F

Board of Zoning Adjustment
District of Columbia
CASE NO. 17232
EXHIBIT NO. 37A3

Parking Requirements

for Shopping Centers

Summary Recommendations and Research Study Report

Second Edition

A Survey Study Conducted by Walker Parking Consultants
under the Direction of ULI–the Urban Land Institute and
the International Council of Shopping Centers

Urban Land Institute

International Council of Shopping Centers

About ULI–the Urban Land Institute

ULI–the Urban Land Institute is a nonprofit education and research institute that is supported and directed by its members. Its mission is to provide responsible leadership in the use of land in order to enhance the total environment.

ULI sponsors education programs and forums to encourage an open international exchange of ideas and sharing of experiences; initiates re-search that anticipates emerging land use trends and issues and proposes creative solutions based on that research; provides advisory services; and publishes a wide variety of materials to disseminate information on land use and development. Established in 1936, the Institute today has more than 15,000 members and associates from more than 50 countries representing the entire spectrum of the land use and development disciplines.

Richard M. Rosan
President

About the International Council of Shopping Centers

Founded in 1957, the International Council of Shopping Centers (ICSC) is the global trade association of the shopping center industry. Its 38,000 members in the United States, Canada, and more than 70 other countries include shopping center owners, developers, managers, marketing specialists, investors, lenders, retailers, and other professionals as well as academics and public officials. As the global industry trade association, ICSC links with more than 20 national and regional shopping center councils throughout the world.

John T. Riordan
President

Project Staff

Rachelle L. Levitt
Senior Vice President, Policy and Practice
Publisher

Gayle Berens
Vice President, Real Estate Development Practice

Robert T. Dunphy
Senior Resident Fellow, Transportation
Project Director

Nancy H. Stewart
Director, Book Program
Managing Editor

Barbara de Boinville
Copy Editor

Betsy VanBuskirk
Art Director

Meg Batdorff
Graphic Artist

Jeanne Berger Design
Design/Layout

Diann Stanley-Austin
Associate Director of Publishing Operations

Recommended bibliographic listing:
ULI–the Urban Land Institute and The International Council of Shopping Centers. *Parking Requirements for Shopping Centers,* Second Edition. Washington, D.C.: ULI–the Urban Land Institute, 1999.

ULI Catalog Number: P92
International Standard Book Number: 0-87420-828-9
Library of Congress Catalog Card Number: 99-66868

Copyright 1999 by ULI–the Urban Land Institute
1025 Thomas Jefferson Street, N.W.
Suite 500 West
Washington, D.C. 20007-5201

Second Printing, 2000

Printed in the United States of America. All rights reserved. No part of this book may be reproduced in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage and retrieval system, without written permission of the publisher.

Acknowledgments

This publication represents a major cooperative venture between ULI and the International Council of Shopping Centers. I had the pleasure of working with an outstanding advisory committee drawn from both organizations, whose advice at every stage of the work has been invaluable. Special thanks are due to Michael Baker, assistant research director of ICSC, whose counsel and humor helped spread the burden of managing this undertaking. Such a significant undertaking required the active involvement of the top management of each organization, and we appreciate the support of Dr. John Konarski III, senior vice president, ICSC, and Rachelle Levitt, senior vice president, policy and practice, ULI. The survey of parking characteristics, the most extensive ever conducted in the United States, would not have been possible without the voluntary participation of the shopping center managers, who collected the information, as well as those specifically identified in the case studies, who provided further information and graphics.

This study was conducted at the busiest time of the year for managers, and we acknowledge the extensive help of the committee chair, Kemper Freeman, who contacted executives of the management companies. The data were collected, interpreted, and reported by the study consultant, Walker Parking Consultants. Our primary contacts were John W. Dorsett, principal and director of study services, with cooperation from Pat Gibson at Kaku Associates, Inc. All members of the advisory committee reviewed the draft manuscript, and William Eager provided special technical assistance. In addition, we received comments from a major retail executive, Michael Lowenkron, vice president and director of real estate, JC Penney.

Finally, I would like to thank the ULI staff members instrumental in production, led by Nancy Stewart, Betsy VanBuskirk, and Meg Batdorff, as well as Karrie Underwood, who incorporated all the changes in the manuscript.

Robert T. Dunphy

Advisory Committee for Parking Requirements for Shopping Centers

Kemper Freeman, Jr.
President
Bellevue Square Managers, Inc.
Bellevue, Washington

Monroe J. Carell, Jr.
Chairman and CEO
Central Parking System
Nashville, Tennessee

Roy P. Drachman
Partner
Roy Drachman Realty Company
Tucson, Arizona

William R. Eager
President
TDA, Inc.
Seattle, Washington

Frederick O. Evans
President, Retail Division
The Irvine Company
Newport Beach, California

Michael P. McCarty
Senior Vice President, Market Research
Simon Property Group
Indianapolis, Indiana

Gerald M. White
Principal
Copaken, White & Blitt
Leawood, Kansas

Contents

1. Introduction 1
The Changing Face of Shopping Centers 1
This Report 1

2. Key Recommendations 3
Parking Ratio Recommendations 3
Method of Travel 4
Employee Parking Requirements 4
Parking Supply Ratios 4
Parking Space Design 4
A Comparison of 1980 and 1998 Studies 5

3. Study Methodology 6
Questionnaire 6
Parking Accumulation Counts 6
Data Analysis 6

4. Determining the 20th Highest Hour 7
Definition of Peak Hours 7
Selection of Survey Day and Time 7

5. Survey Results 8
General Questionnaire 8
Parked Car Survey 8
Definition of Center Types 8
Response 9
Geographic Coverage 9

6. Parking Demand 12
Center Type 12
Center Size 14
Parking Requirements for Centers with Minimal Restaurant, Entertainment, and Cinema Space 15
Comparison of 1975, 1980, and 1998 Studies 15

7. Special Considerations and Adjustments 19
Nonretail Uses 19
Nonautomobile Travel 20
Employee Parking 20
Parking Lot Design 20

8. Profile of Participating Centers 21
Shopping Center Location 21
Shopping Center Type 21

9. Parking Characteristics of Participating Centers 22
General Parking Characteristics 22
Parking Fees and Validation 22
Managers' Views of Parking 22
Peak Demand 22
Transportation Management Associations 23
Employee Parking 23
Handicapped Parking 23
Adjacent Land Use 23
Parking Problems 23
Transit Service 24
Completed Questionnaires by Center Size . . . 24
Parking Supply 24

CHAPTER 1 Introduction

The Changing Face of Shopping Centers

The face of the regional shopping center in the United States has been changing. Retail shopping centers are getting larger. According to the International Council of Shopping Centers (ICSC) publication *Shopping Centers Today*, in 1965, only 73 shopping centers in the United States exceeded 800,000 square feet of gross leasable area (GLA), "the total floor area designed for the tenants' occupancy and exclusive use."[1] By 1974, that number had grown to 249. In 1998, more than 714 centers exceeded 800,000 square feet. In fact, 395 centers exceeded 1 million square feet—almost twice the size of shopping centers that were once considered large.

Not only is the size of centers changing. The mix of land uses within regional shopping centers also is different today. Retail entertainment centers are becoming more common. Retail centers of all sizes contain larger proportions of restaurant service, cinema, and entertainment venues. Moreover, relatively new types of shopping centers have evolved, such as power centers, theme centers, and fashion/specialty centers.

Nearly 20 years have passed since ICSC and the Urban Land Institute collected data for their 1980 study, also entitled *Parking Requirements for Shopping Centers*. Since then, there have been a number of changes in shopper and industry characteristics that have affected parking needs. These include: increased labor force participation among women; higher levels of traffic congestion; growing specialization of the shopping center industry and the emergence of new retail formats; and the addition of entertainment to traditional centers. In light of these many changes, now is an appropriate time to update the study.

The primary goal of this current study is to recommend parking demand ratios for shopping centers in the United States, based upon observations of parking at existing centers. To achieve this objective, the study collected and evaluated data on a wide range of factors influencing travel behavior and parking demand at shopping centers. The findings were prepared in a format usable for all those interested in shopping center parking managers, owners, developers, designers, planners, and local officials.

This analysis updates two extensive studies on parking demand at shopping centers. The first study measured parking demand from 1973 to 1975 during the holiday peaks (the month of December). The results were reported in the May 1977 issue of *Urban Land*. The second study analyzed data collected in 1980; it was sponsored by ICSC and published by ULI in 1982. Data from both of these studies will be compared with data collected during the holiday shopping season of 1998.

This Report

Data for this report were collected in two parts. First, an extensive questionnaire was distributed to shopping centers across the United States. Responses to the questionnaire were received from 490 centers. Second, responding centers were asked to participate in parking accumulation counts during the 1998 holiday season. Parking counts were conducted at 169 centers.

Every effort was made to obtain a reasonable sample size for each type and size of shopping center that was analyzed. Where data are limited, a word of caution is noted. For example, a very limited amount of data was collected for factory outlet centers, power centers, and fashion/specialty centers, so parking demand was not reported. Moreover, a limited amount of parking accumulation data was collected for neighborhood and community centers. Consequently, the recommendations contained in this report err on the con-

servative side for neighborhood and community centers.

This study features significantly more data for regional and super regional centers, for which parking is more of an issue. Survey data indicate that 18 percent of centers with less than 400,000 square feet reported that they experienced "ten or more" days annually in which parking occupancy exceeded 85 percent. In comparison, 45 percent of centers containing 600,000 to 1,499,999 square feet reported parking occupancies that exceeded 85 percent ten or more days of the year.

Chapters 3 and 4 of this report provide detail on the methodology used. Chapter 5 describes the general data collection results. In Chapters 6 and 7, the parking ratio recommendations are presented. The results of the General Questionnaire are provided in Chapters 8 and 9. Chapter 10 summarizes a series of case studies, and the appendices include all of the survey forms, in addition to the comprehensive matrix of recommended parking ratios.

Notes

1 ULI–the Urban Land Institute, *Shopping Center Development Handbook* (Washington D.C.: ULI–the Urban Land Institute, 1985).

CHAPTER 2

Key Recommendations

This report presents a set of base recommendations for parking supply based on center size and makeup. An analysis of the survey data shows that these independent variables do not significantly affect the required parking supply:

- Geographic area
- Urban versus suburban setting
- Large city versus small city.

On the other hand, the amount of parking needed at a shopping center is affected by these variables:

- Proportion of restaurant, cinema, and entertainment land uses
- Percent of nonauto travel to the center
- Treatment of employee parking during shopping peaks
- Size of the center.

Adjustment factors for these variables will be discussed later in the report.

Parking Ratio Recommendations

Table 1 shows the recommended number of parking spaces per 1,000 square feet of gross leasable area (GLA).

The table located in Appendix A provides a comprehensive matrix of recommended ratios. This recommended provision of parking spaces will provide the typical shopping center with sufficient parking to serve the parking needs of customers and employees at the 20th busiest hour of the year. Moreover, these recommended ratios provide for a surplus of parking spaces during all but 19 hours of the more than 3,000 hours per year during which a shopping center is open. During 19 hours of each year, which are typically distributed over four peak shopping days, some patrons will not be able to find vacant spaces when they first enter the center. The recommended parking ratios are applicable for centers in which retail shops occupy at least 80 percent of the GLA.

The recommended parking ratios in Table 1 exclude centers in which 20 percent or more of occupied GLA is composed of restaurants, entertainment, and/or cinema space. The appropriate number of spaces for these centers should be determined using methodology such as that described in the Urban Land Institute's 1983 publication entitled *Shared Parking*. It defines shared parking as "parking spaces that can be used to serve two or more individual land uses without conflict or encroachment." Also, the data analyzed in this study suggest that for neighborhood and community centers, the recommended ratio may be as low as 3.7 spaces per 1,000 square feet of GLA provided

Table 1
Recommended Parking Ratios[a]

Center Size (GLA in Square Feet)	Percentage of GLA in Restaurant, Entertainment, and/or Cinema Space		
	0–10%	11–20%[b]	>20%
Less than 400,000	4.0	4.0	Shared parking[d]
400,000–599,999	4.0–4.5 sliding scale[c]	4.0–4.5 sliding scale[c]	Shared parking[d]
600,000 and over	4.5	4.5	Shared parking[d]

a Parked cars per 1,000 square feet of gross leasable area.

b For each percent above 10 percent, a linear increase of 0.03 spaces per 1,000 square feet should be calculated.

c Recommended parking ratio increases/decreases proportionally with center's square footage.

d Shared parking is defined as parking spaces that can be used to serve two or more individual land uses without conflict or encroachment.

that additional spaces are available for restaurants, entertainment, and/or cinema use. However, because of limited parking data from these centers, the recommended parking ratio of 4.0 spaces per 1,000 square feet from the 1980 study should still be used.

As shown in Table 1, when restaurants, entertainment, and cinema space combine to equal 11 to 20 percent of the total GLA, a linear increase of 0.03 spaces per 1,000 square feet for each percent above 10 percent should be calculated. For instance, a 300,000-square-foot center in which restaurants, entertainment, and cinema space account for 14 percent of the total GLA would require 4.12 parking spaces per 1,000 square feet.

Base Level:	4.0 (Spaces)
+ 4% excess restaurant, entertainment, cinema x .03 =	.12
Estimated ratio:	4.12

For recommended ratios with a sliding scale, the parking ratio increases or decreases proportionally with the center's square footage. For example, a 500,000-square-foot center with restaurant, entertainment, and cinema space constituting 10 percent or less of the total GLA would require 4.25 spaces per 1,000 square feet (halfway between the 400,000- and 599,999-square-foot ratios).

Method of Travel

The method of travel influences parking demand at a center. Employees or customers who arrive by modes of transportation other than private automobile reduce the demand for parking. The parking ratio recommendations contained in this report are for centers that are primarily auto dependent, with minimal walk-in or transit use.

Employee Parking Requirements

Parking demand for employees continues to account for approximately 20 percent of the total parking demand during the peak period. Thus, centers that require employees to park off site during the peak season could see up to a 20 percent reduction in the parking demand. However, this adjustment should be utilized with caution since centers with uncontrolled free parking often have difficulty completely enforcing employee parking.

Parking Supply Ratios

It is important in recommending parking ratios to determine the current parking supply. A series of parking supply ratios was calculated for centers with parking accumulation counts based on the number of parking spaces per 1,000 square feet. As seen in Table 2, the parking supply exceeded demand for the survey period for all center sizes. Therefore, parking demand during the design hour was not constricted by the availability of parking.

Parking Space Design

In the 1970s and 1980s, there was a trend toward smaller vehicle sizes. As stated in the 1980 *Parking Requirements for Shopping Centers*, the expectation was "that by 1990, most automobiles (60 to 95 percent) in use nationwide would be compacts." However, according to the National Parking Association (NPA), vehicles became increasingly larger in the 1990s. This trend has accelerated with the increased sales of sport utility vehicles. The NPA's last report that detailed trends in car size was published in 1996. It stated that only 39 percent of vehicles on the road were considered compact. *Dimensions of Parking*, published by ULI, provides historical automobile sales data by size of vehicle.

Given the declining number of compact vehicles, a one-size-fits-all ("universal" stall) parking space design is recommended.

Table 2
Parking Supply and Demand Ratios for Centers with Car Counts

Center Size (GLA in Square Feet)	Number of Responses	Parking Ratio (Parking Spaces per 1,000 Square Feet of Occupied GLA)	
		Supply	Demand
Less than 400,000	49	5.8	3.7
400,000–599,999	15	5.6	4.0
600,000–1,499,999	96	5.8	4.5
1,500,000–2,500,000	9	4.7	3.8
Total	**169**		

A Comparison of 1980 and 1998 Studies

The recommended parking ratios for centers under 400,000 square feet are consistent in the 1980 and the 1998 studies. However, larger centers require lower parking ratios today than those recommended in 1980. This is particularly evident in centers with 600,000 square feet or more. Table 3 compares the findings of the 1980 and 1998 studies.

Table 3
Recommended Parking Ratios: 1980 and 1998 Studies

Center Size (GLA in Square Feet)	Parking Ratio (Parking Spaces per 1,000 Square Feet of Occupied GLA)	
	1980 Study	1998 Study
Less than 400,000	4.0	4.0
400,000–599,999	4.0	4.0–4.5 (sliding scale)
600,000 and over	4.0–5.0 (sliding scale)	4.5

Note: See Table 1 explanation of sliding scale.

CHAPTER 3

Study Methodology

Questionnaire

An extensive parking questionnaire was distributed to centers of varying types and sizes across the United States. The intent of the questionnaire was to determine the general parking characteristics of shopping centers, ascertain current industry parking practices, and solicit comments on the status of parking in the centers.

The General Questionnaire is presented in Appendix B and the responses in Appendix C. Nearly 500 centers responded to the questionnaire.

Parking Accumulation Counts

The questionnaire asked centers if they were willing to participate in the collection of parking accumulation data during the 1998 holiday peak. One hundred sixty-nine centers indicated a willingness to participate. A survey team was developed to conduct these accumulation counts for a specified time and date. For approximately 35 centers, these counts were obtained via aerial photographs. Detailed instructions were provided so that the data collection process would be consistent across the country. Chapter 4 explains how the time and dates for the collection of parking accumulation counts were chosen.

Of the 169 counts, 95 percent were conducted on December 12, 1998, between the hours of 1:00 p.m. and 3:00 p.m., while the remaining 5 percent were conducted on December 19 during the same hours.

Data Analysis

Responses to the questionnaires were analyzed by center size, location, and type. Cross tabulation of the responses was used to investigate the similarities and differences between the various sizes and types of centers.

In order to calculate a parking ratio, the parking count data were plotted on a graph showing center size and number of parked cars. Both linear and nonlinear regression analyses were performed on the data plots to determine the best fit of the data. A number of different groupings of the center sizes were analyzed to make sure that variation in the groupings did not change the recommended parking ratio.

The 1998 data were compared with the 1975 and 1980 survey results.

CHAPTER 4

Determining the 20th Highest Hour

Definition of Peak Hours

Previous studies have established the 20th highest hour of the year as the appropriate hour for determining parking requirements. *Parking Requirements for Shopping Centers,* published in 1980, gave this rationale:

> This study has selected the 20th highest hour of the year as the demand hour upon which the design of shopping center parking facilities should be based. Use of this hour as the design period will result in adequate parking for all patrons and employees during the more than 3,000 hours per year a center is open. In fact, based on this design period, it is estimated that during 40 percent of the hours of the year, over half of the available spaces will be empty. However, during 19 hours of each year, distributed over ten days, some patrons will be unable to find parking spaces immediately upon entering a center.

Designing a shopping center parking facility to accommodate parking conditions during the average hour of demand would be unacceptable, since by definition, during half of the time parking would be inadequate. However, providing sufficient parking to meet conditions generated during a center's busiest hour of the year would result in substantial excess capacity during all but one hour of the year—an unrealistic design standard for the community, the consumer, and the shopping center developer/owner. This study again recommends the 20th highest hour of the year as the appropriate standard.

Selection of Survey Day and Time

Selection of the appropriate survey day and hour required evaluation of extensive data available from a limited number of centers, responses from the questionnaires, consistency with previous studies, and industry judgment. An array of electronic counting devices makes it possible to count pedestrians at entrances and exits, vehicle traffic on entry roads, and the number of vehicles parking in paid facilities. Pedestrian or vehicle traffic data were available on a daily basis from 32 centers. Another 16 centers collected data on an hourly basis, offering around-the-clock tabulations of shopping center patrons throughout the year. An analysis of the detailed pedestrian and traffic data, shown in Appendix J, determined that the afternoon of December 12, 1998, between the hours of 1:00 p.m. and 3:00 p.m., had the best chance of approximating the 20th highest hour for the study's parking accumulation counts. This survey period also was the same as that used for the 1980 study. Although December 19th was used as a backup data collection day in the event of severely inclement weather or staff shortages, only 5 percent of the parked car data was collected on that day.

CHAPTER 5

Survey Results

The base data analyzed for this study were obtained from two surveys. The first—the General Questionnaire—contained questions regarding the profile and parking characteristics of each center. The second—the Parked Car Survey—studied parked vehicles on the survey date and time selected to approximate the 20th busiest hour. The General Questionnaire was distributed to a large number of centers; the Parked Car Survey focused on fewer centers.

General Questionnaire

Initial attempts were made to select centers randomly from a database of over 3,000 shopping centers. This database was believed to be representative of shopping centers within the United States. Once the sample was selected, the survey process began. This process produced far fewer completed surveys than anticipated. Therefore, a second approach was employed.

This second approach involved eliciting the support of top management of shopping center developers. Once this top management support was established, developers selected a representative sample of their centers for inclusion in the survey. Developers were asked for a specific number of centers —typically 10 to 20 percent of their portfolio. The purpose of this sampling process was to select centers of various types located in different geographical areas. This approach produced nearly 500 completed questionnaire surveys.

Parked Car Survey

A one-time count of parked cars was conducted at 169 centers. The counts were acquired through a manual survey of the lots as well as aerial photographs taken of some centers. These counts were essential in developing parking ratios based on each center's square footage. (A parking ratio is defined as the number of parked cars per 1,000 square feet of occupied GLA.)

The Parked Car Survey had four components: the total number of on-site parking spaces; the number of vehicles that were illegally parked (including vehicles parked in areas without any striping, on grass, and in any other space outside of the marked parking spaces); the number of empty parking spaces; and the number of employee vehicles parked off site.

By adding the on-site parking capacity, the number of illegally parked cars, and the number of employees parking off site, and then subtracting the number of empty parking spaces, the total number of parked cars for each shopping center was calculated.

Definition of Center Types

The Urban Land Institute and the International Council of Shopping Centers define a shopping center as a group of retail and other commercial establishments that are planned, developed, and managed as a single property. Shopping centers are further classified for this survey into the following eight major categories:

Neighborhood center—The typical square footage for this type of center is about 30,000 to 100,000 or more. It usually includes a supermarket and/or drugstores.

Community center—Typically, this center type contains 100,000 to 350,000 square feet or more. Anchors usually consist of general merchandise stores, convenience stores, and occasionally large specialty/discount apparel stores.

Regional center—These centers have approximately 400,000 to 800,000 square feet. Department stores are the most common anchors. Regional centers customarily are enclosed.

Super regional center—Super regional centers are similar to regional centers. However, with over 800,000 square feet, they are larger than regional centers and usually have more department stores and a wider variety and assortment of stores than regional centers have.

Fashion/specialty center—At about 80,000 to 250,000 square feet or more, these centers tend to be high end and fashion oriented.

Power center—Power centers can have from 250,000 to 600,000 square feet. They usually include more category-dominant anchors, such as home improvement stores.

Theme/entertainment center—These centers, usually 80,000 to 250,000 square feet, are mainly leisure and tourist oriented.

Factory outlet center—Factory outlet centers can have anywhere from 50,000 to 400,000 square feet. Anchors at these centers typically are limited to manufacturers' outlet stores.

Response

Table 4 shows the 169 responses from the Parked Car Survey by size of center. From this data, ratios of parked cars per 1,000 occupied square feet (parking demand) were calculated.

Table 4
Centers by Size with Car Counts

Center Size (GLA in Square Feet)	Number of Responses
Less than 250,000	38
250,000–399,999	14
400,000–599,999	17
600,000–799,999	30
800,000–1,199,999	48
1,200,000 and greater	22
Total	**169**

Parking supply per 1,000 square feet of occupied GLA was also calculated.

Figures 1 and 2 show the distribution of parked car counts and questionnaire responses by center size.

Figure 1
Parked Car Counts by Center Size

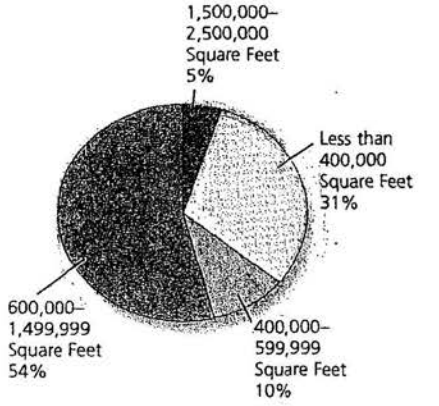
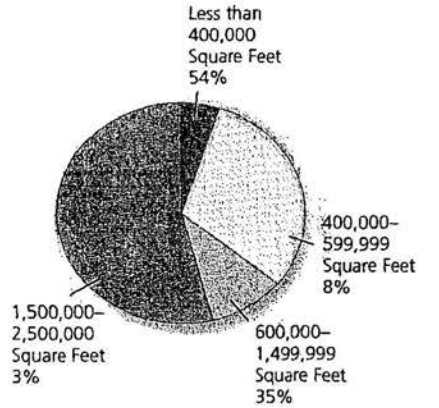


Figure 2
Questionnaire Responses by Center Size



As noted earlier, shopping centers are usually classified as specific center types based on total square footage, configuration, and store types. For this study, the respondents reported their center's square footage and type per a definition sheet included with the General Questionnaire. In most cases, the total square footage and tenant composition matched the appropriate definition. For example, most neighborhood centers had less than 100,000 square feet, with a supermarket or drugstore as the anchor tenant. Moreover, most centers classifying themselves as super regional contained more than 800,000 square feet and were anchored by department stores. However, there were a few exceptions, and in those cases the responses were edited by the consultant.

Geographic Coverage

The study is limited to shopping centers in the United States. Shopping centers from 46 states and the District of Columbia participated in the study by completing a General Questionnaire. (Alaska, Montana, North Dakota, and Wyoming had no centers that participated.) The hourly/daily counts were conducted at 32 centers in 21 states. A large number of car counts was obtained from centers in California and Texas, with 36 and 29 center surveys acquired, respectively. Arizona was represented with car counts at 11 centers, and the remaining states all had fewer than ten participants.

These responses reflect the underlying distribution of centers in those states. According to the National Research Bureau, California had 5,887 centers

in 1998—nearly twice as many centers as in the next highest state, Florida, which had 3,278 centers. Texas ranked third with 2,976 centers. Table 5 shows the geographic distribution of centers participating in the study by state. A map showing the location of the participating centers is included in Appendix H.

Table 6 classifies each state and the District of Columbia into ten regions. The first column lists the number of centers from each region that completed a General Questionnaire. The next column shows each region's responses as a percentage of the total number of responses provided for all regions combined. The third column gives the actual number of existing shopping centers for each region. The final column gives each region's centers as a percentage of the total existing centers in the United States. This table shows that the geographic distribution of participating centers is virtually the same as the distribution of all centers nationwide.

Table 5
Centers Participating in General Questionnaire, Parking Accumulation Counts, and Parked Car Surveys, by State[a]

State	Participated in General Questionnaire	Completed Parking Accumulation Counts	Provided Daily Traffic Data
Alabama	13	0	0
Alaska	0	0	0
Arizona	16	11	2
Arkansas	2	1	0
California	61	37	3
Colorado	6	2	1
Connecticut	3	0	0
Delaware	1	0	0
District of Columbia	1	0	0
Florida	30	6	2
Georgia	24	5	2
Hawaii	5	0	0
Idaho	2	0	0
Illinois	18	8	0
Indiana	3	2	2
Iowa	2	0	0
Kansas	8	3	0
Kentucky	3	1	0
Louisiana	6	0	0
Maine	5	0	0
Maryland	9	4	0
Massachusetts	7	4	0
Michigan	8	3	3
Minnesota	6	4	1
Mississippi	6	0	0
Missouri	9	2	1
Montana	0	0	0
Nebraska	11	0	0
Nevada	5	4	0
New Hampshire	5	1	0
New Jersey	6	3	1
New Mexico	5	1	0
New York	20	8	1
North Carolina	18	3	1
North Dakota	0	0	0
Ohio	13	5	1
Oklahoma	5	3	1
Oregon	6	0	0
Pennsylvania	21	2	1
Rhode Island	1	0	0
South Carolina	12	1	1
South Dakota	1	0	0
Tennessee	16	5	0
Texas	58	29	3
Utah	2	1	1
Vermont	3	0	0
Virginia	12	6	2
Washington	11	2	1
West Virginia	3	1	0
Wisconsin	2	1	1
Wyoming	0	0	0
Total	**490**	**169**	**32**

a Including District of Columbia.

Table 6
Regional Distribution of Participating Centers

Region	States	Number of Centers Completing General Questionnaire	Region's Responses as % of Total Responses	Actual Number of Centers in Each Region[a]	Region's Centers as % of Total Centers
1	Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, Rhode Island Vermont	30	6%	3,729	9%
2	Delaware, New York, Pennsylvania	42	9%	3,509	8%
3	District of Columbia, Maryland, North Carolina, South Carolina, Virginia, West Virginia	55	11%	4,810	11%
4	Alabama, Florida, Georgia, Mississippi, Tennessee	89	18%	7,114	16%
5	Indiana, Kentucky, Michigan, Ohio	27	6%	4,243	10%
6	Iowa, Minnesota, Montana, North Dakota, South Dakota, Wisconsin	11	2%	1,643	4%
7	Illinois, Kansas, Missouri, Nebraska	46	9%	3,271	8%
8	Arkansas, Louisiana, Oklahoma, Texas	71	14%	4,614	11%
9	Arizona, Colorado, Idaho, Nevada, New Mexico, Utah, Wyoming	36	7%	2,866	7%
10	Alaska, California, Hawaii, Oregon, Washington	83	17%	7,402	17%
	Totals	**490**	**100%**	**43,201**	**100%**

a Data for this column from ICSC, *Shopping Centers Today, 1998*

CHAPTER

6 Parking Demand

The completed parking counts collected by field survey and aerial photographs were linked to square footage data to develop parking ratios. These parking ratios are summarized for informational purposes for each of the major shopping center types represented. Statistical analysis was then performed to examine some of the key variables found to influence parking demand, as well as those found not to have an apparent impact.

Center Type

Average peak parking demands found in the 1998 survey are shown in Table 7, along with the median (half have higher demand, half have lower demand), and the range observed for that type of center. The parking ratio was not calculated for categories with fewer than three samples, deemed an inadequate number.

The 1980 study was made up entirely of neighborhood, community, super regional, and regional centers. Since then, there has been an emergence of new center types; theme/entertainment, power, fashion/specialty, and factory outlet centers, which are all represented in the current survey. In 1980, neighborhood and community centers accounted for 62 percent of the response distribution. In 1998, however, super regional and regional centers accounted for 64 percent of the response (Figure 3).

The four most common type of shopping centers were represented most frequently and are summarized in more detail. The data covers all centers, including those with significant proportions of restaurants, entertainment, and/or cinema space, for which adjustments are discussed below.

Twelve neighborhood centers completed surveys. The lowest peak parking

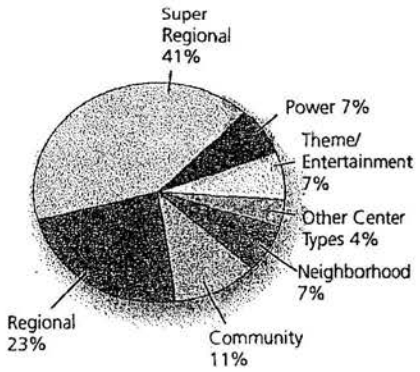
Table 7
Parking Ratios by Center Type

Center Type	Number of Centers Responding	Parking Ratio (Parked Cars per 1,000 Square Feet of Occupied GLA) Low	Median	Average	High	Standard Deviation
Neighborhood[a]	12	2.3	3.0	3.3	4.5	0.7
Community[a]	19	1.3	4.0	3.7	6.3	1.3
Regional	38	2.4	4.5	4.5	6.4	1.2
Super Regional	69	3.1	4.8	4.7	5.9	0.6
Fashion/Specialty	3	–	–	–	–	–
Power[a]	12	1.9	3.0	3.2	5.6	1.2
Theme/Entertainment[a]	12	1.5	3.6	3.5	6.4	1.2
Factory Outlet	3	–	–	–	–	–
Other	1	–	–	–	–	–
Total	**169**					

a Use data with caution, sample size was small.

Note: No data are shown where dashes appear, as sample size was too small.

Figure 3
Distribution of Parked Car Counts by Center Type



Note: The center types are defined in Chapter 5.

demand observed was 2.3 and the highest was 4.5. The average neighborhood center had 3.3 parked cars per 1,000 square feet of gross leasable area.

Figure 4 is a plot of each neighborhood center by occupied square feet of GLA (x-axis) and by the number of parked cars (y-axis).

Responses were received from 19 community centers. Peak parking demand ranged from 1.3 to 6.3 spaces per 1,000 square feet. The mean peak demand was 3.7 spaces, slightly higher than for neighborhood centers. Figure 5 is a plot of each community center by square feet of occupied GLA (x-axis) and by the number of parked cars (y-axis).

Regional centers, with 38 total responses, had a low and high parking ratio of 2.4 and 6.4, respectively, and an average of 4.5 parked cars per 1,000 square feet, significantly higher than for community centers. Figure 6 is a plot of each regional center by square feet of occupied GLA (x-axis) and by the number of parked cars (y-axis).

Super regional centers produced 69 responses. Their lowest parking ratio was 3.1, the highest was 5.9, and they had the overall highest average peak demand of all center types at 4.7 parked cars per 1,000 square feet. Figure 7 is a plot of each super regional center.

Power centers were represented with 12 completed surveys. The lowest ratio within this center type was 1.9, and the highest was 5.6. Power centers had the lowest observed peak parking demand at 3.2 parked cars per 1,000 square feet.

Figure 4
Neighborhood Centers with Car Counts

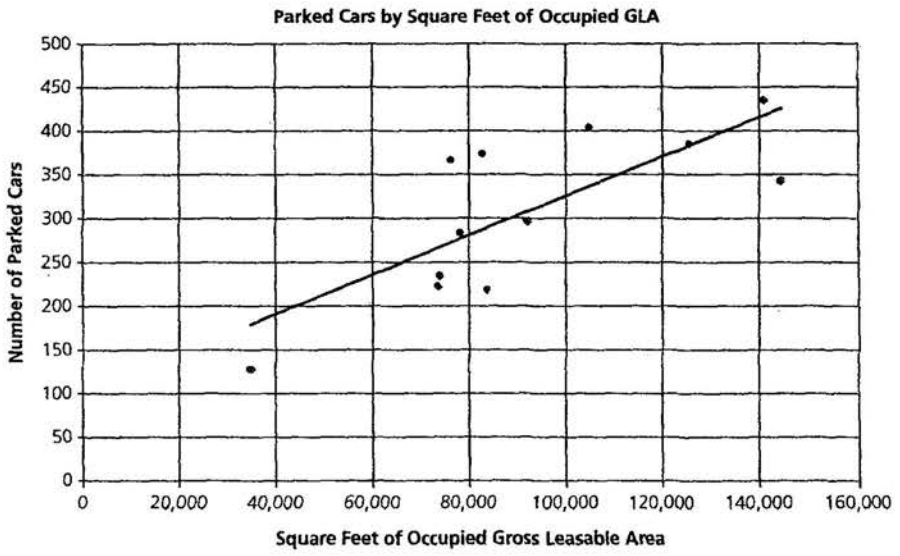


Figure 5
Community Centers with Car Counts

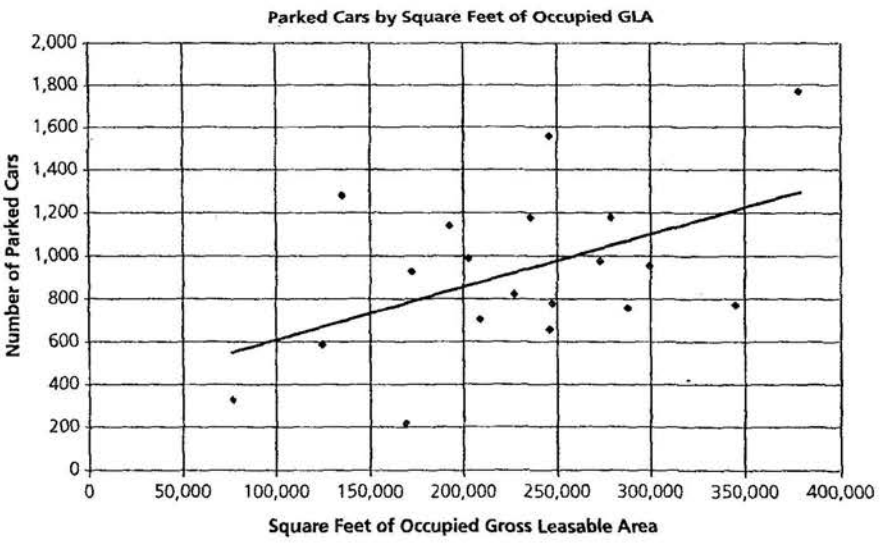


Figure 6
Regional Centers with Car Counts

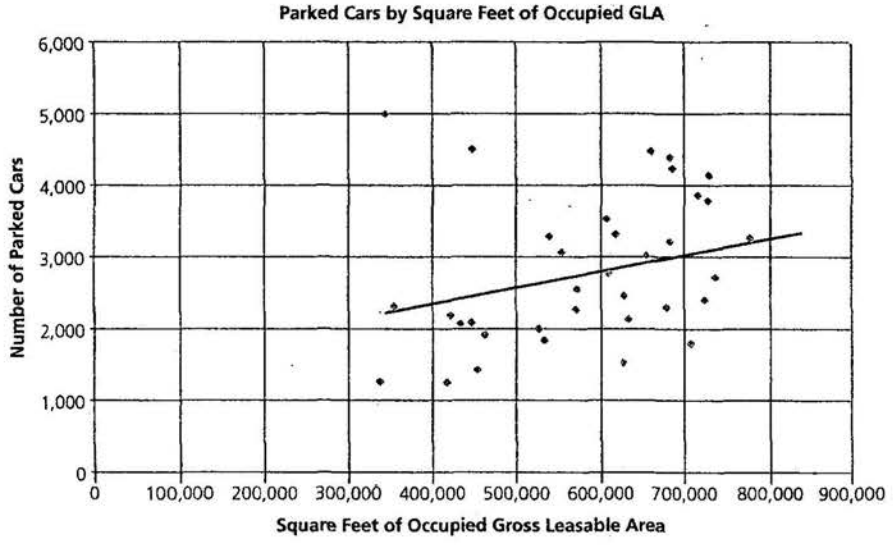
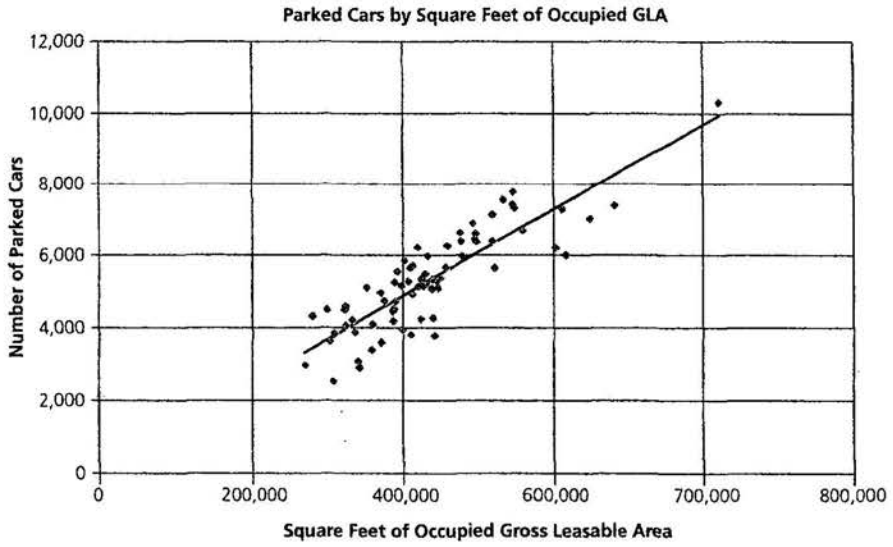


Figure 7
Super Regional Centers with Car Counts



Theme/entertainment centers were also represented with 12 surveys. Parking ratios ranged from 1.5 to 6.4 parked cars per 1,000 square feet, with an average of 3.5 parked cars per 1,000 square feet. These parking demands are lower than those of community centers, which are probably the most comparable centers in terms of size. However, because of the small sample size, it is difficult to place too much confidence in these estimates of parking demand. Moreover, as indicated below, peak parking demands for theme/entertainment centers may occur outside the traditional peak season for retailing.

Only three fashion/specialty centers completed surveys, and only three responses were obtained from factory outlet centers. Because of the small sample size, no parking ratios were calculated for these two center types.

The next section of this report stratifies the parking accumulation data by center size, which is the basis of the key recommendations in this report.

Center Size

Table 8 provides a breakdown of the number of peak hour parked cars per 1,000 square feet by size of center. Mean parking ratios are provided as well as the observed ranges in demand. The ranges represent the lowest and highest parking ratios supplied by all of the centers. The mean ratio for a center size is the average size of all centers for a category of center size.

The usable responses from 169 centers included each center's total square

Table 8
Parking Ratios by Center Size: Centers with Cinema/Restaurant/Entertainment Space Less Than 21 Percent of GLA

Center Size (GLA in Square Feet)	Number of Responses	Parking Ratio (Parked Cars per 1,000 Square Feet of Occupied GLA)			
		Low	Average	High	Standard Deviation
Less than 400,000	41	1.3	3.7	6.4	1.1
400,000–599,999	14	2.4	4.1	5.6	0.9
600,000–1,499,999	95	2.1	4.6	6.4	0.9
1,500,000–2,500,000	8	3.2	4.0	4.7	0.5
	158				

footage. The lowest parking ratio for any responding center—1.3—occurred within the smallest center size range (under 400,000 square feet). Parking ratios above 6.0 were observed for each range of center size except for centers between 1,500,000 and 2,500,000 square feet.

Parking Requirements for Centers with Minimal Restaurant, Entertainment, and Cinema Space

Peak parking demand to accommodate the survey date selected, the second Saturday before Christmas, was found to vary with the size of the center and the amount of floor space devoted to restaurant, entertainment, and/or cinema space. For those with less than 11 percent of GLA used for those purposes, the following rates apply:

The recommended parking ratio for centers with less than 400,000 square feet is 4.0 spaces per 1,000 square feet as described in Table 1. The actual parking occupancy surveys conducted as part of this analysis found a slightly lower parking ratio. However, it was decided not to use the lower ratio because of the relatively small sample size, the variety of different types of centers represented in this category, and the possibility that the centers experience parking peaks during other seasons. Only 41 retail centers meeting the criterion of containing at least 80 percent retail space were sampled, and the consensus was that this was not a large enough sample to adequately represent both the large number of centers and the wide diversity found in retail centers under 400,000 square feet.

These smaller centers could more easily contain a larger proportion of supermarkets, restaurants, cinemas, and nondepartment store type retail land uses than could larger centers. Thus they may experience their 20th highest design hour at a time other than the midday hours of one of the Saturdays before Christmas.

Because of the small sample size and the uncertainty over the actual identification of the design hour, the data did not present enough justification to modify the 4.0 spaces per 1,000 square feet ratio recommended in the 1980 study.

At centers with 400,000 to 599,000 square feet of GLA, the parking demand index increases from 4.0 to 4.5 in a linear progression as size increases. For example, a 500,000-square-foot center with restaurant, entertainment, and cinema space constituting 10 percent or less of the total GLA requires 4.25 spaces per 1,000 square feet (halfway between the 400,000- and 599,999-square-foot ratios).

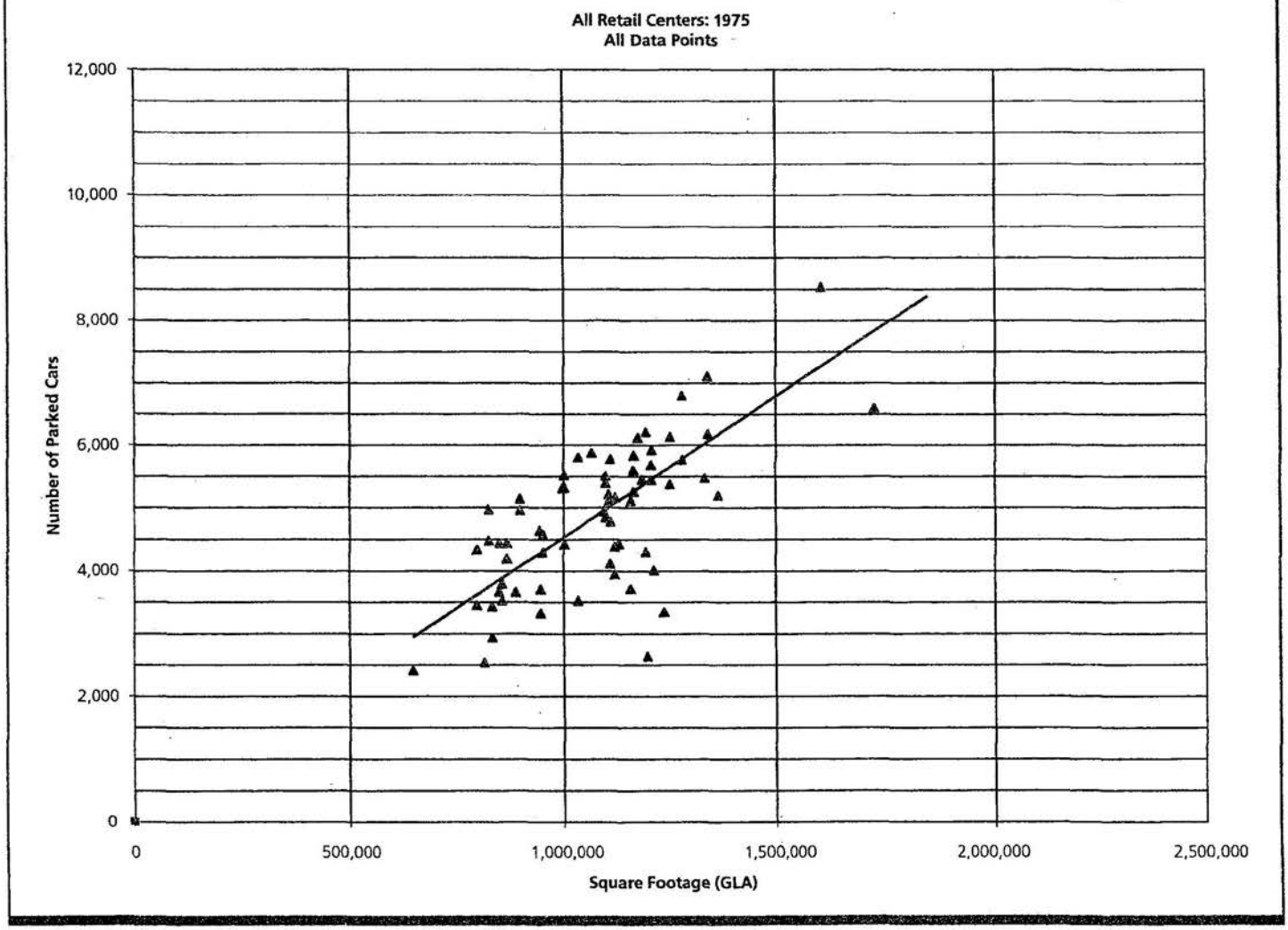
Centers larger than 600,000 square feet, up to about 1.5 million square feet of GLA, require an average of 4.6 spaces per 1,000 square feet of GLA. The parking occupancy counts included eight centers in excess of 1.5 million square feet. The parking counts at these centers suggest that the parking ratio may decrease as centers exceed this threshold. Because of the small sample size, centers in excess of 1.5 million square feet were not placed in a separate category, but the ratio reduction is worth noting.

Adjustments for centers with a greater amount of space in restaurants, entertainment, and/or cinemas will be addressed in the next section.

Comparison of 1975, 1980, and 1998 Studies

The parking ratios have undergone a significant shift since the shopping center parking study published in the May 1977 issue of *Urban Land*. The ratios determined in that 1975 study resemble the ratios from the 1998 study quite

Figure 8
Retail Center Distribution: 1975



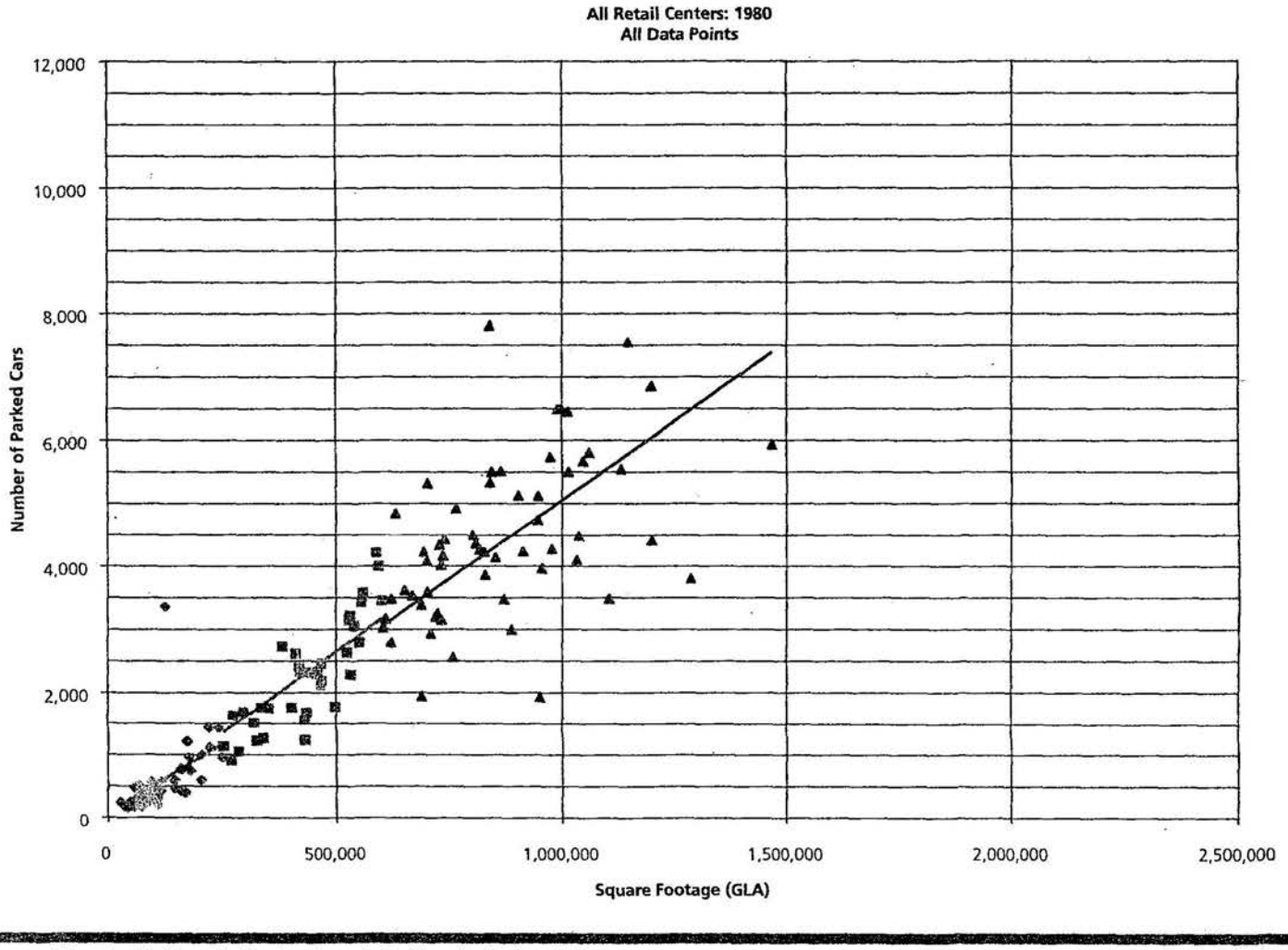
Source: *Urban Land* magazine, May 1977.

closely. However, the 1980 study determined higher parking ratios than did either this study or the 1975 study.

Figures 8, 9, and 10 present plots of each center that provided car counts for the 1975, 1980, and 1998 studies, respectively. Centers are classified and plotted by square footage (x-axis) and the number of parked vehicles (y-axis).

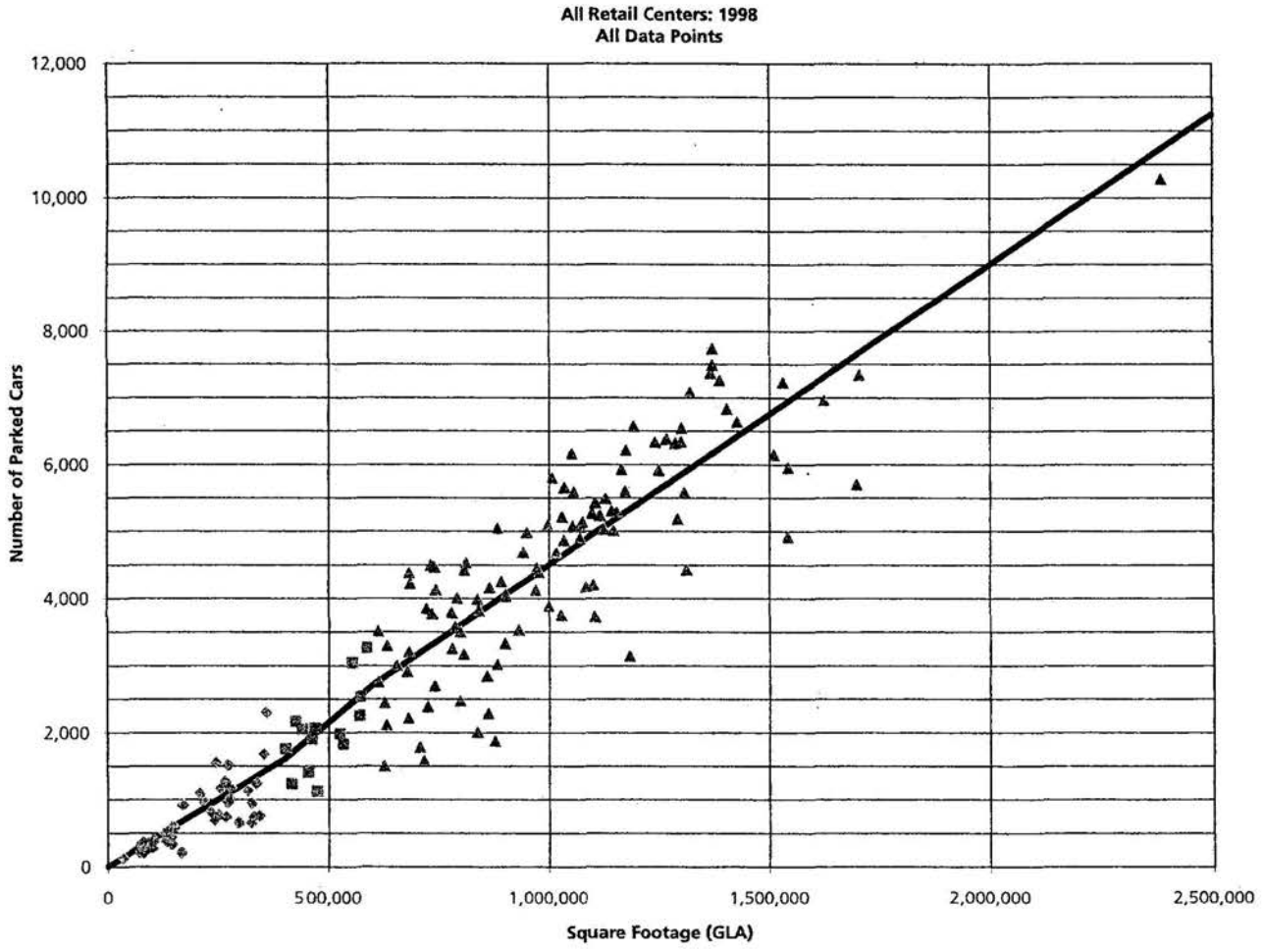
The 1975 study included only centers of 600,000 or more square feet. The linear regression for centers of this size was almost identical to the 1998 study. However, the 1980 study displayed significantly higher parking ratios for larger shopping centers. A comparison of the current study's results with those of the 1980 study indicates a trend of proportionately decreasing parking ratios as centers larger than 600,000 square feet increase in size.

Figure 9
Retail Center Distribution: 1980



Source: Urban Land Institute, *Parking Requirements for Shopping Centers*, 1982.

Figure 10
All Retail Centers: 1998 Data Points



Source: ULI/ICSC Survey, 1998.

CHAPTER 7

Special Considerations and Adjustments

Nonretail Uses

Nonretail land uses influence the overall parking needs of a shopping center. The parking ratios recommended in the previous section are valid for centers where cinema, restaurant, and entertainment land uses are less than 11 percent of the total GLA.

For centers with combinations of restaurant plus entertainment plus cinema that constitute 11 to 20 percent of the center's GLA, a simple adjustment to the base ratio must be made (Table 9). A linear incremental increase of 0.03 spaces per 1,000 square feet for each percent above 10 percent will produce a parking supply adequate to handle this combination of land uses.

When the nonretail land uses exceed 20 percent of the center's GLA, the parking ratios recommended in Table 9 are no longer applicable. With these combinations of land uses, a special methodology is required, such as that found in the Urban Land Institute's *Shared Parking*. The *Shared Parking* methodology allows for an identification of the peak parking demand for different combinations of land uses.

For centers with large (20 percent or more of GLA) restaurant, entertainment, and cinema components, the peak parking demand may not occur at the same time on Saturday as it does for more conventional retail-based regional shopping centers. Moreover, the peak parking demand at these types of centers may not even occur during the December holiday shopping period, but rather during weekends when the cinema activity is at its highest.

Table 10 shows parking demand at four centers on two Saturdays: one in December and the other in March. A majority of the floor area for two of these centers consisted of restaurant, entertainment, and/or cinema tenants. By comparison, less than 20 percent of the floor area in the other two centers was comprised of these tenants. At 8:00 p.m. on Saturday, March 27, 1998, the centers heavily occupied by the restaurant, entertainment, and cinema tenants experienced significantly higher parking occupancy levels than did these same centers on Saturday, December 12, 1998. The two centers leasing less than 20 percent of their space to restaurant, entertainment, and cinema uses had higher parking occupancies on Saturday, December 12, 1998, than on March 27, 1998.

For example, at the 400,000-square-foot shopping center where 72 percent of the total GLA was occupied by restaurant, entertainment, and/or cinema uses, the parking occupancy counts differed markedly by season. The center was more than two-and-a-half times busier during a Saturday evening in March than during the afternoon of Saturday, December 12, 1998.

Table 9
Parking Ratio Adjustments

Center Size (GLA in Square Feet)	Parking Ratio (Parked Cars per 1,000 Square Feet of Occupied GLA)	
	Percentage of GLA in Restaurant, Entertainment, and/or Cinema Space	
	11–20%	>20%
Less than 400,000	4.0[a]	Shared parking
400,000–599,999	4.0–4.5 sliding scale[a]	Shared parking
600,000 and over	4.5[a]	Shared parking

a For each percent above 10 percent, a linear increase of 0.03 spaces per 1,000 square feet should be calculated.

Note: Sliding scale and shared parking are defined in Table 1.

Cinemas with 12 to 30 screens were extremely rare in the mid-1980s when ULI's shared parking research was first conducted. The development pattern of cinemas has changed dramatically since then. The appendices of this report contain more updated data on the weekday/weekend peak demand, hourly and seasonal variation in cinema parking usage.

Table 10
Weekend Parking Demand for Four Centers, December and March 1998

Center Size (GLA in Square Feet)	Percentage of GLA Occupied by Restaurant, Entertainment, and Cinema Space	Percentage of 12/12/98 Demand		
		Sat. 12/12/98 1:00 p.m.	Sat. 3/27/1998 1:00 p.m.	Sat. 3/27/1998 8:00 p.m.
1,840,000	6%	100%	66%	19%
568,500	18%	100%	66%	85%
873,750	55%	100%	127%	143%
400,000	72%	100%	98%	253%

Nonautomobile Travel

The parking studies conducted in 1998 included counts at centers that were served primarily by automobile. In the vast majority of centers, 90 to 95 percent of shoppers arrived by automobile. Shopping centers with significant amounts of walk-in trade from nearby businesses or neighborhoods may require less parking, and these ratios can be adjusted proportionally. However, centers with 90 percent or more of their employees and patrons arriving by private vehicles require no adjustments to the peak demands reported here.

Employee Parking

Based on the data that centers provided for this study, parking demand by employees continues to make up approximately 20 percent of all parking demand during the peak period. At centers where employee parking is located off site during the peak season, parking demand could be 20 percent lower, thus helping to accommodate peak-period parking for customers.

Centers that have the ability to prohibit employee parking on site may be able to reduce the 20 percent employee parking considerably. For example, shopping centers that charge for parking and issue their employees key cards or passes allowing them entry to the parking facility could, with modern equipment, void the passes during the peak shopping season. Under this scenario, employees could be "forced" to park in the designated areas off site.

Centers that have uncontrolled, free parking may not be as successful at keeping employees parked off site. They can only encourage their employees to do so. The parking ratio reduction for those centers would be proportionally less.

Parking Lot Design

The trend in today's parking design is away from a mix of compact and full-size parking spaces and toward a universal, "one-size fits all" parking space dimension. This universal space has been shown to be an effective parking design technique. Not only are today's large cars smaller than those of the past, but the current mix of vehicles means it is likely that a large car will be parked next to a small car, providing an additional comfort margin. Shopping center parking design should take advantage of the universal space. The resulting parking lot would be more convenient for customers because no compact spaces would be abused or left vacant. Consequently, it would be a more efficient parking design (offering a higher number of effective parking spaces). *Dimensions of Parking* (published by ULI) more fully explores this trend.

Short-term parking facilities require a greater level of parking ease and convenience because the patron is making only a brief stop and is probably unfamiliar with the parking facility. Short-term parking locations usually require a greater parking angle and wider parking stalls and drive aisles. Such would be the case for shoppers at neighborhood convenience centers, for example. For longer-term parking, such as that needed for employees, the user generally is familiar with the facility and able to negotiate a tighter configeration.

CHAPTER 8

Profile of Participating Centers

The General Questionnaire included four core components: "Information for This Center," "Parking at This Center," "Transit at This Center," and "Additional Data on This Center." A total of 490 questionnaires were acquired from center managers across the United States. The responses are summarized below. A complete presentation of the responses is included in Appendix C, General Questionnaire Results.

Shopping Center Location

The first question dealt with shopping center location; 483 participants responded to this question and seven left it unanswered. According to the responses, 39 percent of the centers were located in a suburban setting; 30 percent in an urban setting; and 23 percent, in a large urban area (population greater than 250,000). Only 6 percent classified their center as being in a rural/highway nonurban area, and an additional 2 percent were classified as "other."

Shopping Center Type

Shopping center types are defined in terms of square footage and anchor tenants (see Chapter 5). Of the 490 General Questionnaires received, 489 centers categorized their center type, and one center did not answer the question. Of the total responses, 28 percent were from neighborhood centers, 23 percent were from community centers, 21 percent were from super regional centers, and 15 percent were from regional centers. These four center types represented an overwhelming majority of the participants.

The remaining five center types were found in a combined total of 12 percent of all respondents. Six percent of the questionnaires were returned from power centers, and fashion/specialty centers represented 2 percent of the total completed questionnaires. Respondents from an additional 2 percent of the centers stated they were factory outlet centers, and 1 percent believed that they fell into the "other" category. The smallest number of responses came from theme/entertainment centers, which constituted only 1 percent of all respondents.

CHAPTER 9

Parking Characteristics of Participating Centers

The following section addresses parking operations and patterns for each of the shopping centers.

General Parking Characteristics

Overall, few shopping centers accommodated patrons with spaces in a parking garage or parking structure. In fact, 85 percent of the 490 centers did not have either of these parking configurations. Thirteen percent of the centers said they did have one of these types of parking facilities, and 2 percent did not answer the question.

Parking Fees and Validation

Patrons were rarely charged for parking. In 94 percent of the returned questionnaires, respondents indicated there was no parking charge to the customer. Only 2 percent of the centers verified a parking charge, while the remaining 4 percent left the question unanswered. All centers that did charge for parking were located in large urban areas.

Moreover, 86 percent of the centers did not have a parking validation program. Two percent did. This is logical since few centers charged for parking at all. The question was left unanswered by 12 percent of the respondents, presumably because they had no parking charge and thus felt the question was not applicable.

Valet parking was another rarity. Eighty-three percent of the shopping centers surveyed did not offer any type of valet parking program, whereas 4 percent did. The question was not answered by 13 percent of the respondents.

Managers' Views of Parking

Center managers were asked to record the number of days per year that on-site parking was fully occupied. Seventy-seven percent of all the responding centers based their response on general observation, while 12 percent based it on previous occupancy counts. Eleven percent of all centers did not clarify their basis for response. The most common response, from 43 percent of the centers, was that on-site parking was never fully occupied. However, 26 percent of the centers said that the parking lots were fully occupied at least ten or more days of the year, indicating a wide variance among the participating centers. About 18 percent of the centers believed parking was at capacity from four to nine days of the year, while the remaining centers (10 percent) had fully occupied parking from one to three days. Three percent did not answer the question. Table 11 provides a breakdown of the number of days that parking was fully occupied for each center size range.

Table 11 provides evidence that suggests that larger centers tend to have more problems with inadequate parking compared with smaller centers. For example, 58 percent of the centers with less than 400,000 square feet reported "never" experiencing a day when parking exceeded 85 percent occupancy. By comparison, only 14 percent of centers with 600,000 to 1,499,999 square feet reported "never" experiencing a day with capacity parking (above 85 percent occupancy). Moreover, 18 percent of centers with less than 400,000 square feet reported that they experienced "ten or more" days annually where parking occupancy exceeded 85 percent. Comparatively, 45 percent of centers with 600,000 to 1,499,999 square feet reported parking occupancies exceeding 85 percent ten or more days of the year.

Peak Demand

Following the question concerning the number of days during which on-site parking was fully occupied, center managers were asked if this peak parking demand was associated with a special event, seasonal/holiday activity, or a combination of both. Sixty-three percent responded that seasonal/holiday activity was the main reason for peak demand, whereas only 3 percent responded that special events created heavy demand. Twenty-two percent

Table 11
Annual Number of Days with Capacity Parking (Above 85 percent)

Center Size (GLA in Square Feet)	Number of Responses							
	Never	One	Two	Three	Four to Six	Seven to Nine	Ten or More	Total
Less than 400,000	170	9	7	16	26	14	53	**295**
400,000–599,999	15	0	3	3	5	1	10	**37**
600,000–1,499,999	18	1	9	8	26	9	58	**129**
1,500,000–2,500,000	0	0	1	2	1	1	3	**8**
Total	203	10	20	29	58	25	124	**469**

of the centers replied that it was a combination of both that spurred the fully occupied parking lots.

Center managers were asked to describe specific dates and/or circumstances in which peak demand occurred. Although many of these dates and circumstances varied, some of the more common responses were the following: weekends; holidays; day after Thanksgiving; weekends in December; days before forecasted snow; and back-to-school sales.

Transportation Management Associations

A transportation management association is an establishment that helps employers reduce traffic concentration and travel demand. Associations are usually formed in densely developed business districts with worsening roadway congestion. Few shopping centers that participated in the study took part in a local or regional transportation management association (only 11 percent), while 85 percent did not. Four percent of the centers did not answer the question.

Employee Parking

Eighty-seven percent of the centers surveyed allowed employees to park on site during off-peak seasons. Moreover, 66 percent indicated that there were no specific reserved spaces for employees. For the 34 percent that did offer reserved spaces, both the number and location of the spaces varied. Typically, however, the reserved spaces were located in remote lots and around the outer periphery of the property, allowing customers to have prime parking access to department stores and main entrances. Employees were charged for parking in only seven of the centers surveyed (1 percent). All seven centers also charged patrons to park, and each center was equipped with a parking structure. Six of the seven centers were located in a large urban setting, and the remaining center was situated in an urban setting. During peak shopping times, employees were asked to park in a different location, according to 36 percent of the returned questionnaires.

Handicapped Parking

Seventy-seven percent of the respondents had few problems with violation of handicapped parking; 17 percent felt that violations occurred with regularity. The question was not answered by 6 percent of the participants. Also, 77 percent of the respondents stated that there were no designated spaces for compact cars. (See Chapter 1 on parking implications of the compact car.)

Adjacent Land Use

Adjacent property and land use can have a significant impact on the parking needs of shopping centers. For example, heavy demand for parking on an adjacent property can produce overflow into a shopping center's parking lots, thus depleting the parking supply. Conversely, some shopping centers have been able to benefit from adjacent properties with a parking surplus during times of peak shopping. For one particular center, an adjacent office superstore had enough parking surplus to accommodate the shopping center's patrons during times of inadequate parking.

Parking Problems

Most shopping centers (73 percent) indicated that parkers from adjacent properties or land uses did not park frequently on their property. Six percent of the centers agreed that when this does happen, it significantly lessens parking availability for their shoppers. However, 75 percent of the centers left this second question unanswered.

Only 28 percent of all returned questionnaires answered whether or not any action had been taken to curb unauthorized parking. Eighteen percent agreed that some sort of action had been taken,

whereas 10 percent said there had been no action taken. Those that had made an attempt to curb unauthorized parking had done so by means of:

- Ticketing
- Towing
- Written warnings
- Booting
- Signage.

In addition to parking problems caused by adjacent properties or land uses, centers reported the following parking problems:

- Poor lighting in lots
- Vehicles speeding through lots
- Difficulty educating customers that parking is available in other lots
- Fire lane violations
- Enforcing employee parking regulations
- Vehicles occupying more than one parking space
- Abandoned cars
- Snow removal
- Cleanliness
- Vandalism
- Traffic accidents.

Only 10 percent of all centers that returned the questionnaire had seen the need to increase their parking for reasons other than expansion of tenant floor size. Seventy-four percent said that an increase was not necessary, and 16 percent provided no answer.

Transit Service

Thirty-six percent of the responding centers had scheduled bus service to the shopping center area, a surprisingly high rate of transit access in light of the relatively negligible use of transit to most shopping centers. Five percent had scheduled train service. For all of the centers with scheduled bus service to the center property, the following amenities were provided for transit patrons:

- 75 percent provided a shelter or canopy
- 82 percent were equipped with seating
- 72 percent provided signage for bus schedules and routes
- 20 percent had an interior waiting area
- 31 percent had plantings
- 13 percent provided park-and-ride or commuter parking
- 1 percent arranged for connection to the transit system
- 9 percent indicated an amenity not included on the questionnaire.

Completed Questionnaires by Center Size

Overall, centers from each size range participated by completing a General Questionnaire. By far, centers under 400,000 square feet returned the greatest number of questionnaires. In fact, this size range constituted 44 percent of the total respondents for the study. Centers with 600,000 to 1,499,999 square feet were next with 29 percent of the total respondents. Seven percent of the respondents listed their center size between 400,000 and 599,999 square feet. Lastly, centers with 1,500,000 to 2,500,000 square feet constituted 2 percent of all the participating shopping centers.

Seventeen percent of the respondents did not report their total square footage. These figures are shown in Table 12.

Parking Supply

To determine whether parking demand during the design hour was constricted by the availability of parking, the number of parking spaces provided per 1,000 square feet—the parking supply —was evaluated.

The following parking supply ratios are figured for centers based on setting and

Table 12
Questionnaire Responses by Center Size

Center Size (GLA in Square Feet)	Number of Centers Responding	Proportion of Respondents
Less than 400,000	218	44%
400,000–599,999	33	7%
600,000–1,499,999	142	29%
1,500,000–2,500,000	12	2%
Subtotal	405	83%
Not answered	85	17%
Total	**490**	**100%**

type; they include the extreme low and high, as well as the average, for each center type.

The parking supply ratios were first examined in terms of center type. Community centers provided the lowest number of parking spaces per 1,000 square feet (4.7); theme/entertainment and factory outlet centers provided the highest number of spaces (5.4 each). The sample size for the theme/entertainment and factory outlet centers was small so the findings should be viewed with caution. Parking supply ratios by center type are shown in Table 13.

The parking supply ratios were also calculated for each center size. Centers with 400,000 to 599,999 square feet provided the highest average number of parking spaces per 1,000 square feet, with 5.5. Conversely, centers between 1,500,000 and 2,500,000 square feet offered the lowest average number of spaces per 1,000 square feet, with 4.6. Parking supply ratios by center size are shown in Table 14.

In conclusion, the parking supply is higher than the parking demand by an average of almost a full space per 1,000 square feet of GLA for centers smaller than 600,000 square feet, and by about half a space for larger centers. This suggests that the parking supply is not constricting demand. Moreover, it suggests that building more parking spaces will not result in increased traffic volumes and, subsequently, in increased sales at centers.

Table 13
Parking Supply Ratios by Center Type

Center Type	Number of Centers Responding	Parking Ratio (Parking Spaces per 1,000 Square Feet of Occupied GLA)			Standard Deviation
		Low	Average	High	
Neighborhood	121	1.4	4.9	8.6	1.2
Community	104	0.6	4.7	11.7	1.4
Regional	69	2.2	5.3	7.3	1.0
Super Regional	97	3.4	5.0	6.4	0.5
Fashion/Specialty	7	4.6	5.3	6.0	0.5
Power	23	2.4	5.2	7.4	1.2
Theme/Entertainment	15	3.0	5.9	12.1	2.0
Outlet	8	3.4	5.4	8.9	1.8
Other	6	3.1	4.6	6.6	1.6
Total	**450**				

Table 14
Parking Supply Ratios by Center Size

Center Size (GLA in Square Feet)	Number of Responses	Parking Ratio (Parking Spaces per 1,000 Square Feet of Occupied GLA)			Standard Deviation
		Low	Average	High	
Less than 400,000	286	0.6	4.9	11.7	1.3
400,000–599,999	37	3.3	5.5	12.1	1.5
600,000–1,499,999	141	2.7	5.1	7.3	0.7
1,500,000–2,500,000	11	4.1	4.6	5.1	0.3
Total	**475**				

CHAPTER

10

Case Studies

Fifteen different shopping centers were selected as case studies. The selected centers completed a questionnaire regarding their size, transit service (if applicable), surrounding land use, tenant classifications, and parking conditions. Each participating center was chosen based on regional location, center type, and owner/managing company. Consequently, the distribution of shopping centers in the case studies reflects the diversity of centers in the full study.

While the level of parking demand was not a factor in selecting the case studies, it was discovered that eight of the 15 case study centers experienced parking demand higher than the recommended ratios. Thus, they offer some practical examples of coping with higher-than-expected parking demands, a happy circumstance if it translates into more business. For two of these eight centers, the peak demand found during the survey period was slightly higher than the recommended ratios, but statistically virtually the same. For three of the eight centers, the data collection time period—1:00 p.m. to 3:00 p.m. on December 12, 1998—was busier than the 20th busiest hour. (It was possible to discover this since these centers also had continuous counting programs.)

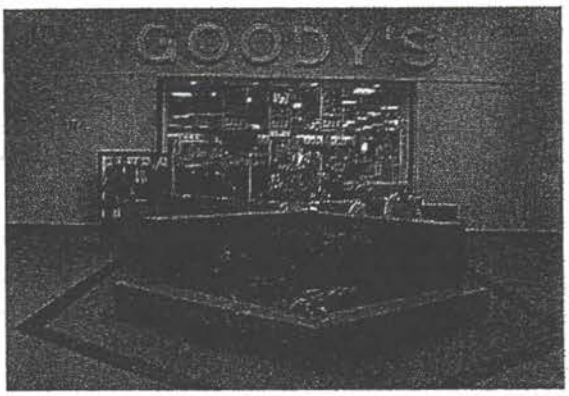
Shady Brook Mall

The Shady Brook Mall is a small, enclosed community center in the historic city of Columbia, Tennessee, population 32,043. Columbia is situated approximately 45 miles south of Nashville in the heart of Maury County. Tourist attractions include former U.S. president James K. Polk's ancestral home. Every year during the first week in April, the Mule Day Parade attracts nearly 200,000 spectators and generates increased activity at the Shady Brook Mall.

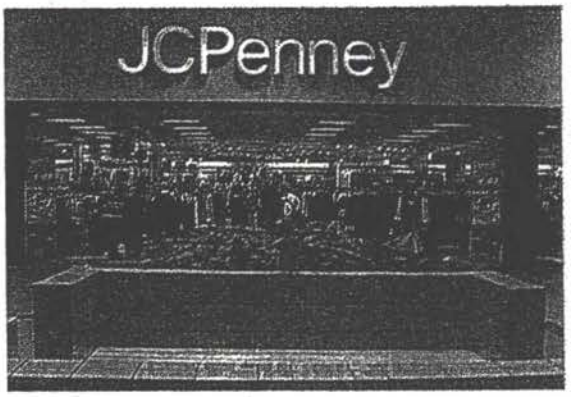
The total site area of the Shady Brook Mall is 1,324,660 square feet. Four major tenants occupy about 62 percent of the center's 282,272 square feet of GLA: Sears (63,156 square feet), JC Penney (51,324 square feet), Peeble's (38,010 square feet), and Goody's (22,500 square feet). There is no office space or restaurant service within the premises, and no cinema is present on the immediate grounds. However, an 11-plex cinema is in very close proximity, and it does occasionally affect parking demand at the mall even though it has no direct relation to the mall. The surrounding land use is commercial.

The site is anchored at the corner of Lawrence Street and the Columbia Bypass. The center's 1,558 parking spaces provide a parking supply of 6.3 spaces per 1,000 square feet of occupied GLA. There were 1,556 parked cars during the survey day, yielding a parking demand of 6.3 parked cars per 1,000 occupied square feet. There is no transit service to the center.

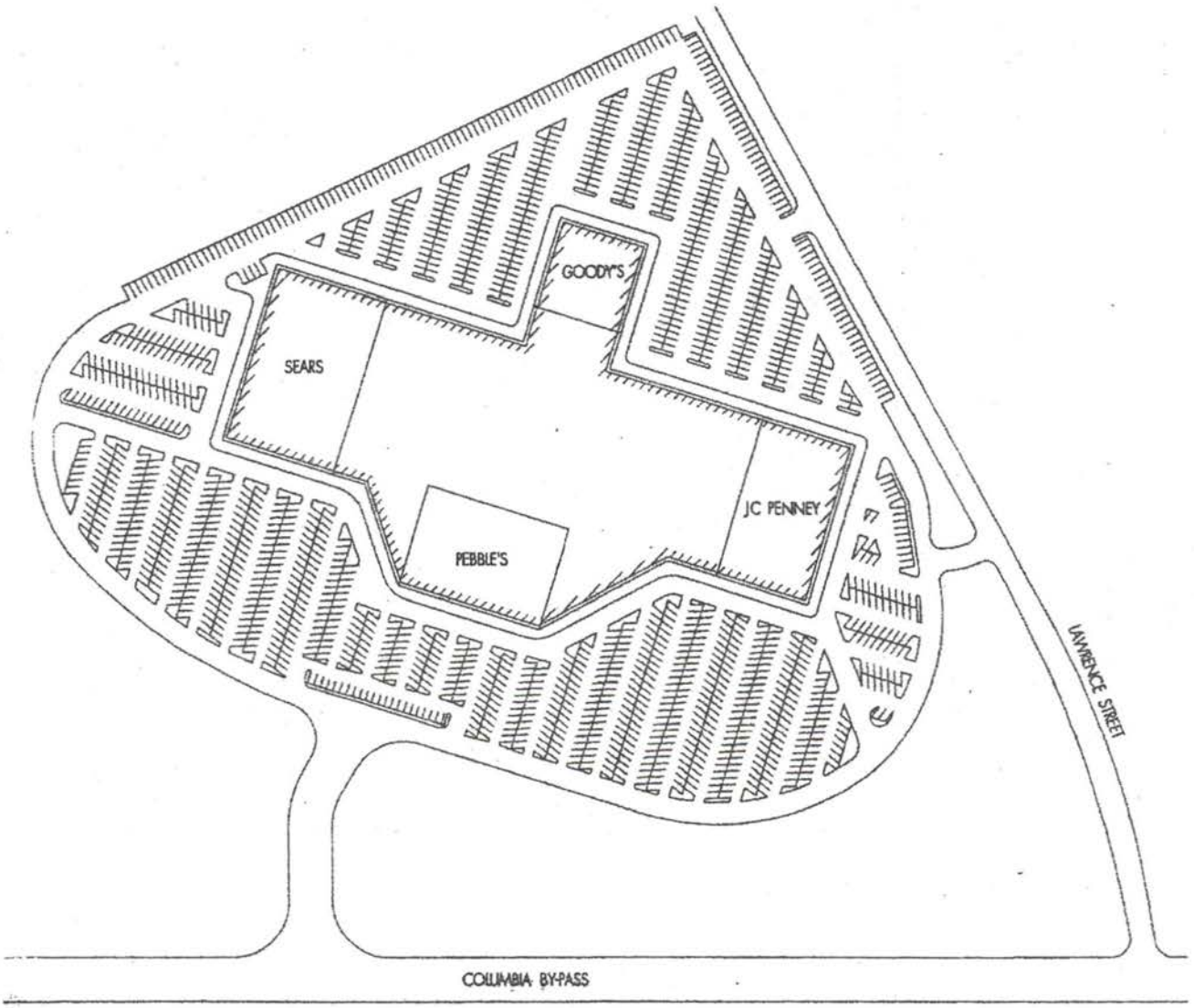
Shady Brook Mall



Interior View: Goody's



Interior View: JCPenney

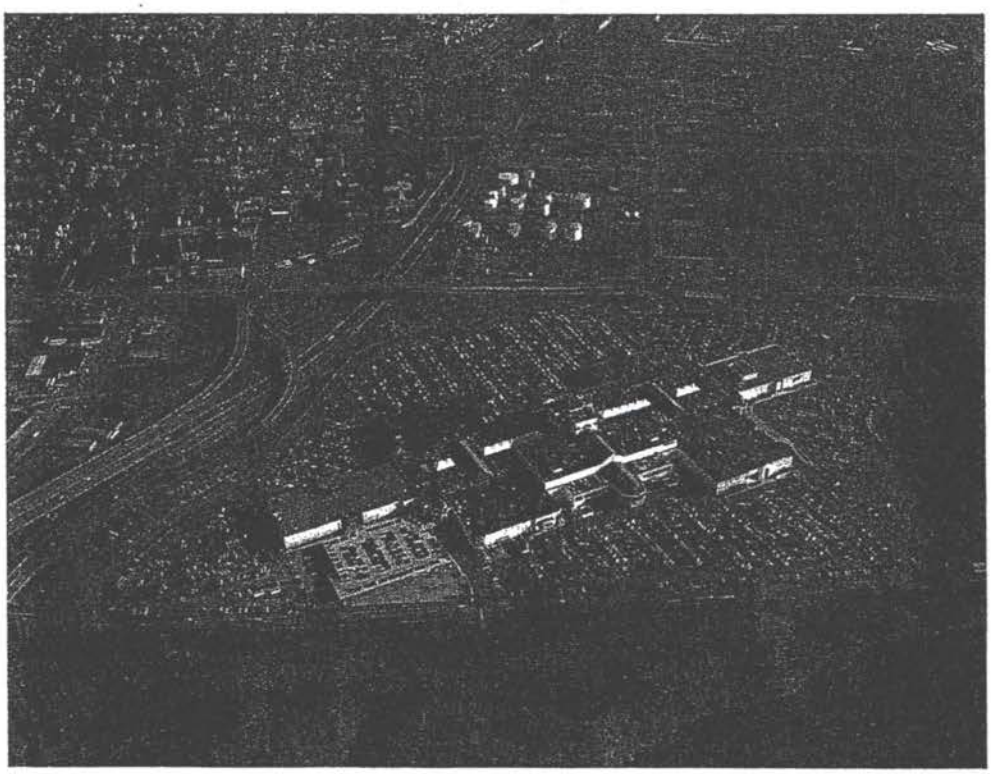


Carousel Center

The Carousel Center, a super regional center just north of downtown Syracuse, New York, is one of the largest centers examined in this study. Its urban setting has undergone major redevelopment since 1988. The redevelopment area covers more than 800 acres in the downtown and surrounding areas. More than $1.5 billion in public and private funding has transformed Syracuse, previously known as the "Oil City," into one of the most dynamic redevelopment areas in the country. The parking and transportation needs of the Carousel Center have been significantly affected.

The center is surrounded on the northwest and southwest by Onondaga Lake. Interstate 81 provides an anchor along the northeast boundary. Hiawatha Boulevard runs along the southeast border. The Carousel Center has a total site area of about 77 acres. Major tenants include JC Penney, Lord & Taylor, Kaufmann's,

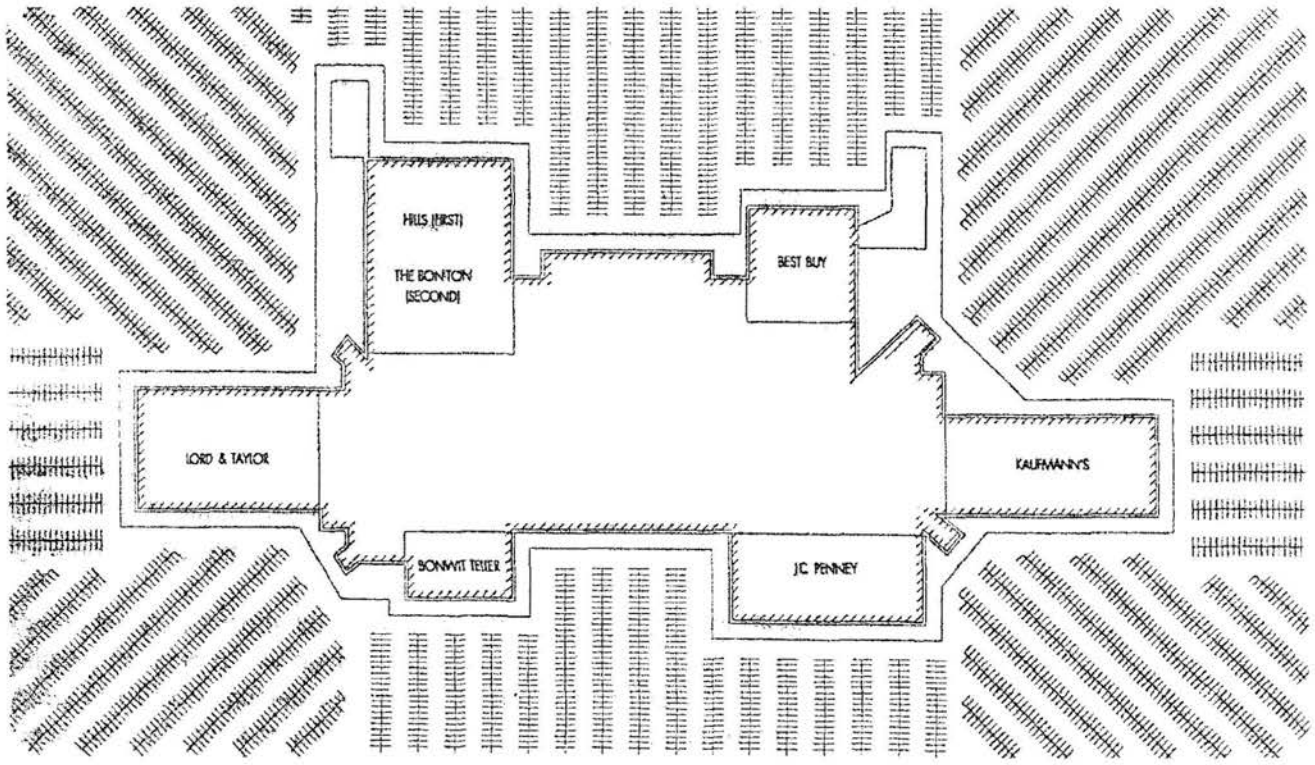
Carousel Center



Aerial View

Bon-Ton, Bonwit Teller, Best Buy, and Hills. These major tenants occupy slightly less than half of the 1,531,972 square feet of GLA. Additional tenants include a 19-plex cinema (76,000 square feet) and 18 restaurants (63,489 total square feet). Only 50,732 square feet are vacant. The surrounding land use is commercial.

The Carousel Center has a parking supply of 7,172 spaces, yielding a parking supply ratio of 4.7 spaces per 1,000 occupied square feet. Parking during the survey day generated a demand of 4.7 parked cars per 1,000 square feet of occupied GLA. To diminish the demand for parking, the center strongly promotes the Centro Bus Stop transit service to its patrons and offers the On-Track Rail Platform.



The Showcase

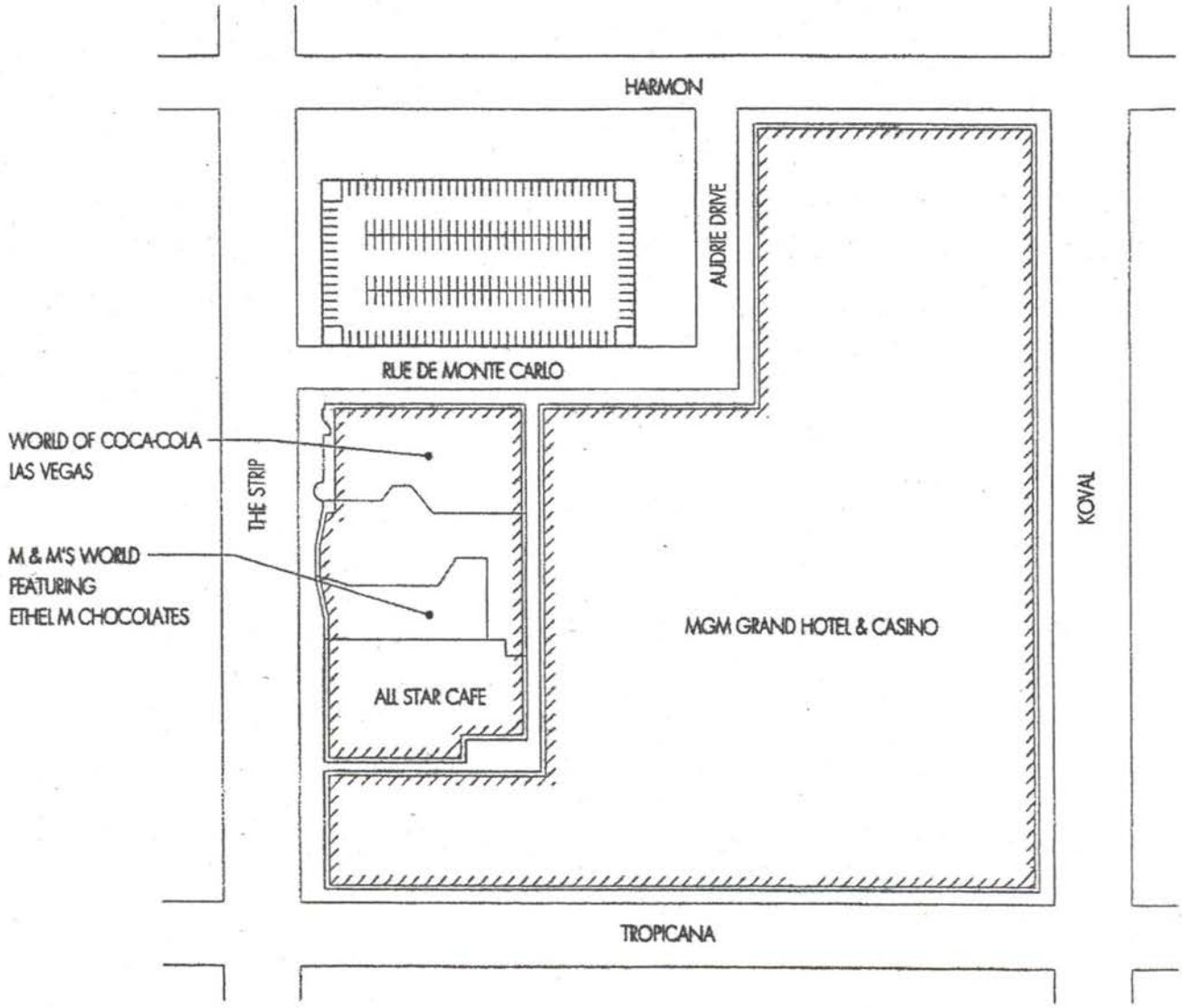
The Showcase is a theme/entertainment center on the lower Las Vegas Strip, directly in front of the MGM Grand Hotel and Theme Park. With its ostentatious appearance, select major tenants, and location in the heart of the city, the Showcase is marketed almost entirely as a tourist attraction. It is managed by Forest City. According to managing officials at the Showcase, there is less tourist activity during the holiday season in Las Vegas than during the rest of the year. Consequently, during the survey day of the study, parking demand at the Showcase was much less than normal.

The Showcase has 200,366 square feet of GLA. Only 2,358 square feet were left vacant at the time of this study. Casinos, restaurants, and retail stores surround the center. All of the occupied GLA is maintained by five major tenants: the World of Coca-Cola (33,563 square feet), M & M World/Ethel M. Chocolates (28,486 square feet), GameWorks (47,161 square feet), the All Star Café (36,172 square feet), and United Artists Cinema (52,226 square feet).

Due to the slowness of the tourist season in Las Vegas during the holidays, the design-hour parking demand at this center was very light. Over 7.2 spaces per 1,000 square feet of occupied GLA are included in the parking supply, and only 2.1 parked cars per 1,000 square feet of occupied GLA were observed on the survey day. The entire parking supply is located in a parking structure. A flat rate of $2 per day is charged for parking. According to management, adequate parking is available at the Showcase on all but one day of the year. There is no transit service to this center.


ALLSTARCAFE
ALLSTARCAFE

East Wing

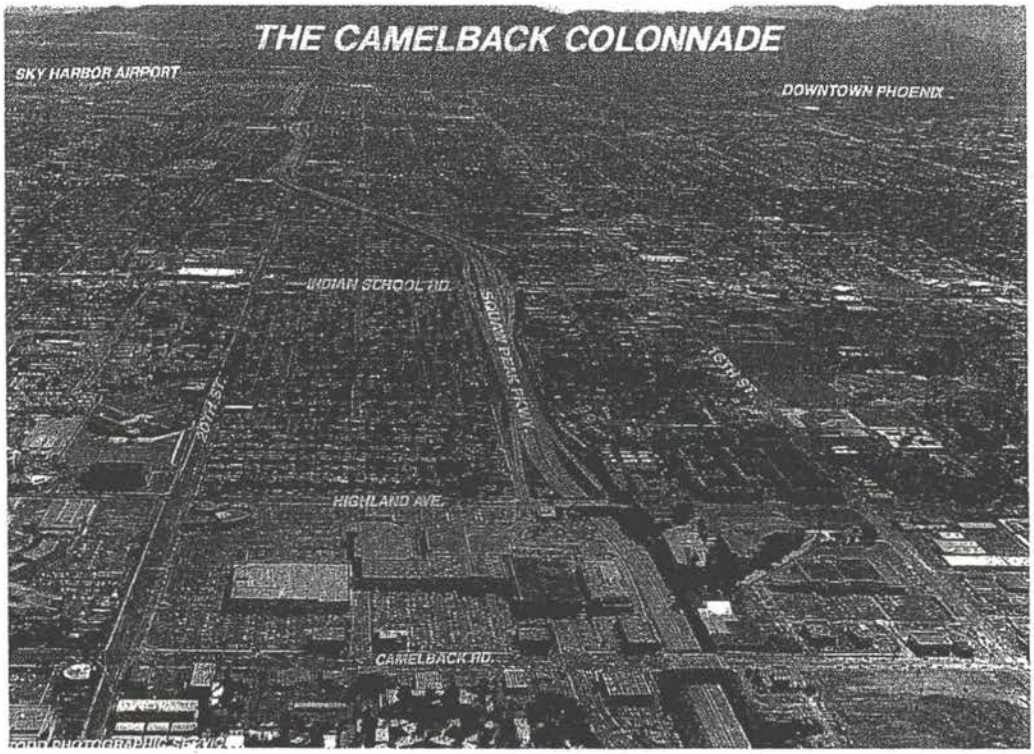

HARMON
AUDRIE DRIVE
RUE DE MONTE CARLO
WORLD OF COCA-COLA
LAS VEGAS
M & M'S WORLD
FEATURING
ETHEL M CHOCOLATES
THE STRIP
ALL STAR CAFE
MGM GRAND HOTEL & CASINO
KOVAL
TROPICANA

Camelback Colonnade

The Camelback Colonnade, managed by the Westcor Company, was developed in several phases beginning in 1963. Designed as an enclosed mall, it was partially demolished and renovated in 1994 and 1995, resulting in an open-air power center with about 15,000 square feet of enclosed common area. This center has some second-level office space leased to a major telecommunications company, 12 anchor tenants, and a ministorage warehouse in the basement.

The Camelback Colonnade is situated at the southwest corner of 20th Street and Camelback Road in Phoenix, Arizona. The center also has substantial frontage on Highland Avenue. Access at the south entrance is provided by an off-ramp from the Squaw Peak Parkway along Highland Avenue.

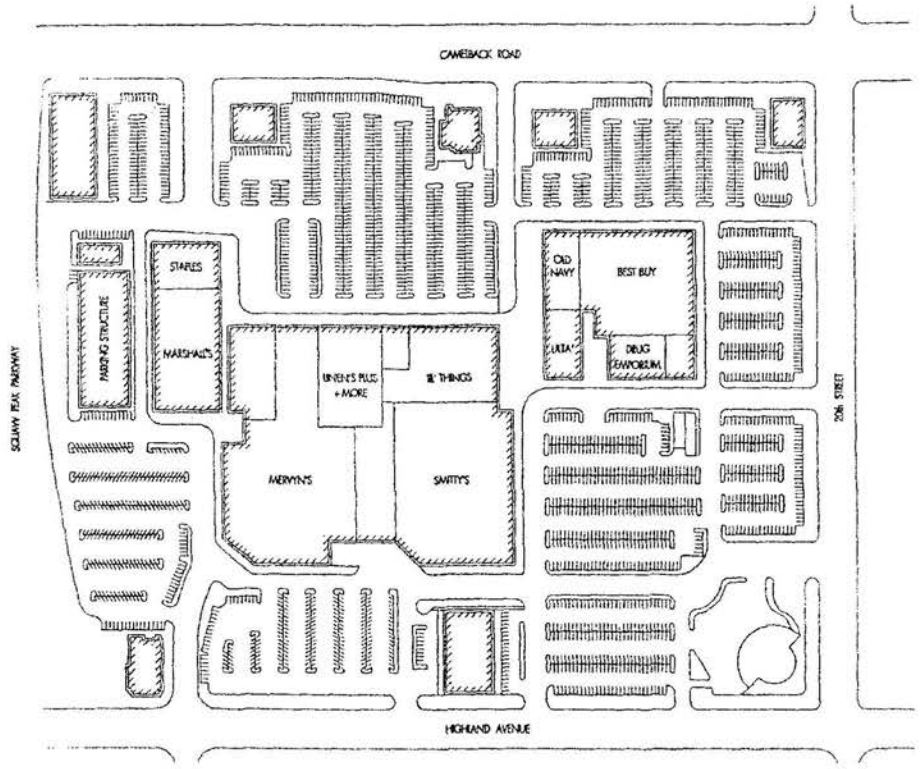
Camelback Colonnade



Aerial View

The total site area is 1,785,731 square feet, and the total occupied GLA is 607,078 square feet. Approximately 22,346 square feet are left vacant. Mervyn's, Smith's, Best Buy, and Last Chance are the four largest tenants, occupying over 38 percent of the total GLA. Other major tenants include Marshall's, Linens Plus, Michael's, Old Navy, and Staples. Office space and restaurant service constitute over 18 percent of the total GLA. The size of the property is typical for the area, and there are no known factors to prevent the site from development to its highest and best use.

The land surrounding the Camelback Colonnade includes retail, hotel, office, and theater space. Transit service is provided by the Valley Metro. The parking supply is 2,875 total spaces, which yields a parking supply ratio of 4.3 spaces per 1,000 square feet of occupied GLA. During the survey day, there were 3.3 parked cars per 1,000 square feet of occupied GLA.



Village Fair

Village Fair, a power center in Phoenix, Arizona, opened in October 1990. This center, also managed by the Westcor Company, is quite similar to the Camelback Colonnade, although it is only one-third its size. Anchors are provided by Toys "R" Us, Sports Authority, and Best Buy. Best Buy owns its own parcel and is not included as a major tenant. Minor anchors include Ultra 3, Bookstar, Office Max, and Linens Plus.

Village Fair is located southwest of the corner of Tatum Boulevard and Paradise Village Parkway East. Exclusive of the ground leased buildings, there are 16 existing tenant suites ranging from 620 to 39,238 square feet in size, and the existing bay depths range between 25 and 100 feet. The total site area is 1,066,823 square feet, and the total occupied GLA is 209,030 square feet. There is no vacant space.

Currently, retail shops, golf, cinema, hotel, and office space surround Village Fair. Restaurants at the center occupy 11,000 square feet. Of the total occupied GLA, Toys "R" Us and Sports Authority account for over 40 percent and the minor anchors (Ultra 3, Bookstar, Office Max, and Linens Plus) for slightly under 28 percent. Village Fair has no office space or theater.

Parking conditions at Village Fair are adequate. The parking supply is 1,266 spaces, which yields 6.4 parked cars per 1,000 square feet of occupied GLA, and on the survey day there were 5.2 parked cars per 1,000 square feet of occupied GLA. Transit service is available via Phoenix Transit, but it does not enter the center property. Instead, a scheduled bus service exists at a shopping center directly across the street. Management at Village Fair indicated that parking is fully occupied (over 95 percent) approximately three days per year.

Village Fair





Village Fair North