GREEN MODES OF TRANSPORTATION FOR CONNECTICUT'S MIXED USED DEVELOPMENTS

Final Report

CTLS 08-02

by

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Center for Transportation and
Livable Systems (CTLS)
270 Middle Turnpike
Storrs, Ct. 06269

February 2011

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
CTLS 08-02	N/A	

4. Title and Subtitle	5. Report Date
Green Modes of Transportation for Connecticut's Mixed Used Developments	February 2011
	6. Performing Organization Code: CTLS-08-02-1

7. Author(s)	8. Performing Organization Report No.
CRDC Team, Associate Professor Peter Miniutti, Associate Professor Edvin Yegir, Assistant Professor Dimo Dimov	CTLS 08-02

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
University of Connecticut Community Research and Design Collaborative	N/A
	11. Contract or Grant No.: N/A

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Center for Transportation and Livable Systems (CTLS) 270 Middle Turnpike Unit 5202 Storrs, CT 06269-5202	Final
	14. Sponsoring Agency Code: N/A

15. Supplementary Notes

This study was conducted at the Center for Transportation and Livable Systems (CTLS) http://www.ctls.uconn.edu/

16. Abstract

Says Connecticut Governor Jodi Rell,

> *"I want to give rise to a culture of change, opportunity and reform at DOT. As an institution DOT has simply become too bureaucratic, too inefficient and too single-minded in its problem solving approach."* [1]

Our multi-disciplinary team will not be single-minded. We will create a dynamic business and transportation model for the delivery of goods for the existing and proposed commercial establishments located in Downtown Storrs. These models will demonstrate how the delivery of goods can be transformed from the existing ad-hoc, carbon producing affair to an organized systematic approach which will increase profits for the local businesses, use green modes of transportation and functionally/symbolically begin to change the "single-minded" approach to Connecticut's transportation needs. Our team will create a flexible, replicatable process which can be used for other towns in the state and region.

17. Key Words	18. Distribution Statement
Green transportation, fast food delivery, Bycicles, cultural sustainability, Multi-disciplinary research	No restrictions. Copies available from CTLS: www.ctls.uconn.edu

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	109	

ACKNOWLEDGEMENTS

"This project was funded by the Center for Transportation and Livable Systems (CTLS)."

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TABLE OF CONTENTS

EXCUTIVE SUMMARY **1**
1.0 OBJECTIVES **3**
1.1 USE SMART GROWTH CRITERIA 3
1.2 OPPORTUNITIES 3
1.3 DEVELOPING 3
1.4 EVALUATE 3
1.5 CREATE PILOT PROGRAM 3
1.6 RECRUIT 3
2.0 DATA COLLECTION **5**
2.1 INTRODUCTION 5
2.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING 5
2.2.1 Downtown Storrs Overview 5
2.2.2 Existing Roads and Classifications 7
2.2.3 Existing Routes 13
2.2.3.1 Delivery Destinations *13*
2.2.3.2 Three-Dimensional Model *13*
2.2.3.3 Off Campus Destinations *14*
2.2.3.4 On Campus Destinations *15*
2.2.4 Existing Land Uses 15
2.2.4.1 Residential and Commercial Land Uses in Mansfield *15*
2.2.4.2 Downtown Land Uses in Mansfield *17*
2.2.5 Proposed Land Uses 18
2.2.5.1 Downtown Land Uses in Mansfield *18*
2.2.6 Inventory of Green Modes of Transportation 18
2.2.7 Interviews with Experts 22
2.2.7.1 Interviewing the experts of Downtown Storrs *22*
2.3 BUSINESS MANAGEMENT 22
2.3.1 Develop Survey Questionnaire 22
2.3.2 Conduct Survey with Downtown Delivery Businesses 24
2.3.2.1 Deliveries and Numbers *24*
2.3.3 Secondary Research 25
2.3.3.1 Market Studies *25*
2.4 COMMUNICATION DESIGN 26
2.4.1 Introduction and Contents 26
2.4.2 Research 26
2.4.2.1 Examples of Communication Systems: Identities of Other Companies *26*
3.0 DATA ANALYSIS **29**
3.1 INTRODUCTION 29
3.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING 29
3.2.1 Determine Efficiency of Existing Delivery Operations 29
3.2.1.1 Carbon Emission *30*
3.2.1 Modes of Transportation 31

3.2.2 Delivery and Modes of Transportation 31
3.2.3 Routing and Sequencing Scenarios 32
3.3 BUSINESS MANAGEMENT 44
3.3.1 Business Implications 44
3.3.2 Survey Results 45
3.3.2.1 Identity Topics: Benefits of Green Transportation 45
3.3.2.2 Concerns 45
3.4 COMMUNICATION DESIGN 46
3.4.1 Visual Preference Study 46
4.0 RECOMMENDATIONS 49
4.1 INTRODUCTION 49
4.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING AND BUSINESS MANAGEMENT 49
4.3 COMMUNICATION DESIGN 51
4.3.1 Graphic Design Alternatives 51
4.3.1.1 Logo Alternatives 51
4.3.2 The Categories of Signs 52
4.3.2.1 Identification 52
4.3.2.2 Orientation 54
4.3.2.3 Directional 54
4.3.2.1 Regulatory 55
5.0 REFERENCES 57
A-3: Interview with Cynthia van Zelm & Macon Toleando. *19*

APPENDICES

APPENDIX A: INTERVIEWING THE EXPERTS

APPENDIX B: DOWNTOWN MANSFIELD MASTER PLAN TARGET STRATEGIES

APPENDIX C: EXAMPLES OF COMMUNICATION SYSTEMS:IDENTITIES OF OTHER COMPANIES

APPENDIX D: SURVEY INTERVIEWS

EXCUTIVE SUMMARY

As a response to Connecticut Governor Jodi Rell to "give rise to a culture of change, opportunity and reform at DOT," this report attempts to showcase a proposal to transform Downtown Storrs from a glorified strip development to a place where progressive alternative modes of transportation can be show-cased to the rest of Connecticut and the region. In order to accomplish this goal, a team spanning four entirely different disciplines were assembled, including community planning (landscape architecture), transportation engineering, business management, and communication
design.

Many objectives for this report were laid out, from using Smart Growth criteria to document, analyze and evaluate existing transportation systems used for food delivery in Downtown Storrs, identifying opportunities to incorporate the principals of Smart Growth, developing transportation and business models to take advantage of these opportunities, evaluating said models based on efficiency, mode of transportation and competitiveness, creating a pilot program to serve as an example to similar communities, and to take a dynamic approach in the recruitment of existing local business and persuade them to participate in the program.
Data collection then had to be carried out, and was broken into three distinct categories; landscape architecture and transportation engineering, business management and communication design. For landscape architecture and transportation engineering, looking into the flaws of the existing Storrs Center, how these problems were addressed with the proposed Storrs Center, and it's relation to UConn students was key. Other key aspects included circulation within and adjacent to UConn, delivery destinations, both existing and proposed land uses in the surrounding area, green modes inventory and lastly interviews with experts. The business management section developed survey questionnaires, identified topics of interest and concerns from business owners expressed in the interview process, and conducted market studies. Lastly communication design included extensive research into existing eco-friendly graphic interpretations (typography, names, and logos).

Analysis of the previous data collection was then conducted in order to determine the efficiency of existing delivery operations at UConn, including parameters such as time, routing, cost and carbon emissions, while at the same time taking a look at different modes of transportation like human powered, human assisted and gas powered bikes, electric car and gas powered cars. Finally, a series of routing and sequencing scenarios was researched, planned and field tested in order to come up with accurate data concerning the proposed green mode alternatives for the food delivery system at UConn. Business management and communication design were again looked into, analyzing implications and survey results, and conducting a visual preference study of logos with several groups of people, respectively.
From the combination of objectives, data collection and analysis, recommendations for the future of UConn's Green Modes of Transportation were made. These recommendations includes the conclusion brought forth by the delivery methods field study, graphic design alternatives derived from preferred qualities of the previous options, categories of signs that can be incorporated

around campus (on restaurant facades, buildings, buses, shirts, mugs, et cetera), and different ways to use signage for way-finding around campus.

1.0 OBJECTIVES

1.1 USE SMART GROWTH CRITERIA

Use Smart Growth criteria as a tool to document, analyze, and evaluate existing transportation systems used for food delivery in Downtown Storrs. Smart Growth will also be used to document, analyze, and evaluate land uses as they relate to transportation systems and Downtown Storrs.

1.2 OPPORTUNITIES

Identify opportunities to incorporate Smart Growth principles into transportation systems used for food delivery in the local area. Determine the possible implications on local restaurants as a result of incorporated Smart Growth principles.

1.3 DEVELOPING

Develop a series of transportation/business models that are able to take advantage of the opportunities identified in objective 1.2. The transportation/business models should also be able to mitigate constraints that are impeding Smart Growth.

1.4 EVALUATE

Evaluate the transportation/business models based on efficiency, mode of transportation and competitiveness. Once the evaluation has occurred, the most appropriate transportation/business model will be selected.

1.5 CREATE PILOT PROGRAM

Create a pilot program that can serve as an example to similar communities in order to begin the process of implementation. Similar communities can include but is not limited to college campuses and towns of certain density.

1.6 RECRUIT

Take a dynamic approach in the recruitment of existing local business and persuade them to participate in the pilot program and have them adhere to rules and regulations pertaining to implementation of the program.

2.0 DATA COLLECTION

2.1 INTRODUCTION

The following section articulates what types of data were collected and how they apply to the study. The data is broken down into three categories; landscape architecture and transportation engineering, business management and communication design. Data collected for landscape architecture and transportation engineering includes existing roads, routes and land uses. It also incorporates proposed land uses and insight into green modes of transportation. Business management data involves survey questionnaires/ feedback with local delivery businesses and benefits of green transportation. Data collected in regards to communication design focuses on devising an identity that will be used in the promotion of green transportation on campus.

2.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING

2.2.1 Downtown Storrs Overview

At present, Storrs Center is not a great example of what a town center ought to be. It consists of a municipal building, a high-school and an unattractive commercial strip with multiple retail stores. The limited variety of stores, accessibility issues and lack of identity has caused concern among many in the community. The lack of a vibrant downtown has raised questions in regards to the future growth and well-being of the University of Connecticut and the town of Mansfield. Many prospective students, faculty and staff have voiced their concerns over the existing downtown or lack thereof and it is widely felt that in order to remain competitive and continue attracting quality students and faculty, the issues of downtown must be addressed. In a survey conducted by enrollment management, the results consistently indicate that the number one reason why admitted students do not enroll is because of lack of off-campus activities. The need for change is present and a revitalized Storrs Center is currently taking shape. The development aspires to be environmentally and economically sustainable and will include mixed-use development, a pedestrian friendly environment, and a sense of identity.

Existing photo of Storrs Center (credit: CRDC)


Existing photo of Storrs Center (credit: CRDC)

The existing Storrs center lacks variety. There are a handful of food stores, non-food stores and vacant store-fronts. The limited dining option creates a problem for students and locals who would like to eat at quality dining establishments. In order to dine at quality establishments, everyone in the area has to get in their car and drive at least 15 minutes to the next commercial area. The existing Storrs Center is vehicular-oriented, meaning that it was designed for the sole use of cars. In order to get there by foot, 1-95-a very busy route- must be crossed. This makes for a pedestrian-unfriendly place which is ironic for a campus whose main way of getting around is by foot. Another major concern in regards to downtown is that it lacks a sense of identity. The experience at downtown Storrs is the same experience that can be attained all over the country. There is nothing about it that is unique to the town of Mansfield or the University of Connecticut.


Proposed Storrs Center credit: Storrs Center Alliance LLC


Proposed Storrs Center credit: Storrs Center Alliance LLC

The design for the new Storrs Center was inspired by traditional New England towns and new urbanism. Ideals for new urbanism include denser, pedestrian-friendly, multi-use development. Downtown will become a place that was designed with the pedestrian in mind and where automobiles and parking lots do not dominate the landscape. Storrs Center will include a mix of retail and residential units. The retail stores will include a variety of restaurants, from fast food to more upscale establishments. The residential units include a mix of houses, lofts and condominiums and are meant to be occupied by a wide range of people, from students to the elderly. The residents that will reside within and around Storrs center will be able to shop locally and take care of many errands within walking distance, eliminating the need to use the car for the most basic of needs. Furthermore, 30 of the sites 47 acres will be preserved as a conservation area. Guidelines will ensure the efficient use of resources such as water, energy and materials used for construction. Measures have also been taken to preserve the existing wetlands. Another major goal of Storrs Center is sustainable development.

As of right now Storrs Center is not serving the needs of the community. It lacks character and is neither environmentally or economically sustainable. Plans for the new Storrs Center are currently underway and will make downtown a more enjoyable place for all members of the community. The process from conception to completion is very extensive and has yet to be realized but it is important that it be completed in a transparent manner with the interests of the people and the environment at the forefront. Once the new Storrs Center is completed, there is no doubt that it will be an enjoyable place for both students and locals of the community.

2.2.2 Existing Roads and Classifications

This map classifies different types of streets within the town of Mansfield. The different types of streets include limited access roads, interchange roads, state routes such as Rt. 195, and connector roads.

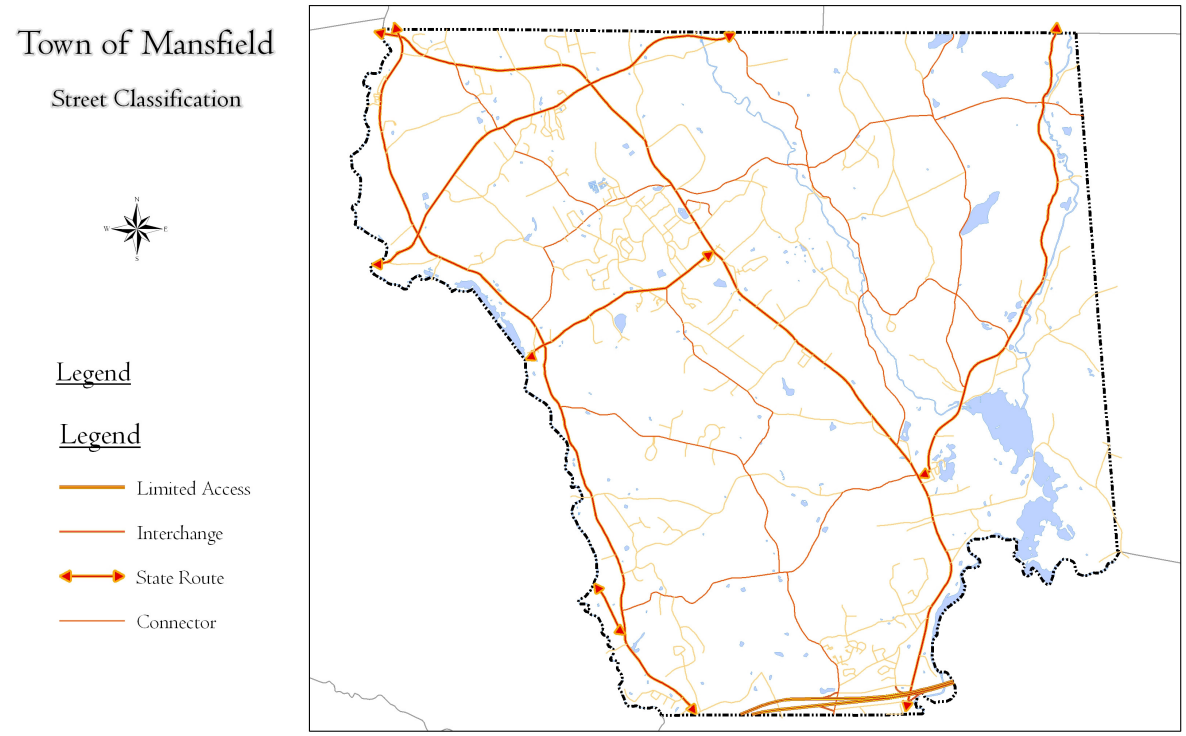


Figure 2.1: Town of Mansfield Street Classification

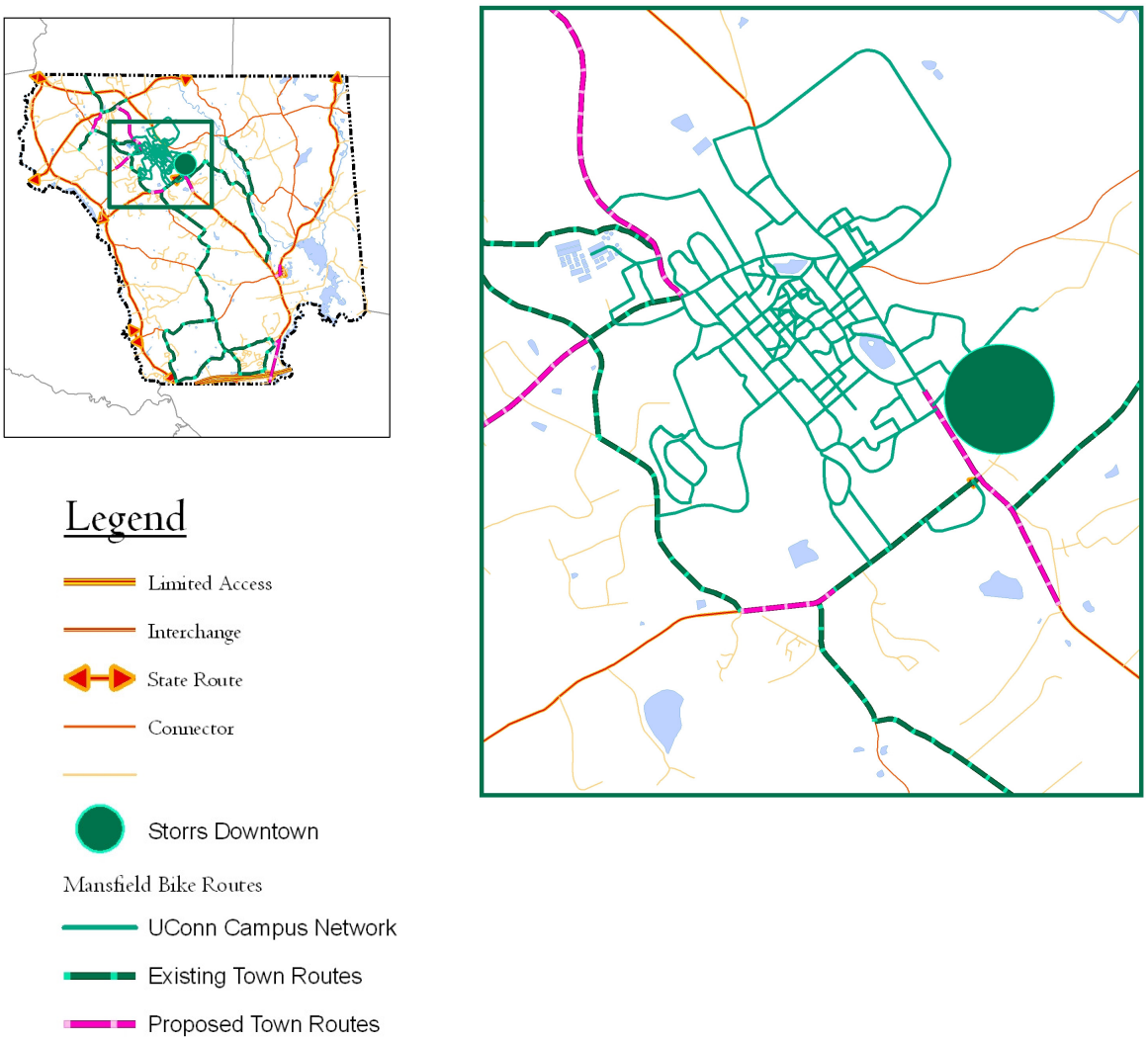


Figure 2.2: Storrs Existing Bike and Trail Network

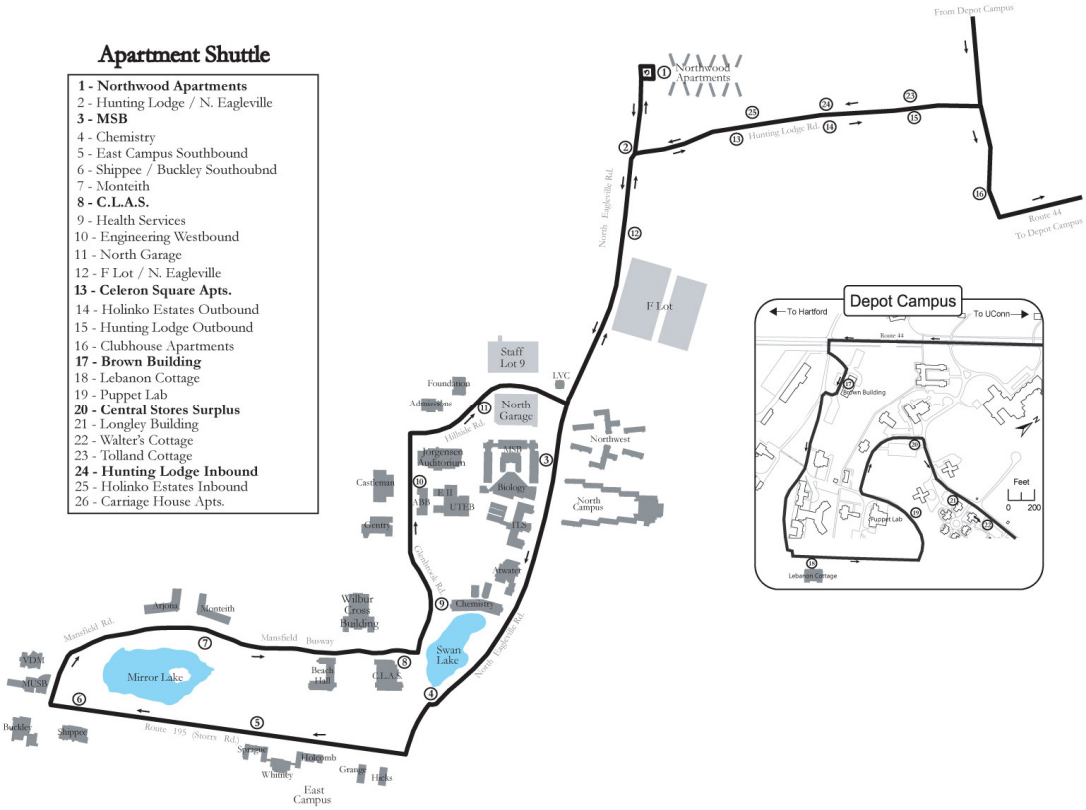


Figure 2.3: Bus Route Apartment Shuttle

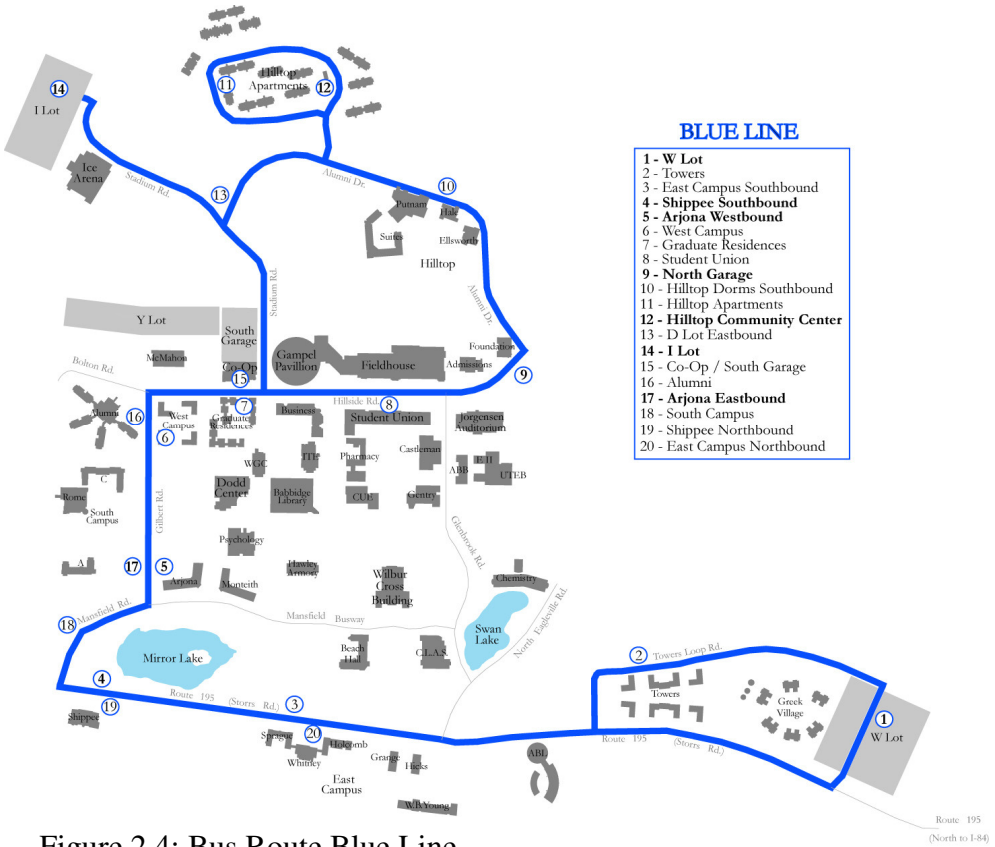


Figure 2.4: Bus Route Blue Line

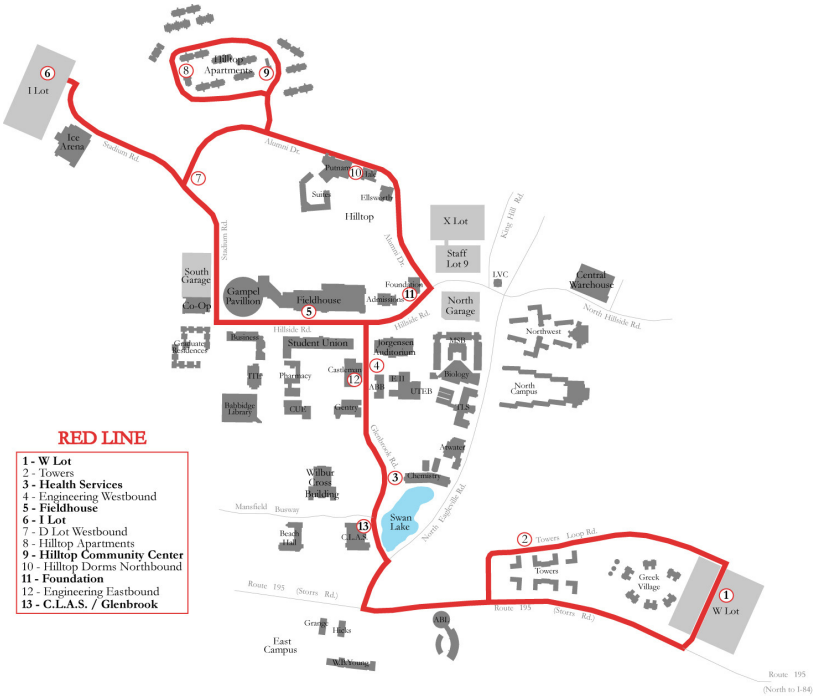


Figure 2.5: Bus Route Red Line

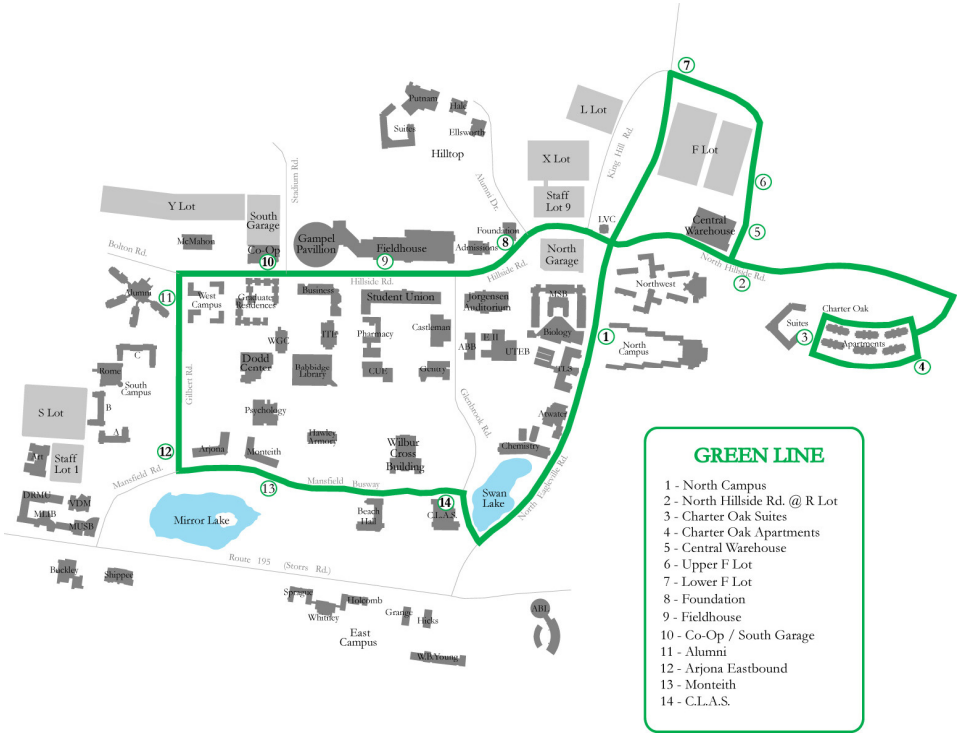


Figure 2.6: Bus Route Green Line

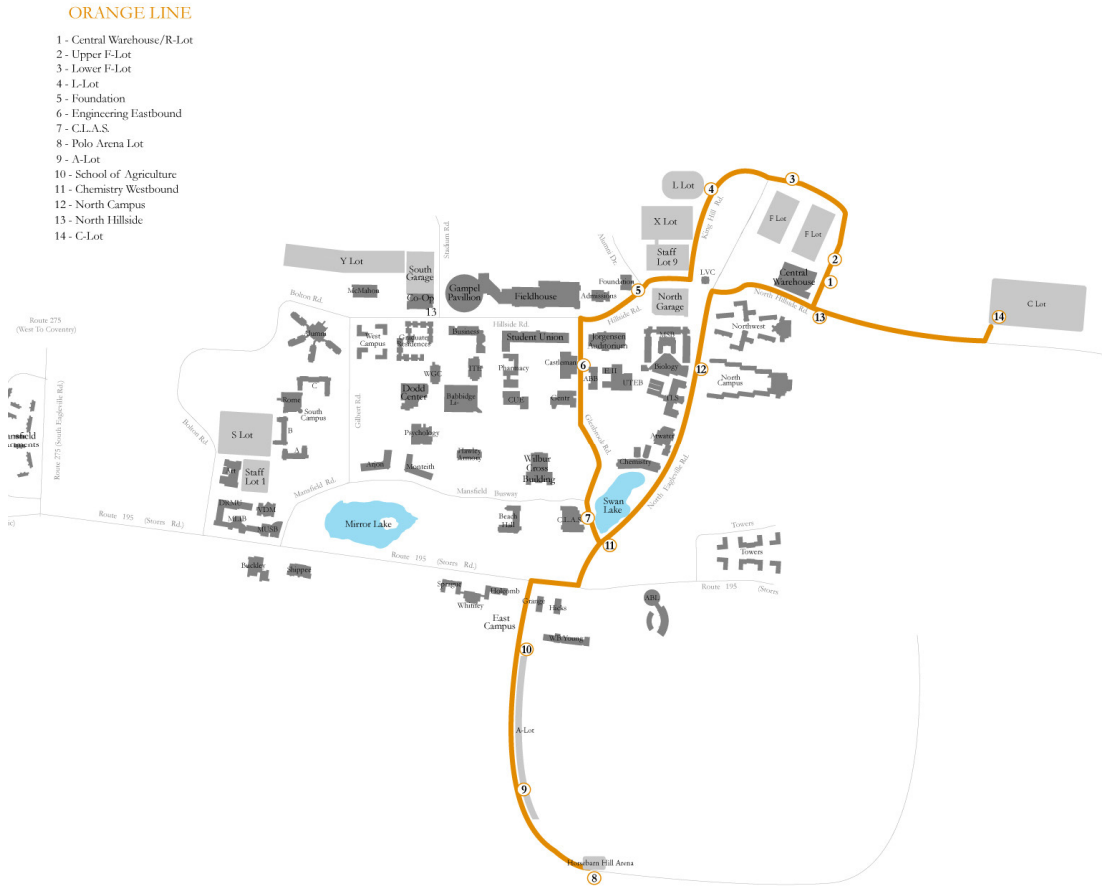


Figure 2.7: Bus Route Orange Line

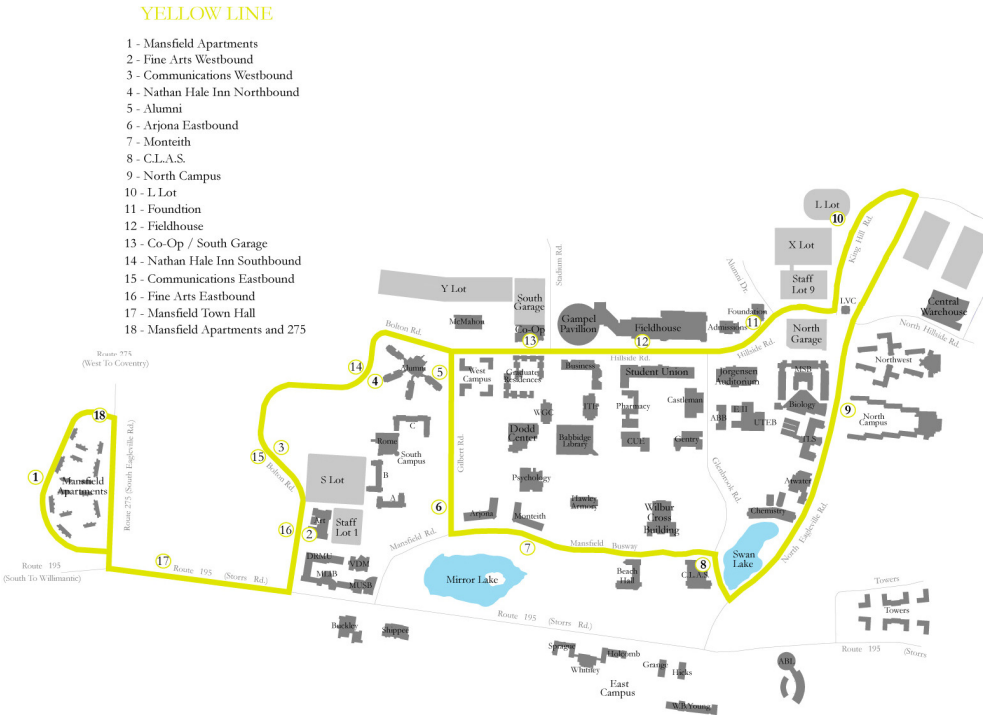


Figure 2.8: Bus Route Yellow Line

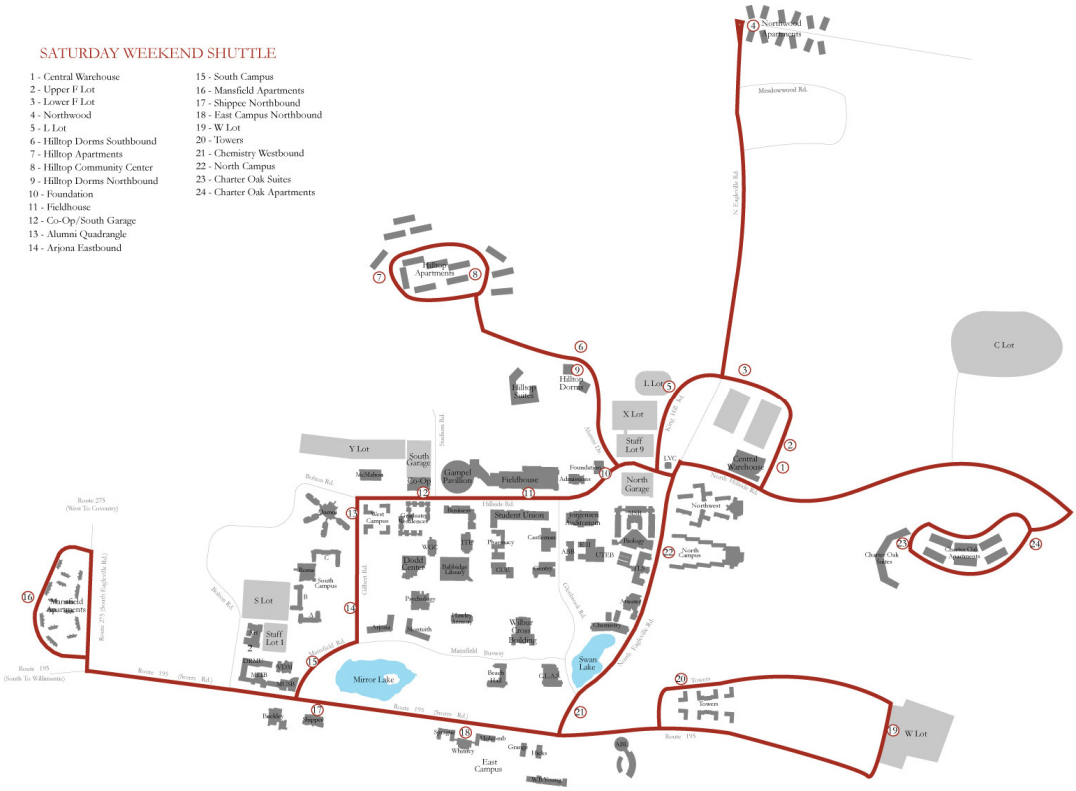


Figure 2.9: Bus Route Saturday Weekend Shuttle

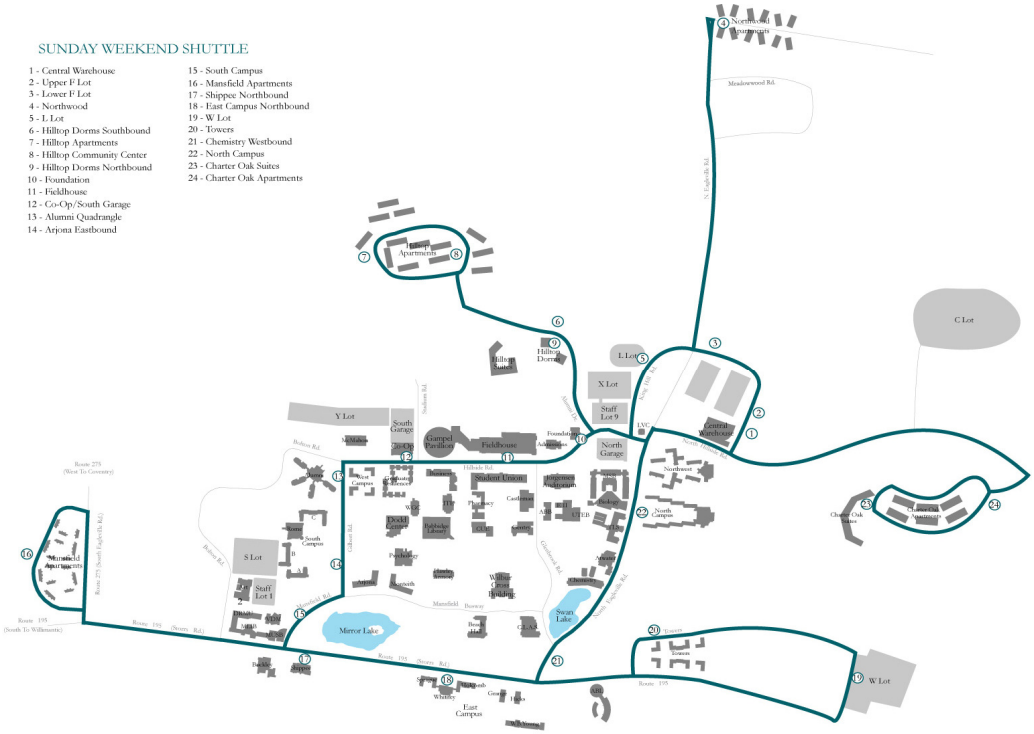


Figure 2.10: Bus Route Sunday Weekend Shuttle

2.2.3 Existing Routes

2.2.3.1 Delivery Destinations

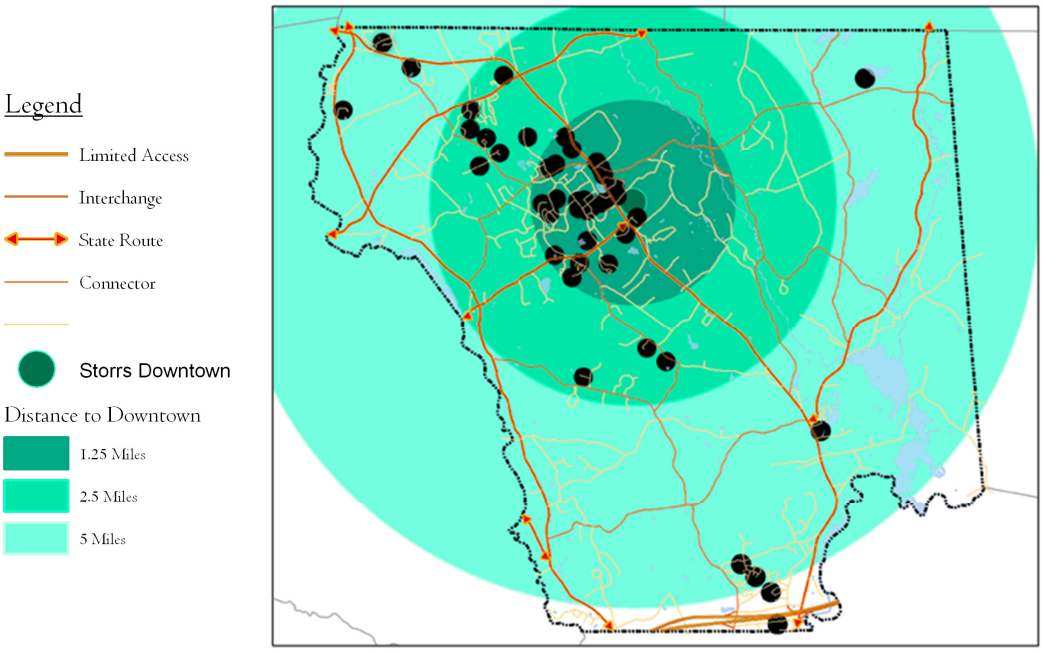
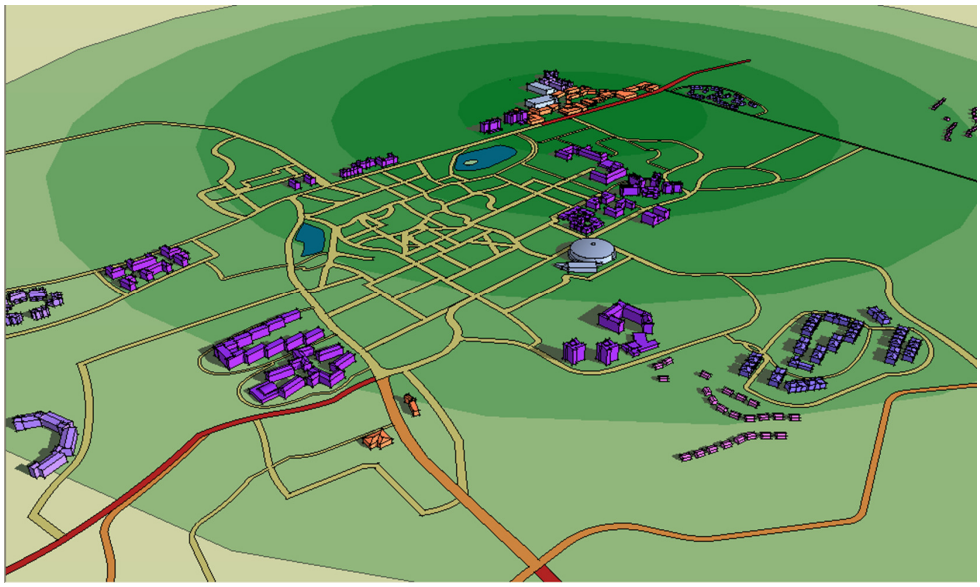


Figure 2.11: Delivery Destinations within Proximity Storrs Downtown

2.2.3.2 Three-Dimensional Model

The following (Figure 2.12) illustrates the proximity of residences as they relate to downtown Storrs. The conglomeration of red buildings represents downtown and the purple buildings represent student residences.



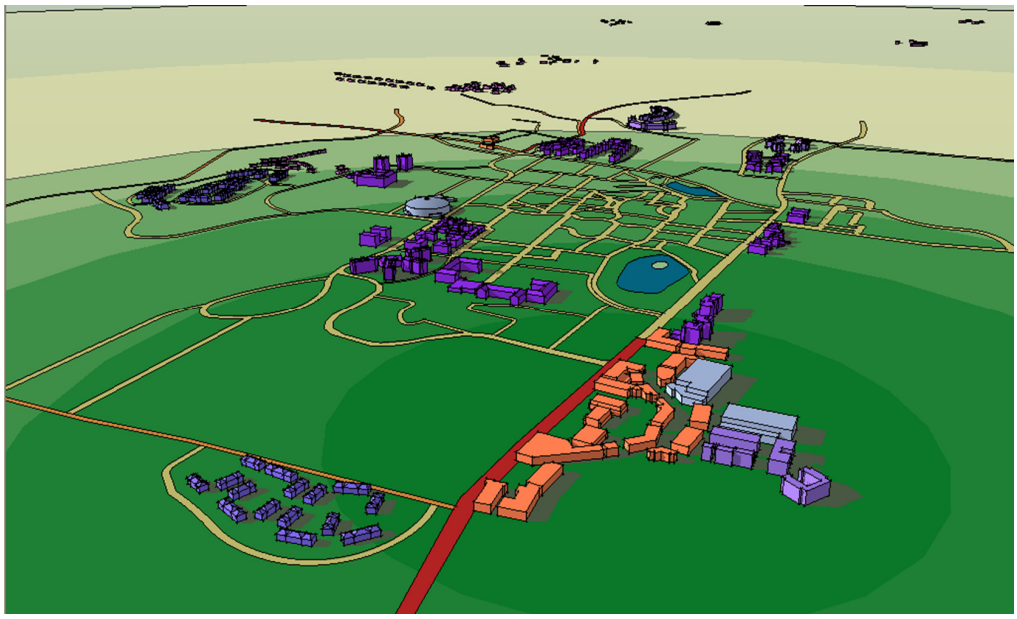


Figure 2.12:Three-dimensional model locating campus dormitories

2.2.3.3 Off Campus Destinations

The following (Table 2.13) describes off-campus apartment complexes, where they are located and the number of residents that reside in each complex.

Table 2.13: Off campus Destinations

Off Campus Apartments	Address	Populations
Renwood	36 Dartmouth Rd, Storrs Mansfield, (860) 429-5351	~200
Willington Oaks	380 Daleville Road, Willington, (860) 429-5584	~100
Cedar Ridge	43 Burt Latham Rd, Willington, (860) 429-3918	~100
Walden	70 Pinney Hill Rd, #111, Willington, (860) 429-4451	150~200
Norwegian Woods	609 Merrow Rd, Tolland, (860) 872-2735	~200
Woodhaven	80 Cisar Rd, #10, Willington, (860) 429-1500	150~200
Carriage House	43 Burt Latham Rd, Willington, (860) 429-3918 Same as Cedar Ridge	Same as Cedar Ridge
Knollwood	101 South Eagleville Rd, Storrs, (860) 429-5584	100~150
Hunting Lodge	16 Hunting Heights Dr. Storrs Mansfield (860) 487-4691	150~200
Clubhouse Apts.	Birch Rd, Storrs Mansfield	100~200
Maplewood Apts.	134 N Eagleville Rd, Storrs Mansfield (860) 429-5584	100~150
Millbrook Apts.	170 Spring Hill Rd, Storrs Mansfield	100~200
Orchard Acres	Cheney Dr, Storrs Mansfield	~100

2.2.3.4 On Campus Destinations

The following (Figure 2.14) depicts images of on campus dormitories. Also the list below articulates the number of units that are present on each on campus dormitory building.

Dorm	**# Units**
<u>Route 195</u>	
Towers	936
Husky Village	306
Grange	559
Hicks	
Whitney	
John Buckley	451
<u>Gilbert & Hillside</u>	
West	503
South	710
Grad Residence	439
Alumni	952
McMahen	605
Garrigus	662
Northwood	282
<u>N. Eagleville Rd.</u>	
North	1341
Northwest	1016
<u>Other Campus Dorms</u>	
Mansfield Apartments	263
Hilltop Apartment	964
Charter Oak	498
Celeron	700

Figure 2.14: Images of campus dormitories

2.2.4 Existing Land Uses

2.2.4.1 Residential and Commercial Land Uses in Mansfield

The proceeding map (Figure 2.15) locates downtown Storrs within the town of Mansfield. It depicts the existing land uses within downtown Storrs, which at present, are very limited.

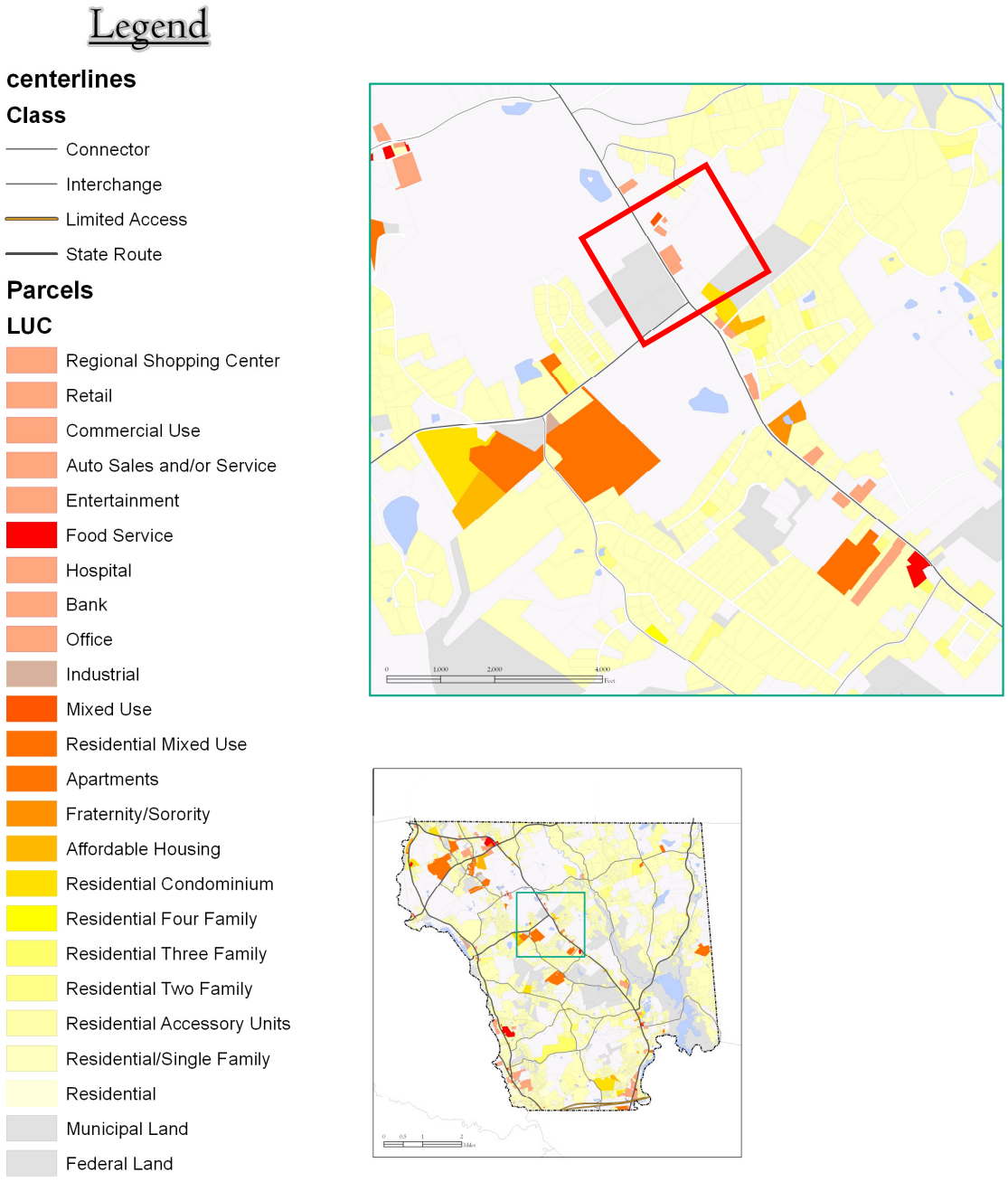


Figure 2.15: Existing Land Uses in Mansfield

2.2.4.2 Downtown Land Uses in Mansfield

This diagram shows the existing single-use zoning of downtown Mansfield. With this current layout, mixed use and residential land uses are located significant distances from these existing delivery services, which then promotes and auto-dependent culture.

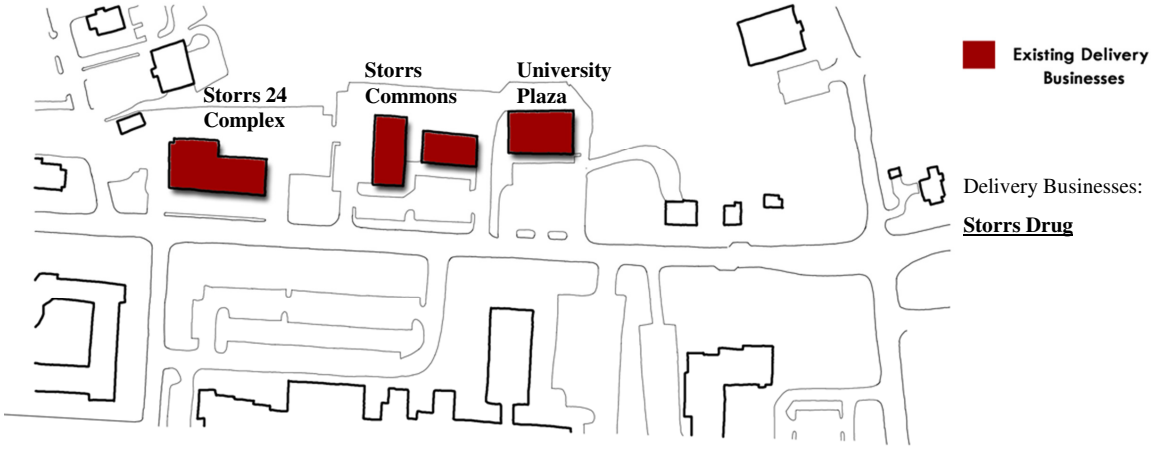


Figure 2.16: Plan view of Downtown Storrs Commercial Land Uses

Storrs 24 Complex	**Storrs Commons**	**University Plaza**
Store 24	Starbucks	Friendly's Restaurant
Subway	People's United Bank	**Storrs Drug**
A Campus Lifestyle	AT&T	Visual Hair Designs
Wings Over Storrs	**Chang's Garden**	**D.P. Dough**
Travel Planners	**Domino's Pizza**	**Randy's Wooster St Pizza**
Husky Pizza	Storrs Laundromat	Storrs Laundromat
Campus Florist	CSE Credit Union	Aztec Sun Tanning
Paperback Trader	Curves	**Oriental Café**
Tequila Cove	Sylvan	Webster Bank
Campus Cuts	Nails	
Skora's Barber	Mansfield Downtown Partnership	
Body Language Tattoos	Law Office	
Paul's Pizza	Massage	

2.2.5 Proposed Land Uses

2.2.5.1 Downtown Land Uses in Mansfield

This diagram is a vision that shows integration between land uses in downtown Mansfield. There are many benefits of having mixed use downtowns, such as customer assurance for retailers, shorter traveling distances, less reliance on the automobile, the reduction of urban sprawl, and a stronger sense of community can arise from this type of layout.

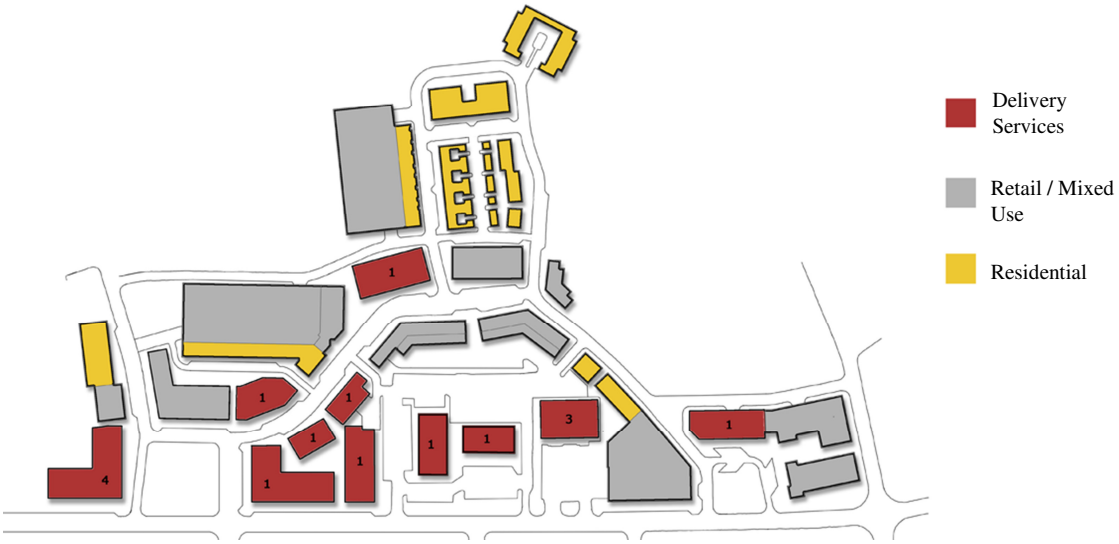
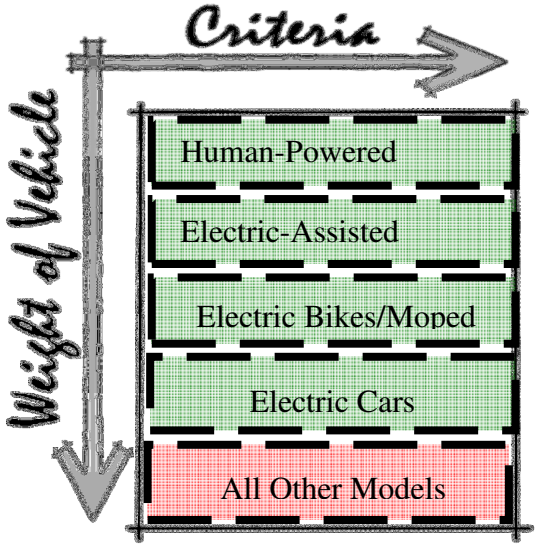


Figure 2.17: Plan view of Downtown Storrs Commercial Land Uses

2.2.6 Inventory of Green Modes of Transportation

The succeeding criteria results in that the more weight the vehicle has the less efficient it is and therefore it emits more carbon dioxide. It depicts the models of vehicles which were evaluated with color representation (red=bad, yellow=average, green=good). Those vehicles were assessed on applicability, feasibility, practicability, energy, followed by a summary of results.



Criteria

Weight of Vehicle

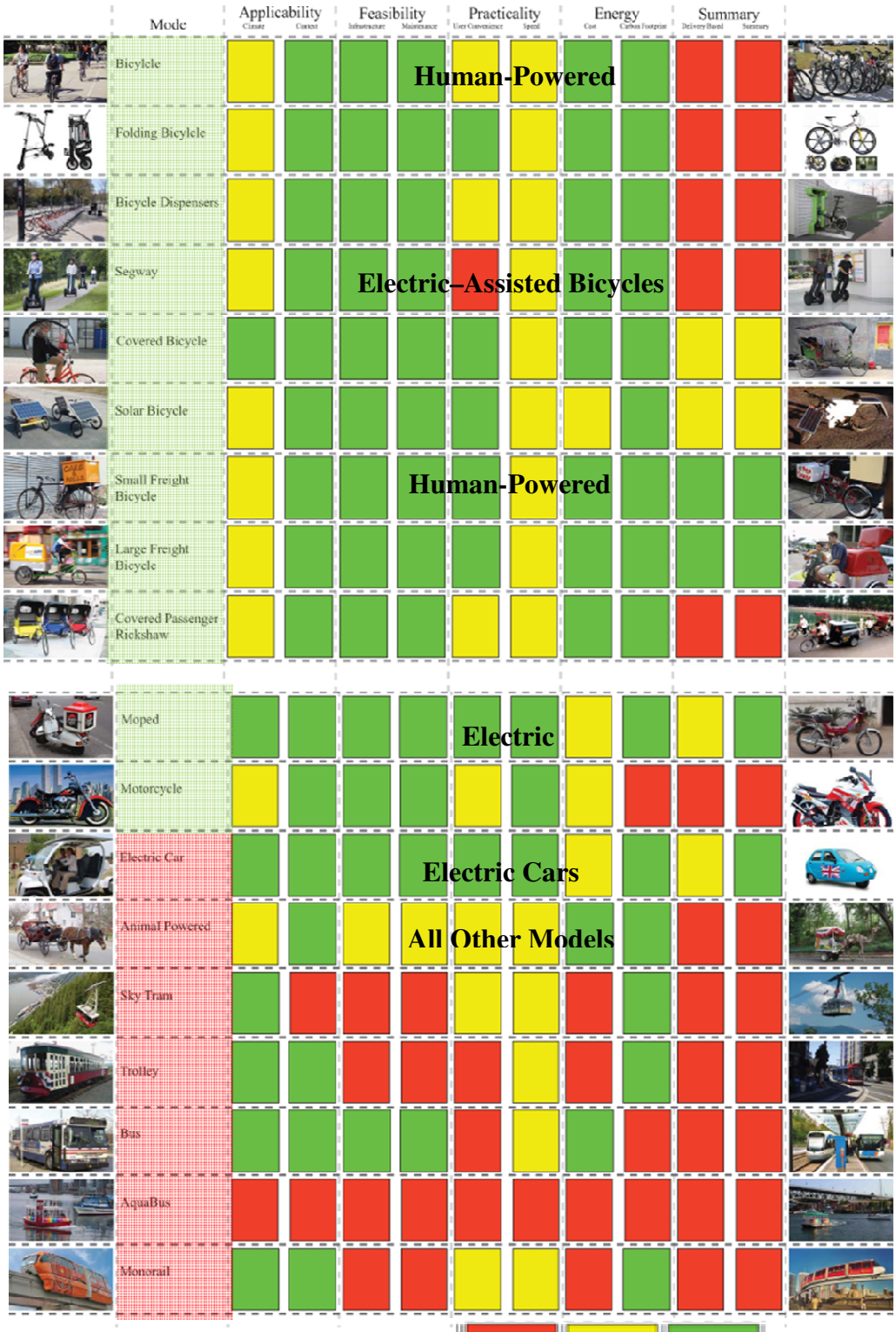


Figure 2.18: Diagram classifying criteria

Weight of Vehicle

Criteria

	Maker	Model	Cost	Speed	Features	Options		Maker	Model	Cost	Speed	Features	Options
	GT	Zum 5.0	$300	8	None	Unknown		Schwinn	World Ave One	$500	8	12"x7"x10" Rear Trunk	Normal
	Industrial Bicycles	HD 105	$329	Unknown	18"x13"x6" basket	Normal		Industrial Bicycles	The Truck	$509	3	24"x17"x6" basket	Normal
	Industrial Bicycles		$370	3	Front basket & rear baskets	Normal		Industrial Bicycles	Pizza Delivery	$549	3	20"x12"x20" Cabinet	Normal
	Mongoose	Wing	$338	1	4 bar link suspension	None		Trek	Soho S	$600	8	All-weather Construction	None
	Industrial Bicycles	HD 120	$350	7	18"X13"X6" Front Basket	Normal		Mongoose	Otero Super	$829	25 mph	Hydraulic Brakes	Unknown
	K2	T-Nine Tradewind	$400	8	Rear rack mounts	None		Trek	District	$930	8	Carbon Fiber Belt Drive	None
	Dahon	Speed D7	$429	7	Folding	Unknown		Industrial Bicycles	Delivery Tricycle	$1,000	1	42"x23"x26" Steel Cabinet	Normal
	Biria	Easy Boarding	$495	7	Unknown	Normal		Scattante	R-660	$1,249	10	Dual Pivot Calipers	None
	K2	Astral	$500	8	Rear rack mounts	None		Trek	Portland	$1,700	8	Fenders & r. rack mounts	None

Figure 2.19: Bike Accessories, $50-$70

Criteria

Weight of Vehicle

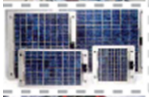
	Description	Maker	Fuel Type	Cost	Size	Capacity		Description	Maker	Fuel Type	Cost	Size	Capacity
	Canopy	Black Bird Bikes	All-Electric	$49.00	Custom	n/a		Windshield	Easy Racer	All-Electric	$300	Varying	2009
	Solar Panels	BP Solarex	All-Electric	$104+	Varying	4.5 - 30 watts		Trailer	CycleTote	All-Electric	$300	28.8 gallons	Unknown
	Cargo Pod	Lightfoot Cycles	All-Electric	$152	14" tall	75 lb		Trailer	Carry Freedom	All-Electric	$300	16"x24"	110 lb
	Trailer	Croozer Cargo	All-Electric	$195	30"x18"x13"	66 lb		Trailer	Croozer Travel	All-Electric	$319	29"x14.5"	100 lb
	Trailer	BicycleR Evolution	All-Electric	$199	26"x18"x15"	24 gallons		Trailer	Quik-Pak	All-Electric	$349	29"x22"x16"	75 lb
	Ski Kit	Burley Wel	All-Electric & hybrid	$219	110 cm	n/a		Trailer	Burley Nomad	All-Electric	$349	8,000 cubic in.	100 lb
	Trailer	BicycleR Evolution	All-Electric	$250	19"x33"x17"	35 gallons		Hitchless Trailer	XtraCycle	All-Electric	$489	Custom	rider+load= 350 lb
	Trailer	BOB Yak	All-Electric	$290	25"x16"x18"	70 lb		Trailer	Radical Design	All-Electric	$650	36"x20"x13"	88 lb
	Cargo Bags	Xtrawheel	All-Electric	$300	2 60 L Bags	66 lb		Trailer	Equinox Trailers	All-Electric	$650	13" high	Unkown

Figure 2.20: Bike Accessories, $50-$70

2.2.7 Interviews with Experts

2.2.7.1 Interviewing the experts of Downtown Storrs

The professional opinion from the following experts listed below was taken into consideration to develop recommendation for the green modes of transportation program. Please see appendix A-1 and A-2 for interview notes.

Name:	**Affiliation**	**Topic of Meeting:**
Cynthia van Zelm	Executive Director of Mansfield Downtown Partnership	Multimodal plans for Downtown
Macon Toleando	Project Manager of Storrs Center, Leyland Alliance Multi-modal plans for Downtown	Multimodal plans for Downtown
Wenzday Jane	Owner of Metro Pedal Power	Managing the pilot project
Steve Rogers	Chair of the Mansfield Business and Professional Association	Financing the Pilot Project
Sean Cox	Connecticut State Police	Accidents and violations
Doug Hayes	Owner of GEM Car Dealer	Discounts for Vehicles
Meghan Ruta	Climate Action Plan Project Manager, Eco Husky	Soliciting Student Labor

2.3 BUSINESS MANAGEMENT

The business management team identified topics of interest and concerns that the business owners express in the interview process. The following survey questionnaire was developed for the interview process of business owners. The complete thesis of Small Businesses and Green Transportation Implementation by Laura Damaio can be found in Appendix A-1.

2.3.1 Develop Survey Questionnaire

Interview Questions:
1.) Name and name of business?
2.) How long have you been in business?
3.) How is the business going?
4.) What's the role of transportation in the business?
5.) What are the main costs associated with transportation?
6.) How would you rank the costs in order of importance?
7.) Roughly what percentage of your costs is transportation?
8.) How many cars are being used at your company?
9.) Who owns them?
10.) How often are they used on a daily basis?
11.) Typical delivery schedule on an average night and a busy night (also, how does this change when UConn is not is session)
12.) How many delivery trips over the course of how many hours?
13.) How many orders per delivery trip?
14.) Where are these deliveries going to?
15.) What is the typical delivery range?

16.) What is the ration between on-campus vs. off-campus deliveries?
17.) How long do these deliveries take?
18.) Age and type of delivery cars currently being used?
19.) What is the cost of fuel?
20.) How many drivers are working at the same time (on both average and busy nights and in-session vs. out of session)?
21.) How much trouble is it to find reliable delivery drivers?
22.) Have you ever considered green modes of transportation?
23.) What would be your main concerns or criteria when looking at green transportation?
24.) What type of obstacles do you see in implementing green transportation?
25.) How do you feel you can benefit from green transportation?
26.) What type of incentives would motivate you to adopt green transportation?
27.) How would customers perceive you if you switched to green transportation?
28.) To what extent is green image important to the business?
29.) To what extent is it important to be engaged with the local community?
30.) How do you think your staff would react to green transportation initiatives if you were to adopt them?
31.) How likely do you think it is that your company would adopt green transportation in the near future?
32.) If there was some type of funding to implement a program related to green transportation, would you be interested? What would you do with it?
33.) At UCONN we are looking at the notion of green transportation in the surrounding area, is there anything you want to add to that idea? Any comments you have concerning green transportation that you would like to report to the University?
34.) Please indicate your level of agreement with the following statements (1 = totally disagree, 4 = neutral, 7 = totally agree)

a. Our customers are concerned with environmental issues, global warming, and energy independence.
b. A green image will increase our customers' goodwill towards the business
c. A green image will inspire customer loyalty even if our prices are not competitive.
d. Our customer are looking at more than just price when choosing to do business with us.

35.) Could you provide delivery route scenarios (or examples) or actual addresses would be helpful? (or maybe just the street names if privacy is an issue)
- In terms of geocoding, the best format for this would be the names of the streets at the nearest intersection

2.3.2 Conduct Survey with Downtown Delivery Businesses

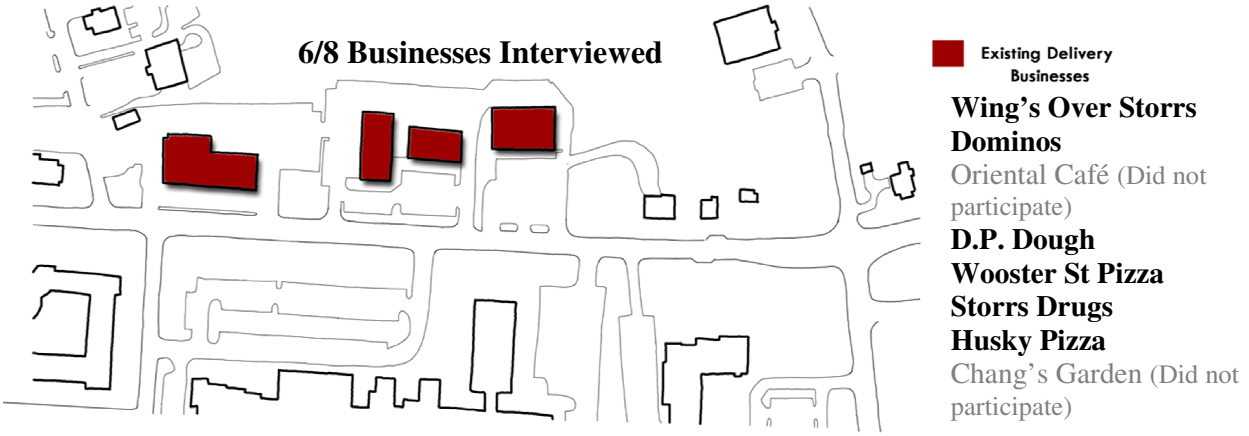


Figure 2.21: Plan view of Delivery Business

2.3.2.1 Deliveries and Numbers

This includes only 5 of the 7 delivery services in Downtown Storrs. In addition, it only includes deliveries made while UConn is in session. The number per year is about 100,000.

85,112 deliveries / academic year (28 weeks)

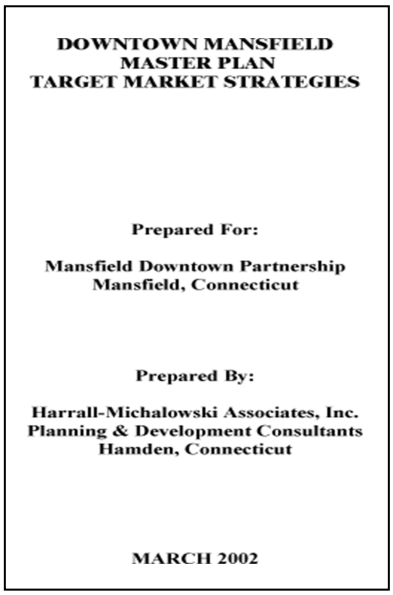
Table 2.2: Delivery data off campus

	# Cars	# Cars Used at Once	Deliveries on Weekdays	Delivery Range	Delivery Range	Age of Business	Ratio of Students vs. Other residents
Chang's Garden	Not Willing	X	X	X	X	X	X
Oriental Café	Not Willing	X	X	X	X	X	X
Wooster St Pizza	15	Two-four	As few as 3	Over twenty	5 miles	1 year	60/40
Husky Pizza	4	Two-four	Less than 10	Ten-fifteen	1-2 miles	2 years	90/10
Domino's	12	Two-four	100	150+	4 surrounding towns	22 years	70/30
D.P. Dough	16	One-six	100	250	5 miles	15 years	80/20
Wing's	16	Four-nine	100	300	5 miles	8 years	90/10
Gianelli's	13	Two	Fifteen-twenty	Thirty-fifty	Up to 10+miles	2 years	60/40
Red Rock	2	One-two	Five-twelve	Ten-twenty	5 miles	6 years	50/50
Sgt. Peps	6	Five-six				3.5 years	

2.3.3 Secondary Research

2.3.3.1 Market Studies

Please refer to appendix B for a complete copy of The Downtown Mansfield Master Plan Target Market Strategies.



DOWNTOWN MANSFIELD
MASTER PLAN
TARGET MARKET STRATEGIES

Prepared For:

Mansfield Downtown Partnership
Mansfield, Connecticut

Prepared By:

Harrall-Michalowski Associates, Inc.
Planning & Development Consultants
Hamden, Connecticut

MARCH 2002

It involves the summary of existing research rather than the primary research where data is collected from. The following market study intends to:

- Develop a market-based plan and niche strategy that builds upon the University housing investment and identifies market-driven opportunities to collaboratively upgrade and nourish the Downtown Mansfield business district.
- Use the distinct identity of a New England village to make Downtown Mansfield a unique niche destination within the regional marketplace.
- Identify new business and development opportunities to make Downtown Mansfield a 12-month destination and that help create a New England village character and sense of place.
- Engage Downtown Mansfield stakeholders in a participatory process that builds a shared vision for development of the area, encourages initiatives in collaborative marketing and investment in their properties and businesses.
- Offer recommendations to the Town of Mansfield and the University of Connecticut that

A summary of the Market Study Master Plan can be found in Appendix B-1.

2.4 COMMUNICATION DESIGN

Contribute to the “Cultural Sustainability” of Downtown Storrs”:
Cultural sustainability is predicated on the idea that built environments must be economically competitive, ecologically sound, and also bring enjoyment and aesthetic appeal to their user groups. Philosophers, as far back as antiquity, have argued that aesthetics have a fundamental effect on how we view the world. Naturalists and ecologists, who promote the protection of the landscape, have reached the same conclusion. Modern day philosopher Marcia Mueller Eaton puts it this way, *“Aesthetic experience is marked by perception of, and reflection upon intrinsic properties of objects and events that a community considers worthy of sustained attention”*.
We want to make green modes of transportation available in downtown Storrs that are economically competitive, efficient, ecologically sound and worthy of sustained attention.
The power of graphic communication to send a message and create interest. We will be looking to bring attention to green modes of transportation. We also want to send a message and create interest.

2.4.1 Introduction and Contents

Research:
A collection of various identities from companies that “eco-friendly”.
36 Pages displaying 102 different graphic applications
Identity Explorations:
An investigation of different names and the treatment of typography.
57 pages of different names and logos.

2.4.2 Research

2.4.2.1 Examples of Communication Systems: Identities of Other Companies

See appendix C for more identities of other companies .


South Bank
Sustainability
Challenge
echoing
green
Forum for the Future
Sustainability
Model and Guide
gllgreen
THINK ACT PROTECT


The World Goes Green
For a healthy environment
Yatesbury
Built Green
BRITISH COLUMBIA

3.0 DATA ANALYSIS

3.1 INTRODUCTION

The data analysis section uses the previous data collected to determine the efficiency of the existing delivery operations. Those existing operations will be analyzed along with numerous parameters including but not limited to, routing, time, cost, and efficiencies. The inventoried alternative modes of transportation will be analyzed based on specific characteristics of Downtown Storrs. Analysis also serves to determine the type of businesses, products, and target markets that are most susceptible to penetration by green transportation. Moreover prioritizing the collected graphic communication systems based on appropriateness to Downtown Storrs.

3.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING

3.2.1 Determine Efficiency of Existing Delivery Operations

VMT / Emissions

Restaurant	Avg. # of Deliveries to Students per Week	VMT Estimate for Student Deliveries per Month*	Total Carbon emissions per Month in pounds** (assuming car type shown below under normal operating conditions with 50% stop-and-go traffic)			
			1994 Chrysler Lebaron	2000 Chevy Cavalier	2006 Honda Civic	2007 Toyota Prius
Gianelli's	42	469	469	426	333	205
Red Rock	16	179	179	162	127	78
Wooster Street Pizza	14	154	154	140	109	67
Husky Pizza	23	251	251	228	178	110
Dominos	175	1,953	1,953	1,773	1,388	854
DP Dough	240	2,678	2,678	2,432	1,904	1,171
Total	**509**	**5,683**	**5,683**	**5,160**	**4,040**	**2,484**

* calculated based upon weighted mean average of euclidean distance from students to Storrs Center multiplied by 1.5 to account for euclidean measurement and by 2 for round-trip

** calculated using carbon emissions estimates by vehicle type from travelmatters.org

Total: 100,332 LB/ YEAR

Figure 3.1: Carbon Emissions Results per month

3.2.1.1 Carbon Emission

Housing

On-Campus Housing
~10,487 Residents
0.83 Mean Euclidean Distance (miles) to Storrs Center
0.84 Weighted Mean Euclidean Distance (miles) to Storrs Center by population

Off-Campus Housing
12 Apartment Complexes within 2-mile study area
~1,786 Residents
1.26 Mean Euclidean Distance (miles) to Storrs Center
1.45 Weighted Mean Euclidean Distance (miles) to Storrs Center by population

18 Apartment Complexes within 3-mile study area
~2,626 Residents
1.68 Mean Euclidean Distance (miles) to Storrs Center
1.82 Weighted Mean Euclidean Distance (miles) to Storrs Center by population

Total Student Housing within 2-mile study area
~12,273 Residents
1.01 Mean Euclidean Distance (miles) to Storrs Center
0.93 Weighted Mean Euclidean Distance (miles) to Storrs Center by population

3.2.1 Modes of Transportation

	Mode	Climate	Infrastructure	Speed	Cost	Sustainability
	Human-Powered Bike	Lack of climate control can make delivery less convenient during periods of incelement weather but can be augmented.	Potential need for additional infrastructure or accesories to support program needs. (ie bikeways and trailers)	Human powered deliveries are not as fast as cars but could be more efficient for campus deliveries.	Cost for bicycles is the second most inexpensive form of transportation for business owners and includes no fuel costs.	Reduces emissions and facilitates the cultural change needed for transportation in mixed use developments
	Human-Assisted Electric Bike	Lack of climate control can make delivery less convenient during periods of incelement weather but can be augmented.	Potential need for accesories to support program needs. (ie canopies, trailers) but no need for additional infrastructure.	Faster than human powered bikes but can not travel at high speeds or ranges like a car.	Cost is relatively inexpensive ranging from 1,000 to 3,000 dollars. Cheaper than electric cars and also requires no fuel costs.	Reduces emissions and facilitates the cultural change needed for transportation in mixed use developments
	Electric Bike	Lack of climate control can make delivery less convenient during periods of incelement weather but can be augmented.	Potential need for accesories to support program needs. (ie canopies, trailers) but not need for additional infrastructure.	Faster than human powered bikes but can not travel at high speeds or ranges like a car.	Cost is relatively inexpensive ranging from 3,000 to 7,000 dollars. Cheaper than electric cars and also requires no fuel costs.	Reduces emissions and facilitates the cultural change needed for transportation in mixed use developments
	Electric Car	Climate control makes delivery more convenient during periods of inclement weather such as rain and snow.	No need for additional infrastructure and storage space for delivery goods is plentiful.	Fastest form of transportation in terms of speed and also has greatest length second only to a normal car.	The most expensive form of transportation for any one individual business owner with prices starting around 7,000 dollars.	Reduces emissions but perpetuates reliance on cars, parking lots, and impervious surfaces.
	Gas-Powered Bike	Lack of climate control can make delivery less convenient during periods of incelement weather but can be augmented.	Potential need for accesories to support program needs. (ie canopies, trailers) but no need for additional infrastructure.	Faster than human powered bikes and more range than electric bikes.	Cost is relatively inexpensive ranging from 3,000 to 7,000 dollars. Cheaper than electric cars but requires fuel costs.	Petroleum based form of transportation not ecologically sound. Also perpetuates reliance on cars, parking lots, and impervious surfaces.
	Gas Powered Car	Climate control makes delivery more convenient during periods of inclement weather such as rain and snow.	No need for additional infrastructure and storage space for delivery goods is plentiful.	Fastest form of transportation in terms of speed and also has greatest length second only to a normal car.	The most expensive form of transportation for any one individual business owner with prices starting around 7,000 dollars.	Petroleum based form of transportation not ecologically sound. Also perpetuates reliance on cars, parking lots, and impervious surfaces.

3.2.2 Delivery and Modes of Transportation

The density representation map shown on (Figure 3.2) is represented by color dots as follows: Red dots represent high density locations within 1.25 miles of Downtown Storrs. This accounts for 17 on campus dorms and 7 off campus student complexes which add up to about **11,600 units.** Orange dots represent high density locations within 2.5 miles of Downtown Storrs. This accounts for 10 off campus complexes composed of **466 units**.
The yellow dots represent the low density locations within 5 miles of Downtown Storrs. Which are mostly private residences.

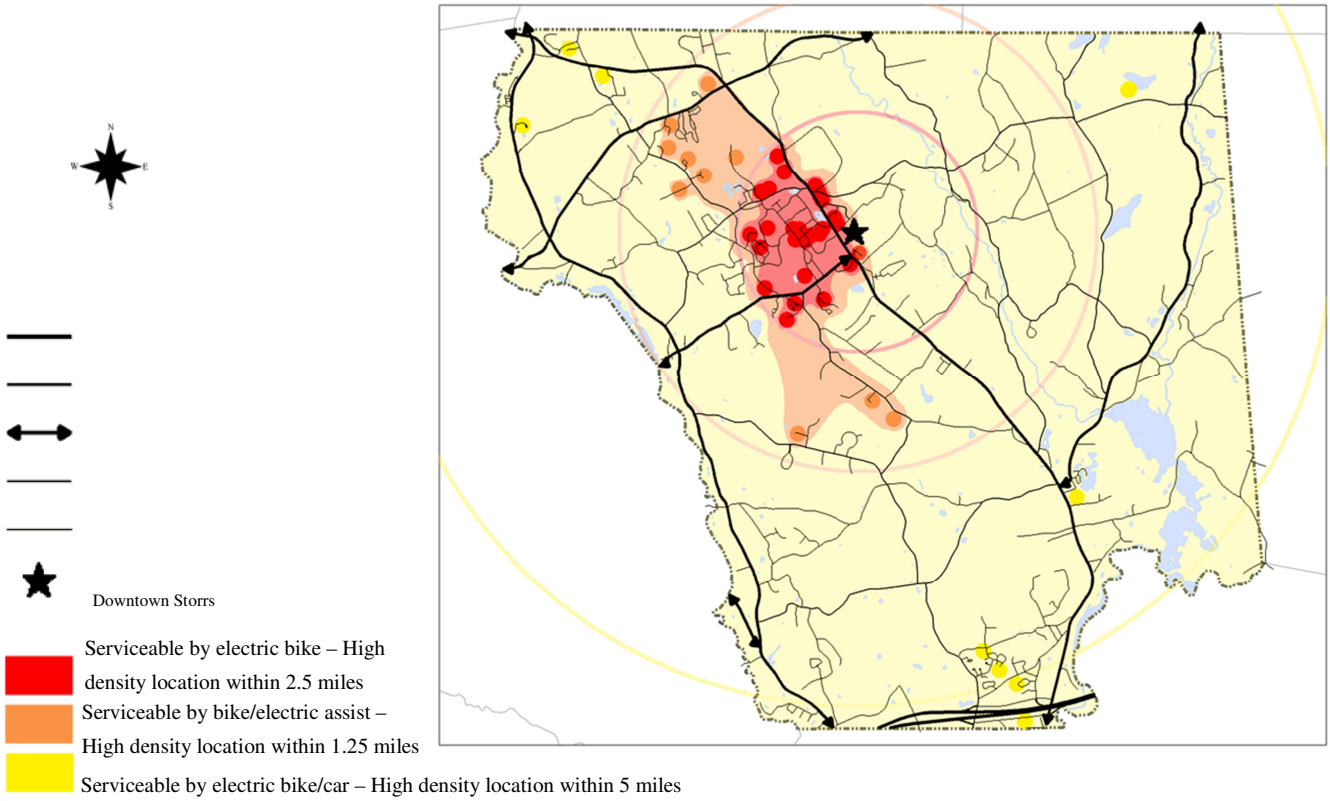


Figure 3.2: High density areas and proposed type of service delivery

3.2.3 Routing and Sequencing Scenarios

With the lack of field testing and reliance on calculations with best-guessed variables (such as a constant bike speed of 15 mph), and not taking into account the slope of routes in both directions, a new and more accurate study had to be conducted.

Studies similar to this have become more commonplace as the increased global awareness of the negative impacts humans put on the world, and many places have already put these ideas into effect. For example, B-Line, a Portland native sustainable delivery company has been using human and electric tricycles since 2009 and have stated, "over 10,000 deliveries and 12,000 miles later, we have reduced C02 emissions by an estimated 54,000 pounds" (Bay, 2011). Bella Bacino's Pizza Restaurant in Chicago now uses Segway's to Deliver and shuttle employees between their four stores. Stating the original purpose was purely for economic reasons, as it costs about 1/6th as much to operate than a car, but "...obviously there's no internal combustion engine, just two batteries. It's a very green way to go" (Economy Meets Ecology) In addition this, the Segway charge lasts for about 12 hours, and it has the ability to park anywhere, including sidewalks. With positive results from many different case studies, it is easily apparent why the adaption to "green transportation" has become so important.

In order to come to a set of conclusions based on actual data for the new Green Modes of Transportation Study, both bicycle and car routes had to be determined and tested. Using software such as ArcGIS, and four years of personal experience with Storrs Campus, both

driving and biking, the first step was to pick locations around UConn Storrs campus that would be tested. These stops were based on groupings of student housing within 2 miles of Storrs Center that were defined by the previous study. With Storrs Center being the starting and ending destination, Carriage House, Charter Oak Apartments and McMahon and Towers residence halls were picked as suitable test locations (Table 3.6).

Figure 3.3: Test Locations

Each individual location was picked not only for its connection to Storrs Center, including distance, slope, and traffic volume, but also for their connection to each other because of the potential bicycle shortcuts. For example, Carriage House and Charter Oak Apartments were chosen for being the furthest from Storrs Center, having the most uphill slope, and also having a pedestrian/bicycle only paved path between the two that cuts down on the time travelled. Similarly, McMahon and Towers residence halls have though-campus pedestrian/bicycle paths that cars do not have access to.

A new circulation network for both Bicycle (Table 3.7) and Car (Table 3.8) had to be developed simultaneously, which would provide the best possible route for each, taking into consideration all the facets necessary for efficient connection. As base guidelines, only paved public roads would be used for both bicycle car routes, except for three areas between locations that had shorter routes via pedestrian/bicycle only paved paths.

Figure 3.4: Bicycle Network

Figure 3.5: Car Network

The routes were then carried out, using a GPS to track distance, time, and routes taken. Once completed, all of this data was imported into ArcGIS to view and manipulate. For bicycle tests, many full routes were carried out, both to and from, while others were tested in smaller segments, using the main hub between UConn's Visitor Center and North Garage as a branching point, and then interpolated using the raw data once completed. Car tests were carried out in one direction for each route, due to the factor of human strain on uphill slopes versus downhill being eliminated. Using the compiled data from the tests, the time and distance it would take for 1, 2 and 3 stop deliveries for both bicycle and car were produced, just as the previous Green Modes of Transportation had in its study. In comparison, bicycle routes for 1 stop deliveries were on average 2.02 slower than estimates by a transportation engineer for the previous study (Table 3.9) , 2.36 times slower for 2 stop deliveries (Table 3.10), and 2.06 times slower for 3 stop deliveries (Table 3.11). Car routes yielded similar results, with 1 stop deliveries being on average 2.2 times slower than a the transportation engineer estimates (Table 3.12), 2.4 times slower for 2 stop deliveries (Table 3.13), and 2.06 times faster for 3 stop deliveries (Table 3.14). Clearly furthering the original study and conducting field test for more accurate data proved worthwhile. (See Graph 3.15 and 3.16)

Table 3.6: One Item Delivery Tests (Bike)

	Actual Road Test	**Estimate By Transportation Engineer**
Route	**Time (min) (Dis. (Mi.))**	**Time (min)**
SC -- McMahon -- SC	7 (1.46 mi.)	4.5
SC -- Carriage -- SC	25 (4.69 mi.)	16.2
SC -- Charter Oak -- SC	28 (3.59 mi.)	9.7
SC -- Towers -- SC	12 (1.92 mi.)	6.1

Figure 3.6 McMahon

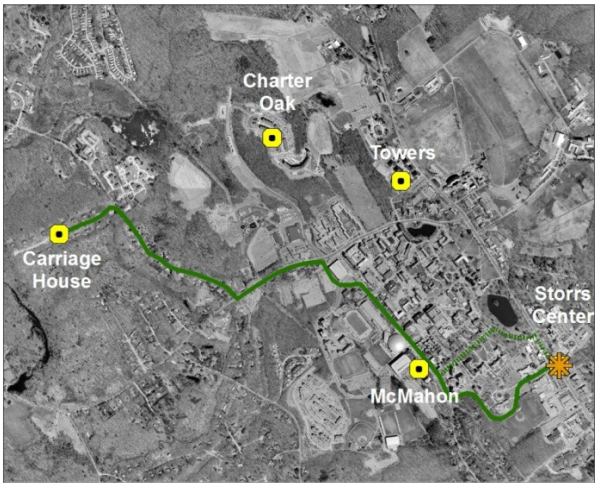
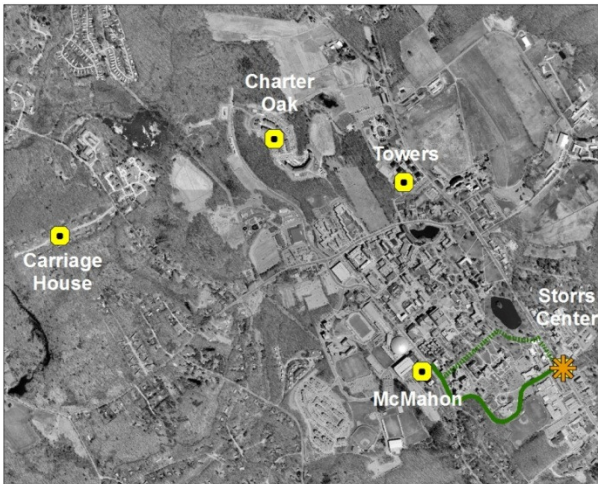


Figure 3.6 McMahon



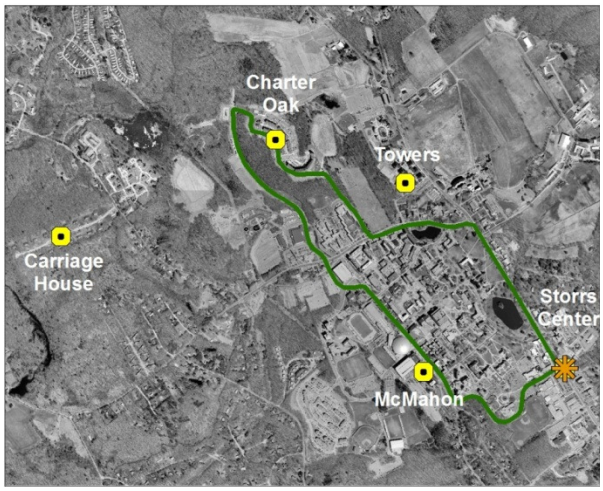


Figure 3.6: Charter Oak

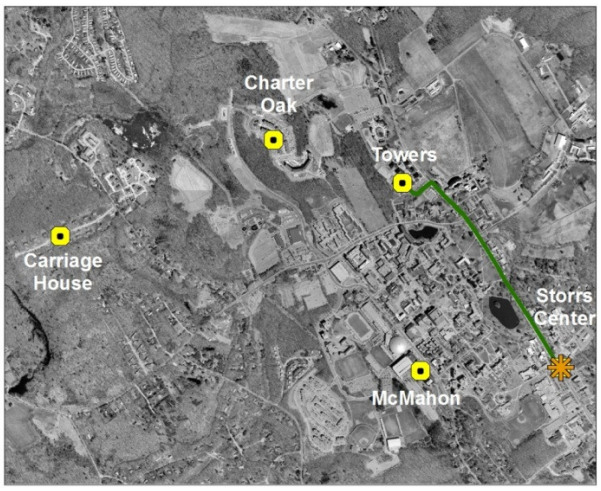


Figure 3.6: Towers

Table3.7: Two Item Delivery Tests (Bike)

	Actual Road Test	**Estimate by Transportation Engineer**
Routes	**Time (min.) ((Dist. (mi.))**	**Time (min.)**
SC -- McMahon -- Carriage -- SC	23 (4.69 mi.)	16.4
SC -- McMahon -- Charter Oak -- SC	28 (3.59 mi.)	7.3
SC -- McMahon -- Towers -- SC	17 (2.58 mi.)	7.3
SC -- Carriage -- Charter Oak -- SC	38.5 (4.69 mi.)	16.4
SC -- Carriage -- Towers -- SC	29 (4.89 mi.)	16.4
SC -- Charter Oak -- Towers -- SC	25 (4.29 mi.)	9.7

Figure 3.7: McMahon – Carriage

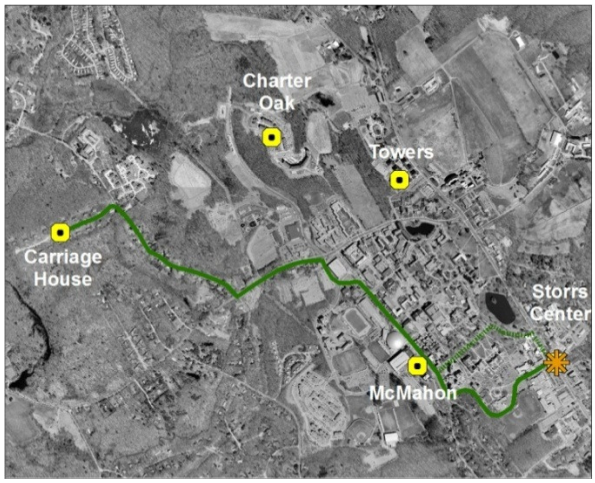


Figure 3.7: McMahon – Charter Oak

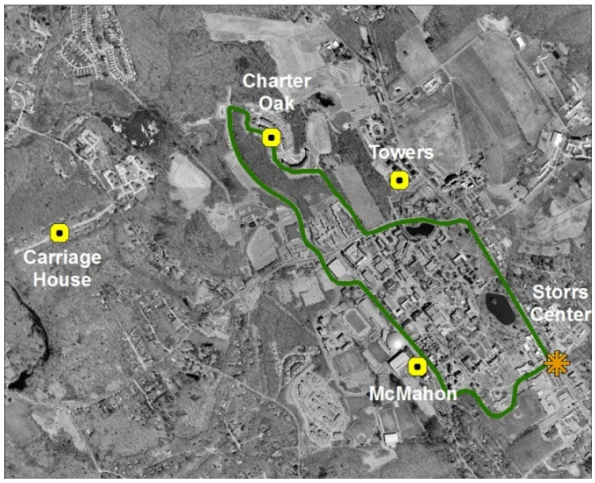


Figure 3.7: McMahon – Towers

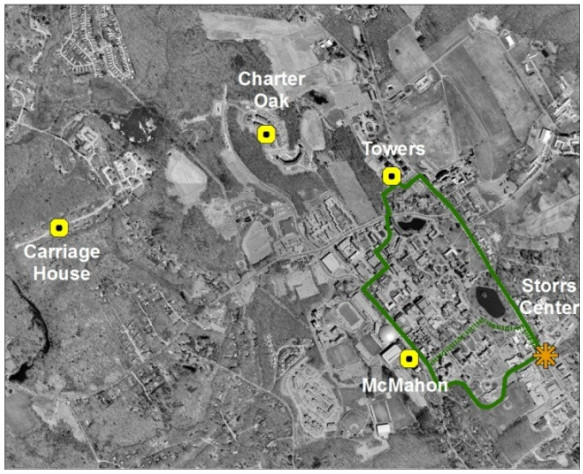


Figure 3.7: Carriage – Charter Oak

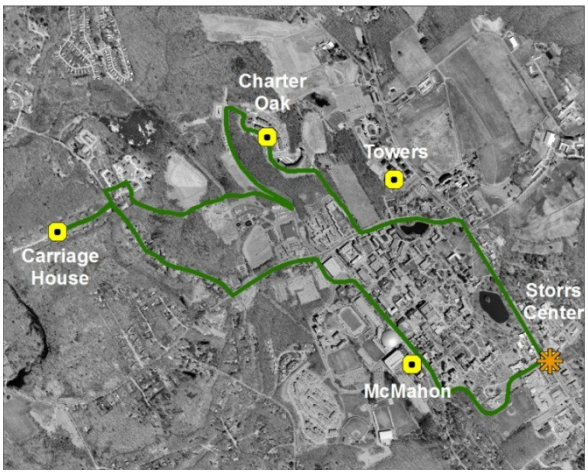


Figure 3.7: Carriage – Towers

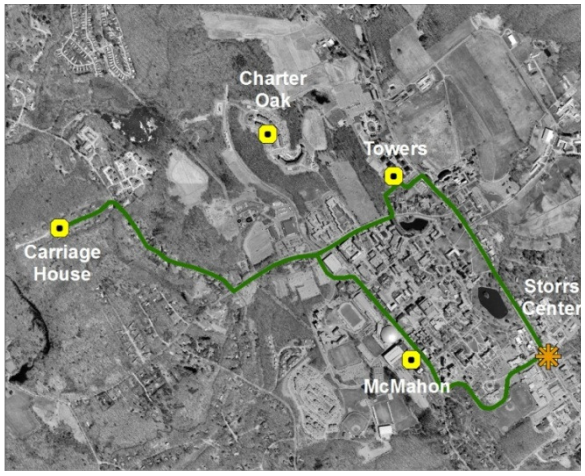


Figure 3.7: Charter Oak - Towers

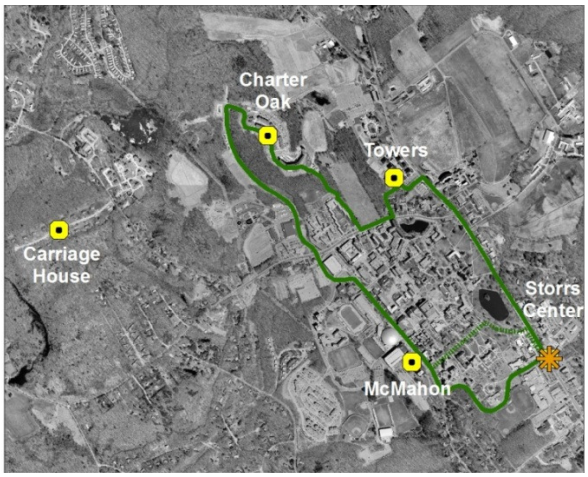


Table 3.8: Three Item Delivery Tests (Bike)

	Actual Road Test	**Estimate by Transportation Engineer**
Routes	**Time (min.) ((Dis. (mi.))**	**Time (min.)**
SC -- McMahon -- Carriage - Charter Oak -- SC	36.5 (5.37 mi)	16.5
SC -- McMahon -- Carriage - Towers -- SC	27 (4.89 mi)	16.5
SC -- McMahon -- Charter Oak -- Towers -- SC	33 (4.29 mi)	14
SC -- Carriage -- Charter Oak -- Towers -- SC	35.5 (6.07 mi)	17

Figure 3.8: McMahon – Carriage – Charter Oak

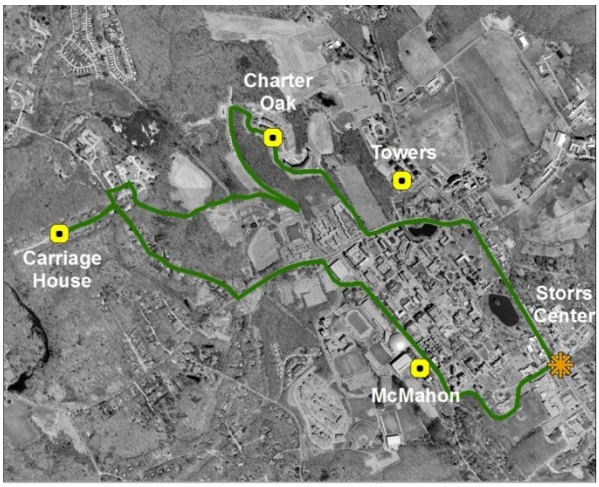


Figure 3.8: McMahon – Carriage - Towers

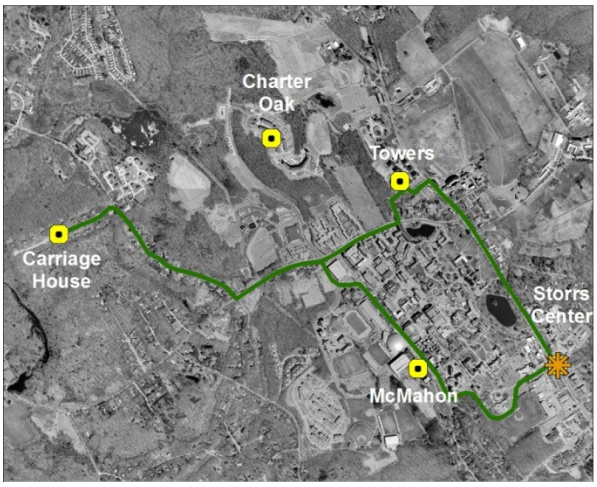


Figure 3.8: McMahon – Charter Oak – Towers

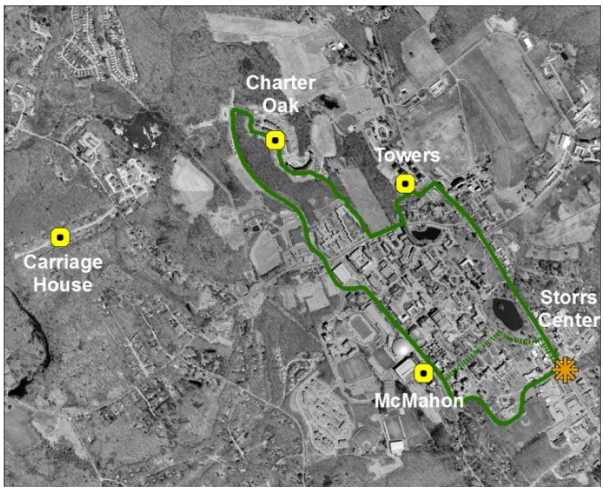


Figure 3.8: Carriage – Charter Oak - Towers

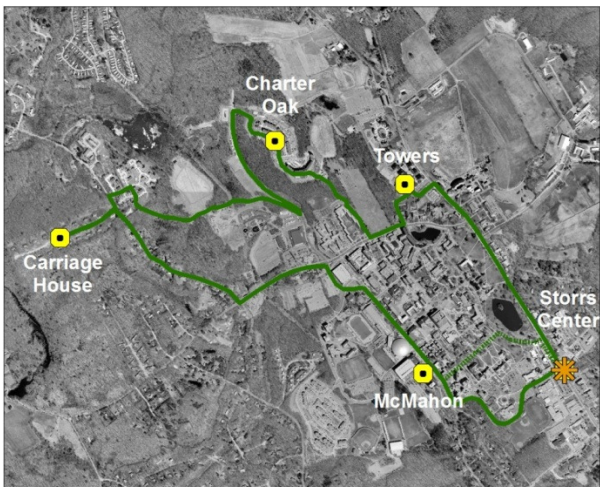


Table 3.9: One Item Delivery Tests (Car)

	Actual Road Test	**Estimate by Transportation Engineer**
Route	**Time (min)** ***(Dist. (mi.))***	**Time (min)**
SC -- McMahon -- SC	10 (1.32 mi.)	2.7
SC -- Carriage -- SC	12 (4.58 mi.)	9.8
SC -- Charter Oak -- SC	14 (4.16 mi.)	5.8
SC -- Towers -- SC	6 (1.92 mi.)	3.6

Figure 3.9: McMahon

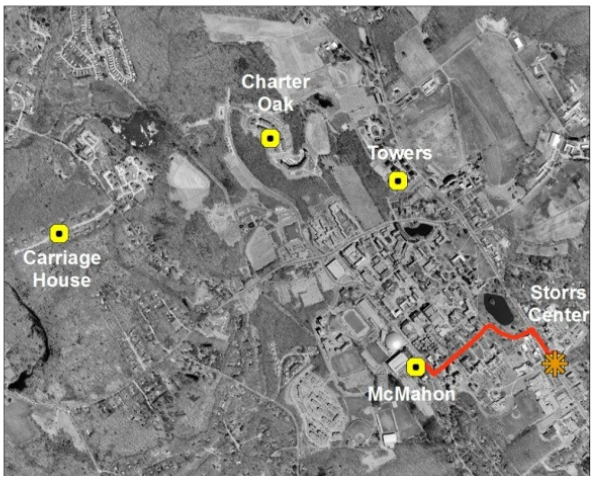


Figure 3.9: Carriage

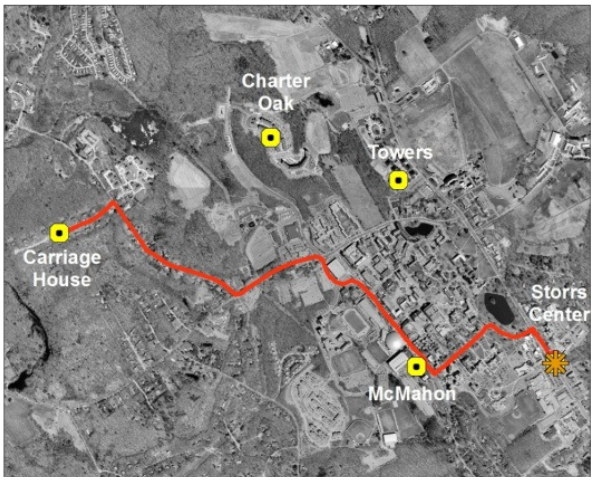


Figure 3.9: Charter Oak

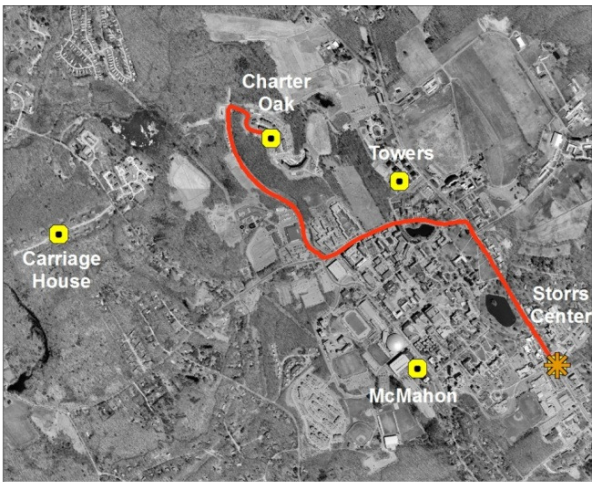


Figure 3.9: Towers

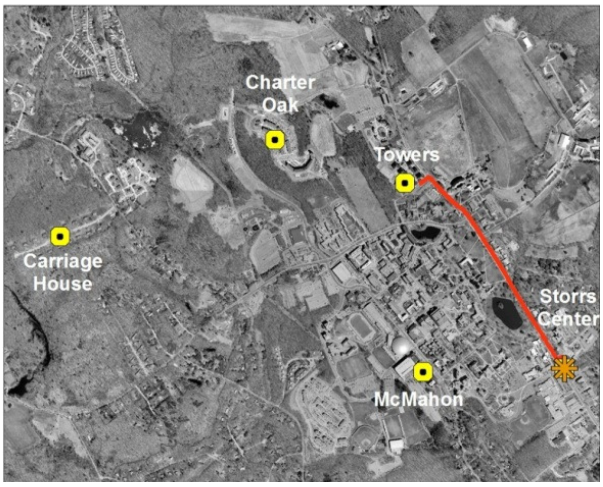


Table 3.10: One Item Delivery Tests (Car)

	Actual Road Test	**Estimate by Transportation Engineer**
Route	**Time (min)** ***(Dist. (mi.)***	**Time (min)**
SC -- McMahon -- Carriage -- SC	22 (4.58 mi.)	10
SC -- McMahon -- Charter Oak -- SC	17.5 (4.1 mi.)	4.5
SC -- McMahon -- Towers -- SC	13 (2.7 mi.)	4.5
SC -- Carriage -- Charter Oak -- SC	18 (6.3 mi.)	10
SC -- Carriage -- Towers -- SC	13 (5.15 mi.)	10
SC -- Charter Oak -- Towers -- SC	15 (4.61 mi.)	5.8

Figure 3.10: McMahon – Carriage

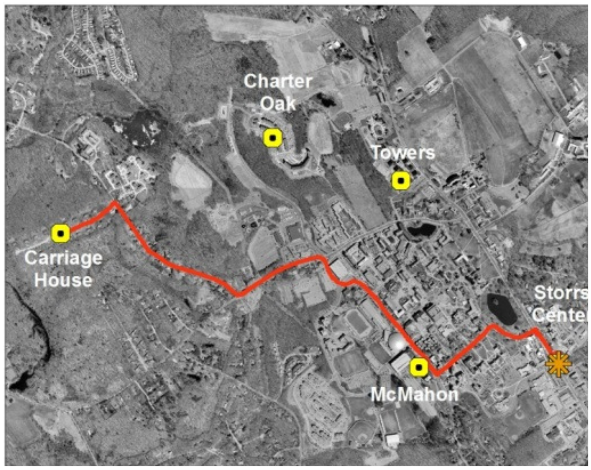


Figure 3.10: McMahon – Charter Oak

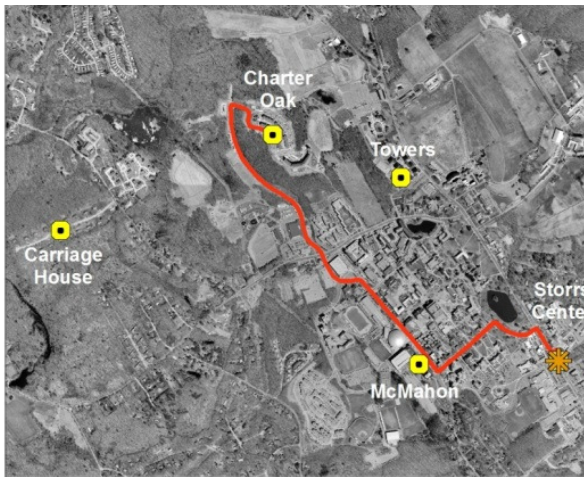


Figure 3.10: McMahon – Towers

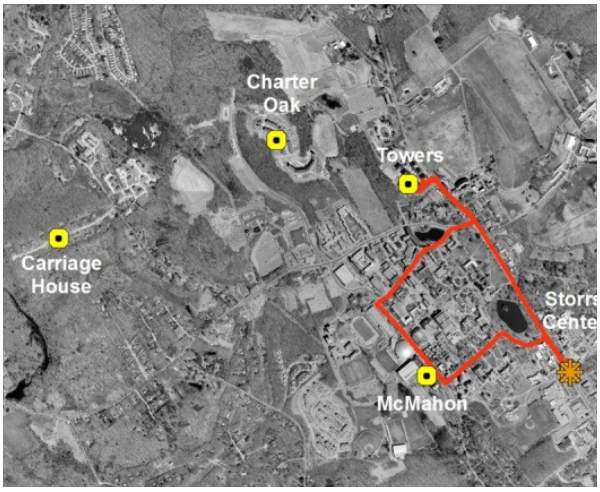


Figure 3.10: Carriage – Charter Oak

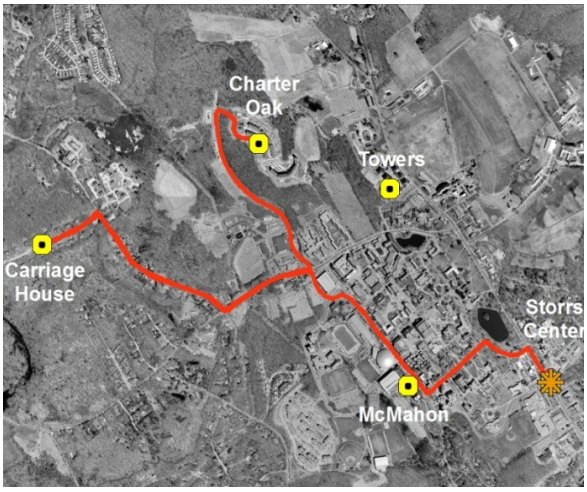


Figure 3.10: Carriage – Towers

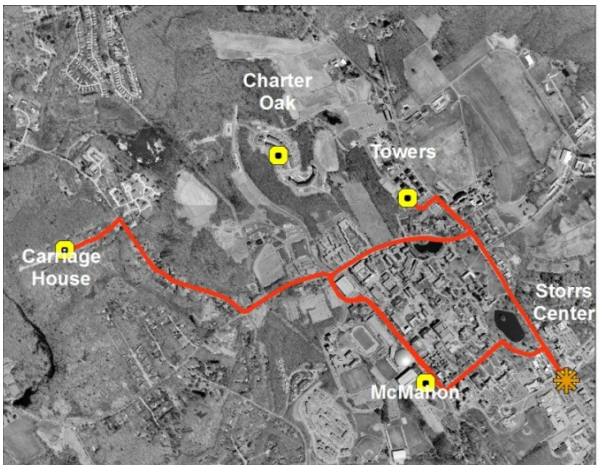


Figure 3.10: Charter Oak - Towers

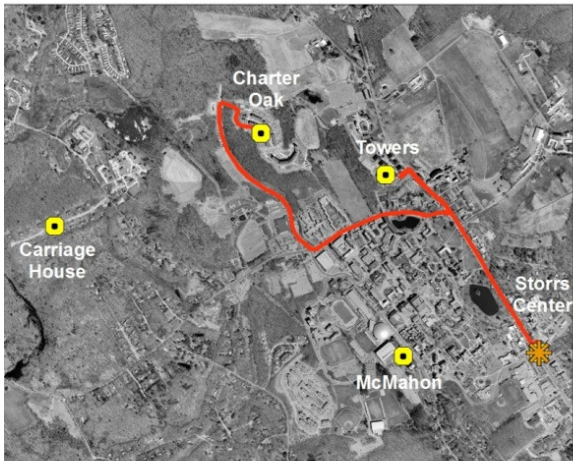


Table 3.11: Three Item Delivery Tests (Car)

	Actual Road Test	Estimate by Transportation Engineer
Route	Time (min) *(Dist. (mi.)*	Time (min)
SC -- McMahon -- Carriage - Charter Oak -- SC	28 (6.3 mi.)	10
SC -- McMahon -- Carriage - Towers -- SC	23 (5.1 mi.)	10
SC -- McMahon -- Charter Oak -- Towers -- SC	18.5 (4.6 mi.)	13
SC -- Carriage -- Charter Oak -- Towers -- SC	19 (5.94 mi.)	11

Figure 3.11: McMahon – Carriage – Charter Oak

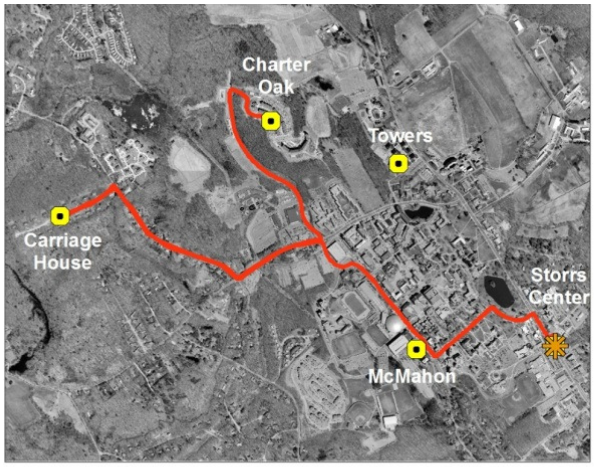


Figure 3.11: McMahon – Carriage - Towers

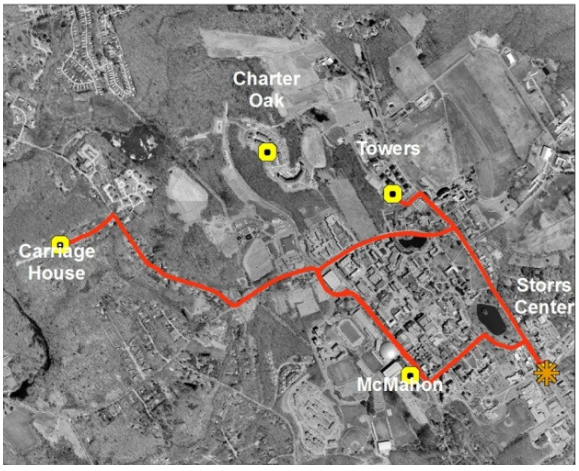


Figure 3.11: McMahon – Charter Oak – Towers

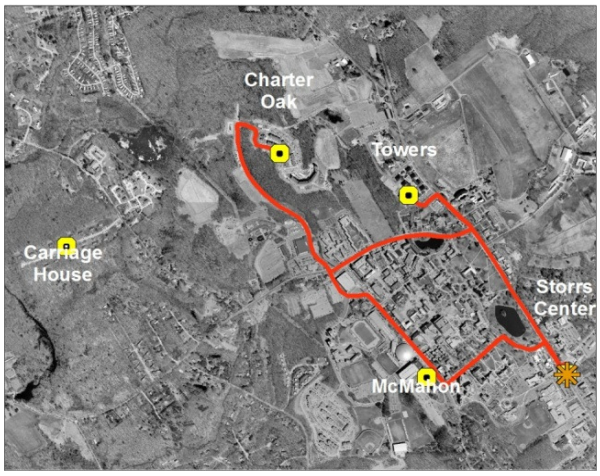


Figure 3.11: Carriage – Charter Oak - Towers

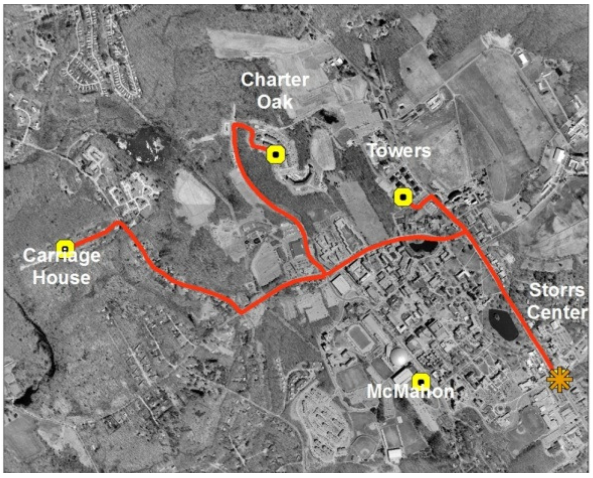


Table 4.12: Bicycle Route Data Comparison

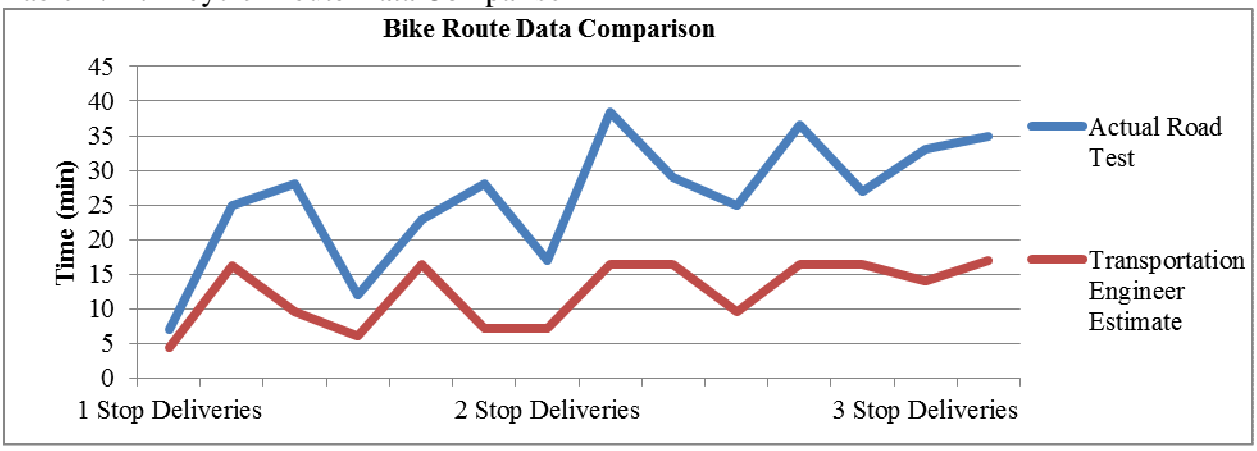


Table 4.13: Car Route Data Comparison

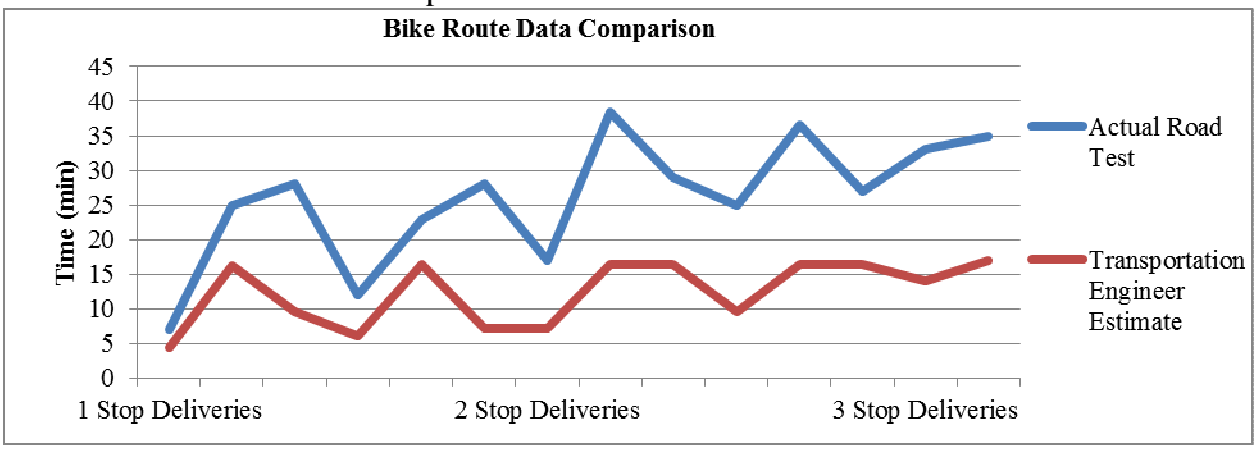


Figure 3.14: Test Locations

Figure 3.15: Bicycle Network

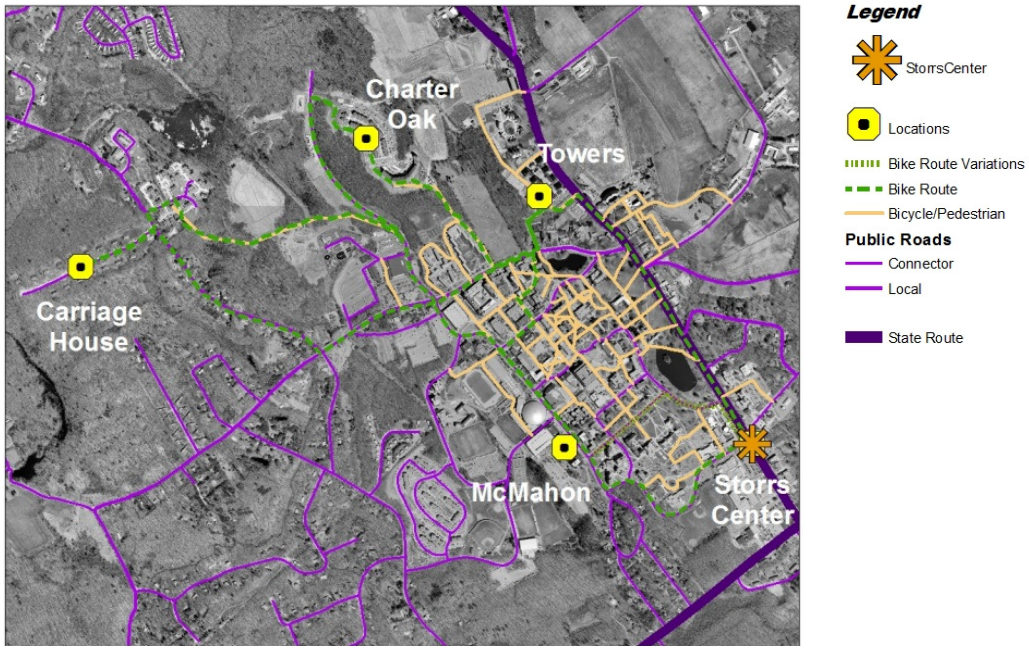


Figure 3.16: Car Network

Bringing this information into the larger scope was the final step of the study. The point of this study was not to debunk the methods and conclusions of the past, but to provide useful and informative data concerning the future of environmentally friendly delivery services not only in the UConn area, but around the globe.

Conclusions were calculated using 15 item deliveries total between Carriage House, McMahon and Towers Residence Halls, and with an assumed 50% stop and go traffic for cars. The Chrysler Lebaron was chosen for the car in order to compare existing and proposed methods of delivery based on its low 18 MPG rating, and its use in the previous study. Additionally, in order to show how the proposed method results would be affected by a more fuel efficient car, the Toyota Prius with its high 48 MPG was chosen. Bicycle conclusions were also calculated for the proposed method, including an electric bike as well because of its ability to go faster and strain its user less, and it's substantially lower energy use.

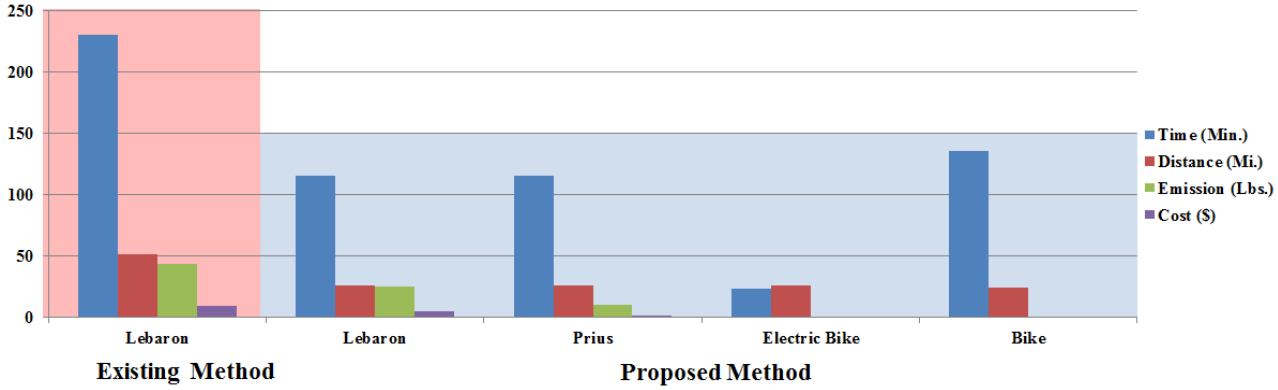
Time, distance, carbon emissions and monetary value were concluded for each (Table 3.17, 3.18), showing a considerable difference for each value when comparing existing and proposed methods of delivery for the Lebaron, and for a further decrease in each for the Prius, electric bike, and regular bike conclusions.

Using the data concluded in this study, it can be deduced the adaption to this proposed method of delivery would have significant advantages in the ever-more important sustainability movement. Taking on the routes and means of transportation as conducted in this study will have a significant impact on lowering carbon emissions, and help save money at the same time. It is in the hopes that other not only other college campuses, but towns and cities globally will begin to realize to importance and efficiency of greener modes of transportation, when used properly.

Table 3.17*: Data Conclusions

Car : Chrysler Lebaron Time: 115 min. x 2 = 230 min Distance: 25.5 miles x 2 = 51 mi Emissions: 43 lbs. **MPG: 18** Cost @ 2.89/gal = 8$ Cost @ 4.00/gal = 11$	**Car: Chrysler Lebaron** Time: 23 min . x 5 = 115 min Distance: 5.1 mi. x 5 = 25.5 mi. Emissions: 5 lbs. x 5 = 25 lbs. **MPG: 18** Cost @ 2.89/gal= 4$ Cost @ 4.89/gal = 5$	**Car: Toyota Prius** Time: 23 min. x 5 = 115 min. Distance: 5.1 mi. x 5 = 25.5 mi. Emissions: 2 lbs. x 5 = 10 lbs. **MPG: 48** Cost @ 2.89/gal= 1$ Cost @ 4.89/gal = 2$	**Electric Bike** Time: 27 min. x 5 = 135 min. Distance: 4.8 mi. x 5 = 24.1mi Emissions: 0 lbs. **MPG: 160 to 200** Cost: >1$	**Bike** 27 min. x 5 = 135 min. 4.8 mi. x 5 = 24.1 mi. 0 Emissions **MPG: 670** 0$ Cost
3 Hr. 50 Min. **51 Mi.** **43 lbs.** **8 to 11$**	**1 Hr. 55 Min.** **25.5 Mi.** **25 lbs.** **4 to 5$**	**1 Hr. 55 Min.** **25.5 Mi.** **10 lbs.** **1 to 2$**	**2 Hr. 15 min.** **24.1 Mi.** **0 lbs.** **>1 $**	**2 Hr. 15 min.** **24.1 Mi.** **0 lbs.** **0$**

Table 3.18: Graphical Conclusion



3.3 BUSINESS MANAGEMENT

3.3.1 Business Implications

Local delivery businesses can have most impact through the utilization of green transportation systems. For many, and especially those around the UConn Storrs campus, deliveries represent 50-80% of their business.

Under the current practices, the delivery vehicles belong to the employees, who receive a fixed hourly wage and are responsible for all expenses related to making deliveries, such as gas and car maintenance. In this regard, from the perspective of the business owners, the delivery costs are completely externalized.

As a result, from an economic perspective, business owners seem to be indifferent to the types of vehicles their businesses use for deliveries. Nevertheless, the "green" theme has penetrated their minds and they generally agree that using green vehicles would be good for the environment. At this point, however, this is beyond their decision control since it is not feasible for them to hire delivery employees on the basis of the types of cars they drive (and indeed, almost no employees drive hybrids).

One favorable factor for the Storrs community is that college students represent the majority of customers for the local delivery businesses. College students are increasingly conscious of their environmental impact and hold strong attitudes about being environmentally responsible. Local business owners are aware of this and believe that if their businesses were to utilize green transportation systems, the perception of the customers and local community would be very positive.

Given these considerations, one feasible option for the implementation of green transportation would be to target the employees of the local delivery businesses (who are typically students). A fleet of vehicles could be made available to employees who work at local delivery businesses.

Based on such option, employment at those businesses would be open not only to those who have their own cars but also to those who do not own cars. Since each employee is normally responsible for the costs associated with the delivery, the green vehicles could be leased to the employees at rates that make their utilization cost effective for the employees. Clearly, the pursuit of this option requires a more careful assessment of its financial feasibility, based on the cost of the acquisition and maintenance of the vehicles and the rates at which they can be leased out.

3.3.2 Survey Results

See appendix D for the complete survey interview.

- All businesses interviewed noted that the only costs associated with transportation include labor for drivers. (with the exception of Dominos and Storrs Drug)
- All vehicles being used are owned by the drivers and not by the company. (except Storrs Drug)
- 100% of survey participants said they would be interested in Green Transportation if some sort of financial assistance or incentive was provided.
- Two establishments have already been thinking about implementing a green delivery system.

3.3.2.1 Identity Topics: Benefits of Green Transportation

Access – "Obviously you could save a lot of money on gas. A scooter can get over 100 miles to the gallon. But accessibility would be the biggest benefit. With a scooter, you can get wherever you want to go whereas with a car you are really much more restricted. We could probably save a lot of time using a moped or scooter for that reason."
Labor – "There may be tremendous labor benefits because if we are paying a courier service to make the delivery then we wouldn't have to pay our drivers. At that point, we could really focus our man power inward."
Marketing – "It would probably be good for our image. People, especially students that care about the future of the planet."

3.3.2.2 Concerns

Economic – "Again cost. We obviously would not be able to afford purchasing a fleet of green vehicles but it depends on the structure of the system."
Safety – "Obviously our highest priority is keeping our drivers safe. I would imagine that it might be difficult to make deliveries on a bike at night."

3.4 COMMUNICATION DESIGN

3.4.1 Visual Preference Study

Several groups of people were asked to give their opinion on the graphic communication logos. They were not told anything about the project. Each logo was shown individually for 5 seconds two times. For all seven graphics, each group was then asked:

What does it say and what does it mean to you?
We then explained what the project was and asked the following series of questions.
Which of the Start Smart Graphics is your favorite?
Which of the Green Motion graphics is your favorite?
Which name do you like better?
Which graphic do you find the
most appropriate for the project?

Figure 3.5: Selected graphics for preference study

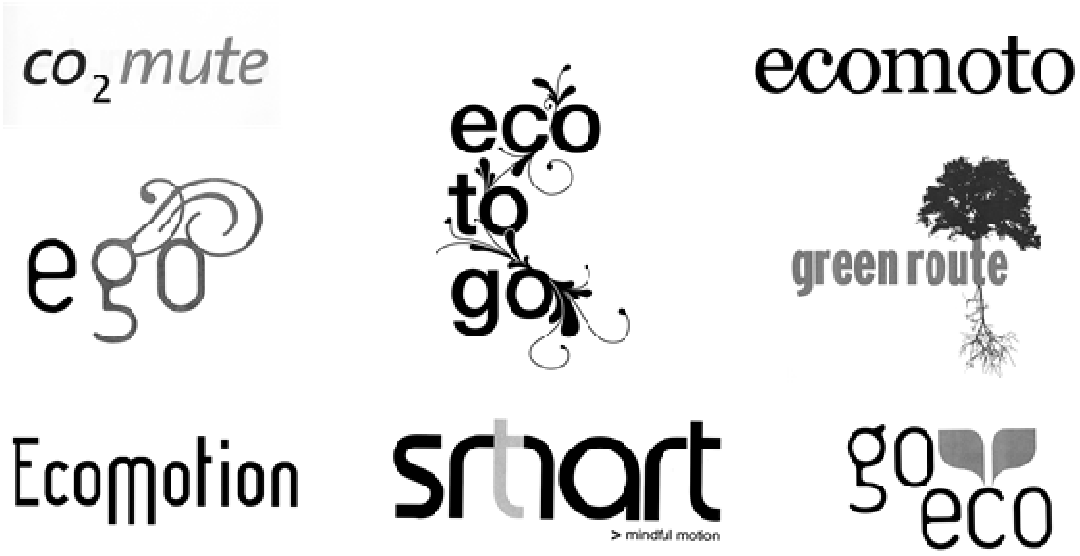


Figure 3.5: Graphics done by Edvin Yegir and his students

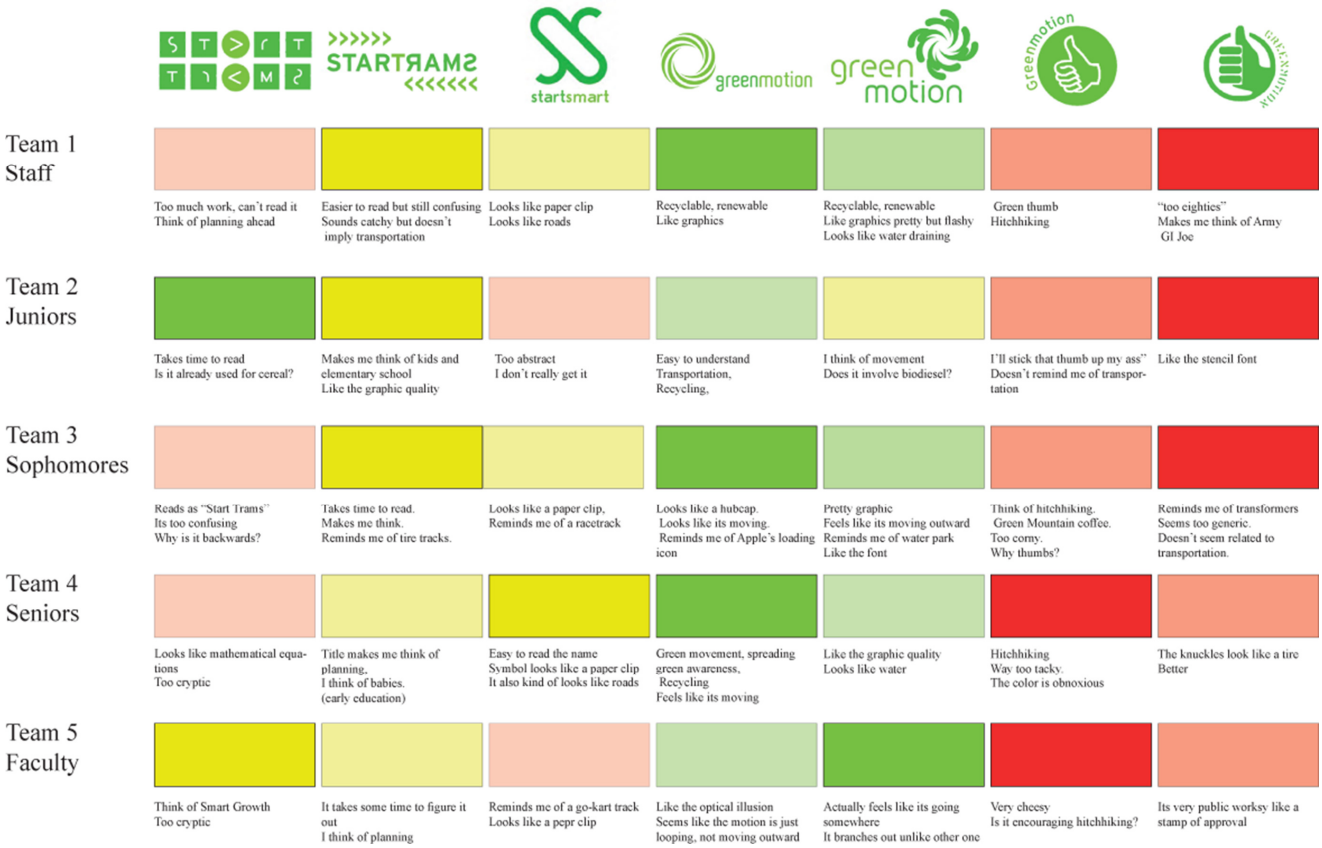


Figure 3.6: Criteria of selection and results

“Very pretty graphic.”

“I like the text.”

“I think of movement.”

“Feels like there is a point of origin and destinations.”

“It looks like water draining.”

“Feels like its moving.”

“I like the optical illusion.”

“Makes me think of recycling.”

“Looks like a hubcap.”

“Seems like its just looping instead of branching out.”

4.0 RECOMMENDATIONS

4.1 INTRODUCTION

The goal of the study was to test and expand on the previous Green Modes of Transportation Study conducted by the multi-disciplinary team of Miniutti, Dimov, Yegir, Marshall, and Kenny under the Center for Transportation and Urban Planning @ UConn Research Proposal 2008 grant. As a result of the data analysis, the following objective is recommended for delivery businesses. Strive for three deliveries in one single delivery trip, using bicycles, electric bicycles, and or electric cars. The delivery business does not mind delivering green. But the study has shown that the clients will be more interesting in ordering more from those places who deliver green.

4.2 LANDSCAPE ARCHITECTURE AND TRANSPORTATION ENGINEERING AND BUSINESS MANAGEMENT

To say that the United States is too dependent on the personal automobile as a form of transportation is nothing new. We hear about all of the problems that the automobile has brought such as urban sprawl, air pollution, water pollution and a large carbon footprint. Although we have spent many years blaming cars for most of our environmental problems, society has yet to make significant changes in the way we get from point A to point B. In order to create a more sustainable future, we must stop talking the talk and start implementing new methods of transportation. However, getting started is probably the hardest part of the process. How can a society dependent on the personal automobile be encouraged to use other methods of transportation such as a bicycle? This following lines discusses how college campuses are great places to implement changes in methods of transportation, particularly bicycle use.

Common characteristics of a college campus include students, professionals, academic buildings, residence halls and small stores. They are communities within themselves and tend to be more compact than your average town. Campuses "have and ideal human scale (Balsas)"-not too big, not too small and because of this "Campuses make good laboratories to test new modes of transportation (Toor,William)."

The use of an alternative mode of transportation, such as a bicycle becomes more realistic on campuses where dorms, classes, and stores are within a 3-mile radius. This relatively short distance can allow students to get to their destinations in less time than if they took a car or a bus. "The bicycle offers riders speed and flexibility over short distances. It produces no pollution, uses no energy, is silent, can be accommodated with relatively little space, is fast and cheap, and is also accessible to many people who cannot drive, especially the young (Balsas)".

As institutions of higher learning, it is easier for college campuses to educate and promote sustainability. Students who are encouraged to use bicycles as a means of transportation and students who actually use them are more likely to continue to use them even after they have

moved on. The following is an excerpt from Carlos J. L. Balsas essay on "Sustainable Transportation Planning on College Campuses":

One aspect often overlooked by campus administrators and planners is the college's potential to affect not only the transportation behavior of the campus population in the present but also the transportation habits and the environmental awareness that students can develop in the long term, as "they will progress to occupy influential roles in government, companies or other organizations"…In this way, innovative transportation approaches are likely to diffuse from higher education to other parts of society.

If looked at from the perspective of Balsas, college students can be the agents of change that we need to help a transportation revolution gain momentum.
The planning and transportation engineering departments in the United States typically focus the curriculum around the automobile, marginalizing all other methods of transportation. Sustainable transportation is not a major component of the curricula and since it is almost non-existent perpetuates the type of planning and engineering that has made us so dependent on the personal automobile.

Planning and transportation engineering departments have lack typically lack curricula focused on sustainable transportation because the professors who teach planning and transportation engineering grew up in a time where the automobile was king and its harm to the environment was not being questioned. The obvious problem is that professor's lack the knowledge, sound research and materials to be able to effectively teach on other modes of transportation. There are many statistics and studies to be found on the automobile but when it comes to the marginalized methods like bikes, available research is very limited. More research and funding of different modes of transportation can "create more awareness of how to achieve and promote more sustainable transportation systems". Education is vital in the transition to sustainable modes of transportation.

Promoting the shift from cars to bicycles on college campuses will take more than education to be realized. "Shifting people's approach to transport is now a common objective of transport policies (Ogilvie)." In order to be effective, college campuses must approach the implementation of sustainable transportation through an integrated approach. Ogilvie proposes four interventions in promoting a modal shift: Education, engineering, financial incentives, providing alternatives.

Educating students on the environmental and physical health benefits of cycling is one way of promoting. Another way to promote the shift is to plan and design our environment to be cyclist friendly such as providing bike lanes, air filling stations, bike repair workshops, etc. A particular example of a financial incentive takes place at Stanford University. "Employees who choose not to buy a parking permit are paid $144 a year (Toor, Will)". Campuses that provide alternatives to driving personal automobiles may also see positive results. Examples of alternatives include ride-share programs or free bus passes for commuter students. The latter alternative is currently in place at the University of Connecticut and is very useful for international students who do not have easy access to personal vehicles.

The United States has come to a point where the continued dependence on the automobile is not possible. People have taken notice and want change but finding a starting point has proven to be no easy task. Although we have made drastic improvements in the gas efficiency of our personal vehicles, it is simply not enough. The idea of starting the transportation revolution on college campuses makes sense for multiple reasons. Eventually, students who learned and practiced sustainable transportation can pay it forward to future students, thus perpetuating sustainability.

4.3 COMMUNICATION DESIGN

4.3.1 Graphic Design Alternatives

Using the previous graphic communication analysis, the following graphics are alternatives that were derived from the combination of preferred qualities of the previous options depicted on chapter 3.4 Visual Preference Study.

4.3.1.1 Logo Alternatives

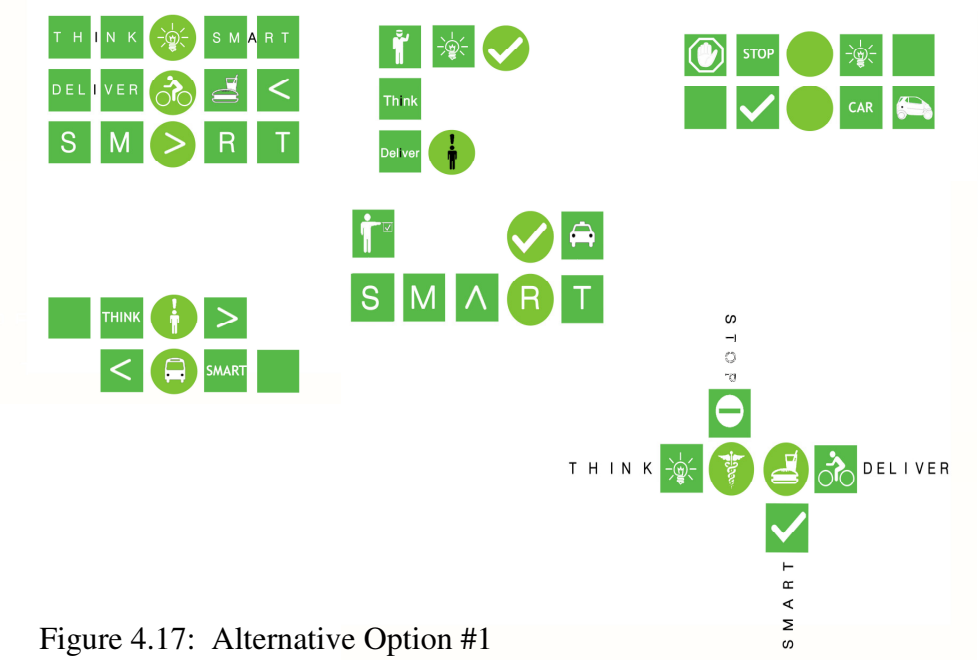


Figure 4.17: Alternative Option #1

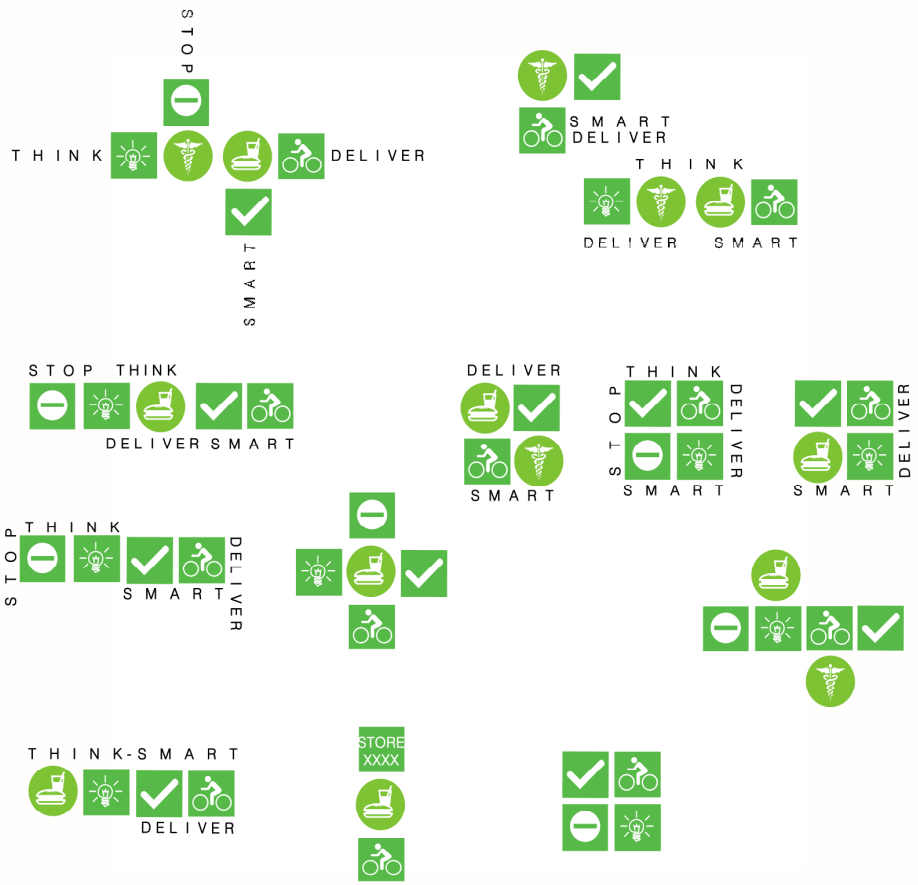


Figure 4.18: Alternative Option #2

4.3.2 The Categories of Signs

4.3.2.1 Identification

Identification signs provide the first impression of a destination. These signs are visual markers that display the name and function of a place or space, weather it is a room, an individual building or campus gateway. They appear at the beginning and end of routes and indicate entrances and exits to primary and secondary destinations. Their purpose is not purely functional. Styled appropriately, they also express a place's personality, character, and even its historic context. These signs can communicate a place's identity explicitly by presenting an actual logo or more generally by evoking an image.

- Site entry identification
- Site monument identification
- Building mounted identification
- Entrance identification
- Parking area identification
- Accessible parking identification

Figure 4.19: Identification Graphics

4.3.2.2 Orientation

To make a complicated space less baffling, orientation signs offer visitors an overview of their surroundings in the form of comprehensive site maps and directories. The design needs to coordinate with other identification and directional signs in a system. When all these signs work together, visitors are able to move easily along circulation routes. Most site maps show people their location with a You Are Here indicator. Outdoor maps show the boundaries of campus, entryways, major buildings, or other components of the space. On directories, occupants are usually listed in alphabetical or numerical order. In most cases maps should maintain the same orientation throughout a facility to avoid confusion. Orientation signs are usually large free standing units with maps, readily visible to many people simultaneously or wall-mounted if space does not allow it. An exterior orientation map can also show how an entire site fits into the neighborhood or district context.

- Directories (Floor, Elevator, Store)
- Maps
- Information/Orientation kiosk

Figure 4.20: Orientation Kiosks

4.3.2.3 Directional

Directional signs constitute the circulatory system of wayfinding because they provide the necessary cues that users need to keep on the move once they have entered a space. This sign type routes pedestrian or vehicular traffic between main entrances, key decision points, destination points, and exit points, by displaying graphic prompts such as: symbols typography and arrows. While their design should harmonize with the surrounding architecture, directional signs also need to be obvious and recognizable. Message should be simple, coordinated for easy navigation through an entire facility, and based on a specific wayfinding strategy.

- Off-site trailblazers
- On-site vehicular directional signs

- Pedestrian directional signs

Figure 4.21: Directional Signs

4.3.2.1 Regulatory

A regulatory sign describes the do's and don'ts of a place. It can be as simple as a No Smoking sign or a more complex display with rules indicating how citizens should enjoy and respect their public park. Regulatory signs should be unobtrusive and enhance the experience of a place but large enough to communicate instructions or warning information immediately. The writer needs to craft the language carefully, clearly stating the intent without making the visitor fell unwelcome. When regulatory signs are well integrated into a signs system, they seem an essential part of the overall experience of place and not just a necessary evil.

- Entrance information
- Parking regulations

Figure 4.22: Regulatory Signs

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APPENDIX A

INTERVIEWS WITH THE EXPERTS

A-1: Laura Demaio Thesis Abstract

This paper examines the relationship between small food delivery businesses and environmentally friendly transportation. Specifically it looks at the costs and benefits associated with implementing automobiles that are environmentally friendly.

In my research I studied five delivery businesses located near college campuses. Informational interviews were used to collect data from the five store managers/owners. Specific questions were used along with an open ended format to gain maximum information from the participants.

From this study I found three significant trends that have implication for theory. First, the importance of company image is not correlated with the physical environment of the community and the business's affect on the community. Second, cost effectiveness is a major obstacle in the implementation of green transportation. Finally, the current delivery business model is a barrier to executing programs related to environmentally friendly vehicles. From this information I built a model in which an environmental shock elicits a response from a business dependant on cognitive, economic and institutional/behavioral forces. Overall, small food delivery business owners do not see environmentally friendly transportation being implemented in the near future for their small businesses.

KEY WORDS
environmentally friendly, green transportation

Beginning in the 1990's there has been increased pressure for businesses to become "environmentally friendly" to continue to compete successfully in the market. As research in sustainability and environmental degradation has increased in the past two decades, consumers have been even more adamant about businesses "going green" and are expressing this through the way they spend their disposable income. The government has even stepped in to create policy that encourages socially responsible firms and sets limits on pollution released into the environment.

In recent years the focus has shifted to creating environmentally sustainable firms that are socially responsible (Gouldson 2008). Recent research has considered the effects of environmental pressures on survivability of small to medium sized enterprises (SME's), and has found that the amount of social improvements executed by the business are directly related to size, sector and circumstance of the company in question(D. Perez-Sanchez, J. R. Barton, D. Bower 2003).

Pressure can be a main influencer for change within a business. Environmental pressures can create incremental change that responds to the demands of civil society and markets (Gouldson 2008). Thus, in my research I identified a specific sector and market to focus on. By doing so, I could narrowly delve into the thoughts and effects that the recent trend of "green" business has on small delivery-based businesses.

Most of the current research identifies threats and opportunities broadly for management issues along with pressures from the environment and the effect those pressures have on firms. However, I have not found a significant amount of research on small business and the green business environment. A recent survey from the Wells Fargo/Gallup Small Business Index shows that "two-thirds of small business owners surveyed say they would be willing to pay more

for goods and services to run their businesses if they knew they were environmentally-friendly" (Wells Fargo Survey Finds Business Owners Will Pay to Cut Greenhouse Effects 2007). However, the survey results also show that business owners do not believe customers would be willing to pay more to get environmentally friendly goods or services. It also found that 78% of those surveyed were in favor of government spending to find alternative fuel sources. Though this survey says that small businesses are willing to spend more to be environmentally friendly, it does not determine a threshold for the amount of that spending. Furthermore, the study lacks any analysis of implementation of the alternative fuel sources that small business owners are in favor of the government implementing.

There was also a research study done on small business in Australia that found that climate change was not a high ranking issue of concern for small business operators. Furthermore, the study found that these businesses had not taken any steps to decrease carbon emissions, and had no intention of doing so in the future (Small biz: confident, but not green 2008).

The study I conducted touched on business owner's level of concern for climate change issues, but goes deeper, to understand the threats and opportunities of implementing specifically green transportation in the high mileage delivery businesses. I am studying the perceived risks and opportunities for implementing green transportation in delivery businesses, and also how small businesses react to changes in their business environment. This insight will eventually help to develop a program that creates a more socially responsible environment for delivery businesses, specifically near colleges and universities looking to create a greener campus.

Green transportation and *environmentally friendly transportation* are used interchangeably throughout this paper to signify transportation that has a high mile per gallon average, and thus emits less pollution into the environment than the average consumer vehicle. In 2006 the average passenger car received a rating of 22.4 mpg. In this study, an environmentally friendly vehicle is any vehicle that obtains a rating of over 27.5 miles per gallon, which is the Corporate Average Fuel Economy (CAFÉ) standard for the years 1985-2009 (National Highway Traffic Safety Administration).

Despite recent research on environmental issues and its influence on corporations, there is very little research on small businesses, specifically those that use automobiles for delivery as a main source of income. Thus, my research question is: what do business owners see as the opportunities and challenges related to implementation of environmentally friendly transportation in delivery-type businesses. Specifically we examine perceived risks and costs, along with perceived benefits and future intentions of implementation for five delivery businesses located close to college campuses. My data collection is based on personal interviews with the owners/managers of individual food delivery firms to develop a better understanding of the research question.

Through this research I found that businesses tend to associate more costs than benefits related to the implementation of green transportation. Specifically, I found that the importance of their company image was not related to the importance of being an environmentally friendly firm. Furthermore, managers felt that implementation would not be cost effective for the firm. Finally, I found disconnect between owners' willingness to implement a fleet of hybrid vehicles and the organizational structure allowing managers to do so. From this I can offer contribution to theory related to the size of a firm and its ability to implement, along with perceived costs and benefits of socially responsible program implementation on the small business level. In addition, I contribute my own model on the reaction of small businesses to environmental changes or shocks.

Relevance to Business Landscape

Given the research done in this study, it is important to identify those that will be affected by the theories presented here, and any other further research done on the topic of green transportation in small delivery businesses. In Connecticut, there are 75,626 small employers making up 97.4% of the states workforce. This is the larger landscape in which we look at the Storrs-Mansfield area of Connecticut where the majority of this study was located. There is 70,000 square feet of retail space in downtown Mansfield. There are currently 50 businesses located in this area. Of the 50 businesses present, 10 are eating places which represent the most square footage of the retail space. There is also a bar and a florist located in this area who also participate in delivery activities (Harrall-Michalowski Associates, Inc. 2002). The Student Monitor also finds that students spend an average of $56 on food/eating out each month. Of the top 5 retail stores visited in Mansfield by students, two of these are delivery businesses, and two of the four most popular restaurants were also delivery businesses. This indicates that delivery is a huge part of commerce in the town of Mansfield. Consumer spending patterns in the town of Mansfield also indicate that a household spends an average of $5,465 annually on food away from home. Assuming that a portion of this expenditure is takeout food, this means many miles of driving for the delivery driver, and thus a substantial amount of pollution. Those businesses that participate in this food market, and in other delivery markets such as the flower business, may be particularly interested in the findings presented by this data.

However, these results may also be used by any small business to understand the response to environmental shocks or changes that affect their responsiveness. There are over six million small firms in the United States, and over 77,000 of those are in Connecticut alone. All of these small businesses have at some point experienced environmental changes, and are probably now feeling the pinch from the environmental crisis's that are currently upon us. By understanding the problem and working to be open to an appropriate response, these businesses can better serve their customers, and the environment.

METHODS

The research design is an exploratory, multiple case study. Multiple cases allows for each study to be examined and matched against other studies to determine if findings are consistent throughout.

During the time period of October 2008 to January 2009 when all of the interviews were conducted, the United States of America was in an economic downturn, marked by greed on Wall Street, high home foreclosure rate caused by a mortgage crisis, and a historical presidential election. Due to reduced consumer confidence, and stock market decline, there was an increase in the unemployment rate along with the threat of the three major auto companies filing bankruptcy, leading to even greater unemployment.

Families were feeling the strain on their pocketbooks and there had been a large decrease in spending. With the advent of the first African-American president, President Barack Obama, being sworn into office, the nation was hopeful, and looking to him for a huge turnaround in the economy.

In the auto industry, as stated previously, there was a serious threat of bankruptcy of the three major American auto companies, as their revenue and sales continued to decline. There had been talk of a bailout for the auto industry, though negotiations had not resulted in a deal as of the time of this study. Gas prices that rose to over four dollars in the summer, dropped significantly by more than two dollars in the fall. Global warming continued to be a hot-topic, and many people were trying to get involved in the green movement. Because of this, most car companies were introducing new hybrid cars with updated technology and consumer appeal, providing more options than ever before. Scientists were working to improve hydrogen cars, along with the re-emergence of a few electric cars, and the introduction of the Smart Car to the United States. Though the purchase of hybrid cars continues to increase, the current economic crisis is hurting the auto industry, forcing dealers to offer huge incentives, and consumers to buy more economical cars.

Studying environmentally friendly car implementation in delivery businesses is an attractive subject at this point in time due to the widespread knowledge of the environmental effects of pollution, and the amount of options available to the consumer looking to purchase an environmentally friendly car. Though the hybrid was actually first conceived of and built by Victor Wouk and Charlie Rosen in 1974 in response to the Federal Clean Car Incentive Program, mainstream vehicles began being introduced in the United States in 1999 by Honda. Two years before the Insight was introduced, electric cars were introduced to California, but they failed to receive high consumer demand. In 2000 the popular Toyota Prius was introduced to the United States, and its popularity has grown ever since (History of Hybrid Vehicles 2009).

Due to over a decade of energy efficient car visibility in the market, this is an appropriate time to do a study on management's reaction and ability to implement this technology.

The sample in this study is composed of five small food delivery businesses located close to college campuses. The three businesses located in Storrs are Sgt. Pepperoni's (delivering pizza), D.P. Dough (delivering calzones), and Wings Over Storrs (delivering wings) Each of the businesses are delivery businesses with small shops that handle mostly take-out, rather than dine-in orders, and delivery mainly the goods mentioned above, though they do supplement their menu with other food items. They are located within walking distance to the University of Connecticut, Storrs campus. Another participant was Tom's Pizza, located near the Central Connecticut State University campus in Newington, CT. The establishment had recently moved store locations and is now adjacent to a bar. As of late, much less of its business comes from delivery, most coming from pick-up or dine-ins. Finally, Leaves and Pages, a small lunch and coffee shop, was interviewed in the city of New-Britain. This store was much different than the other businesses, as it delivered catering foods such as tea, coffee, pastries and sandwiches.

The process for choosing participants was based mostly on convenience sampling, and willingness to respond. A list of all the delivery businesses local to the Storrs campus was procured, and then each was called. It was very difficult to get respondents on the phone to set up an interview because of the nature of the delivery business. The general owners were usually working during the busiest time for delivery, and thus were not able to take phone calls. When messages were left, no business actually called back. Thus, after several calls to over twenty businesses, three interviews were set up at the Storrs campus. To ensure variety, and to get more participants involved in interviews, local business owners were also called in the Greater

Hartford area near Central Connecticut State University. This allowed for two more business owners to be interviewed.

Overall, it was much harder to get interviews with business owners than expected at the outset of this study. Thus, the five participants selected, were the five that responded, making this purely a convenience sample of location, and response. Even when an interview was finally arranged, it was interrupted multiple times by employees and customers. All of the establishments lacked any office to speak of, and interviews were held on the small dining areas located in the store. The difficulty of arranging interviews, along with the locations of the interviews, were not what was expected at the outset of the study.

Data Collection

The focus of the data collection was on exploratory, open-ended questions about the general nature of the use of transportation in delivery businesses. It also probed the participants on their thoughts about switching to green transportation, and what the cost and benefits of implementation would be.

The source of the data acquired was five food delivery businesses that volunteered to participate in the study. Each was interviewed in their businesses location, except for one that preferred to be interviewed over the phone as a matter of convenience. Each interview was important to gain insight into the minds or the owners of the business, and to glean information on potential implementation of a grant program for hybrid/environmentally friendly cars in the delivery businesses close to the University of Connecticut. Because the interviews were exploratory, much of the useful information had to do with the daily workings of the transportation side of the business (i.e. how many cars were used, who used them, etc.), along with information on how the owners believed their staff would feel about green transportation, and whether or not they believed they could effectively implement it.

Each interview was approximately fifteen to twenty minutes long with a standard set of questions used as a guideline for the interview. The questions used were split into four sections with the beginning set being used to become familiar with the business and owner. These questions were used to get a general idea of the daily operations of the business. The second section considered the role and cost of transportation in the business, using questions to explore exact costs and numbers as applied to the bottom line for the business. The third section asked specifically about the cars used, and the costs and hours used for those vehicles. The next section asked the participant how they felt about implementing green transportation in the business, along with the costs and benefits they saw associated with green transportation. This set of questions was important to expose the pros and cons that the managers felt were involved, gaining insight into the role of management's thoughts in the green implementation decisions. The final section of questions consisted of considering the businesses image if it did adopt green transportation, the importance of involvement in the community, and how likely it would be that they would adopt green transportation in the future. This set also emphases questions about what it would take for green transportation to be adopted. Such inquiry was important if a program were to be developed and implemented on a larger scale.

These questions provided a variety of both specific and broad information about the business and the interviewee's thoughts on green transportation for their business. Information about specific costs, but also manager opinions about costs and opportunities, was provided.

Data Analysis

Data analysis began with a thorough analysis of each interview from the perspective of the research questions (Yin 1994). This data was analyzed both through auditory and written transcripts created after the interviews. By going over each interview and looking for common themes, crucial trends were identified, and tested against other cases. Many of the interviewee's echoed each other in their responses to specific questions and these consistencies were noted, along with trends that differed between cases. After reviewing the cases multiple times theories about opportunities and threats associated with the implementation of green transportation emerged, along with a model for business reaction to environmental shocks or changes.

THREATS AND OPPORTUNITIES OF GREEN TRANSPORTATION ADOPTION

My findings suggest that delivery business owners do not believe the implementation of a green transportation program is feasible in the near future. I found that each delivery business puts a high premium on community involvement and company image within the community, though the community is not inextricably linked to the physical environment of the community, but rather only the people within it. The research also indicate that the cost effectiveness of implementing green transportation is of utmost importance when considering a green transportation program. Finally, I found that the delivery business model structure creates barriers to green transportation implementation. These findings show significant barriers to green transportation implementation on an individual business basis.

Importance of Image and Community Involvement

One result from my research was that almost all participants thought that their business could benefit from a greener image. Most agreed that by adopting hybrid cars, some of their customers would be impressed, while some would be indifferent to the switch. The college base of students was noted as being the most likely to be impressed with the change.

"Yeah. It[green transportation] would probably be good for our image. People, especially students, that care about the future of the planet, they would probably appreciate the fact that DP Dough uses hybrid or electric cars."

However, it was also noted that this image was not very likely to increase business. One company believed that with extensive marketing, the business may be able to gain a "green" following, but was skeptical about the idea. Others believed that a "green" image and environmentally friendly car implementation may be only an added benefit for the existing customers. Owners were not certain that a greener image would attract too many more customers, and believed hybrid technology was not worth investing in at this point in time.

All of the businesses recognized that in today's business world, the "green" trend was here to stay and that it would be an important aspect of business in the coming years. However, the technology is so "new" that they believed hybrid transportation could be implemented in the future, and was not yet feasible. This is consistent with the fact that in 2005, only 1% of new cars purchased were hybrid cars (Wells Fargo Survey Finds Business Owners Will Pay to Cut Greenhouse Effects 2007) However, when asked how long hybrid cars have been on the market, two companies correctly said that they were marketed from the late 1990's, verifying that the option has been around for over a decade. However, they did not believe that this was an adequate amount of time to make the technology anything but "newer".

Another significant result of the study was that each participant gave examples of having a strong link to the community and how important it was to be involved in the activities of the town. They each gave instances of the company giving back through donating food, or being involved in local school plays and through senior centers.
It's very important [to be involved in the community] if you want to survive in today's business economy. It needs to be part of the community, it all spills off for business for you, little league, you know, like, senior citizen centers. I mean, it just makes more clients, more customers, more business. You have to be there, you have to participate, you have to donate.

It is apparent that the companies have a symbiotic relationship with the community. They donate to community events when it is appropriate and in turn, the community provides them with ongoing business. This has been a robust form of marketing for many years in the delivery business.

However, the link between the importance of being involved in the community, and being an environmentally conscious member of the community, did not seem to be linked in the minds of the mangers in most cases. Every participant toted the importance of being involved in the community.
"We're part of a community and you have to be tied to that. Not just your business, but your whole community is driven by your local businesses and the people that are a part of it. I think everyone needs to realize they have ties to [the community]."

These community ties did not, however, spill over into the natural resources and physical environment of the community. This brings up an important point that "the environment" and "the community" are not one-in-the-same for these business owners. The environment and the impact business has on it are not as important as community relations, and are seen as separate entities.

Overall, I found that participants were not convinced that a greener image would have a large effect on the perception of their business, though image was very important to them. Furthermore, I found that they did not necessarily link the community's environment to the overall well being of the community, even though community was highly important to each participant. This is a significant finding in that increased awareness that the environment has an effect on the community could increase green improvements to business.

Concerns about cost effectiveness of implementation

One of the most consistent findings among those interviewed was the concern over issues of cost effectiveness for the business. As previously discussed, business owners were not certain of the real benefit, monetarily to the business. They believed that any increase in customers or gas savings would not outweigh the cost of implementation.

It would be difficult to interest businesses in implementation without a cost benefit to the company. Each person believed that the idea was positive, and that if they had the ability to do so, environmentally friendly vehicles would be a good thing for a responsible citizen to do, but it just wasn't economically practical for their business. One participant put the responsibility on the driver to be environmentally friendly on their own, instead of the company being responsible, which did not support the idea of socially responsible business, but rather a socially responsible society.

One thing was clear, though. When the availability of a grant for an environmentally friendly transportation program was suggested, owners were on board, and willing to implement it. *"Oh absolutely[I would implement a program], like I said, I would do it morally, but it would make it a lot easier if we did have money for a benefit for that. It's just to provide it to them. They are here to work and make money. They want to work as little as possible and make as much as they can. So, I think the more incentives you give them to do something like that, the more they would react to do it."*

Every participant, when a hypothetical grant was offered, expressed excitement to start a green program, offering ideas on how it would be possible. Most suggested extra compensation for those that drove hybrid cars so that they not only received gas money savings, but an extra dollar or two on top of their normal wages. They believed this might also entice drivers of environmentally friendly cars to be employed at their companies. The participants also suggested a stipend for those who had standard models of automobiles and traded them in for a hybrid car.

The participants did, however, also state drawbacks of a grant in the feasibility of implementing it. A few businesses believed coming up with distinguishing factors for "environmentally friendly vehicles" would be too subjective. They suggested questions such as: Does the monetary benefit only apply to hybrid cars or does it also apply to low miles per gallon cars? Also, do hybrid SUV's with lower mpg's get the same treatment as a Toyota Corolla getting a high 35 mpg? Furthermore, would this incentive really be enough to get drivers to change the car they were driving?

"I think some people who had the cars already, would be happy, but I don't think it would make drivers that didn't have those vehicles go out and buy new ones. That's pretty costly, and not a lot of people buy a lot of new cars to start with, and a lot of those are kind of newer cars, but the hybrids I know you could get for a while. Honda came out with one in 98 or something, but a lot of newer ones are still kind of expensive."

This pinpoints a concern for an eventual implementation of a grant program because each business would have to deal with standards for receiving the incentives. Standards could also be written into the grant to become less confusing.

Overall, I found two main themes; businesses do not believe in the cost effectiveness of implementation at this time; and, a grant for incentive programs within the business were highly favored by participants, though further studies would have to be done to find the most effective implementation and incentive possibilities.

Delivery Business Operational Structure

One of the most significant findings of this study was the concerns business owners had about the lack of enforceability of a green program due to their business model. The delivery business model, used at all four of the delivery establishments (excluding the catering business), creates disconnect between the actual delivery vehicle and the business owner. In each situation, the employee who delivers the food to the customer brings his own car to work. The businesses do not discriminate against any type of car used, as long as the driver has a car. To compensate for the use of the car, drivers are paid full minimum wage, and allowed to keep their tips, and in one instance are given an extra two dollars every time they go out with a delivery, to compensate for gas and wear and tear on the car.

In traditional restaurants, the employee delivering food to seated tables is given less than minimum wage and is expected to make up for this in tips. However, due to wear and tear on the vehicle, these delivery businesses exceed this standard, in order to compensate the employee for their personal car use. Not having to directly insure drivers allows for lower liability on the part of the company, and lower insurance rates. However, it poses the problem that the business owner has no authority over the type of vehicle used to make deliveries. Futhermore, business owners are not convinced their delivery drivers would be on board with new policy that required environmentally friendly automobiles.
"With the students it would obviously be "Why would I want to [invest in a hybrid car]?" We would have to give some type of benefit, I mean there are some kids that do think about that, but a lot of these guys are just thinking about money, money, money, but it would have to be some type of incentive or benefit for why they would want to do it."

Thus, this problem is two-fold. First, any inclination the business has to adopt green modes of transportation is thwarted by the business model, and second, any incentive offered by the company for the delivery drivers to buy green cars would be significantly less than the cost of buying a green car. Participants stated that the only way to rectify this discrepancy was to have the company buy the cars. Unfortunately, the insurance costs for insuring drivers would far outweigh any benefits gained either through customers or gas savings.

Through this information we find a disconnect between owners intention to implement environmentally friendly transportation, and the ability to do so, due to the business model presently used for food delivery businesses. Business operations models would have to be altered to be able to have any significant impact on the cars used to deliver food to the customers.

DISCUSSION

Due to the recent emergence of the "green" trend, there is little scholarly research done on manager implementation of environmentally friendly transportation programs within a business,

and specifically on green transportation in small food delivery businesses. Because this topic is gaining importance as more businesses realize the impact their production has on the environment, this is a timely topic to do exploratory research on, in hopes of encouraging others to further explore this "hot" topic.
In this research, the focus was on gaining knowledge of small food delivery businesses' day-to-day operations, and expenditures, specifically on transportation. More importantly, it focused on manager reactions to implementation of green transportation within the company. Through personal interviews, I found out the costs and benefits from the managers point of view of implementing environmentally friendly modes of transportation.

I found that delivery business managers displayed three main characteristics in relationship to green transportation. First, positive community involvement was important to them, but this involvement was not linked to their business's effects on the environment in their opinions. Second, the monetary costs of introducing green transportation to the business do not outweigh the monetary benefits of this program. Finally, the operational structure of the delivery businesses studied is not conducive to implementing environmentally friendly transportation.

From this information I deduce that green transportation is not economically feasible at this time for delivery businesses without supplementation from some type of government intervention. Current business models would have to be updated, and the cost savings of green transportation would have to be substantially increased and made clear to business managers. Furthermore, without scientific research on the costs to the community of delivery car pollution, it would be difficult to convince owners of their negative impact on the community environment. Without concrete evidence of both costs and benefits and environmental impact, it is unlikely that delivery business managers would implement a green transportation program in the near future.

My findings suggest significant implications for theory. First, delivery business owners do not believe that the physical community environment is linked with their participation in the community. This means that the businesses believe they are an active and positive influence on the community because they do not see the community and the community environment as one in the same, but rather as separate entities. Without finding the pollution emitted from their extensive use of delivery cars as a direct pollutant of the community, they will not take the necessary measures to reduce emissions as urgently as is needed.

Second, cost effectiveness is the primary concern when considering green transportation in the food delivery business. Altruism or effect on the surrounding areas environment is not enough to get businesses to reduce their carbon emissions when it comes to transportation. Because there is not a direct and large enough link to their bottom line, green transportation is not a consideration for small delivery business managers. They are more apt to adopt smaller programs that would allow them to see immediate changes in costs, such as recycling and using less electricity when possible. Cost savings is the most important element to implementing changes within the business, and green transportation does not yet save the company immediate money.

Third, delivery business structure is not conducive to change implementation on the driver side of the delivery equation. This makes it impossible for the manager to completely control outputs of emissions into the environment. Because of the disconnect in the delivery business model,

even well-intentioned owners interested in putting environmentally friendly programs in place, would be partially blocked from doing so, due to lack of control of delivery vehicles.

My findings contribute significantly to existing theory. In *Implementing environmental management in SMEs* (D. Perez-Sanchez, J. R. Barton, D. Bower 2003) the authors find that the amount of effort and expenses put towards implementation of socially responsible endeavors is directly related to company size and sector. My research further contributes to this study. The author's conclusion suggests that environmentally friendly automobiles can not feasibly be implemented in small delivery businesses due to the size of the company in relation to the costs of implementation. The study's conclusion enhances my findings, showing costs would be overwhelming to a small company, who is more capable of implementing smaller programs such as recycling, or waste reduction. The sector of personal food delivery is also one that is not known for its "green" practices, and thus there is less importance placed on implementation. This however could be overcome through niche market profitability exploration and increased green process innovation performance (Chen 2008).

I would like to offer a broader scope of the implication of my research for theory. By examining the conclusions specific to the small delivery business industry, we can then look at how the findings are applicable to all small businesses and perhaps even to midsize and large firms.

The important overlying theme of this research is the introduction of an environmental shock or change to the business environment. This came in the form of the need for businesses to "go green" in response to new scientific evidence on how pollution is effecting our planet, but can be any type of overlying change in a sector. Then it is up to the business on how it responds to this change, and how open it is to the change. This is dependant on three important considerations for the business. First, there is the cognitive perspective, which involves the community perception of the change for the business. This includes how the managers believe customers and the community will perceive them if they adapt to, or choose to ignore the environmental shock. Second, there are the economic concerns which mainly involve cost concerns for the business. Will this shock and the businesses reaction to it create value for the business, or will their responsiveness hurt the business? Finally, the institutional or behavioral aspects of the business also determine the businesses response to change. This includes the current business model and habits of the current management. Openness to change is affected by the status quo within a business and how mobile the business is in adjusting to an environmental shock. This involves managerial decisions such as "should we do what everyone else is doing?" and "should we do what we've always done?" Each consideration for management has a direct effect on the businesses openness to change and responsiveness to the environmental shock.

This model shows that the responsiveness to the environmental shock from the business is directly dependent on three crucial considerations; cognitive, economic, and institutional/behavioral. A business will consider each factor in the context of the environmental change and then respond to the change according to their perception of the community's response, their personal cost concerns, and the flexibility and adaptability of business model currently in use. All of these forces together will cause a reaction or non-reaction from the business affected by the environmental shock.

CONCLUSION

In this research I find that small delivery businesses do not believe it is financially beneficial or conceivably able to implement green transportation due to social circumstances and restricting organizational models. In closing I consider several unanswered questions. First, why do businesses not consider their physical environment a part of their community? This may be related to the general idea of the population not seeing their impact on their environment. By removing the source of sales (people) from the physical environment, businesses can say they are having a positive impact on the community when in reality they mean the people within the community.

We can also ask the question, are my findings normatively valid? Due to the limited participants in this study and the voluntary nature, along with the limited locations of the businesses, the results may not be valid on a larger scale. However, most of the participants offered very similar responses to a wide array of questions. Because their answers were so similar, I believe that these results could be repeated elsewhere in various environmental settings, though the more environmentally conscious areas of the country may have more progressive views.

Though my research focused on the high-mileage sector of food delivery, I believe these results could hold consistent in other small business sectors. In this study, I hoped to shed light on the topic of delivery businesses and the possible implementation of energy efficient vehicles, due to the high use of gas and emissions inherent in the business. Due to this studies exploratory nature, this paper was meant to bring awareness to the issue of delivery business transportation issues, in hopes that more research would be conducted on the possible implementation of green transportation for delivery purposes in small businesses. With this study, I not only hoped to contribute to the understanding of small business delivery, but also provide a basis for further study into the use of cars by employees of delivery businesses.

FUTURE RESEARCH

Because this research was conducted for exploratory purposes with the intent of further in-depth studies, there is significant room for further research. One important continuation of this research would be interviews with the delivery driver employees themselves to better understand the costs and benefits of implementing hybrid cars on this level of employee. Through this study we found out that there is a breakdown between the intentions of the delivery owner to implement green transportation, and the ability to do so, due to the structure of the delivery business. By exploring the role of the delivery driver, insight could be gained into how the individual driver could be motivated to participate in green initiatives, or if this type of implementation is cost effective or implementable on their level.

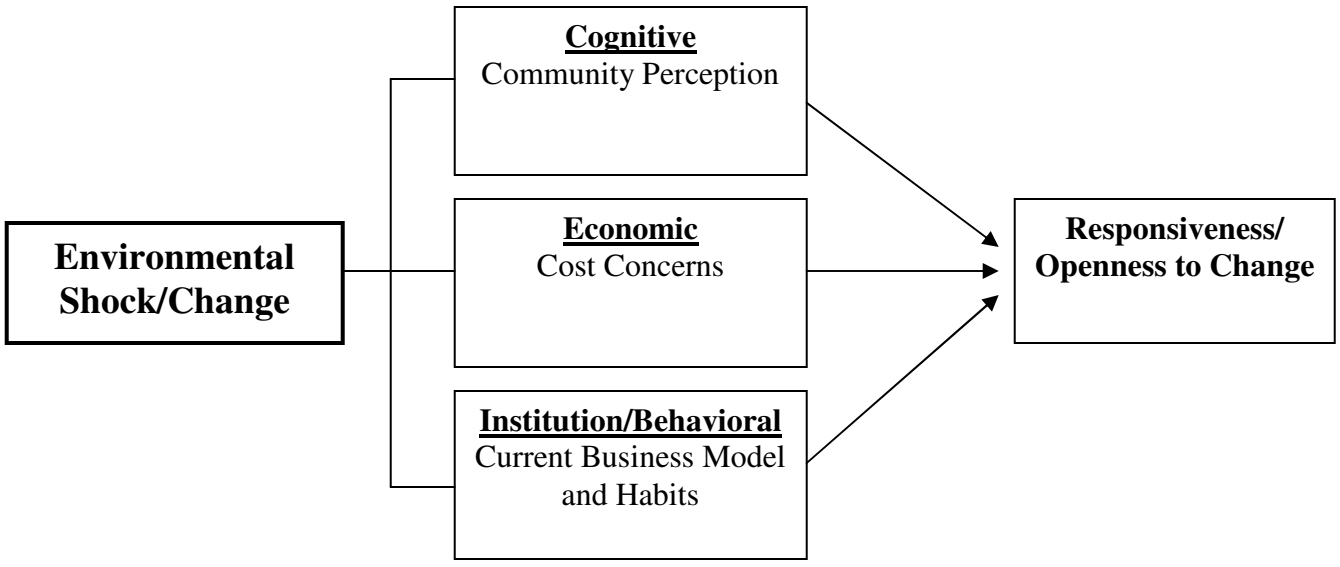
Along the same lines, studies could be done on other types of delivery models where the company owns the fleet of cars used. These studies could be used to find an appropriate model for delivery businesses using the current non-ownership system. This would be valuable in decreasing the barriers to implementation.

Another topic for further research is the costs of implementation. It will take several more years for this technology to become cost-effective in the eyes of the business, where

implementation will not be just an altruistic deed for the environment. Cost effectiveness is an important factor for these small businesses if they are going to invest funds in such a costly project.

Furthermore, it would be important to study the cost effectiveness of giving a grant towards increasing environmentally friendly cars in the delivery business. A study would be required to find the effects of the current methods of transportation on the environment, and the savings on both pollution and cost if an environmentally friendly transportation program would be implemented. Only after this information was acquired could we effectively decide if a grant program would create a net benefit for the environment, or if grant money would be more effectively for another type of program.
Also, studying the net increase in sales due to a "green" image, along with the cost savings for the companies, would be beneficial. Cost benefit analysis would be a useful tool for both the business and the community when planning for new delivery businesses developing property within a town. This information could also potentially help convince delivery business owners that green transportation would be a cost effective option over a designated time period, or for citizens to urge their businesses to adopt green modes of transportation.
One final study that would be very beneficial after initial research is done is the creation of a pilot program to judge the accuracy of cost benefit analysis. A pilot program would allow for consumer research on the effects green transportation has on company image and decision to patronize that business. All of these suggestions for further research would help clarify the effects of green transportation on the food delivery business market and hopefully encourage businesses to adopt green transportation if it proved profitable.

Figure 1: Forces Affecting Responsiveness to Environmental Shock



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A-2: Survey Questions

Name and name of business?
How long have you been in business?
How is the business going?

What's the role of transportation in the business?
What are the main costs associated with transportation?
How would you rank the costs in order of importance?
Roughly what percentage of your costs is transportation?

How many cars are being used at your company?
Who owns them?
How often are they used on a daily basis?
What are they mostly used for?

Have you ever considered green modes of transportation?
What would be your main concerns or criteria when looking at green transportation?
What type of obstacles do you see in implementing green transportation?
How do you feel you can benefit from green transportation?
What type of incentives would motivate you to adopt green transportation?

How would customers perceive you if you switched to green transportation?
To what extent is green image important to the business?
To what extent is it important to be engaged with the local community?
How do you think your staff would react to green transportation initiatives if you were to adopt them?
How likely do you think it is that your company would adopt green transportation in the near future?

At UCONN we are looking at the notion of green transportation in the surrounding area, is there anything you want to add to that idea? Any comments you have concerning green transportation that you would like to report to the University?

A-2: Interview with Wenzday Jane (Owner of Metro Pedal Power)

- Interested in collaborating with UConn Team
- Willing to manage and/or train business affiliates
- Stressed the importance of mobile communication and technology
- Strongly believes that bike deliveries can be made during any season
- and any type of weather condition
- Suggested to research failed businesses
- Emphasized that name of the company is essential to a successful businesses
- "The concept of green transportation is hard enough for people to grasp, so the name can't be ambiguous."

Figure 2.2.6.1: Photo of Wenzday Jane

Mission: "Eco-friendly pick-up and delivery, courier services for local businesses, organizations and universities. We can provide full courier service and route delivery - inclusive of friendly drivers, fossil fuel-free vehicles, and unparalleled marketing opportunities for your business on our unique, environmentally friendly trucks."

Clientele

Harvard Book Store, Harvard Square
Greenward, Cambridge
University Florist, Cambridge
Staples Office Supply
Petsi Pies, Somerville
Taza Chocolate, Somerville
Zigo, Kendall Square
Fiore Di Nonno, Somerville
Momentum - The magazine for self-propelled people
Cambridge Local First
Enterprise CSA
Parker Farm CSA
Lionette's Market CSM
Shared Harvest CSA
Red Fire Farm
Silverbrook Farm
Harvest Co-op Market, Central Square
Whole Foods, Fresh Pond Shopping Center
Lionette's Market, South End
In Season, Boston
Dave's Fresh Pasta, Somerville

Diesel Café / Bloc 11 Café, Somerville
Other Side Café, Newbury St., Boston

A-3: Interview with Cynthia van Zelm & Macon Toleando

Dear Mr. Miniutti:

Thank you for presenting your Green Modes of Transportation for Connecticut's Mixed Use Development research project to me and Storrs Center project manager Macon Toledano, of Leyland Alliance. As you know, the Storrs Center downtown project is focused on creating a pedestrian-friendly downtown. One of the key components is to utilize alternative modes of transportation to get to and from the downtown as well as within the downtown. **The Storrs Center intermodal center being developed will provide access to a variety of modes including cars, buses, bikes, and potentially a venue to store Zipcars.**

***Your research project of looking at alternative modes for service delivery is very complimentary to our goal of creating environmental and economic sustainability*. Reducing the carbon footprint in the Storrs area is critical as well as assisting our local businesses become more successful. The proposed alternative modes of service delivery could serve as a model for the state while highlighting our local businesses.** We look forward to assisting you as you move forward on this exciting project.

Sincerely,

Cynthia van Zelm

APPENDIX B

DOWNTOWN MANSFIELD MASTER PLAN TARGET STRATEGIES

B-1: Summary report Downtown Mansfield Master Plan Target Strategies

70,000 sq. ft. of retail space (50 businesses).

10/50 businesses are eating places which account for most of the retail space.

Students spend an average of $56 a month on eating out.

Of the top 5 retail stores, two are delivery businesses.

Two of the four most popular restaurants are delivery businesses.

$12,297,501 is generated annually from eating and drinking places (this is about 35% of the total retail store sales).

Rental housing represents 38.2& of the housing market in Mansfield in 2000.

There are 20 restaurants in Mansfield. To achieve the scale and balance of retailing, Storrs would need to add 10 – 15 more restaurants including several full-service restaurants.

7,500,000 in full service restaurants are leaving the trade area.

85% of the student respondents stated that they recently have eaten off campus in Mansfield.

85% of students fill their prescriptions and drug store needs in Mansfield.

There are a total of 723 apartment units in Mansfield.

The top five visited retail businesses by UConn students are Store 24 (49%), Friendly's (34%), D.P. Dough (29%), Chang's Garden (23%), and Starbucks (14%).

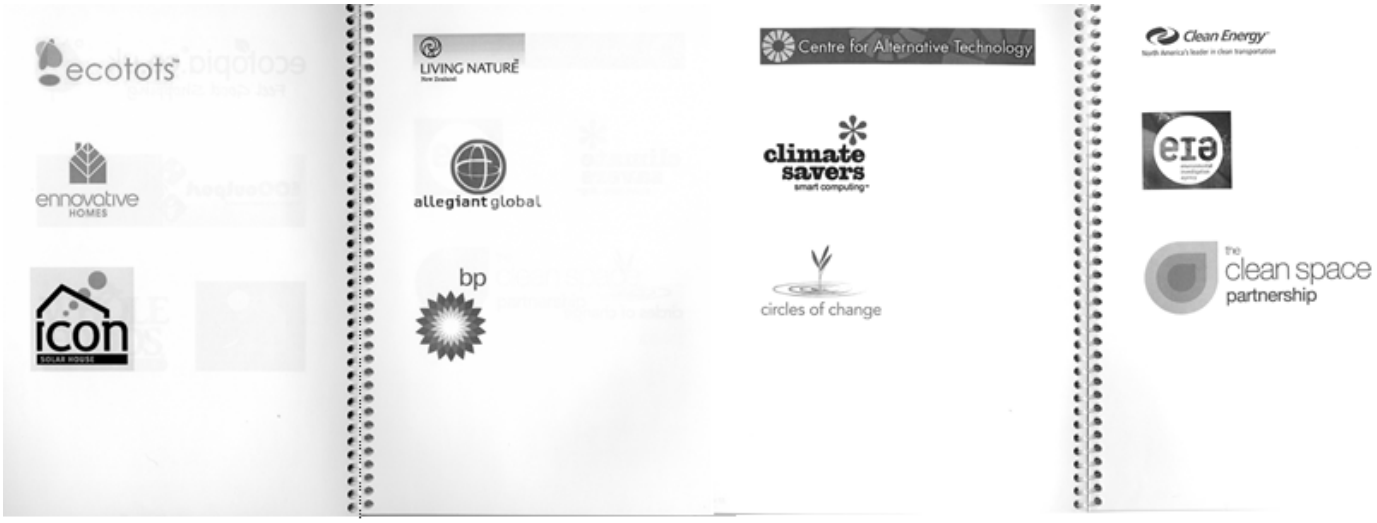
The most frequently visited stores were Storrs Drug (40%), Store 24 (37%), and CVS (20%).

51% of students in survey desire more restaurants.

APPENDIX C

EXAMPLES OF COMMUNICATION SYSTEMS: IDENTITIES OF OTHER COMPANIES

C-1: Graphic identities of other companies



APPENDIX D

SURVEY INTERVIEWS

D-1: Survey Interviews of Delivery Business

Sgt. Peps

Name?
Shawn

How long been in business?
3.5 Years

How is business going?
Very well

What is the role of transportation in the business?
For us, it's huge because of the delivery aspect of it. We have 5 sometimes 6 drivers going at one time, so transportation is obviously very very big for a place like us.

And what are the main costs associated with transportation?
Well that's the one thing, the costs associated with it, with us it is just an hourly, because drivers have to assume the control of the gas, repairs and all that kind of stuff. That is why when you come to a restaurants, waiters and waitresses who make tips, make four dollars an hour. Here you have to pay them 8 dollars an hour plus they make their tips, so that's the cost, so for us it's more of a labor issue. But, for the drivers, that's something different, obviously, the gas is out of pocket.

What percentage of your cost is transportation? The cost of transportation is a percentage of their labor, I would say that it is probably close to 50 percent of our labor, maybe a little bit less, maybe 45 or so, but 40-50% of our labor would be cost of transportation.

And you said 5-6 cars at a time are being used,
Usually we have three on weekdays, and anywhere from 5-6 depending on the weekend like tonight and tomorrow will be crazy because of Halloween so we'll have 6 people on.

So the students own them, so that's a prerequisite for working here for all students?
No, because there's people that work inside, if you don't have a car, you can work inside, but in order to be a driver obviously, you have to, it would be almost impossible with our insurance cost, and our liability would fly through the roof if we tried to provide people with the cars. That's just where, we can't do it, the liability is just way too high.

So you say they are used on a daily basis, how many hours would you say a night?
Well, we open at 4 oclock, so on a weekday we prolly have 27 hours, on a weekend, oh boy, maybe 60 hours on weekends, around there.

Are cars used for anything else?
Mostly just delivery, nothing else really.

Have you ever considered green modes of transportation?
Recently, as of now, we are trying to find ways to go as green as possible, not just transportation, but everything regarding recycling and stuff like that. Um, I havn't come up with a theory yet, I'm thinking about it, it's such an early stage of the green mode of it, but you know, it's one of those things that I'd like to consider ways to become more green because I think it's really important. Whether it is giving incentives for drivers who are driving a hybrid, that's something that we considered, we just haven't finalized yet.

What is your main concern when looking for green transportation? The students, or trying to get the students to get transportation?
With the students it would obviously be "Why would I want to do it?" we would have to give some type of benefit, I mean there are some kids that do think about that, but a lot of theses guys are just thinking about money, money, money, but it would have to be some type of incentive or benefit for why they would want to do it.

What type of obstacles do you see implementing green transpiration?
Just them, and whether it's cost efficient for them, but like I said, it's there kind of a thing, so what type of incentives can we give them ,and work on some type of things that are feasible for us to give.

What type of benefits do you see?
Labor would be the same, honestly it would just be a moral thing, that's all it would be. It wouldn't help us in any way financially, just morally knowing you're helping the environment, because I mean, I know what we do, our type of business, do not help the environment obviously so I'd like to be doing something to help a little bit.

How do you think your customers would perceive it if you switched to green transportation?
I think that would be very positive. It is something that I thought of too, that's the thing financially, that you could say, if you provide green transportation, that's something I think people would find very favorable, it wouldn't be the only reason I would do it, but I think people would find it very favorable. I don't see how you couldn't if you came up with something like that.

To what extent is a green image important to your business especially a delivery service?
Like I said, now it's becoming more and more important as we are learning more and more how important it needs to be. Like I said it's such early stages of all this stuff, you know, that I think it's almost evolving year by year, it's becoming much more important, which is why I'm sitting down and having these type of conversations because I think it's very very important.

To what extent do you think it's important to be engaged in the local community?

Very, very. Were part of a community and you have to be tied to that. Not just your business, but your whole community is driven by your local businesses and the people that are a part of it. I think everyone needs to realize they have ties to that.

How do you think your staff would react to green transportation initiatives if you were to adopt some type of incentives? Hard on your staff?
It's not that it's hard, it's a matter of whether it's feasible or not. Because, each person comes with their own car so you can't order that and say no more trucks or sucking cars, because let face it, not a lot of kids right now have hybrid cars, and can't afford hybrid cars. As we go along, we all know that the cost of hybrid cars will go down just like any other new technology, so as that happens, I think that could be favorable, but as of now, I think it's impossible, I can't order someone to go buy a hybrid car, I wouldn't have any delivery drivers.

How likely do you think it is for your company to adopt green transportation in the future?
As we go along, a bunch more, as the cost of the hybrids go down, much more. As I said, we don't provide the transportation. If we did, I would almost absolutely adopt hybrid transportation. Since we don't, it's one of those things, as they become cheaper and more students have them, maybe we do get some type of initiatives, we could give benefits, if the government helped out or something.

If the university gives you an incentive or grant would you be interested?
Oh absolutely, like I said, I would do it morally, but it would make it a lot easier if we did have money for a benefit for that. It's just to provide it to them. They are here to work and make money. They want to work as little as possible and make as much as they can. So, I think the more incentives you give them to do something like that, the more they would react to do it.

DP Dough

Name: Cory Hill

How long have you been in business here?
The stores been here for 15 years, and I've been the owner for about three months

How is the business going?
Great, good.

So what is the role of transportation in this business?
Pretty much, we do 80% of our business as delivery, and it's all like the delivery drivers use their own cars, so I mean, transportation is a big part of the business.

What are the main costs associated with the transportation?
Gas, wear and tear on the vehicles, oil changes, stuff like that.

And of the costs, which is the highest?
Gas

You said 80% of the business is delivery. How many cars are being used by your company?
I have, like, lets see, eight drivers so eight cars.

Who owns them?
The drivers own the cars.
How often are the cars used on a daily basis?
From 11am till 3am. We deliver all day.

When you're talking about gas prices and stuff, is that factored into their salary? Or do they pay for that out of pocket?
The drivers get an hourly wage, and that just covers pretty much gas, taxes and stuff, and they make their money off tips.

Have you ever considered green modes of transportation?
What kind of modes?
Hybrids?
I approve of that type of stuff, but I don't really recommend things to my drivesr. If they have a car that works, that's all I really care about.

So you personally, if you're looking at green transportation, what's your major concern for the company?
Cost.

The obstacle would be the cost. Do you feel like there would be any benefit to green transportation?
Yeah. It would probably be good for our image. People, especially students that care about the future of the planet, they would probably appreciate the fact that DP Dough uses hybrid or electric cars.

What type of incentive would you have to get to motivate you to adopt green transportation?
Maybe if I got a grant from the college or the state or the government, some cash, I'd probably do it.

How would your customers perceive you if you switched to green transportation?
I think they would think of us as a more earth conscious type of business instead of a fast food, making people unhealthy kind of place.

To what extent is that green image important to the business?
It's important because we're pretty much, our customer base is all college kids and it seems like the number one group of people that are concerned with taking care of the planet is people our age (college age) so it would be pretty important.

To what extent is it important to be engaged with the local community?

I think it is very important. Like I said, because our customer base is all college kids so I like to get involved and I like to, I like to be a part of the community as well as a business. So it's pretty important.

How do you think your staff would react to green transportation initiatives?
They would like it. They would appreciate the fact that I'm looking out for things other than myself. They would probably feel like, I wouldn't say more confident, but they might feel a sense of nobility, like nobleness, like feel good about themselves because they are doing something better for the planet. The way the world is now, I mean gas prices, pollution and all that stuff, especially with the election coming up, people I think, my employees would appreciate the fact that we are looking out for the community.

How likely do you think it is that your business would be to adopt green transportation in the future?
It would be more likely in the next 5 years because the car companies are going through a lot of changes. That is something that is definitely something we're all concerned about, because about 80% of our business is delivery. So I mean, there's a good chance.

Wings Over Storrs

Name: Jeremy

How long have you been in business?
Wings itself, this store has been about 8 years. It started over at the four corners, and that one closed down and we moved it down here.

How is business going?
Good. This location for Wings is pretty much their best location. This store makes the most money out of any one of the stores.

What's the role of transportation in the business?
As far as delivery drivers?
Is it just the delivery? Or do you use it for anything else?
It's just the delivery drivers for the delivery of Wings, is the primarily for th delivery of food for Wings.

What are the main costs associated with transportation?
Now, like I know domino's they pay their drivers mileage. So obviously, with driving, they have gas charges, maintenance on their cars, umm stuff like that, and that's kind of, they know that coming in, they know that coming in, they will be using their own car. We don't pay milage, they get 7.65 an hour. So they get, minimum wage, where a lot of people get 4 or 5 dollars an hour and tips. I think at Domino's that's what they do. Here we just do 7.65, they usually make enough money that they can easily make, like one of our driver last Sunday made 180 bucks. So yeah, they make good money, so that compensates for the gas, the mileage and wear and tear on their cars and stuff like that.

So you pay them minimum wage to compensate?
Exactly, the minimum wage and they keep their tips.

How much would you say, what percentage of your overall cost? If you are paying the extra 3 bucks for the drivers would you consider that a significant cost?
Yeah, but you see that's the thing, we really don't have to pay any costs, no cost comes out of Wings for the drivers because they pay their own gas, and stuff like that. We're really not taking any money out of Wings pockets for anything for the drivers besides their base pay.

How many cars or drivers would you say you have per night?
Monday, Tuesday, Wednesday and Sunday we have four drivers. Thursday we have 6. Friday and Saturday we have 7 or 8.

How many hours are they used on a daily basis?
The drivers themselves, shifts can be anywhere from people that come in at 4pm and work till we close at 3 and then clean up till 4am. Some people come in and just do our late night when we get real busy, they'll do 11pm till close at 3am and clean up till 4 where they might just have a 5 hour shift. Either way it's late night, it's late.

Have you ever considered green modes of transportation for wings?
Sure, if the drivers want to buy them. Like I said, we don't buy them for them, the drivers use their own cars, and if say I was the owner, sure why not. That would be cool if I could provide cars for the actual drivers.

What would your main concerns be when looking at green transportation?
Just that it would be consistent. It would keep developing, that it would not be something that would just die in a year.

What type of obstacles do you see in implementing green transportation?

If you were to implement a system where drivers got a percentage for implementing it?
Some people may be like "I have a hybrid that gets 35", "well I have a Toyota Corolla that gets 32 so I should get it too, because I am only 3 miles less than that."

How do you feel this company could benefit from green transportation?
Obviously, it's healthier, it's better for the earth, that and just people looking and seeing okay that's a good thing that they are doing, they're helping out, so that's good.

What type of incentives would motivate you or your drivers to adopt green transportation?
Probably nothing. That would mean us forcing drivers to have those types of vehicles, and the it would be extremely hard to hire employees, or then we would have to completely buy the cars for them, which we're not going to do because of liability and the money.

How would your customers perceive you if you switched to green transportation?
I think definitely some people would look at it as better, have a better outlook, that it is really good. Others would be like whatever.

To what extent is green image important to the business?
I guess it should be, but right now obviously, it's just not.

To what extent is it important to be engaged with the local community here at Uconn
I like to, when certain groups call with donations, I always try to help when I can. Obviously I'm limited to how much stuff I can give out, but to good causes, I always like to. So it's not just when you pass out flyers, people just see a flyer, but they can kind of put a face to Wings, it's just communication with the community, people around us, which I think is good.

If you were to be given a grant towards green transportation, how do you think your staff would react to incentives for green transportation, to use however you wanted, to give incentives to high mileage cars, how would employees react?
I think some people who had the cars already, would be happy, but I don't think it would make drivers that didn't have those vehicles go out and buy new ones. That's pretty costly, and not of people buy a lot of new cars to start with, and a lot of those are kind of newer cars, but the hybrids I know you could get for a while, Honda came out with one in 98 or something, but a lot of newer ones are still kind of expensive.

If there were to be money in it, how likely would you be to adopt a program like that?
I think it's cool, it's just how it affects everyone else. I'm the GM here, so that's not even something I could really decide. But I think it's kind of cool for delivery places to have that, but it's kind of hard to implement with the economy and peoples money and trying to survive to start with and then getting cleaner cars.

Leaves and Pages

Name: Arleane Palmer and Dan Palmer Co-owner

We cater, we have a contract with ITBD, which is the universities incubatators industries over at 185 Main St. We have to drive there, although we put our cart in the back of the car and run it over there just because the cart isn't sturdy enough to run over there and time's an element. But when we go to City Hall and the Board of Education down the street we do infact push our cart and put everything with us.

How long have you guys been in business?
8 Years
Business is going well.

What is the role of transportation in the business?
Just catering. We come in from Burlington and we stop in Plainville and pick up all of our dairy and all of our food, and once we're here, we pretty much stay put. We don't leave until we leave at night. We walk things most places.
We do carry, we do deal only with Green Mountain Coffee and they are a green company which is nice, very nice.

Do you think having a green image is important to your business?
I'll be really honest, it just wouldn't make sense to drive because we're a few doors down the road. It sounds really nice, I could say yeah, that's our part. But, it wouldn't make any sense to drive because we're so close by.
But it's true, most businesses will not take a cart out on the street and do that, but that doesn't bother us at all.

To what extent is it important to be engaged with the local community?
A lot. It is very important to us. We've been in public service for our whole lives. Dan and I were librarians right up the street at the public library for a combination 51 years and so we decided to open the store, we were actually going to do this in Maine, and then changed our mind and we were talked into staying in New Britain, and we're glad we did.
But we are active in the community, we really like our customers. It's like a family store. People have described it as somebody's living room or Cheers without the booze.

Do you use your own cars to do the delivery and pickup?
Yes, we only have one vehicle, between the two of us. We used to have two, but now that we're with each other 24/7 we don't bother, there was no point in doing it. It's much more economical and makes much more sense to have just one vehicle.

The nice thing in our regard is that we know specifically what amount of food we have to buy, how much coffee we make and if there's waste, it's at that end (the consumer of their delivery), that they haven't consumed it, but other than that, we send them just a particular amount and that's pretty much that's it.
We drive a lot more on the supply end than on the delivery end.

Then we try to keep it very basic, we either do the big companies like Sam's or BJ's or Cosco and try to combine it with other things, so we're not out there driving in six different directions. We are very conscientious about that. When we are going one place, we make sure there are six more on the route so we don't have to go back again. Price of gas, the wear and tear on the car, and basically we have to be here a lot.

Right now we're here six days a week during mid October until the end of December we're here. But because there's just the two of us and we do so much catering now, we now just go back to Monday – Friday from January until next October.

Tom's Pizza at the Bar

Name: Mario Vinci

How long have you been in business?
25 years
And you just moved to that location right?
6 months now.

How is the business going?
Umm, it's going okay. We're doing okay. I guess everyone still talking about the recession and the economy, and it's affecting everybody. We had a big little issue couple months ago with the gas prices being so high, and the delivery guys, put that gas in their car, they really were hurting.

What's the role of transportation in the business?
Well, I mean we're pretty a dine-in facility. We do have delivery, it's not my main source of revenue. We have our delivery service and our drivers go under outside contractors. We add them on to our insurance policy through their insurance. That's pretty much how we work that. We don't have any vehicles, besides our own cars.

Do you build the cost of gas into their wage for delivery?
Well, what I do is we give them a base pay, and 2 dollars a delivery. And their tips. So they add all those together. But they get, every time they go out the door I put in two bucks. That probably helps with their gas and stuff like that. I know a lot of places will have built in delivery charges, for the customer plus tip. But we don't do that. Some people are great with tipping, some people don't tip at all. It's a tough business for the drivers, but they seem to be doing quite well. Most of them are college kids and stuff like that. They are hustling and making 15 or 20 bucks an hour. That's pretty good.

When you do delivery, do you do it to the CCSU campus?
We do a lot of residential, which is nice. It helps me, and I have been in business for 20-25 years so we have a nice client base.

How many cars would you say you use on a typical night, how many drivers do you have?
We have one driver a night and two on the weekends. As I said, it's really not my main business. We do a lot more take-out and dining in. I guess nowadays, everybody delivers, so I realize that I have to kind of keep up with the Joneses, and I'd prefer not to deliver, but I guess it's not an option.

Have you ever considered green modes of transportation?
Umm. No. Nope. My drivers have little cars, little Suzuki's. I mean, if you drive and stuff like that, you have to be worrying about your gas mileage and maintenance. I had a guy who got the job with a big truck, and he sold his truck for a nice little green car. Yeah, but that's not on me, it's not on the business. We don't have any have any rules that you have to do this or that, because we have no control.

Do you think that you could implement some type of incentive for people to drive smaller cars if you were given grants?
Yeah, I mean, it seems like everybody now is a lot more aware and they want to be educated and they kind of want to, besides doing the right thing, I think it's also good for your yourself, like moneywise, financially. Like when you're saving money on gas, you're helping the planet, whatever, but you're also working out for yourself. Why wouldn't you?

How do you think your customers would perceive you if you switched greener transportation?

My customers, I tell you, they're all, I mean my customers right now, they are very middle class, working type. Middle of the road, that have a pepperoni pizza and a steak. I don't think they are thinking that far ahead or are that concerned. They do stuff at the college, for the kids, but I think it would be, I mean I wouldn't mind trying it. It would be nice to do that whole thing, with a little marketing and a lot of advertising to let people know what we are doing. It would probably be good for business. I could bet if I find a government grant for 50,000 dollars, I would be more than willing to try it.

To what extent is it important to be engaged with the local community?
Oh it's very important, it's very important if you want to survive in today's business economy. It needs to be part of the community, it all spills off for business for you, little league, you know, like, senior citizen center, I mean it just makes more clients, more customers, more business. I mean, you have to be there, you have participate, you have to donate. You know, you have to do the high school prom, the elementary school stuff. I mean, you have to. It's good for business.

How do you think your staff would react if you implemented green transportation?
You know, a lot of, I don't want to say the age barrier, gap, but I got college kids that are vegetarians, and worrying about the planet, recycling, and then I got some older folks that just could care less. You know? Really, it's down the middle on that one, but you know, you pick a point and start with it, you know like I said, 10, 15 years from now, we would be a green business, something like that. I mean, all I'm really doing now, that I've done in the past 10 years is recycling, you know, but that's about it for us.

Major Themes

- No control over the driver's choice of vehicles as they are not owned by the business
- Not sure there would be any real benefit to the business
- Would be interested in implementing something if there was grant money to do it
- Would create a better image for the business
- The technology is still too new