, 40,000 sq.ft. of general commercial space, 30,000, sq.ft. of office space, and 250 residential units. The total size of the development would be about 15 acres (Hovee 2008).

In October 2008, TGM funded a survey of River Road area residents to gather more information on their shopping and travel behavior to gauge their receptivity to the nodal development plan. The results of this survey were written up in the Neighborhood Needs Survey Report by the Community Planning Workshop. The following report is also based on the Neighborhood Needs Survey data and will analyze respondent behavior in areas complementary to the Community Planning Workshop's Report (2008).

Purpose and Benefits of the Study

The purpose of this exploratory study is: 1) identify some of the variables that make residents of the River Road neighborhood most interested in shopping at the proposed supermarket; and 2)

quantify the local demand for the supermarket by comparing significant variables to attributes of respondents' current grocery shopping destinations.

This information will be useful to multiple groups. Nodal developments are a crucial part of promoting sustainable urban growth in the US. Municipalities can look at this data to gauge the success of promoting a supermarket as the "carrot" that makes residents more accepting of dense new development in established neighborhoods.

Should the River Road nodal development succeed, a future supermarket operator could look at this report as a market study of the demographics and shopping habits of local residents. The information in this report would help the operator tailor the store's format to fit local desires.

The City of Eugene and the River Road Community Organization should look at this report as an objective supplement to the 2008 Neighborhood Needs Survey Report and a measure of their success in promoting the nodal development idea to the neighborhood.

Methodology

The variables used in this study are primarily derived from the River Road Neighborhood Needs Survey Report completed in October 2008. The basic methodology for this study was looking for interesting correlations in an analysis of variance between the independent variables and a dependent index variable measuring respondents' desire for using the proposed grocery store. Additional information was gathered as needed in accordance with the exploratory nature of this study. Chapter 3, Methodology provides more information on the process used to gather and identify variables.

Organization

This research paper has six parts. Following this introduction, Chapter 2) "Literature Review", covers the existing research pertaining to urban land use theories and consumer's shopping choices. Chapter 3, "Methodology," describes the qualitative and quantitative methods used during the research. Chapter 4, "Results," first presents the frequencies and descriptive variables defining residents' location, demographics, travel, and shopping preferences; then looks at the relationships between the independent variables and the dependent variable, residents' preference for using a grocery store at the River Road nodal development. Chapter 5, "Discussion," presents the most interesting elements defining River Road residents' preference for using a grocery store at the development. The "Discussion" chapter also includes avenues for further study of the topic. Chapter 6, "Policy Implications" details my perceptions of the urban design elements and collaborative environment necessary to help this project succeed.

CHAPTER 2: LITERATURE REVIEW

This study identifies variables with a significant influence on residents' preference for using a grocery store at a proposed infill development in their neighborhood, and roughly quantifies their desire for the new store by comparing significant preferences and current behaviors.

To understand the inner workings of this topic it is necessary to understand existing scholarly research in several areas, and to understand the history of the River Road nodal development. The scholarly research reviewed in the report include: land use, especially urban sprawl, smart growth and nodal development; an overview of the retail grocery industry; and a look at consumers' decision making behaviors. The site specific information in this study covers the details of nodal development in lower River Road, and a brief overview of the Community Planning Workshop's Neighborhood Needs Survey Report.

Urban Sprawl

Urban sprawl is the unplanned, uncontrolled spread of urban development along the edge of a city (Gale 2009). Urban sprawl consumes significant amounts of resources, adds to travel costs, and creates large areas with uniform land uses (Burchell 1998). The burden of sprawl on living systems can be seen in the deterioration of natural areas, water and air pollution, and the depletion of non-renewable resources (EPA 2009). Humans are not immune from the deleterious effects of urban sprawl. The growth pattern contributes to socio-economic segregation (Talen 1999), (Frumpkin 2002), breaks down social networks (Putnam 2000), Freeman 2001), and contributes to obesity and other illnesses (Ewing & Mcann 2003), (Ewing, et al 2003).

In spite of its deleterious effects, urban sprawl is intimately linked to the fulfillment of "The American Dream." US citizens like urban sprawl because it dilutes congestion, accommodates unlimited automobile use, provides a heterogeneous economic mix, and fosters neighborhoods separate from blighted core areas where housing values will appreciate (Gearhart 1999).

More and more, decision-makers in the US are recognizing that the short term economic benefits of sprawling development can't outweigh the cost of sprawl on the public sector (Litman 2003). Opening a new highway may bring jobs and tax revenue to a municipality now, but the burden of providing services and maintaining roads outweighs the tax benefit when the area is developed at a low density (Hirshman 2009). In our collective rush to spread roads that serve sprawling needs, our country has under-funded infrastructure, postponed replacement of outdated infrastructure, and not taken full advantage of technological improvements in infrastructure.

The River Road neighborhood where this study takes place could not be considered "sprawl." Rather, it is a historically rural community that the City of Eugene has grown around. The River Road neighborhood now occupies a central location in the Eugene area. Because of its rural history it has a low population density and presents a viable opportunity for nodal development – urban growth that embodies smart growth principles and seeks to counter sprawl.

Smart Growth

Our country's backlog of infrastructure repairs and increasing health care costs point to the fact that we can no longer afford the sprawling development that has been commonplace for the last 50 years. "Smart Growth" is the term for land use patterns that seek to mitigate the worst costs of urban sprawl.

The Urban Land Institute explains that Smart Growth is development that accommodates growth in economically viable, environmentally responsible, and collaboratively determined ways. It calls for building communities that are more hospitable, productive, and fiscally and environmentally responsible than most of the communities that have been developed in the last century. Smart Growth seeks to identify a common ground where developers, environmentalists, public officials, citizens, and others can all find acceptable ways to accommodate growth (Porter 2002).

The Smart Growth Network recognizes that the values expressed above have different meanings in different communities. To promote a comprehensive definition of Smart Growth, the group formulated ten common smart growth principles. The principles that have the greatest bearing on the topic of this paper are the principles of promoting a mixture of land uses, and promoting growth within existing communities. These principles are meant to optimize existing infrastructure, increase community tax bases, increase the proximity of jobs to housing, and preserve rural open space. However, they raise the question of how existing communities can redevelop without losing their existing neighborhood character.

Nodal Development

Nodal developments are one method for incorporating smart growth principles into existing communities. Nodal developments are high density, pedestrian friendly developments that combine commercial uses with multi-family and single-family dwelling units. They are a desirable method for integrating smart growth into existing communities because they balance increased housing densities with the jobs and commercial services needed to support those residents. Nodal developments increase the number of destinations within walking distance for neighborhood residents and can become local centers that evoke civic pride. In Lane County, Oregon, where this study takes place, Nodal developments are considered an effective infrastructure investment for "fostering compact development patterns in communities, encouraging the availability and use of transportation alternatives, enhancing livability and economic competitiveness (LCOG 2002).

This study will focus specifically on resident opinions related to the development of a nodal development in the River Road neighborhood of Eugene, OR. A 2007 market evaluation determined that there is a need for 40,000 additional square feet of retail development in the neighborhood by 2015. The development concept promoted in conjunction with the evaluation proposed a 15 acre development with 250 housing units, and 60,000 square feet of retail with the

anchor tenant being a 20,000 square foot supermarket. Retail space is provided over the amount needed by 2015 because the development site lies over existing commercial areas where square footage will be lost (Hovee 2008).

River Road community members have identified in multiple surveys that a supermarket is the commercial tenant they want most in the proposed development. Research by Condon and Handy echoes this desire – in general, supermarkets are the commercial tenant residents desire most for infill developments. Local desire for a grocery store can be further explained by the closure of a Safeway store in the neighborhood in September 2007. The reason that grocery stores are perceived as valuable additions to a residential neighborhood lies in both the utility of grocery shopping trips and trends in the grocery retailing industry. In the following sections of the literature review I will first provide a brief history of grocery retailing, then define the spectrum of typologies defining retail grocery outlets. Then, I will review current research on consumers' grocery shopping preferences.

Grocery Retailing

Over the last century, grocery retailing in the US has been characterized by a reduction in store locations, but an increase in store size. Average annual sales per grocery store grew from about $195,000 in 1934 to about $3 million in 1991 (both in 2008 dollars). Today, the store type that shoppers are most familiar with, the supermarket, averages around $17 million in sales per year. Average grocery items per store increased from 867 in 1928 to 45,000 in 2006. As grocery stores increased in size, the total number of grocery stores decreased from 386,900 in 1939 to 168,016 in 1991 (Messinger 1995). Today there are about 34,000 supermarkets with annual sales over $2 million in the U.S. (FMI 2007).

In "Retail Concentration, Food Deserts and Food Disadvantaged Communities," Troy Blanchard and Thomas Lyson (2003) describe the causes and impacts of growing supermarket sizes:

> *"The impetus for the shift from a large number of widely dispersed small scale local grocers to a concentration of supermarkets and supercenters into a limited geographic area has been fueled by the globalization of food production and distribution resulting in a handful of corporations controlling the majority of sales Globalization allows supermarket and supercenter chains to purchase large quantities of food from suppliers in order to sell at lower prices. The buying power possessed by large retail chains, such as Wal-Mart, Target, Sam's Club, Albertson's, and others, provides these corporations a distinct advantage over smaller chains and "mom and pop" grocers."*

The majority of grocery shopping trips are made to "supermarkets." The Food Marketing Institute (2007) defines a supermarket as, "any full-line self-service grocery store generating a sales volume of $2 million or more annually." Other traditional grocery store formats include: food/drug combo stores, warehouse stores, super warehouse stores, limited assortment stores,

corner groceries, and convenience stores. The popularity of the supermarket and other traditional formats are in decline as a variety of new store formats are increasing in market share.

The supercenter is a recent addition to grocery retailing. It is a large food/drug combination store and mass merchandiser under a single roof. The most popular retailer in the new format is Walmart. The company opened their first supercenter in 1988. Non-traditional food retailers include hypermarkets, supercenters, warehouse clubs, mini-clubs, drugstores, dollar stores, specialty markets, fresh format stores, and the internet. For more information on these store types see Figure 2.1. Non-traditional retailers are a rapidly growing market segment. When Walmart opened its first supercenter, 13.8% of food purchases were made at non-traditional stores. In 2006, 32.6% of food purchases were made at non-traditional stores (Martinez & Kaufman 2008). The following literature on shopping preferences sheds some light on the reasons for the success of large format stores and provides the basis for the variables analyzed in this study.

Figure 2.1 Traditional and Non-traditional Grocery Store Formats

What Combinations of Prices, Services and Products do Different Grocery Stores Offer?

Traditional Grocery Store Formats		
Store type	**Description**	**Example**
Conventional Supermarket	The original supermarket format offering a full line of groceries, meat, and produce with at least $2 million in annual sales. These stores typically carry approximately 15,000 items.	Red Apple, Market of Choice
Superstore	A larger version of the conventional supermarket with at least 40,000 square feet in total selling area and 25,000 items.	Albertsons, Safeway
Food/Drug Combo	A combination of superstore and drug store under a single roof, with common checkouts. These stores also have a pharmacy.	Albertsons, Safeway
Warehouse Store	A low-margin grocery store offering reduced variety, lower service levels, minimal decor, and a streamlined merchandising presentation, along with aggressive pricing.	Winco
Super Warehouse	a high-volume, hybrid format of a superstore and a warehouse store. Super warehouse stores typically offer a full range of departments, quality perishables, and reduced prices.	Cub Foods
Limited-Assortment Store	A "bare-bones," low-priced grocery store that provides very limited services and carries fewer than 2,000 items with limited-if any-perishables.	Grocery Outlet
Mom & Pop Store	The small corner grocery store that carries a limited selection of staples and other convenience goods. These stores generate approximately $1 million in business annually.	New Frontier, Red Barn
Convenience Store	A small, higher-margin store that offers an edited selection of staple groceries, non-foods, and other convenience food items. Many also sell gasoline.	Dairy Mart, 7-11

Non-Traditional Grocery Store Formats		
Store type	**Description**	**Example**
Hypermarket	A very large food and general merchandise store with approximately 180,000 square feet of selling space. These stores typically devote as much as 75% of the selling area to general merchandise.	Fred Meyer on W. 11th, Walmart on W. 11th
Wholesale Club	A 120,000 sq. ft. membership retail/wholesale hybrid with a varied selection and limited variety in a warehouse environment. The grocery line dedicated to bulk sizes and sales.	Sam's Club, Costco
Mini-Club	A scaled-down version of the wholesale club. The mini-club is approximately one-fourth the size of a typical wholesale club and carries about 60% of the items	Cash-n-Carry, Bi-Mart
Supercenters	A large food/drug combination store and mass merchandiser under a single roof. These stores average more than 170,000 square feet.	Fred Meyer on Division, Walmart at Delta Oaks
Deep-Discount Drug Store	A low-margin store with approximately 28,000 square feet of selling space. These stores typically carry more general merchandise than a supermarket. Food accounts for 20% of sales	Phar-Mor, Drug Emporium
"Fresh" Format Store	A supermarket sized store that emphasizes perishibles - usually ethnic, organic, or local goods. Prices are generally higher than other supermarkets.	Market of Choice
Internet	A grocery distribution operator who uses the Internet as the primary means of accepting grocery orders for home delivery or pickup.	Peapod

Sources: Marion, B., et al. (1991). "Strategic Groups, Competition and Retail Food Prices."; Martinez, S. & Kaufman P. (2008). Twenty Years of Competition Reshape the US Food Marketing System.; Progressive Grocer (2005). Marketing Guidebook. Compiled by Casey Kleinhenz.

Retail Grocery Shopping Behavior

Food is essential for life and the average U.S. citizen spends about 6% of his disposable income on groceries (FMI 2006). However, the variables considered by individuals when they consider which grocery store to patronize and how to do it range from utilitarian to emotional.

Marion (1991) states that we classify grocery stores by the range of "prices, services and products" that they provide. Different combinations of these variables are enticing to different types of consumers and the strategy of the grocery store determines its customer base.

Figure 2.1 shows that non-traditional grocery store formats that offer very low prices like deep discount drug stores, and limited assortment stores have increased in popularity. However, fresh format stores and internet grocers that offer items at a premium price have increased in popularity as well. Industry wide, retailers are able to offer relatively lower prices because increased store sizes allow locations to profit on smaller per item margins.

The products that some shoppers desire most are fresh fruits, vegetables, meats, and dairy. An increasingly popular store type is the "fresh format" store that emphasizes perishables – usually ethnic, natural or organic products. These stores will also carry special prepared products that emphasize health concerns like preservatives and transfats (Martinez & Kaufman 2008).

Another product based marketing technique is providing general merchandise or services like banking and vision centers in conjunction with grocery items. They success of this format can be seen in the increased market share of supercenters (Messinger 1995).

Tauber (1972) hypothesizes that the motivation to shop includes desire for the activity of shopping as well as "prices, services and products." Some people are merely "shopping" for physical activity, sensory stimulation, or social motives. Handy and Clifton (2001) found support for this shopping mentality from respondents who replied, "My wife uses our supermarket because she says it has personality," and "My supermarket plays better music!" These shoppers are likely to have a specific type of shopping experience in mind when they consider what grocery store to patronize.

The grocery retailing industry has responded to these emotional shopping desires with advertising campaigns that emphasize the social consciousness of their corporations, customized marketing campaigns, and creating more pleasant shopping environments (Martinez & Kaufman 2008). Other considerations of shoppers include local ownership and local products.

Grocery stores that meet consumers' price, product, service, and emotional needs may not be patronized if they are difficult to access. The gravity model of travel behavior suggests that minimizing travel costs is the dominant variable influencing destination choices (Huff 1964), and Holton (1958) adheres to this model by defining grocery shopping trips as "convenience" shopping trips, where the consumer purchases goods "frequently, immediately and with minimum effort. Considering Tauber's emphasis of the non-product benefits derived from

shopping it is more likely that grocery shopping trips are not purely based on proximity. Grocery industry research supports this idea by indicating that 70% of the variance in people's choice of grocery shopping destination is determined by the location of the market (Progressive Grocer 1995). Consumers in store-dense areas are less likely to use proximity as the defining store choice variable. Handy and Clifton (2001) found that store choice models suggest the greater the distance between a household and the closest store the less likely residents are to bypass that store to shop at a further option.

The vast majority of shopping trips are made by personal automobile (NHTS 2003). However, some neighborhoods allow more opportunities to use alternative transportation for shopping trips. In highly accessible areas walking and biking become desirable over travel by personal vehicle because of the difficulties associated with congestion and parking (Frank & Pivo 1994). Not all alternative transportation users live in dense urban areas. The existence of the desire to use alternative modes for shopping trips may be attributed to the impact of attitudinal and lifestyle variables on travel demand (Bagley, Mohktarian 2001). Residents want to walk or bike to get groceries because, well . . . they want to.

The conventional unit used to measure travel behavior is "trips" - direct travel from an origin to a destination. However, consumers often plan their trips so they can travel to a similar location for multiple unrelated needs; or maximize the advantage derived from a required trip by visiting an additional shopping destination (Krizek 2003). Both of these behaviors are called trip chaining. Trip chaining limits the effectiveness of conventional trip based travel analysis because it obscures the reason consumers choose to travel to a particular grocery shopping destination.

The lifestyle variables that shape shopping preferences and shopping travel demand have a strong correlation with the demographics of the shopper. The primary demographic variable considered in the literature on grocery store choice is household income. Income influences the degree that the consumer is able to look away from low price options and indulge his emotional shopping needs. Household size is also an important factor because it influences the "basket size" of the shopping trip. Age of household members is also an important consideration because consumption patterns vary over an individual's lifespan. Shopping travel behavior also varies with age. Another important household characteristic is vehicle access. Households without an automobile have difficulty accessing distant stores and making large purchases.

Neighborhood Needs Survey Report Summary

The literature review concludes with an overview of the methodology and results of the Neighborhood Needs Survey drafted in the 2008 report by the Community Planning Workshop.

Survey Methodology

The Neighborhood Needs survey was mailed out to a random sampling of River Road neighborhood home owners within approximately a one mile radius of a proposed mixed use

development site. The sampling area is shown in Figure 3.1. The survey included seven pages of questions regarding residents' shopping trip travel modes and shopping preferences. It also asked residents to project changes in their behavior based on the existence of additional shopping options in a local Study Area. The City of Eugene mailed out 1500 surveys and received 379 surveys back, a 25% response rate. Assuming the survey sample was perfectly random and there was no response bias then the survey has a ±2.5% margin of error at the 95% confidence interval. In simple terms, this means that if survey were conducted 100 times, the results would end up within ±2.5% of those presented in this report.

Survey Results: Demographics

The Community Planning Workshop found that respondents under 44 were under-represented when compared to the River Road population. This may be due in part because the survey was sent only to homeowners and likely excludes residents under the age of 18. Younger people are more likely to rent and less likely to own than older age groups. Survey respondents were over-represented in all age categories above the age of 55. The overrepresentation is typical of mailed surveys, but may not be quite as extreme as indicated - nearly 55% of survey respondents said that they had lived in the River Road neighborhood for 10 years or more. This population has "aged in place." Today, 2000 Census demographics would not accurately represent their age groups.

Two-person households were the most common household size for Neighborhood Needs Survey respondents. The average household size was 2.31 persons. This is slightly lower than the 2.48 person average household size recorded for the area in the 2000 U.S. Census.

About one third of survey respondents reported a household income between $50,000 and $74,999. An additional 27% made $25,000 to $49,999. As compared to 2000 U.S. Census data, the Neighborhood Needs Survey has more response from higher income households and less response from lower income households. Part of the discrepancy between the Census and Survey data can be accounted for by inflation. A household earning $42,000 a year in 2000 would be making $50,000 a year in October 2008.

It is important that the reader realize that the conclusions drawn in this article are based on the opinions of lower River Road homeowners that may be older and wealthier than the average resident.

Survey Results: Shopping and Travel Behavior

Nearly two thirds of survey respondents indicated they make "very few" or "none" of their shopping trips in the neighborhood. Less than 10% indicated they made "all" or "most of them" to destinations in the neighborhood. The most commonly used shopping location outside the neighborhood is the Santa Clara/Division Avenue shopping area. The types of commercial

businesses that respondents would like to see more of in the neighborhood include a grocery store, and a restaurant or café.

Ninety-seven percent of respondents stated that the quality of the product or service they purchased was an "important" factor in determining where their household shops. Some aspects of "quality" that are important to respondents include organic food and locally grown food, However the majority of respondents prefer conventional groceries. Forty two percent of the respondents' indicated they purchase local produce "very often" or "often."

The majority of residents drive on shopping trips, but a considerable percentage walk or bike as well. Respondents recognized the lack of close destinations and the quantity of motor vehicle traffic as the two factors preventing them from using active transportation modes more often. If more services were available in the neighborhood, 60% of respondents said they would drive less often, 71% would walk more often and 63% would bicycle more often.

CHAPTER 3: METHODOLOGY

The River Road nodal development project in Eugene proposes the addition of neighborhood residential, and commercial services, including a grocery store, to the River Road corridor. Currently, land uses in the corridor study area include residential uses, commercial uses, parks, and vacant land. The potential benefits of the nodal development include decreased vehicle miles traveled on resident shopping trips and increased residential housing densities. The main purpose of this study was to determine what variables have the most impact on residents' perception of the utility of a grocery shopping location in the nodal development. Understanding what variables have the most impact on residents' perception of infill development projects will be useful to both municipalities and private developers. In order to compile a list of potentially significant variables, a thorough review of existing literature was completed as described in the previous chapter. The spatial, shopping and travel variables analyzed in this study are based on variables examined by Handy and Clifton (2001), and Krizek (2003). The variables regarding grocery store attributes are based on industry reports from Progressive Grocer (1995, 2005, 2008), and Martinez and Kaufman (2008). The primary data source was the River Road Neighborhood Needs Survey. Index variables were calculated from survey data using Microsoft Excel 2003 and spatial variables were calculated using ArcGIS 9.3. SPSS v16 was used in the statistical analysis of the variables. Supplementary data sources include telephone interviews, online research, store visits, and The River Road Business Needs Survey. The following steps outline the methodology for this study.

1. Select a set of variables for analysis which represent the literature on infill development and grocery store choice AND can be easily derived from the River Road Neighborhood Needs Survey.

2. Collect the data necessary to represent the desired variables through original data collection, and spreadsheet and geodatabase processing of the Neighborhood Needs Survey results.

3. Analyze the descriptive statistics and frequencies of each independent variable, then search for meaningful correlations between the independent variables and a dependent variable measuring preference for the infill grocery store.

4. Determine the most interesting correlations in the data and perform additional explorations as needed to explain the correlations.

5. Describe additional research that could be conducted to generate a more thorough understanding of grocery store preference variables and reveal some of this study's limitations.

Selecting Variables

The data for this analysis represents variables outlined in the previous chapter regarding the academic literature on store choice decision making. The following section describes the data sources from which study variables are derived.

Figure 3.1 River Road Needs Survey Recipients, 2008

Source: River Road Community Needs Survey Report, CPW, 2008

Data Sources

 The primary data source for this study was the River Road Neighborhood Needs Survey conducted by the City of Eugene, Oregon in October 2008. Additionally, data on grocery store size was collected using the GoogleMap "Planimeter" application, telephone interviews with grocery store employees, and data from the 2008 River Road Business Needs Survey. Information on the road network distance between respondents' homes and their preferred grocery shopping location was calculated using the ArcGIS road layer designed by Lane Council of Governments. Store typology is not a variable tested for statistical significance, but it was used as an intermediate measure to help determine natural breaks in the categorization of store sizes, and in the determination of one primary shopping location for respondents who listed multiple preferred grocery stores. Store typology was determined through an application of

Marion's, and the Progressive Grocer's store format criteria to data on store size and selection found in online research and store site visits.

Processing Variables

The independent variables used in this study come from the academic literature described in the previous chapter. The following section describes the techniques that were used to convert raw data into scaled and ordinal variables that could be measured for their impact on respondents' preference for shopping at a new grocery store in their neighborhood.

Dependent Variable

The dependent variable is an index score of residents' preference for shopping at a grocery store in the proposed commercial development. As part of the Neighborhood Needs Survey, residents were asked what categories of grocery items they would be most likely to purchase at the proposed location in the following question: "If there was a grocery store/market in the study area how likely would you be to purchase the following products there?" The 12 product categories listed below this question include: fresh produce, fresh meats and fish, milk and cheese, bakery items, frozen foods, canned goods, bulk foods, ready-to-eat deli items, alcoholic beverages, snack foods, organic/natural foods, and other specialty foods. A line was also included that prompted residents to write in any categories of products that they felt were omitted from the list above. The product category "other specialty foods" received a low response rate on the survey, so it was excluded from the product categories used in this study. The "alcoholic beverages" category was also excluded so that the study focuses exclusively on food items. The "organic/natural foods" category was considered an independent variable because foods from all other categories can be marketed as organic. Initially, respondents were given five answer choices for each of the categories above. The options included: *very likely, likely, somewhat likely, unlikely,* and *don't know.* The survey responses were fitted to a 4-point scale. Each item is judged as being *very likely to purchase* (scored 3), *likely to purchase* (scored 2), *somewhat likely to purchase* (scored 1), or *unlikely to purchase or don't know* (scored 0). Respondents who did not respond to any of the categories were scored with a non-response marker that was preserved throughout the data analysis. Respondents who selected an answer choice for some, but not all variables had their non-responses scored "0".

The items were grouped into three categories representing broader areas such as: Fresh Staples, Preserved Staples, and "Quick" Food. These three indices will be treated as dependent variables for multivariate analysis. The indices will be created additively by summing the responses that combine to form each of the three groups. The resultant variables will represent three broad categories of grocery store purchases: the desire to purchase fresh staple foods (produce, meat and fish, and dairy products), the desire to purchase preserved staple foods (frozen goods, canned goods, and bulk goods), and the desire to purchase "quick" foods (ready-to-eat, bakery items, and snack food). Since responses for each category of items were coded as 0 (not likely to purchase), 1 (somewhat likely to purchase), 2 (likely to purchase), and 3(very likely to purchase),

each of the three groups has a possible low index score of 0 and a high index score of 9. The overall mean of each index can be used to assess the relative importance of each group of items to potential shoppers.

Summing the three index scores creates an overall preference index with possible scores from 0-27. This preference index was used to determine the significance of independent variables in an analysis of variance.

Independent Variables

Twenty independent variables were tested in this study. The variables fall into four major categories: demographics, grocery store attributes, travel modes, and spatial attributes. Table 3.2 lists the independent variables used in this study and their level of measurement.

Demographics

The demographic variables in this study include: age, gender, household size, seniors in household, minors in household, duration of residency, and income level. They were imported from the survey results. The variables representing senior/minor presence in household were reformatted from scale variables (number of seniors/minors in household) to categorical variables (yes/no). Age and residency variables were also reformatted from scale to categorical variables.

Table 3.1 Study Variables

Variable	Type of Measurement	Units/Range
Dependent Variable		
Store Preference Index	ordinal index score	0-27
Independent Variables		
Grocery Store		
Store size	ratio	square feet
Low price preference	ordinal	0-3
Customer service preference	ordinal	0-3
Local ownership	ordinal	0-3
Combo store preference	ordinal	binary
Organic preference	ordinal	0-3
Spatial		
Network distance to store	ratio	feet
Straight-line distance to site	ratio	feet
Travel Mode		
Walk preference	ordinal	0-3
Bike preference	ordinal	0-3
Bus preference	ordinal	0-3
Car preference	ordinal	0-3
Trip chaining preference	ordinal	0-3
Demographics		
Age	ratio	years
Gender	nominal	binary
Household size	ratio	persons
Senior in household	ordinal	binary
Minor in household	ordinal	binary
Tenure	ratio	years
Income	ordinal	0-9

Grocery Store Attributes and Shopping Behavior

The Grocery Store Attributes and Shopping Behavior variables analyzed in this study include: store size, low price preference, quality customer service preference, preference for patronizing locally owned stores, preference for shopping at supercenters (food and general merchandise), and organic/conventional food preference.

The variables regarding low price, customer service and local ownership are derived from question 8 on the River Road Neighborhood Needs Survey. The question asks, "How important are each of the following factors in determining where you will shop for goods and services?" The response choices for each of the factors include, "very important, important, somewhat important, unimportant, and not considered." For analysis, the responses were converted to a four level ordinal scale. Unimportant and not considered were coded as "0," somewhat important was coded as "1," important was coded as "2", and very important was coded as "3". Non-responses were preserved.

The store size attribute was created from the response to survey question nine: "At what store does your household currently purchase the most groceries?" Respondents who listed more than one shopping location were paired with a primary grocery store using the method described in the calculating spatial variables section. The footprint of all grocery stores used by respondents was calculated using the Google Maps Area Calculator Tool, (see Figure 3.1). Several of the smallest grocery stores were difficult to measure from an aerial photograph. For these stores, measurements were obtained through the River Road Business Needs Survey, or through telephone inquiries of store employees. After measurements for all stores were obtained, the stores were grouped into three categories by natural and typological breaks. Progressive Grocer (2005) uses 40,000 square feet as the breakpoint between "supermarkets" and "superstores," but 50,000 square feet was a more natural breakpoint for Eugene stores because it does not divide outlets of the same regional chains into different categories. Table 3.2 shows the footprint of stores, their strategic group, and their size category.

Figure 3.2 Measuring the Square Footage of Red Apple Market
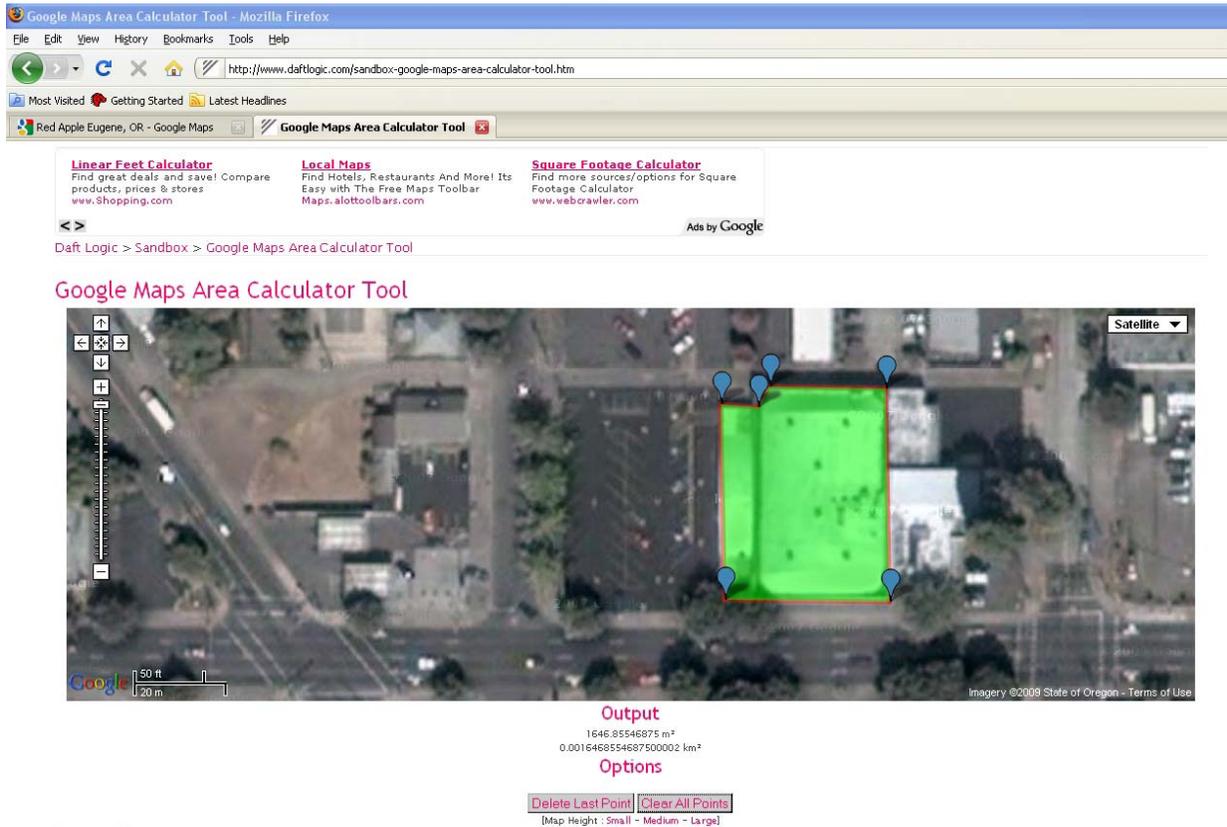
Source: Google Maps Area Calculator Tool, www.daftlogic.com, 2009

Table 3.2 Sizes of Stores Used by Survey Respondents

Name of Store	square footage (ft)	sq ft group
Fisherman's Market*	1500	0 to 20,000
Red Barn*	2000	0 to 20,000
Saturday Market*	2000	0 to 20,000
Grower's Market**	2000	0 to 20,000
Friendly Street Market**	2000	0 to 20,000
New Frontier**	2000	0 to 20,000
Sundance*	4900	0 to 20,000
Trader Joes	10000	0 to 20,000
Kiva*	10000	0 to 20,000
Capella*	15000	0 to 20,000
Market of Choice, Franklin	16146	0 to 20,000
Red Apple	17760	0 to 20,000
Cash and Carry	23681	20K to 50K
Grocery Outlet	24326	20K to 50K
Market of Choice, Willakenzie	26910	20K to 50K
Safeway, 18th	33368	20K to 50K
BiMart	34444	20K to 50K
Market of Choice, Delta Oaks	38750	20K to 50K
Market of Choice, Willamette	41979	20K to 50K
Albertsons, Division	44778	20K to 50K
Albertsons, 18th	46069	20K to 50K
Albertsons, Coburg Rd	47361	20K to 50K
Safeway, Coburg Rd	48437	20K to 50K
Winco	78038	over 50K
Costco	133472	over 50K
Fred Meyer, Division	160166	over 50K
Fred Meyer W.11th	186215	over 50K
Walmart, 11th	226041	over 50K

*data from River Road Business Needs Survey
**data from telephone interview
All others from Google Maps Area Calculator Tool

Source: River Road Neighborhood Needs Survey, area sources listed above

The variable showing preference for organic food items comes from survey question 11. The process used to determine the organic variable is identical to that used to determine the each of the 12 components of the dependent variable and is described in that section of the methodology.

Travel Variables

This study contains four variables measuring residents preferred travel modes – travel by personal vehicle, walking, biking and riding the bus, and a variable measuring residents desire for trip-chaining from school or work.

Calculating Travel Variables

The independent variables representing transportation mode preferences are derived from survey responses. To create more effective and equitable groupings the variables were reduced from 6 response categories to 4 response categories. For Example: Residents were asked how frequently

they use various transportation modes in the following question: "How frequently do you and you household use the following methods of transportation for getting to work, school, shopping or errands?" The four options listed below this question that were included in the study are: walk, bicycle, take the bus, and drive. Respondents selected one of five frequency options: more often, the same amount, less often, I don't use this mode, and I don't know. In order to fit the survey responses to a 4 point scale, "I don't use this mode/I don't know" was coded as 0, "less often" was coded as 1, "the same amount" was coded as 2, and "often" and "more often" were coded as 3. Non-responses were preserved.

Spatial Variables

The two spatial variables analyzed in this study were: the straight line distance between the respondents' home and the development site, and the road network distance between the respondents' home and the respondents' current preferred grocery shopping location.

Building a Spatial Database

The first step in determining spatial variables was to locate respondents' addresses. Survey respondents were prompted to provide their home address in an optional open ended question on the Neighborhood Needs Survey. Of 379 total respondents, 323 elected to provide some form of identifying information in the address field. Of the 323 respondents who provided address data, 54 neglected to include their address number with their home street. Three of the 54 described their home address as the intersection of two streets - these respondents could be located fairly accurately. The 51 respondents who provided only a street name were geocoded using a central point on their home street.

In most cases this method created only a minimum amount of distortion from the residents' real address. For example, assume that one respondent listed their home address as "Walnut Drive." The straightline distance from the south end of Walnut Drive to the development site is about 2800 feet, while the distance from the north end of the street is 3000 feet. Geocoding "Walnut Drive" to an address at the midpoint of Walnut Drive creates a point with a straightline distance that only varies up to 100 feet from the respondent's actual home address. The average straight line distance between a respondent's home and the development site is 3,092 feet. Walnut Drive is approximately 800 feet in length. This implies a deviation up to 400 feet between the actual home address and recorded home address of the respondent. The average network distance between a respondents' home and preferred grocery store is 14,200 feet. In this scenario, locating the resident at the center point of their home street presents a maximum of +/- 3% variance between the predicted location and the actual location.

After the 54 respondents who provided partial address data were assigned a central address number on their home street. I attempted to reference the 323 respondents with address data to a point within the neighborhood using the ArcMAP geocoding tool. Of the 323 respondents with address data, 318 were successfully georeferenced – 84% of the 379 total respondents. A review

of the five respondents who could not be georeferenced showed that the street addresses were non-existent, or located outside of the study area.

A similar process was followed to locate residents preferred grocery stores within the ArcMAP database. In survey question 9, residents were asked, "At what store does your household currently purchase the most groceries?" All responses to the open-ended question were compiled and the result was a list of 28 grocery stores within Eugene. An internet search revealed the addresses of the 28 stores. All stores were successfully georeferenced using the ArcMAP geocoding tool.

Calculating Spatial Variables

Using the spatial database compiled through the processes described above. I derived two distance variables with the potential to influence residents' preference for an infill grocery store. These variables include 1) the straight-line distance in feet between the respondent's home address and the proposed grocery store site, and 2) the road network distance between the respondent's home address and the supermarket where his household purchases the most groceries.

Straight-line Distance to Site

Using the "Near" tool in ArcMAP, I was able to calculate the distance in feet between each residential point and a point in a separate layer that marked the location of the proposed supermarket. Distances for all 318 spatially located respondents were calculated. The measurement of respondents distance to the development site helps determine if respondents were more or less likely to return the survey based on their proximity to the site.

Network Distance to Preferred Grocery Store

The first step in calculating the distance on the road network between the resident and their preferred grocery store was to code each resident with one preferred store. This was accomplished by sorting the residents according to their responses to survey question #9.

Some residents provided multiple stores as their preferred shopping location. In this case, I performed a two step process to determine which of the stores would be used for spatial calculations. The first step was determining if one of the stores listed carried a more complete selection of goods than the other store. According to Marion, the supermarket group, stores with a complete selection of foods, are the locations that compete for the majority of residents' grocery shopping trips. By this principle, I linked residents to their preferred supermarkets over their preferred specialty markets. For example, if the respondent wrote down their preferred grocery store as: "Albertsons on 18th and Fisherman's Market," then I would code Albertsons on 18th as their preferred grocery store. Although respondents may place a special value on their trips to specialty markets, those that use these markets as a primary shopping location are a minority. I esteem fish highly, but I flounder to drum up any chum whose sole staple is smelt. I

determined if stores were supermarkets or specialty stores through a combination of store visits, store website reviews and queries to store users.

If respondents listed multiple stores in the supermarket category then the closest store was selected as their primary shopping location. I elected to use the respondent's closest preferred supermarket in my calculations because this allows for interesting discussion of reasons that closer un-used stores are considered unacceptable and the possible reasons why. I performed this preliminary measure of the proximity of the preferred stores by tracing the path to the store with the ArcMAP measure tool. The measure tool does not provide as accurate a measure of distance as the network analyst extension, but it is an effective way to roughly compare the distance between two locations.

Nine respondents who provided a home address did not provide a preferred grocery shopping location, so network distances to stores could only be calculated for 309 respondents.

After respondents were matched with a preferred supermarket it was possible to run the network calculations. First, the database of all respondents including respondent's preferred supermarket was geocoded to the River Road neighborhood. Next, the respondents were sorted within ArcMAP by the attribute of supermarket preference and groups of respondents preferring each of the 28 stores were exported into separate data layers. Then, I created 28 layers, each layer containing one point marking the geocoded location of each of the 28 preferred grocery stores.

The road network used for analysis was created by Lane Council of Governments. Some editing of the network was required to ensure accurate results from the network analyst extension. This involved removing residential streets outside of the neighborhood so that the Analyst would calculate shortest distances along arterials.

At this point, I activated the network analyst extension and ran an Origin-Destination Cost Matrix analysis using one of the sorted groups of River Road residents as the Origin and the groups preferred grocery store as the destination. This analysis results in the output of a "lines" layer containing the distance in feet between each household and their preferred grocery store. The "lines" layers were exported and saved with a file name indicating the destination grocery store. This process was repeated for all 28 groups.

Variable Analysis

After all variables were defined, they were analyzed using SPSS v.16. There was a univariate and bivariate component to the analysis. These analyses are explained in the following sections.

Univariate Analysis

The descriptive statistics and frequencies of individual variables were generated using SPSS. These outputs were exported into Microsoft Excel where they were selectively used to generate

tables and figures for this report in the "Results" section. A complete list of the descriptive and frequency outputs can be found in Appendix A.

Bivariate Analysis

Variables were compared against each other in two ways. Within each variable group, variables derived from the same survey question were compared against each other to determine their relative important to respondents. The primary bivariate analysis is between the independent variables and the dependent "preference index." This analysis was performed using a one way analysis of variance test in SPSS. The most interesting results of this analysis can be found in the the "Results" section of the report and Appendix A.

Results

After the independent variables were selected and extrapolated from the survey results, the next step was to describe the independent variables and their relationship to the dependent variable. Chapter 4 presents the results of the study.

Discussion

Chapter 5, Discussion reviews implications of the statistical data. The discussion section focuses only on the relationships between the independent and dependent variables that are most interesting. Chapter 5 also includes a description of additional research that could be conducted to generate a more thorough understanding of grocery store preference variables, and a discussion of some of this study's limitations.

Chapter 4: Results

The Results chapter consists of two parts. The first part includes the frequencies and descriptive statistics for each of the dependent and independent variables. The second part of the chapter includes the interesting and statistically significant correlations between select dependent and independent variables. The following chapter "Discussion" explains the implications of key results and shortcomings of the research.

Dependent Variable:

As explained in the methodology section, the primary dependent variable is an index score describing survey respondents overall preference for purchasing goods at a grocery store in the proposed River Road mixed use development. The index score can be broken into three sub-indexes. I will first present an analysis of the three sub-index scores, then an analysis of the overall index.

The three sub-index scores include 1) Preference for fresh foods, 2) Preference for preserved foods, and 3) Preference for ready-to-eat foods. Figure 4.1 shows respondent preferences for each of these groups.

Figure 4.1 Overall Respondent Preferences for Food Types
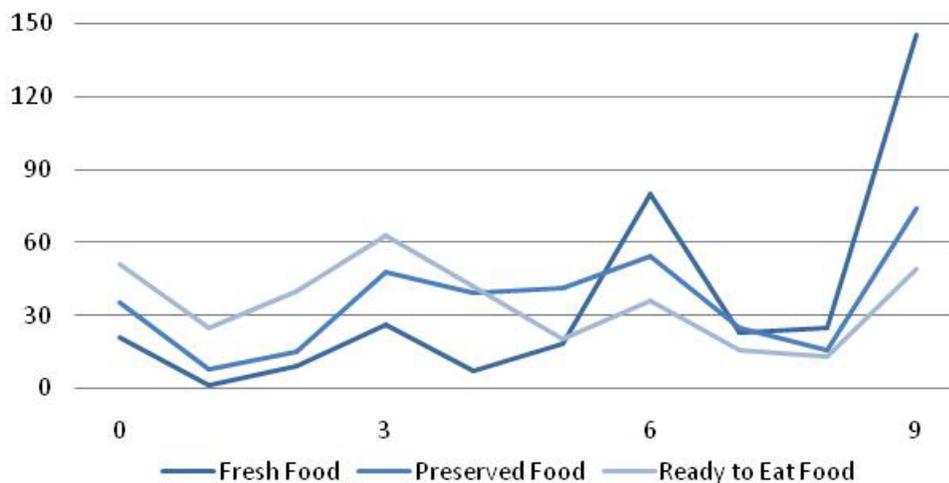
Source: River Road Neighborhood Needs Survey
Note: Values on the X-axis represent the index scores of each subgroup. A value of zero means the respondent had the lowest possible preference. A value of 9 means the respondent had the highest possible preference.

As seen in the chart. Respondents expressed the greatest desire for purchasing fresh foods. They expressed a moderate desire for purchasing preserved foods and a low desire for purchasing ready-to-eat foods. Table 4.1 shows the components of each of these groups. The results also reinforce larger trends in the retail grocery industry. Industry data shows that the store departments making up fresh foods and preserved foods each make up about 1/3 of total annual grocery sales.

The higher preference for fresh foods relative to industry data reinforces trends expressed in other survey questions and by the River Road Community Organization. Namely, farmers markets and CSA subscriptions are an important part of the local food system and there is a large desire to support local growers by consuming fresh goods.

Table 4.1 Supermarket Sales by Department, 2007

Department	Percent of total sales
fresh food (meat/fish/poultry, produce, dairy)	33.3%
preserved food (dry grocery, frozen foods)	33.9%
ready-to-eat food (service deli, self-service deli, baked goods, in-store bakery)	10.1%

Source: Progressive Grocer's 61st Annual Customer Expenditure Study, 2008

The Preference Index aggregates the department data and shows residents' overall desire for using a grocery store in the proposed nodal development.

Figure 4.2 Preference Index
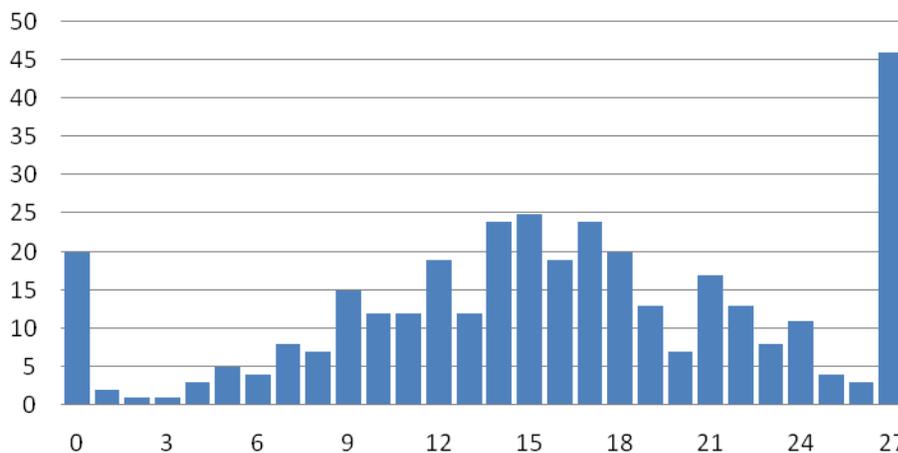
Source: River Road Neighborhood Needs Survey
Note: Values on the X-axis represent the Preference Index score. A value of zero means the respondent had the lowest possible preference. A value of 27 means the respondent had the highest possible preference.

Although there are a large number of residents with extreme opinions (20 respondents have no desire to use the store and 46 respondents can't wait buy to the shelves bare), the average Preference Index score was 15.86. If factored back to the weighting of the original survey question (PI/9), the preference response is 1.76 on a 0 to 3 scale – between "somewhat likely" and "likely" to use the store. Complete frequencies and descriptive statistics for the dependent variables can be found in Appendix A.

It is interesting to see that the characteristics of the "0" preference respondents and "27" preference respondents are indicative of overall significant trends in the data. Table 4.2 shows a comparison of high, low and average preferences for some significant variables.

Table 4.2 Preference Data for Outlier Groups

	Mean	"0"	"27"
Organic Preference	1.6	0.9	1.9
Walking Preference	1.0	0.5	1.1
Biking Preference	1.3	0.6	1.3
Trip Chaining Preference	1.1	1.0	1.5
Age	55.2	61.6	50.4

Source: River Road Neighborhood Needs Survey Report

Independent Variables:

The results of univariate analysis of the independent variables will be broken down into four sections: demographics, grocery store attributes, travel modes, and spatial attributes.

Demographic Variables

The demographic variables in this study look at both the household and the individual respondent. Household variables include size, income, duration of tenure, and member characteristics. Individual variables include respondent's age and gender. Age data for the individual respondent is still valuable in this study because it is indicative of the age range of the rest of the household.

In the Neighborhood Needs Survey Report, the Community Planning Workshop compared the demographic characteristics of the survey respondents to those of the demographics of area residents, as reported by the 2000 U.S. Census. Significant demographic differences that may exist between the sample and the population as a whole could indicate areas of potential bias. The survey sample area does not align with 2000 Census block groups, so demographic data was compiled from the block groups that have their centroid within the survey sample area. This section includes the comparisons between survey data and Census data made by CPW. I will not attempt to statistically correct for the discrepancies between the 2008 sample data and the 2000 Census data. After 2010 census data is available it could be useful to the neighborhood organization to use that data to re-assess the statistical validity of the survey responses.

Table 4.3 Demographic Preference Variables

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Gender	358	1.0	0.0	1.0	0.6	0.48
Age	356	65.0	26.0	91.0	55.2	14.34
Senior in Household	379	1.0	0.0	1.0	0.3	0.44
Child in Household	379	1.0	0.0	1.0	0.2	0.41
Household Size	363	8.0	1.0	9.0	2.3	1.07
Tenure	364	69.0	1.0	70.0	18.4	15.39
Household Income (groups)	347	4.0	1.0	5.0	2.6	1.23
Valid N (listwise)	302					

Source: River Road Neighborhood Needs Survey

Household ages

Figure 4.3 shows the age ranges reported by respondents in the 2000 US Census and the Fall 2008 survey report. The youngest survey respondent was 26, the oldest respondent was 91 and the average age of all respondents was 55.2.

Figure 4.3 River Road Population Age Ranges
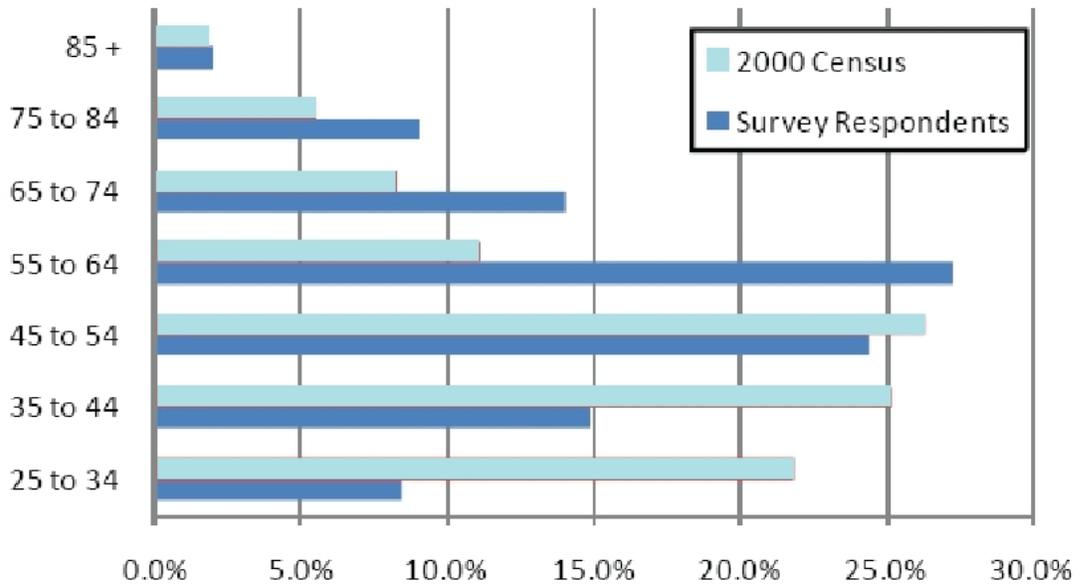
Source: River Road Neighborhood Needs Survey Report, 2000 U.S. Census

26% of survey respondents indicated that there is a senior citizen in their household and 21% indicated that there is a child in their household.

Respondent Gender

Of all 379 survey respondents, 358 reported their gender. 64% were female and 36% were male. According to the 2000 Census, 51% of area residents are female.

Duration of Tenure

The average length of time that survey respondents have lived in the River Road Neighborhood was 18.4 years. However, 44% of respondents have lived in River Road 10 years or less and 2/3 or respondents have lived in the neighborhood 20 years or less. The high average duration of tenure reflects the "long tail" of the data. One respondent has lived in the River Road neighborhood for 70 years.

Figure 4.4 Years lived in the River Road Neighborhood, 2008, N=364
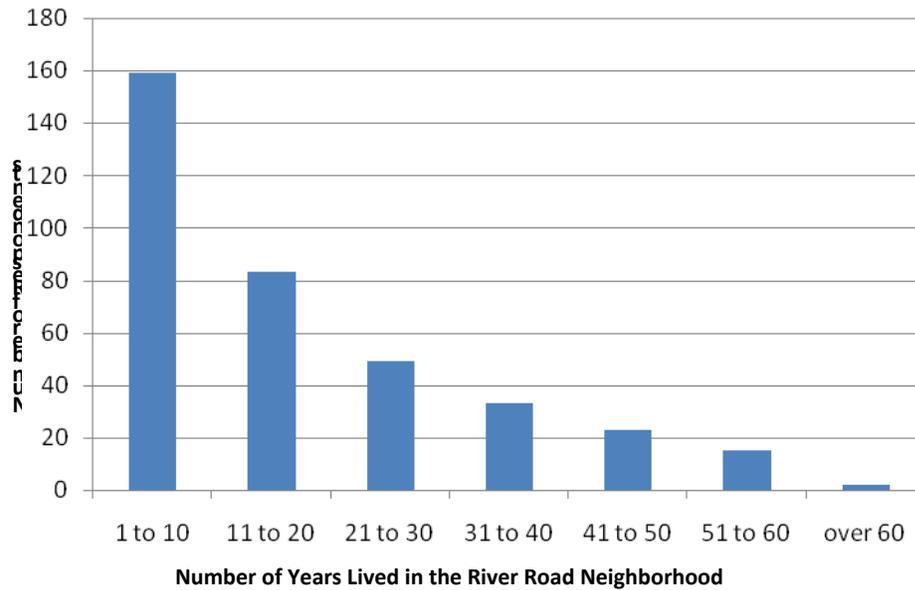
Source: River Road Neighborhood Needs Survey Results, 2008

Household Size

The average household size of survey respondents was 2.3 persons. The average household size in 2000 Census data was 2.5 persons. This discrepancy agrees with the differences in age between the Census and Survey data. Householders approaching retirement age generally have fewer members of their household. Figure 4.5 shows the household sizes of River Road residents.

Figure 4.5 Household Sizes in the River Road Neighborhood, 2008, N=363
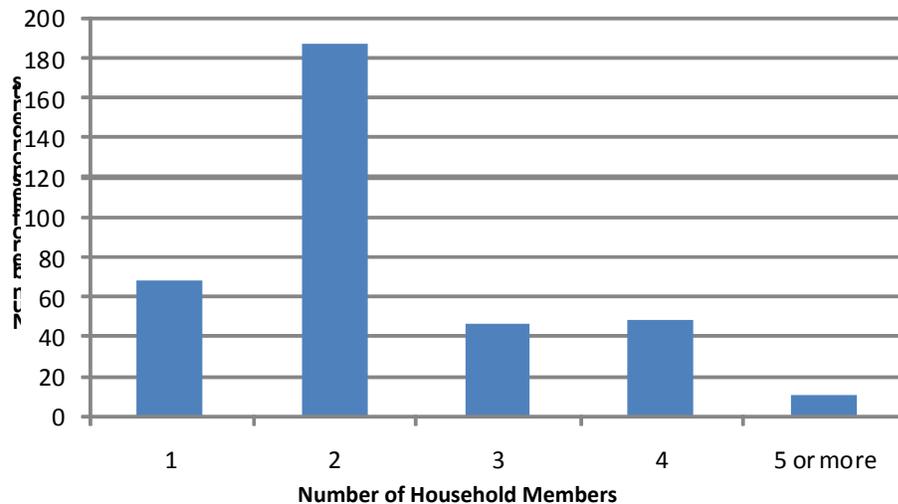
Source: River Road Neighborhood Needs Survey Results, 2008

Household Income

347 of 379 survey respondents chose to share data on their household income level. 54% of respondents make between $25,000 and $75,000 per year. Figure 4.6 shows the distribution of respondents' household income.

Figure 4.6. Household Income in the River Road Neighborhood, 2008, N=347
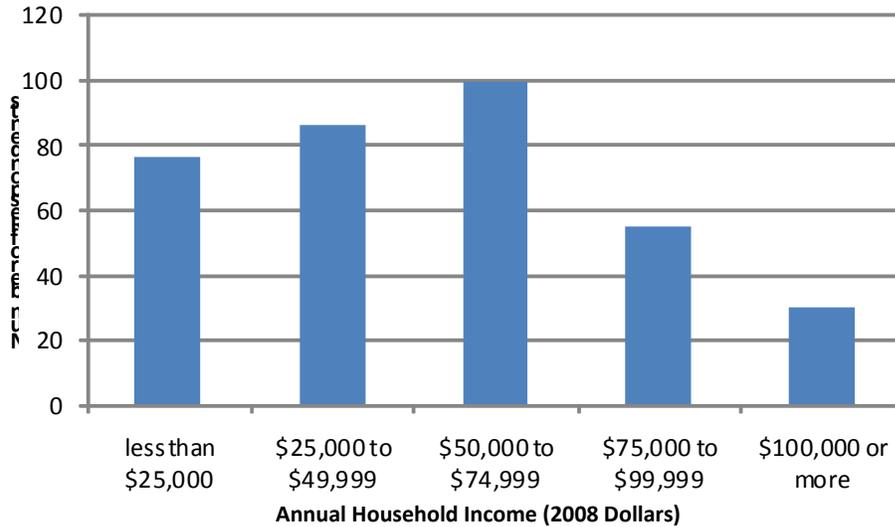
Source: River Road Neighborhood Needs Survey Results, 2008

For additional analysis of the demographics of survey respondents see the 2008 River Road Neighborhood Needs Survey Report by the Community Planning Workshop, or Appendix X.

Grocery Store Attribute Variables

The variables in this section of the report describe residents' preference for or use of different grocery store attributes. These attributes include: desire for low prices; desire for quality customer service; desire to patronize a locally owned store; desire to purchase organic foods; desire to patronize stores within different size ranges; and desire to purchase groceries from a store that also sells retail goods. The low price, customer service, local ownership and organic food variables were derived from the same question on the survey, so it is possible to gauge their relative importance to respondents.

Low Prices

The importance of low prices to River Road shoppers averaged 2.0 on a 0 to 3 point rating scale. According to the original survey document, this means low prices are an "important" factor in determining where local shoppers will go for groceries. Relative to the other variables, preference for low prices was almost as high as preference for quality customer service.

Quality Customer Service

The importance of quality customer service to River Road shoppers averaged 2.1 on a 0 to 3 point rating scale. According to the original survey document, this means quality customer service are an "important" factor in determining where local shoppers will go for groceries. A higher number of respondents noted that quality customer service was an important choice than for other store attribute variables.

Local Ownership

The importance of local store ownership to River Road shoppers averaged 1.7 on a 0 to 3 point rating scale. According to the original survey document, this means local ownership falls somewhere between being a "somewhat important" and "important" factor in determining where local shoppers will go for groceries.

Organic Foods

The importance of organic foods to River Road shoppers averaged 1.6 on a 0 to 3 point rating scale. According to the original survey document, this means organic foods fall somewhere between being a "somewhat important" and "important" factor in determining where local shoppers will go for groceries. However, Figure 4.7 shows organic food is more polarizing than the rest of the preference variables. There are a high number of respondents with a strong preference for organics, and a high number with no preference for organics, but few who are moderate on the issue.

Table 4.4 Grocery Shopping Preference Variables

Independent Variables: Qualitative Shopping Preferences Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Low Prices	348	0.0	3.0	2.0	0.84
Quality Customer Service	355	0.0	3.0	2.1	0.75
Local Ownership	351	0.0	3.0	1.7	0.95
Organic Foods	353	0.0	3.0	1.6	1.12
Store Size	309	1.0	3.0	2.5	0.77
Combination Store	309	0.0	1.0	0.5	0.50
Valid N (listwise)	288				

Source: River Road Neighborhood Needs Survey Results, 2008

Figure 4.7 Store Attribute Preferences
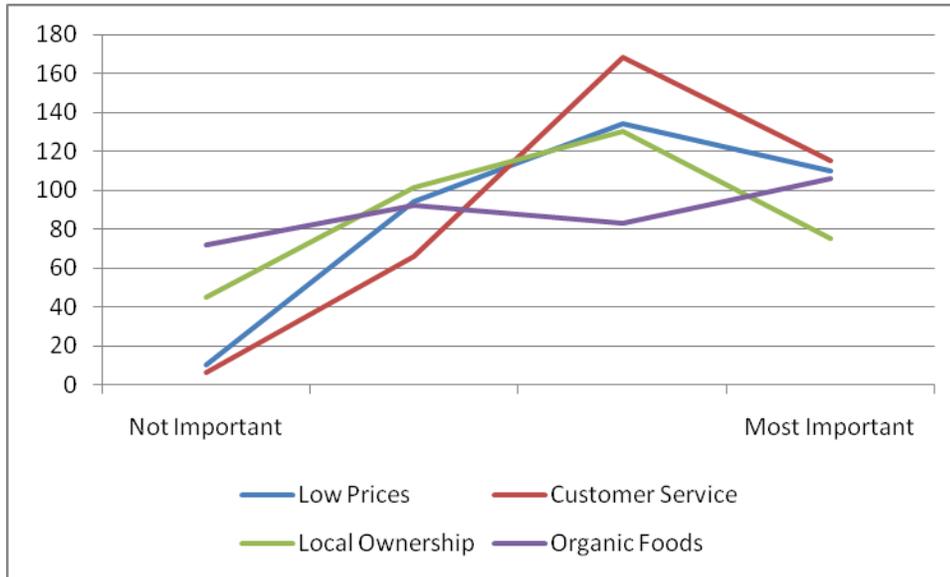
Source: River Road Neighborhood Needs Survey, 2008
Note: Y-axis shows number of respondents.

Store Size

The primary grocery stores used by River Road residents were placed in three groups based on their size in square feet. Group one includes stores under 20,000 sq.ft (12 stores)., group two includes stores between 20,000 and 50,000 sq. ft. (11 stores), and group three includes stores over 50,000 sq.ft. (5 stores). The five stores over 50,000 sq.ft. are the primary grocery shopping destinations for 63% of survey respondents. 20% of respondents preferred stores between 20,000 and 50,000 sq.ft., and 17% preferred stores under 20,000 sq.ft.

Figure 4.8 Respondent Grocery Store Use by Store Size
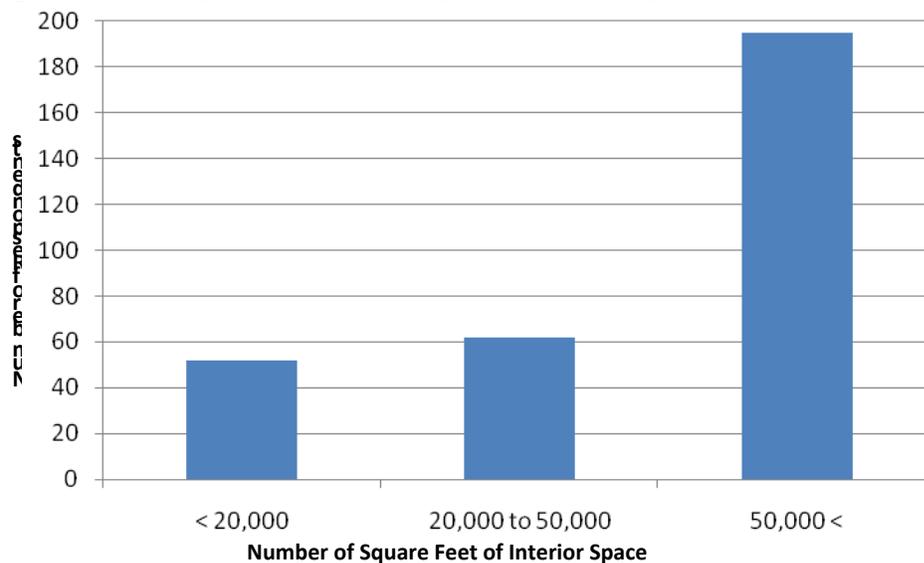
Source: River Road Neighborhood Needs Survey, 2008

Combination Stores

Large retail grocery stores are often places where customers can purchase retail goods and grocery items at the same checkout. A binary variable was used to record if a customers preferred grocery outlet also sold retail goods. Of the grocery stores most used by residents, 46% also sell a substantial amount of retail goods.

Travel Variables

The variables describing residents travel behavior on grocery shopping trips include: the desire to combine grocery shopping trips with trips to work or school (trip chaining); the desire to walk to purchase groceries; the desire to bike to purchase groceries; the desire to ride the bus to purchase groceries; and the desire to drive a car to purchase groceries. Table 4.4 shows the descriptive statistics for respondents travel mode choices. Figure 4.10 shows the frequencies that different travel modes are preferred. All data is derived from the Neighborhood Needs Survey.

Table 4.5 Travel Preferences Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Trip Chaining	341	3.0	0.0	3.0	1.1	1.03
Walking	351	3.0	0.0	3.0	1.0	0.81
Bicycling	349	3.0	0.0	3.0	1.3	1.06
Riding the bus	333	3.0	0.0	3.0	0.6	0.85
Driving the car	362	3.0	0.0	3.0	2.7	0.62
Valid N (listwise)	312					

Trip Chaining

The average desire for trip chaining from school or work was 1.1 on a 0 to 3 point scale. The standard deviation is 1.03. Referring to the original survey document, the average respondent considers trip chaining "somewhat important." However, 36% of respondents consider trip chaining from school or work unimportant. Figure 4.9 shows the frequencies of respondents' preferences for trip chaining.

Figure 4.9 Trip Chaining Frequencies
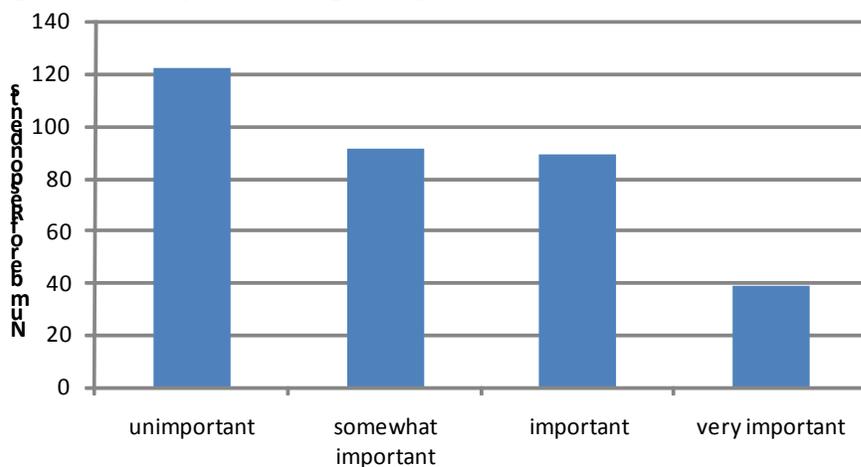
Walking Preference

The average desire to walk to purchase goods is 1.0 on a 0 to 3 point scale., the standard deviation is .81. The average respondent, and 56% of respondents report they "occasionally" walk to purchase goods. 73% of respondents reported that they walk to some degree.

Biking Preference

The average desire to bike to purchase goods is 1.3 on a 0 to 3 point scale., the standard deviation is 1.06. Thirty-eight percent of respondents report they "occasionally" bicycle to purchase goods. 72% of respondents reported that they bicycle to some degree. Bicycling is second to driving in modes of transportation that respondents use "very often."

Bus Riding Preference

The average desire to ride the bus to purchase goods is .6 on a 0 to 3 point scale., the standard deviation is .85. Riding the bus is the least popular mode of transportation for River Road residents, 63% never ride the bus. 5% of respondents ride the bus "very often."

Driving Preference

The average desire to bike to purchase goods is 2.7 on a 0 to 3 point scale., the standard deviation is .62. Driving is the most popular transportation mode for River Road residents, 73% report they drive "very often" to purchase goods. Only 1% of respondents never drive for shopping trips.

Figure 4.10 Travel Modes Used for Shopping Trips
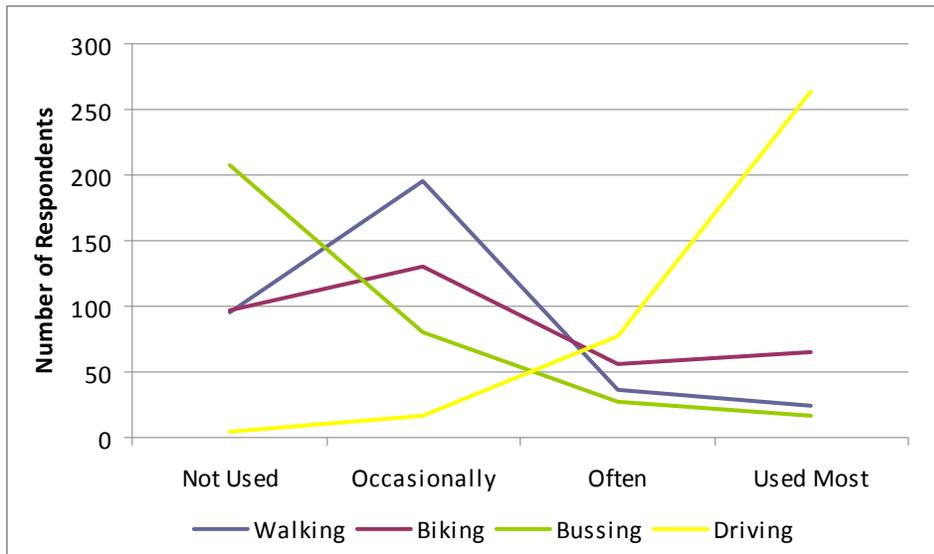
Source: River Road Neighborhood Needs Survey, 2008

Spatial Variables

The variables described in this section of the report describe the spatial relationship between residents' homes and important store choice destinations. These variables include: the network distance between a resident's home and their primary shopping location; and the straight-line distance between the resident's home and the site of the proposed grocery store. Figure 4.11 shows all grocery stores used by survey respondents.

Figure 4.11 Respondents' Grocery Store Use
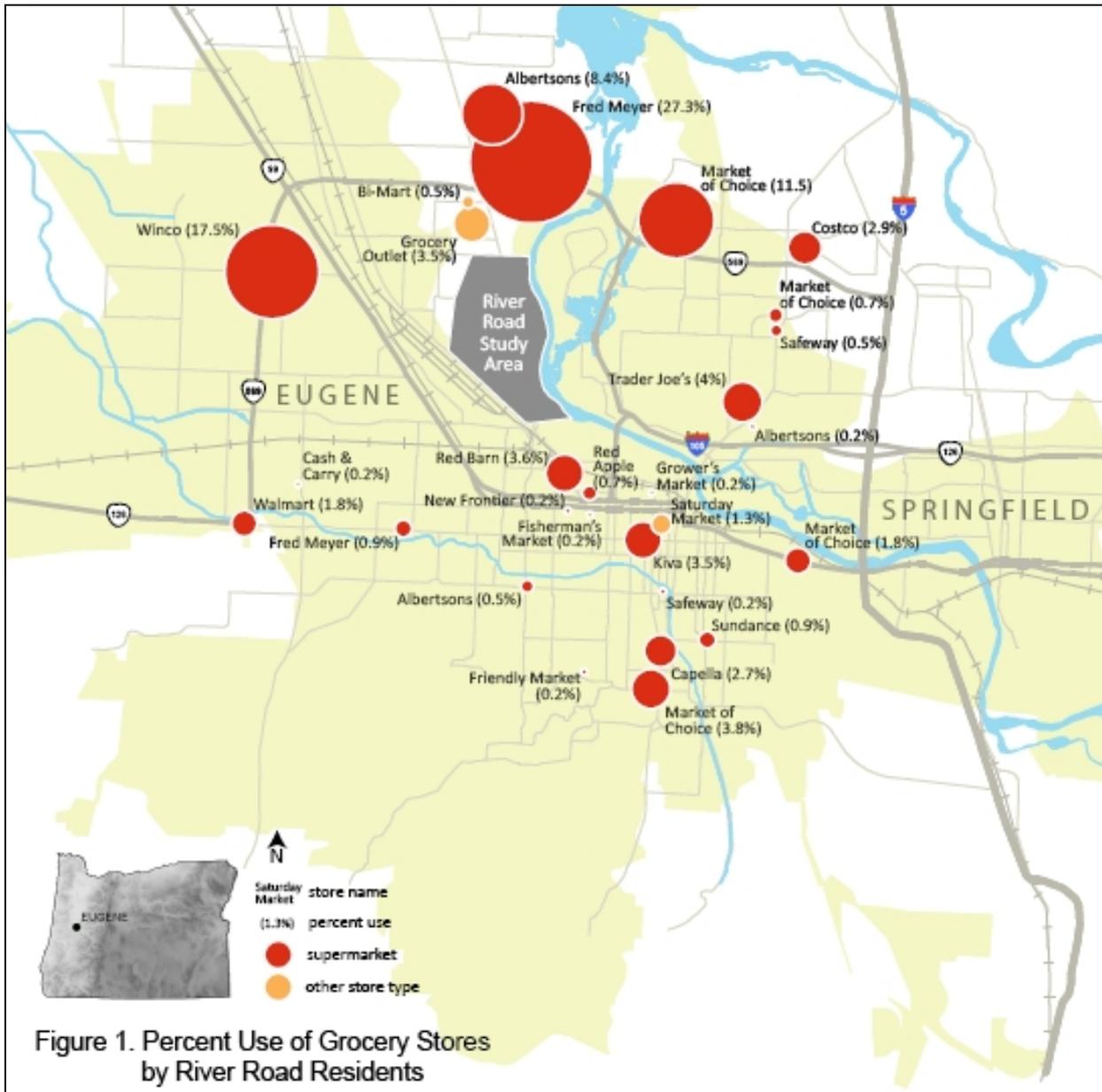
Figure 1. Percent Use of Grocery Stores by River Road Residents

Source: River Road Neighborhood Needs Survey

Network Distance to Store

The network variable shows the distance that residents travel to reach their preferred grocery store. Residents travel between .64 and 5.7 miles to reach their preferred grocery stores. The average distance traveled is 2.69 miles, the standard deviation is 1.12 miles. 54% of respondents travel between 1 and 2.5 miles to purchase groceries. 26% travel between 3.5 and 4.5 miles to purchase groceries. The increase in shopping travel at 3.5 to 4.5 miles can primarily be attributed to the location of Winco, a discount grocery superstore. It is the closest preferred shopping location for 18% of respondents. Only 1% of respondents travel less than 1 mile to reach their

preferred store. The most popular shopping destination is Fred Meyer on Division St. It is the closest preferred shopping location for 45% of survey respondents. On average, respondents travel 1.9 miles to reach Fred Meyer. Figure 4.12 shows the most preferred shopping locations and the average distance travelled to reach them.

Figure 4.12 Distance Traveled from Respondents' Homes to Preferred Grocery
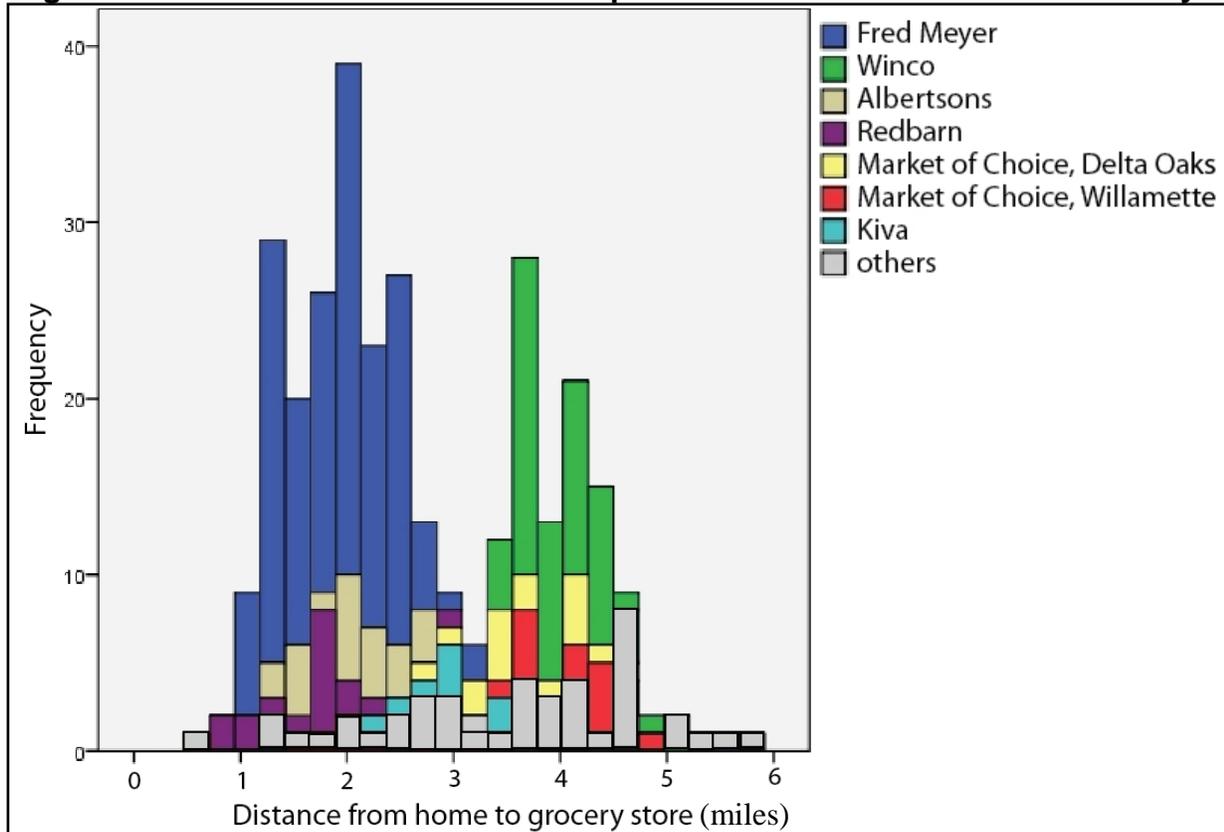
Source: River Road Neighborhood Needs Survey, 2008

Straight-line Distance to Site

Distances ranged from 219 feet to 7,149 feet from the site. The average distance from the site was 3,092 feet with a standard deviation of 1,644 feet. 70% of respondents live within one mile of the site. The average distance between survey respondents and the store site was primarily determined by the area of River Road surveyed by the City of Eugene. Residents living within one mile from the site who identified their home address had a 19% response rate. Past one mile, only 5% of residents who identified their home address responded to the survey. However, there were survey administration complications that hinder my ability to draw conclusions from the lower response rate.

Figure 4.13 Response Rate by Distance from Development

	Lots in Survey Area	# of Surveys Sent*	Survey Responses	Response Rate
less than .5 miles	769	769	143	19%
between .5 miles and 1 mile	731	731	140	19%
between 1 mile and 1.5 miles	981	769	40	5%
no spatial ID	--	--	56	--
Total	1712	1500	379	25%

*The City of Eugene reported 1712 lots in the survey area and 1500 surveys distributed. There is no documentation of how 212 addresses were culled from the list. For this calculation I assume all addresses were culled from the group of residents living between 1 mile and 1.5 miles from the site.

Source: River Road Neighborhood Needs Survey, 2008

Results of Bivariate Analysis

The primary purpose of this project is to determine if there is any interesting or significant correlation between the independent variables described above and the dependent "Preference Index." This section of results begins with an overview of the relationships that the researcher found most interesting. Then, a more detailed description of each of the variable relationships follows.

Key relationships

Eight of the 20 independent variables had a significant relationship with the dependent variable at the 95% confidence level. These variables include: organic preference, trip chaining, walking, biking, income level, household size, age of respondent and senior in household. There was a negative correlation between age and store preference, but all other significant variables had a positive correlation.

Table 4.5 Study Variables

Variable	Significance of Correlation with Preference Index	Direction of Relationship, Confidence Level
Dependent Variable		
Store Preference Index	--	--
Independent Variables		
Grocery Store		
Store size	insignificant	--
Low price preference	insignificant	--
Customer service preference	insignificant	--
Local ownership	insignificant	--
Combo store preference	insignificant	--
Organic preference	significant	+, 95%
Spatial		
Network distance to store	insignificant	--
Straight-line distance to site	insignificant	--
Travel Mode		
Walk preference	significant	+, 95%
Bike preference	significant	+, 95%
Bus preference	insignificant	--
Car preference	insignificant	--
Trip chaining preference	significant	+, 99%
Demographics		
Age	significant	-, 99%
Gender	insignificant	--
Household size	significant	+, 99%
Senior in household	significant	-, 95%
Minor in household	insignificant	--
Tenure	significant	-, 95%
Income	significant	+, 99%

The following section of this report, Chapter 5 "Discussion," looks at the significant relationships between the variables in more depth and attempts to provide some explanation for the correlations.

Chapter 5: Discussion

This chapter of the report focuses on conclusions that can be made regarding the connection between selected independent variables and respondents' preference for using the proposed grocery store. The areas with relationships that are most interesting include: residents' current store preference, residents desire to purchase organic goods, residents desire to use alternative transportation (walk and bike), residents desire for trip chaining, and residents demographic characteristics including: age, income, and household size.

In addition to findings from the data, it is important to discuss the behavior of populations underrepresented in the data and areas where additional study is recommended.

Current Store Preferences

Looking at the most preferred grocery stores shown in Table 5.1, it is possible to identify the various shopping attitudes that drive respondents' choice of grocery stores. Shoppers choosing Fred Meyer or Albertsons are primarily "convenience" shoppers. They choose the most accessible grocery retailers with a wide range of product and price choices. Winco shoppers are low price shoppers. They are willing to travel further to purchase lower priced items. Market of Choice, Red Barn and Kiva shoppers expect more from their shopping trip than easy store access or affordable goods. Their store choice motivations are based a specific shopping experience or product need. These motivators could include, organic goods, supporting a local business, a specific physical appearance of the store, or pleasant interactions with employees and other shoppers.

Table 5.1 Distance and Use of Primary Shopping Locations

Store	Percent Use (N=301)	Average Distance (miles)	Defining Characteristic
Fred Meyer, Division	45%	1.91	easy access
Winco	18%	3.95	low prices
Albertsons, Division	8%	2.05	easy access
Red Barn	6%	1.66	"fresh" format
Market of Choice, Delta Oaks	5%	3.62	"fresh" format
Market of Choice, Willamette	4%	4.09	"fresh" format
Kiva	3%	2.87	"fresh" format
others	12%	3.75	varies
Total	**100%**	**2.69**	--

Source: River Road Neighborhood Needs Survey, 2008

Fred Meyer/Albertsons shoppers and Market of Choice/Red Barn/Kiva shoppers are the groups most likely to patronize the proposed grocery store.

Fred Meyer/Albertsons shoppers value the convenience of shopping within a short trip from their home. The proposed grocery store is expected to be 20,000 sq.ft. At this size, the store may not be large enough to fully attract shoppers who are used to Fred Meyer (160,000 sq.ft.) and Albertsons (45,000 sq ft), but it is likely that they would consider the proposed store for smaller shopping trips or trips made within limited time constraints.

Market of Choice/Red Barn/Kiva shoppers could consider the proposed store as a primary shopping location depending on the degree that it meets their vision of the ideal shopping experience. The qualitative nature of these respondents' store choices implies that they could have a "relationship" with their current grocery store that would prevent them from using the new store even if it met their trip experience requirements. The new store does have an advantage because it is geographically closer to respondents than their current shopping options. If these shoppers chose to patronize the proposed store it is likely they would purchase a higher percentage of their goods there than Fred Meyer/Albertsons shoppers would.

Organic Food Preference

There is a significant correlation between residents' preference for purchasing organic goods and residents' preference for using the proposed store. There are several reasons why this correlation exists. The Levene test for Homogeneity of Variances shows a significant correlation between the desire to walk for shopping trips and the desire for organic goods. This implies that there are residents whose lifestyle preferences include the desire for organic foods and living in a neighborhood with higher connectivity.

Active Transportation Preference

There was a significant correlation between residents' desire for walking and biking, and their preference for shopping at the proposed market. There are currently no grocery stores within easy walking or biking distance for most of the lower River Road neighborhood. It will be interesting to see how well the proposed store meets residents' expectations for alternative transportation accessibility. The River Road neighborhood consists primarily of large lot, single family homes. This means that relatively few residents are within an easy alternative transportation trip distance from the store. Additionally, most residents would have to cross a busy arterial to access the store. This may dissuade some residents from walking or biking. Effective site design will be very important in enabling residents to realize their desire for more active transportation opportunities.

Trip Chaining

Trip chaining involves planning the sequence and combination of trips to maximize the utility derived from one required trip. The positive correlation between shoppers desire to use the market and their desire for trip chaining shows that many residents believe that a stop at the proposed store would be a convenient addition to their existing travel patterns to work or school.

The proposed store is in a convenient location for all residents, but it would be most convenient in trip chaining to residents whose required destination lies beyond the south end of River Road.

The River Road Neighborhood has a unique urban form. Most residents enter and exit the neighborhood either through the north or south end of River Road. There are no arterials leaving the neighborhood to the east or west.

Table 5.2 Twenty-Four Hour Traffic Flow Counts on River Road

	Northbound	Southbound	Total
North End of River Road	15,200	17,100	32,300
South End of River Road	11,400	10,700	22,100

Source: City of Eugene, 2007

This travel situation creates a structural dilemma for many residents. They travel south on River Road to access jobs and school, but they travel north on River Road to purchase groceries and other shopping items. Evidence for this behavior can be found using the US Census Bureau LED OnTheMap website (See Figure 5.1). This site generates statistical data for geographically selected areas. One of the functions is a comparison of the location of workers homes and workers place of employment. The site showed that 1,570 River Road residents work in areas accessible by the south end of River Road, and 614 residents work in areas accessible by the north end of River Road. However, over 75% of respondents shop at stores accessed by taking River Road north (See Figure 5.2). It is likely that many in this group desire a location that is more accessible when traveling south.

As an additional test for hypothesis I created a binary variable denoting residents who currently shop at stores accessed by traveling south on River Road. I assumed that this variable captures a large number of respondents who already chain their grocery trips on the way to work on other destinations. I ran a one-way analysis of variance test between the trip chaining variable and the southbound shopping variable. The 99% significant correlation between the two variables shows that residents need to travel to destinations south of River Road could lead to their desire for a shopping option that is more accessible on their route to those destinations. This is likely because important destinations like Downtown Eugene, University of Oregon, and W. 11th are all accessed by traveling south on River Road.

Figure 5.1 Employment Locations of River Road Residents
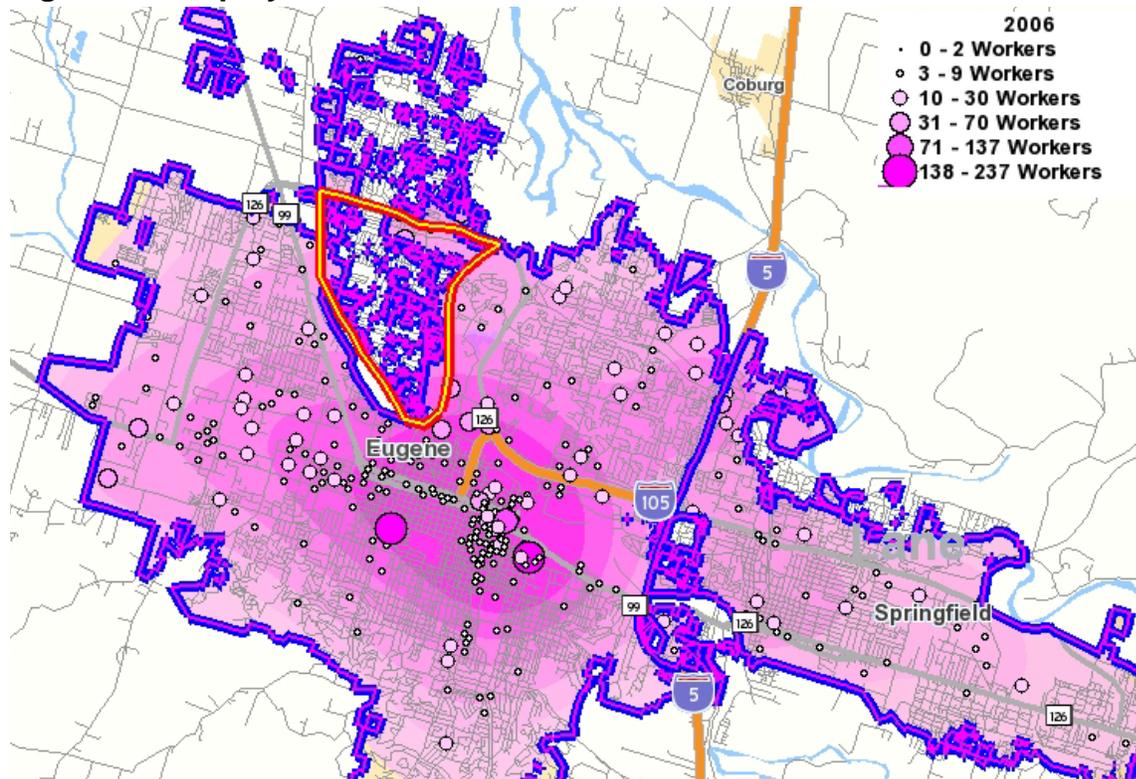
Source: U.S. Census, LED OnTheMap

Figure 5.2 Primary Shopping Locations of River Road Residents
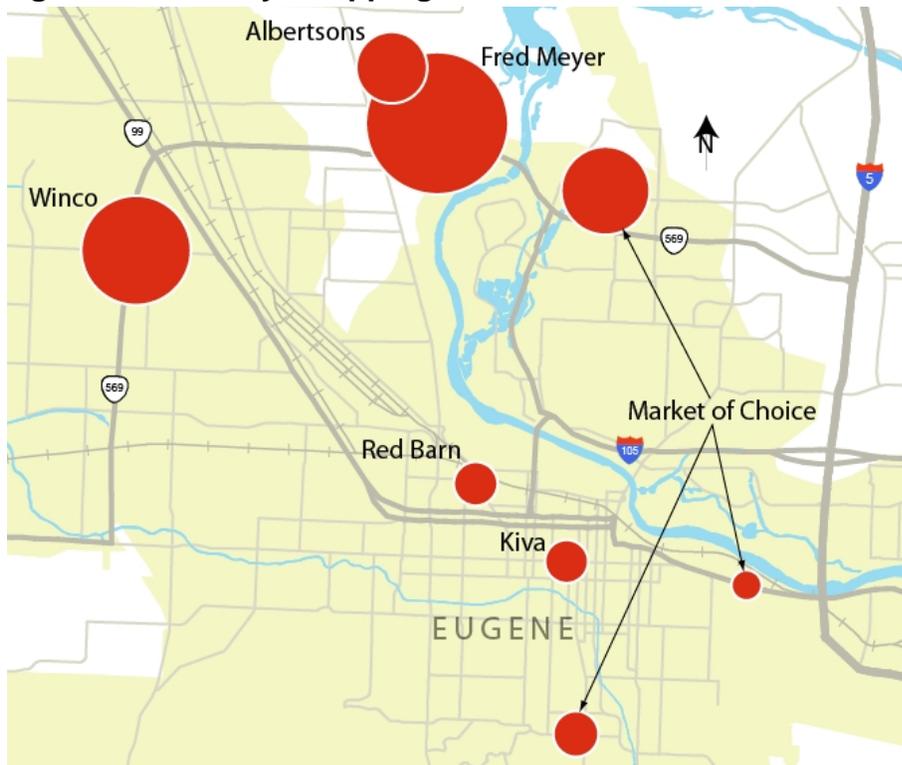
Source: River Road Neighborhood Needs Survey, City of Eugene

Demographic Characteristics

The demographic characteristics of River Road residents have a well documented impact on their preference for shopping at the proposed store. The most significant demographic variable is age. Older respondents have a lower preference for using the store than other residents. This tendency is supported by the significant negative correlation between store preference and senior status and the significant positive correlation between household income and store preference. The results point to several reasons why older residents have less desire for using the new store.

Table 5.3 Analysis of Variance for Age and Preference Index

Age	Preference Index	Standard Deviation	Standard Error	N
under 30	17.2	8.0	1.5	30
30-39	17.3	6.3	0.9	48
40-49	18.0	7.5	0.9	68
50-59	15.5	6.5	0.7	98
60-69	13.6	7.7	1.0	60
70 or more	14.3	7.8	1.1	51
Total	15.9	7.3	0.4	355
Significance	0.004			

Figure 5.2 River Road Demographic Preference Patterns
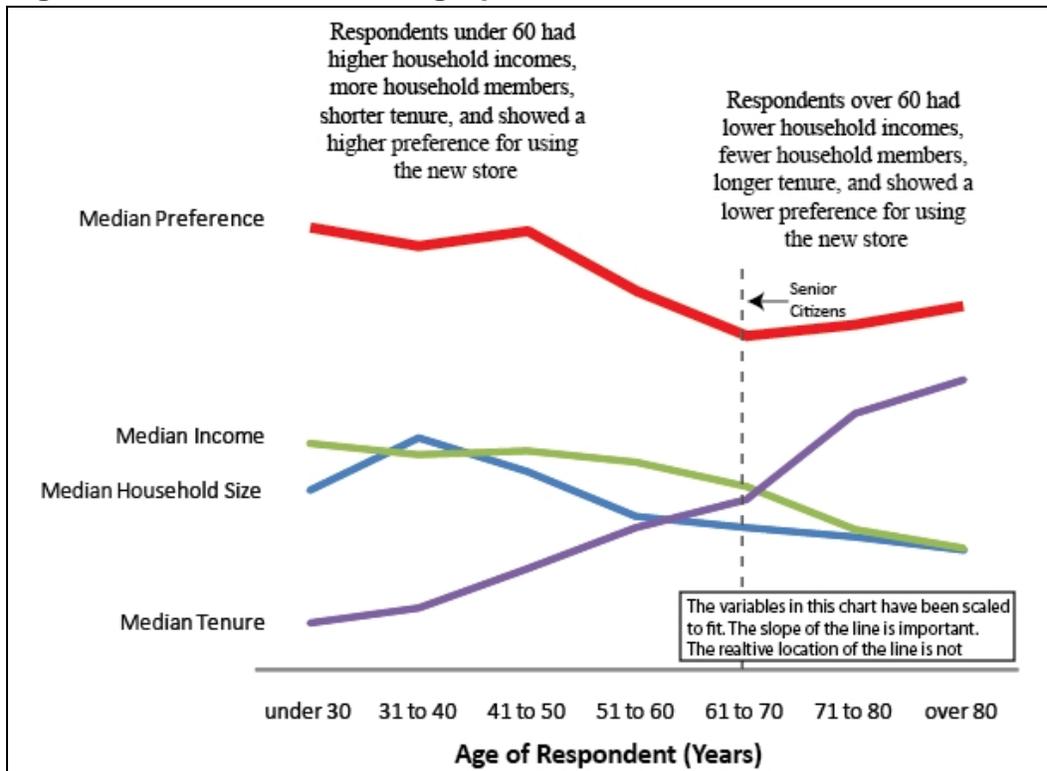
Source: River Road Neighborhood Needs Survey, 2008

The Levene test for Homogeneity of Variances shows a 99% significant correlation between respondent age and tenure in the River Road neighborhood. Long term residents are less likely to embrace change to a neighborhood form that they have grown accustomed to.

Older residents are more likely to be retired and living on fixed incomes. Grocery stores with a smaller footprint generally have higher item prices to compensate for lower sales volume. Residents may be predicting that the new store will have "high" prices, and they will be unable to pay the increased cost for shopping at the location.

Older residents generally live in households with fewer members. The analysis showed a positive correlation between household size and preference for the new store.

This study under-represents the behaviors of residents under 30 years old. These residents are likely to have lower incomes than middle age residents, but may have higher household sizes. Higher household sizes are associated with increased preference for using the new store and lower incomes are associated with decreased preference for using the new store. This implies that the preference of young adult River Road residents may be lower than middle age residents, but higher than senior residents.

Additional Study

There are several areas where additional study would add to the body of knowledge on River Road residents' shopping and travel preferences. These areas include: an improved understanding of the shopping and travel preferences of neighborhood residents under 50 and the addition of a variable measuring grocery shopping trip frequency. It would also be interesting to conduct an additional study after the nodal development is completed to determine the accuracy of the current body of knowledge.

The Community Planning Workshop and this study have pointed out that respondents under 50 were under-sampled according to 2000 U.S. Census statistics. The actual degree of the discrepancy is difficult to determine because of the age of the 2000 Census data at the time of this study. When 2010 Census data is available it would be interesting to compare it to the demographic variables from this study.

The academic literature states that travel route, travel mode, and travel frequency are the three main considerations involved in trip making. This study looks at travel modes and travel routes, but ignores trip frequency because there is no adequate data on the topic from the Neighborhood Needs Survey. Were this study to be duplicated, the author recommends measuring data for trip frequency in addition to the variables currently examined.

The River Road Nodal Development is a long term project. Considering the number of large scale development projects currently being discussed in Eugene, and the current lack of financing for any of them, it may be many years before ground is broken on the River Road

nodal development. However, if the development is ever completed, it would be interesting to recreate this study to monitor the changes in behavior due to the new development.

CHAPTER 6: Policy Implications

This chapter concludes my report on the shopping and travel patterns of lower River Road residents. It begins with an exercise that characterizes the primary types of demand that currently exist for a grocery store in the nodal development. An interested party could apply the results of this exercise to local demographic data and attempt to quantify the latent demand. This may be useful for a market study, but for my discussion it is best to consider the findings in terms of general percentages of the population.

Next, I make some general recommendations for the access and site design of the nodal development. I consider the site's accessibility in terms of active transportation and personal motor vehicle. Site design aspects include commercial and residential elements. The section concludes with a discussion of the Collaborative relationships that are necessary to make the lower River Road nodal development project succeed.

Qualifying Demand

The Neighborhood Needs survey data allows me the unique ability to compare respondents stated preference (significant independent variables) with their actual behavior (preferred shopping experiences). Through this analysis, I determined that the vast majority of River Road shoppers fall into one of three groups – each with different variables influencing their likelihood of shopping at a store in the proposed nodal development.

About 50% of residents can be classified as "Fred Meyer/Albertsons on Division" shoppers. Qualities of their shopping experience include: everyday-low-prices, full service shopping, general merchandise available, wide product selection, large basket size trips, and easy auto access.

About 20% of resident can be classified as "Red Barn, Market of Choice, or Kiva" shoppers. Their shopping experience includes: premium prices, full service shopping, minimal general merchandise, a focus on locally produced, organic, ethnic and specialty foods, moderate basket size trips, and high active transportation accessibility.

Another 20% of residents can be classified as "Winco" shoppers. Their shopping experience includes: lowest prices in the area, minimal services, minimal general merchandise, a broad range of goods, large basket size trips, and auto access within a ten to 15 minute drive.

The final 10% of residents have shopping behavior that is more difficult to classify and I will not make any predictions on their potential use of a grocery store at the nodal development beyond stating that there is some likelihood they will see the utility of the location and patronize the store to varying degrees.

The significant store choice variables in my study include: organic preference, work/school trip chaining preference, and active travel preference. It is also important to keep in mind that the vast majority of grocery shopping trips are made by personal vehicle.

"Fred Meyer/Albertsons on Division" shoppers are personal vehicle shoppers. When these shoppers evaluate their shopping experience at the proposed market they will focus on the ease of auto access and parking environment. They may value its location on the way to employment in downtown Eugene. They may be used to larger basket size trips than are convenient at a 15,000 sq. ft. store, but still may be attracted to the new location if it has an appealing environment or is closer to their home than the Santa Clara Square shopping options.

"Red Barn, Market of Choice, or Kiva" shoppers are personal vehicle shoppers, but a considerable amount use, or want to use active transportation on shopping trips. Active transportation access will also be a very important aspect of their experience. Site elements and bike lock-up facilities should be designed to accommodate this populations' travel preferences. When these shoppers evaluate their experience at the proposed market they will focus on the product range offered, especially organic, local, ethnic, and specialty foods.

It is unlikely that "Winco" shoppers will find enough desirable attributes in the proposed grocery store that it will attract a majority of their shopping trips. They may use the store for small convenience shopping trips where the cost of higher priced goods at the new store is less than the time cost of driving to Winco.

The majority of new store patrons will come from the "Red Barn, Market of Choice, or Kiva" shopping group, but a large number may also come from the "Fred Meyer/Albertsons on Division" shopping group. The desires of this group shouldn't be discounted in the planning of the nodal development because they make up the majority of River Road residents.

Access

A higher intensity commercial node in lower River Road will need to attract consumers throughout the neighborhood and beyond the neighborhood in order to succeed economically. Gravity modeling shows that shopping locations are chosen largely for their accessibility from consumers' homes. Therefore, convenient multi-modal accessibility will be crucial to the success of the lower River Road nodal development. An analysis of current travel shows that the majority of patrons will drive to the nodal development, however a considerable number will walk and bike; and the incorporation of affordable housing into the nodal development makes bus access an important consideration.

This section includes broad policy recommendations for the transportation and accessibility aspects of the nodal development. Traditionally, walking and biking infrastructure is planned secondary to the needs of the mighty automobile. In a nod to the environmental awareness and

sustainability focused mindset that is prevalent in the River Road neighborhood, I will address active transportation policy recommendations before auto-oriented policy recommendations.

Active Transportation Access

"River Road is a corridor."

I've heard that statement many times throughout the nodal development planning process. It is nearly always used to describe the North-South flow of over 20,000 vehicles on River Road each day. But River Road is a corridor for more than vehicle traffic. The Willamette River Path is a major corridor for walkers and bikers already. However, emphasizing the connection between the Valley River Center and the neighborhood will increase the use of the active transportation corridor. This is important because the River Road nodal development would be located at the crux of this corridor and businesses would profit from the transportation advantage.

In the Neighborhood Needs Survey, respondents identified traffic on River Road as the number one barrier to walking and biking travel. It is imperative that the perceived danger of River Road traffic be mitigated through complete streets planning or a pedestrian underpass that allows vehicle and pedestrian traffic to cross without impedance. These improvements would make the nodal development more accessible to the neighborhood residents living West of River Road.

The nodal development also needs to be visible and accessible to active transportation users on the Willamette River Trail. Orienting the commercial portion of the development toward the River Trail would welcome walking and biking trips and raise awareness of the nodal destination with shoppers originating outside the immediate neighborhood.

The effect of making accessibility improvements on both the East and West sides of the development is the creation of an active transportation corridor extending from the River Road neighborhood across the Greenway Bridge to the Valley River Center. There is opportunity for beneficial traffic flow from both sides of the corridor.

 The majority of River Road residents travel to the Valley River Center by parking at Maurie Jacobs Park and walking across the Greenway Bridge to the mall. This practice will continue and may increase in popularity with west-side Eugene residents outside the neighborhood as they realize that it is easier to park and walk than to fight mall traffic driving in from the Delta Highway. Current River Road demographic studies show an older population in the neighborhood. As this population continues to age, some may leave their homes for lower maintenance living situations. It is likely that the neighborhood will "turn over" to a younger population. The new population will be more likely to travel to Valley River Center for shopping, entertainment and employment than the current population.

A successful nodal development in lower River Road could be viewed as a walkable extension of the Valley River Center. Mall-goers interested in new destination may chose to walk to the nodal development from the mall, especially if they are interested in purchasing groceries – an amenity

not offered in the Valley River Center. A small electric shuttle between the two destinations could also help solidify the idea of an east-west shopping corridor.

Vehicle Access

The majority of nodal development patrons will consider using the location because it is conveniently accessible by motor vehicle. Therefore it is important that future improvements not deter local residents or corridor travelers from using the services at the nodal development.

Over 50% of local residents go to the Santa Clara Square/Division Avenue shopping center for basic food items and general merchandise. The nodal development will need to be competitive with this location for any duplicative commercial goods or services it offers. Even for unique commercial offerings, it is important that the development accommodate the "convenience shopping" population by offering easy access from River Road and adequate vehicle parking.

Not all River Road commuters are also River Road residents. It is difficult to gauge the potential for residents outside the neighborhood to use the development, but River Road commuters make up the group with the highest likelihood for doing so. They could play a crucial role in the success of commercial establishments at the nodal development. To help attract this population it is important that improvements to River Road not drive commuters to develop alternative North-South travel habits. This consideration applies to congestion created during the construction process as well as to the completed corridor plan.

Site Design

Throughout this report I have focused on the commercial aspect of the nodal development, specifically a retail grocery store. However, much of my research also addresses topics relative to the behavior of future nodal development residents. I do not feel it is beyond the scope of my research to make recommendations for the residential portion of the nodal development and will do so prior to discussing some siting recommendations for the commercial aspects of the nodal development.

Residential

State and local codes make it difficult to develop properties fronting the Willamette River. This places a premium value on developments with a river view. Although the lower River Road nodal development is focused on providing affordable housing, it will be possible to develop premium riverfront units above market rate to offset the affordable units.

Above market rate units could be rentals or ownership units. In the Neighborhood Needs study, higher incomes had a significant positive correlation with likelihood for shopping at the nodal development. The market rate tenants higher desire for using the commercial services on site means that they are more likely to use the services even if they are relatively more distant from the services. However, it is important that market rate units be distributed throughout the

development so potential residents have a choice of where to live. Also, affordable housing tenants shouldn't feel like increased income levels are associated with increased separation from commercial services. This is the stereotype of urban form that New Urbanism (on a block scale) and Smart Growth (on a regional scale) are attempting to overturn.

Affordable housing units should include rental units and home ownership units. The River Road neighborhood grew because of its ability to provide affordable home ownership. This tradition should be continued in the nodal development.

Commercial

The siting of the commercial portion of the nodal development should address the Willamette River Trail and River Road. It also should be visible to shoppers at the Valley River Center.

One method for accomplishing these requirements is to site a portion of the commercial development with a Southern exposure along an active transportation corridor linking the River Road neighborhood and Valley River Center. A southern orientation will also increase the opportunity for passive heating from solar gain during the Fall, (maybe winter and spring too, but we are in Eugene). A focus should be made on attracting commercial tenants who bring foot traffic to the development all day. A center with only "9-to-5" service providers will not do much to decrease the travel needs of residents.

Figure 6.1 River Road Nodal Development Access Considerations

The grocery store in the commercial development would be most successful as a fresh format store of 15,000 square feet or less. It was never the intent for the grocery store to compete with Fred Meyer or Albertsons in the Santa Clara Square shopping center in terms of product range or basket size. The fresh format store will appeal to residents most open to using the new store, and the 15,000 sq.ft footprint will be large enough to contain a range of items that is enticing for some convenience shopping trips.

One idea that could bring together the desire for a grocery store, local/organic foods, and the development site's Class I soils is a "Central Agriculture and Food Facility." This facility provides storage for locally grown foods, a commercial kitchen, food processing space and farmer's market space. It would help create a center for the neighborhood by offering a location where local food suppliers and food buyers could interact. A premium restaurant with views of the Willamette would benefit from the ability to offer food grown or processed on site. This innovative idea deserves legitimate consideration considering the fresh format, organic and local food trends prevalent in grocery retailing today.

Collaborative Opportunities

More than once I have been explaining my research to an acquaintance from River Road and they have said, "Oh yeah, our Community Organization is trying to get a new development built in River Road." Statements like this from residents who are not intimately involved in the planning process are a testament to the efficacy of repetition, and collaboration at influencing peoples' perspectives and inciting action. To this point, The City of Eugene and the River Road Community Organization have been the primary movers in development planning. As the nodal development moves from plan to reality it will be beneficial to partner with even more groups. The Lane Transit District could help with the mass transit and corridor design components of the project. St. Vincent DePaul and NEDCO are local organizations with experience in affordable housing and commercial development. Food for Lane County and the OSU extension have experience in urban farming and food processing, and UO graduate students can lend a hand with future planning assignments.

Downtown Eugene, The EWEB riverfront site, the Federal courthouse area, Crescent Village and other places in Eugene are all clamoring for recognition as the site where growth is most justified. If development happens in lower River Road it will not be based on merit alone. It will happen at the expense of these other sites and because supporters here cried louder than anywhere else. In this development environment, collaboration plays a crucial role in shaping the urban form of Eugene.

The lower River Road nodal development plan is a well thought-out methodology for creating a new urban center and improving the quality of life for current and future residents. I hope it gets the collaborative support it needs to become a reality.

WORKS CITED

Bagley, M. & Mokhtarian, P., (2002). "The impact of residential neighborhood type on travel behavior: A structural equations modeling approach." Annals of Regional Science, 36: 279-297.

Bend MPO. (2009). DRAFT PUBLIC PARTICIPATION PLAN. April 6. Retrieved April 24, 2009. Web site: http://www.ci.bend.or.us/depts/bend_mpo/public_participation.html

Blanchard, T. & Lyson, T., (2003). "Retail Concentration, "Food Deserts," and Food-Disadvantaged Communities," USDA, Economic Research Service, Research Innovation and Development Grant in Economics study, Mississippi State University.

Burchell, R., et al (1998). "Report 39: The Costs of Sprawl – Revisited." Transit Cooperative Research Program, Transportation Research Board. Washington DC, National Academy Press.

Community Service Center. (2008). "River Road Neighborhood Needs Survey Report." October.

Community Service Center. "River Road Business Needs Survey Report." Oct. 2008.

Community Service Center. "River Road Neighborhood Needs Survey Report." Oct. 2008.

Community. New York NY, Simon & Schuster.

Condon, P. (2008), Design Charrettes for Sustainable Communities. Washington DC, Island Press.

E.D. Hovee & Co. LLC. (2008) "Eugene Rasor Park Market Assessment Update Memorandum." Web site: http://www.eugene.or.gov/portal/server.pt/gateway/PTARGS_0_2_290395_0_0_18/2008%20Market%20Assment%20Update%20Memorandum.pdf

Ewing, R & Mcann, B. (2003). "Measuring the Health Affects of Sprawl: A National Analysis of Physical Activity, Obesity and Chronic Disease." Smart Growth America Surface Transportation Policy Project.

Ewing, R., et al. (2003). "Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity." American Journal of Health Promotion, Vol. 18, No.1.

Frank, L. & Pivo, G., (1994). "The Impacts of Mixed Use and Density on the Utilization of Three Modes of Travel: The Single Occupant Vehicle, Transit, and Walking." *Transportation Research Record* No. 1466: Issues in Land Use and Transportation Planning, Models, and Applications. Washington, D.C., National Academy Press: 44-52.

Freeman, L. (2001). "The Effects of Sprawl on Neighborhood Social Ties." APA Journal. Vol. 67, No. 1.

Friendly St. Market. (2009). Employee telephone interview. February 10, 2009.

Frumpkin, H. (2002). "Urban Sprawl and Public Health." Public Health Reports. Vol. 17.

Gerhart, Andrea. (1999) "David Rusk's Message: Sprawl and Race Shaping the Land." Planning and Zoning News. May, p. 5-12.

Google Planimeter. (2008). Retrieved November 11, 2008. Web site: http://www.acme.com/planimeter/

Grower's Market. (2009). Employee telephone interview. February 10, 2009

Handy, S. & Clifton, K. (2001). "Local Shopping as a Strategy for Reducing Automobile Travel." Transportation, Vol. 28: 317-346.

Handy, S. (1992). "Regional vs. Local Accessability: Variations in Suburban Form and the Implications for Nonwork Travel." Unpublished dissertation, Department of City and Regional Planning, University of California at Berkely.

Hirshman, I. (2009) "Transportation Infrastructure and Economic Growth" APA National Convention, lecture. April 26.

Holton, R. (1958). "The Distinction Between Convenience Goods, Shopping Goods, and Specialty Goods," The Journal of Marketing, July: 53-56.

Huff, D. (1964). "Defining and Estimating a Trade Area." Journal of Marketing.

Krizek, K. (2003). "Residential relocation and changes in urban travel: Does neighborhood-scale urban form matter?" Journal of the American Planning Association, Vol. 69, Iss. 3: 265-281.

Lane Council of Governments. (2002). Transplan Chapter 2.

Litman, T. (2003). "Economic Value of Walkability." Transportation Research Record 1828. Paper No. 03-2731.

Marion B. (1984). "Strategic Groups, Entry Barriers and Competitive Behavior in Grocery Retailing" Food Systems Research Group, Working Paper 81.

Marion, B., et al. (1991). "Strategic Groups, Competition and Retail Food Prices." Food Systems Research Group, Working Paper 99. October.

Martinez, S. & Kaufman P. (2008). Twenty Years of Competition Reshape the US Food Marketing System. US Department of Agriculture, Economic Research Service. Amber Waves. Vol. 6 Iss. 2:28.

Messinger, P. & Narasimhan, C. (1995) "Has Power Shifted in the Grocery Channel." Marketing Science. Vol.14, No. 2.

New Frontier Market. (2009). Employee telephone interview. February 12, 2009.

Porter, D. (2002). "Making Smart Growth Work." Urban Land Institute, Washington D.C.

Progressive Grocer. (1995). 48th Annual Customer Expenditure Study.

Progressive Grocer. (2005) Marketing Guidebook. Retrieved May 9, 2009. Web site: http://www.fmi.org/facts_figs/?fuseaction=superfact

Progressive Grocer. (2008). 61st Annual Customer Expenditure Study. September: 58-60.

Putnam, R. (2000). Bowling Alone: The Collapse and Revival of the American

R. Cervero & K. Kockelman (1997), "Travel Demand and the 3Ds: Density, Diversity, and Design," Transportation Research D, Vol. 2: 199–219.

Smart Growth Network. (2003). Retrieved December 4, 2008. Web site: http://www.smartgrowth.org/about/default.asp?res=1024.

Smart Growth Network. (2003). Retrieved December 4, 2008. Web site: http://www.smartgrowth.org/about/principles/principles.asp?prin=7

Talen, E. (1999). "Sense of Community and Neighborhood Form: An Assessment of the Social Doctrine of New Urbanism." Urban Studies, Vol. 36, No. 8.

Tauber, E. (1972). "Marketing Notes and Communications: Why do People Shop?" Journal of Marketing. December, Vol. 36: 46-59.

U.S. Department of Transportation, Bureau of Transportation Statistics.(2003) "Highlights of the 2001 National Household Travel Survey." Washington, DC.

U.S. Environmental Protection Agency. (2009). Retrieved January 23, 2009. Web site: http://www.epa.gov/smartgrowth/topics/eb.htm

APPENDIX A: Variable Descriptives and Frequencies

Dependent Variables: Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Fresh Foods	355	0	9.0	6.7	2.6
Preserved Foods	355	0	9.0	5.2	2.8
Ready-to-eat Foods	355	0	9.0	4.0	2.9
Preference Index	355	0	27.0	15.9	7.3

Dependent Variable: Preference Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	20	5.3	5.6	5.6
	1	2	0.5	0.6	6.2
	2	1	0.3	0.3	6.5
	3	1	0.3	0.3	6.8
	4	3	0.8	0.8	7.6
	5	5	1.3	1.4	9.0
	6	4	1.1	1.1	10.1
	7	8	2.1	2.3	12.4
	8	7	1.8	2.0	14.4
	9	15	4.0	4.2	18.6
	10	12	3.2	3.4	22.0
	11	12	3.2	3.4	25.4
	12	19	5.0	5.4	30.7
	13	12	3.2	3.4	34.1
	14	24	6.3	6.8	40.8
	15	25	6.6	7.0	47.9
	16	19	5.0	5.4	53.2
	17	24	6.3	6.8	60.0
	18	20	5.3	5.6	65.6
	19	13	3.4	3.7	69.3
	20	7	1.8	2.0	71.3
	21	17	4.5	4.8	76.1
	22	13	3.4	3.7	79.7
	23	8	2.1	2.3	82.0
	24	11	2.9	3.1	85.1
	25	4	1.1	1.1	86.2
	26	3	0.8	0.8	87.0
	27	46	12.1	13.0	100.0
	Total	355	93.7	100.0	
Missing		24	6.3		
Total		379	100		

Dependent Variable: Respondents preference for fresh foods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	21	5.5	5.9	5.9
	1	1	0.3	0.3	6.2
	2	9	2.4	2.5	8.7
	3	26	6.9	7.3	16.1
	4	7	1.8	2.0	18.0
	5	18	4.7	5.1	23.1
	6	80	21.1	22.5	45.6
	7	23	6.1	6.5	52.1
	8	25	6.6	7.0	59.2
	9	145	38.3	40.8	100.0
	Total	355	93.7	100.0	
Missing		24	6.3		
Total		379	100		

Dependent Variable: Respondents preference for preserved foods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	35	9.2	9.9	9.9
	1	8	2.1	2.3	12.1
	2	15	4.0	4.2	16.3
	3	48	12.7	13.5	29.9
	4	39	10.3	11.0	40.8
	5	41	10.8	11.5	52.4
	6	54	14.2	15.2	67.6
	7	25	6.6	7.0	74.6
	8	16	4.2	4.5	79.2
	9	74	19.5	20.8	100.0
	Total	355	93.7	100.0	
Missing		24	6.3		
Total		379	100		

Dependent Variable: Respondents preference for ready-to-eat foods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	51	13.5	14.4	14.4
	1	25	6.6	7.0	21.4
	2	40	10.6	11.3	32.7
	3	63	16.6	17.7	50.4
	4	42	11.1	11.8	62.3
	5	20	5.3	5.6	67.9
	6	36	9.5	10.1	78.0
	7	16	4.2	4.5	82.5
	8	13	3.4	3.7	86.2
	9	49	12.9	13.8	100.0
	Total	355	93.7	100.0	
Missing		24	6.3		
Total		379	100		

Independent Variables: Demographics Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Gender	358	1.0	0.0	1.0	0.6	0.48
Age	356	65.0	26.0	91.0	55.2	14.34
Senior in Household	379	1.0	0.0	1.0	0.3	0.44
Child in Household	379	1.0	0.0	1.0	0.2	0.41
Household Size	363	8.0	1.0	9.0	2.3	1.07
Tenure	364	69.0	1.0	70.0	18.4	15.39
Household Income (groups)	347	4.0	1.0	5.0	2.6	1.23
Valid N (listwise)	302					

Independent Variable: Household Income (Grouped)

	Yearly HH Income	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than $25,000	76	20.1	21.9	21.9
	$25,000 to $49,999	86	22.7	24.8	46.7
	$50,000 to $74,999	100	26.4	28.8	75.5
	$75,000 to $99,999	55	14.5	15.9	91.4
	$100,000 or more	30	7.9	8.6	100.0
	Total	347	91.6	100.0	
Missing		32	8.4		
Total		379	100.0		

Independent Variable: Household Size

	Persons in HH	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	69	18.2	19.0	19.0
	2	187	49.3	51.5	70.5
	3	47	12.4	12.9	83.5
	4	49	12.9	13.5	97.0
	5 or more	11	2.9	3.0	100.0
	Total	363	95.8	100.0	
Missing		16	4.2		
Total		379	100.0		

Independent Variable: Respondent Age (Grouped)

	Years	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 30	17	4.5	4.8	4.8
	31 to 40	49	12.9	13.8	18.5
	41 to 50	68	17.9	19.1	37.6
	51 to 60	103	27.2	28.9	66.6
	61 to 70	65	17.2	18.3	84.8
	71 to 80	35	9.2	9.8	94.7
	over 80	19	5.0	5.3	100.0
	Total	356	93.9	100.0	
Missing		23	6.1		
Total		379	100.0		

Independent Variable: Tenure (Grouped)

	Years	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 10	159	42.0	43.7	43.7
	11 to 20	83	21.9	22.8	66.5
	21 to 30	49	12.9	13.5	79.9
	31 to 40	33	8.7	9.1	89.0
	41 to 50	23	6.1	6.3	95.3
	51 to 60	15	4.0	4.1	99.5
	over 60	2	0.5	0.5	100.0
	Total	364	96.0	100.0	
Missing		15	4.0		
Total		379	100.0		

Independent Variables: Respondent Gender & Special Householders

	Frequency	Percent
Male	128	33.8
Female	230	60.7
Gender not reported	21	5.5
Total	379	
Senior in HH	99	26.1
Child in HH	80	21.1
Total	379	

Independent Variables: Travel Preferences Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Trip Chaining	341	3.0	0.0	3.0	1.1	1.03
Walking	351	3.0	0.0	3.0	1.0	0.81
Bicycling	349	3.0	0.0	3.0	1.3	1.06
Riding the bus	333	3.0	0.0	3.0	0.6	0.85
Driving the car	362	3.0	0.0	3.0	2.7	0.62
Valid N (listwise)	312					

Independent Variable: Trip-chaining

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	122	32.2	35.8	35.8
	1	91	24.0	26.7	62.5
	2	89	23.5	26.1	88.6
	3	39	10.3	11.4	100.0
	Total	341	90.0	100.0	
Missing		38	10.0		
Total		379	100.0		

Independent Variable: Walking to Shop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	95	25.1	27.1	27.1
	1	195	51.5	55.6	82.6
	2	36	9.5	10.3	92.9
	3	25	6.6	7.1	100.0
	Total	351	92.6	100.0	
Missing		28	7.4		
Total		379	100.0		

Independent Variable: Bicycling to Shop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	97	25.6	27.8	27.8
	1	131	34.6	37.5	65.3
	2	56	14.8	16.0	81.4
	3	65	17.2	18.6	100.0
	Total	349	92.1	100.0	
Missing		30	7.9		
Total		379	100.0		

Independent Variable: Riding the Bus to Shop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	208	54.9	62.5	62.5
	1	81	21.4	24.3	86.8
	2	27	7.1	8.1	94.9
	3	17	4.5	5.1	100.0
	Total	333	87.9	100.0	
Missing		46	12.1		
Total		379	100.0		

Independent Variable: Driving the Car to Shop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.1	1.1	1.1
	1	17	4.5	4.7	5.8
	2	77	20.3	21.3	27.1
	3	264	69.7	72.9	100.0
	Total	362	95.5	100.0	
Missing		17	4.5		
Total		379	100.0		

Independent Variables: Qualitative Shopping Preferences Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Low Prices	348	0.0	3.0	2.0	0.84
Quality Customer Service	355	0.0	3.0	2.1	0.75
Local Ownership	351	0.0	3.0	1.7	0.95
Organic Foods	353	0.0	3.0	1.6	1.12
Store Size	309	1.0	3.0	2.5	0.77
Combination Store	309	0.0	1.0	0.5	0.50
Valid N (listwise)	288				

Independent Variable: Low Price Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	10	2.6	2.9	2.9
	1	94	24.8	27.0	29.9
	2	134	35.4	38.5	68.4
	3	110	29.0	31.6	100.0
	Total	348	91.8	100.0	
Missing		31	8.2		
Total		379	100.0		

Independent Variable: Quality Customer Service Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	1.6	1.7	1.7
	1	66	17.4	18.6	20.3
	2	168	44.3	47.3	67.6
	3	115	30.3	32.4	100.0
	Total	355	93.7	100.0	
Missing		24	6.3		
Total		379	100.0		

Independent Variable: Local Ownership Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	45	11.9	12.8	12.8
	1	101	26.6	28.8	41.6
	2	130	34.3	37.0	78.6
	3	75	19.8	21.4	100.0
	Total	351	92.6	100.0	
Missing		28	7.4		
Total		379	100.0		

Independent Variable: Organic Food Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	72	19.0	20.4	20.4
	1	92	24.3	26.1	46.5
	2	83	21.9	23.5	70.0
	3	106	28.0	30.0	100.0
	Total	353	93.1	100.0	
Missing		26	6.9		
Total		379	100.0		

Independent Variable: Store Size Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	52	13.7	16.8	16.8
	2	62	16.4	20.1	36.9
	3	195	51.5	63.1	100.0
	Total	309	81.5	100.0	
Missing		70	18.5		
Total		379	100.0		

Independent Variable: Combination Store Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	167	44.1	54.0	54.0
	1	142	37.5	46.0	100.0
	Total	309	81.5	100.0	
Missing		70	18.5		
Total		379	100.0		

Independent Variables: Spatial Factors Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Network Distance to Store	309	26701	3375	30076	14184	5914
Straight-line Distance to Site	318	6930	219	7149	3092	1644

Independent Variable: Network Distance to Store

	Miles	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1.0	3	0.8	1.0	1.0
	1.0 to 1.49	42	11.1	13.6	14.6
	1.5 to 1.99	61	16.1	19.7	34.3
	2.0 to 2.49	64	16.9	20.7	55.0
	2.5 to 2.99	26	6.9	8.4	63.4
	3.0 to 3.49	18	4.7	5.8	69.3
	3.5 to 3.99	43	11.3	13.9	83.2
	4.0 to 4.49	36	9.5	11.7	94.8
	4.5 to 4.99	12	3.2	3.9	98.7
	5.0 <	4	1.1	1.3	100.0
	Total	309	81.5	100.0	
Missing		70	18.5		
Total		379	100.0		

Independent Variable: Straight-line Distance to Site

	Miles	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< .25	47	12.4	14.8	14.8
	.25 to .49	96	25.3	30.3	45.1
	.50 to .99	80	21.1	25.2	70.3
	1.00 to 1.24	53	14.0	16.7	87.1
	1.25 <	41	10.8	12.9	100.0
	Total	317	83.6	100.0	
Missing		62	16.4		
Total		379	100.0		

APPENDIX B: Analysis of Variance, Significant Results

Analysis of Variance: Organics and Store Preference Index

Organic Preference	Preference Index	Standard Deviation	Standard Error	N
unimportant	14.2	7.6	0.9	71
somewhat important	15.3	7.7	0.8	90
important	16.8	7.1	0.8	81
very important	17.0	6.6	0.7	103
Total	15.9	7.3	0.4	345
Significance	0.049			

Analysis of Variance: Trip Chain and Store Preference Index

Trip Chaining	Preference Index	Standard Deviation	Standard Error	N
unimportant	14.5	7.4	0.7	121
somewhat important	15.8	6.3	0.7	90
important	16.7	7.5	0.8	87
very important	19.7	6.8	1.1	38
Total	16.0	7.2	0.4	336
Significance	0.001			

Analysis of Variance: Walking and Store Preference Index

Walking Preference	Preference Index	Standard Deviation	Standard Error	N
unimportant	14.0	7.7	0.8	93
somewhat important	16.5	7.1	0.5	190
important	18.1	5.5	0.9	36
very important	15.7	7.8	1.7	22
Total	16.0	7.2	0.4	341
Significance	0.012			

Analysis of Variance: Bicycling and Store Preference Index

Bicycling Preference	Preference Index	Standard Deviation	Standard Error	N
unimportant	15.4	8.0	0.8	97
somewhat important	15.1	7.0	0.6	127
important	17.9	6.6	0.9	52
very important	17.0	6.5	0.8	63
Total	16.0	7.2	0.4	339
Significance	0.054			

Analysis of Variance: Senior Status and Store Preference Index

Senior in Household	Preference Index	Standard Deviation	Standard Error	N
No	16.4	7.0	0.4	262
Yes	14.4	8.0	0.8	93
Total	15.9	7.3	0.4	355
Significance	0.026			

Analysis of Variance: Income and Store Preference Index

Income level	Preference Index	Standard Deviation	Standard Error	N
under 24,999	13.0	8.7	1.1	65
25,000-49,999	15.7	6.5	0.7	80
50,000-74,999	16.5	6.6	0.7	97
75,000-99,999	18.2	7.7	1.1	53
100,000 or more	17.0	6.0	1.1	29
Total	15.9	7.3	0.4	324
Significance	0.002			

Analysis of Variance: Household Size and Store Preference Index

Household Size	Preference Index	Standard Deviation	Standard Error	N
1	14.2	8.1	1.0	65
2	15.5	7.0	0.5	181
3	17.0	6.1	0.9	44
4	17.9	7.4	1.1	47
5 or more	21.4	7.0	2.2	10
Total	15.9	7.3	0.4	347
Significance	0.006			

Analysis of Variance: Age and Store Preference Index

Age	Preference Index	Standard Deviation	Standard Error	N
under 30	17.2	8.0	1.5	30
30-39	17.3	6.3	0.9	48
40-49	18.0	7.5	0.9	68
50-59	15.5	6.5	0.7	98
60-69	13.6	7.7	1.0	60
70 or more	14.3	7.8	1.1	51
Total	15.9	7.3	0.4	355
Significance	0.004			

APPENDIX C: Grocery Shopping Share Map

Figure 1. Percent Use of Grocery Stores by River Road Residents