MORE STUDENTS, MORE PARKING: TRANSPORTATION AT COMMUNITY COLLEGES

A RESEARCH PAPER

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTERS OF URBAN AND REGIONAL PLANNING

BY

RYAN WILHITE

DR. FRANCIS PARKER – ADVISOR

BALL STATE UNIVERSITY

MUNCIE, INDIANA

MAY 2012
# Table of Contents

LIST OF FIGURES .................................................................................................................. iii
LIST OF TABLES .................................................................................................................... iv
INTRODUCTION ................................................................................................................... 1

CHAPTER ONE ....................................................................................................................... 5
  Literature Review .................................................................................................................. 5
  Problem Statement ............................................................................................................... 14
  Methodology ....................................................................................................................... 14

CHAPTER TWO ..................................................................................................................... 18
  States ................................................................................................................................... 18
    Control .............................................................................................................................. 19
    Funding ............................................................................................................................. 19
    Capital Financing ............................................................................................................. 21
    Expenses .......................................................................................................................... 21
    Planning ............................................................................................................................ 22
    Site Selection ................................................................................................................... 22
    Emphasis on Sustainability ............................................................................................... 23
    Review of States ............................................................................................................... 25

Individual Campuses ........................................................................................................... 25
  Virginia – Annandale Campus ......................................................................................... 26
  Virginia – Portsmouth Campus ....................................................................................... 29
  Illinois – Heartland Community College ......................................................................... 31
  Illinois – Joliet Junior College .......................................................................................... 34
  Indiana – North Meridian Campus ................................................................................... 35
  Indiana – Muncie Campus ............................................................................................... 37
  Traffic Impact of Individual Campuses ............................................................................. 38
  Review of the Individual Campuses ................................................................................ 39

CHAPTER THREE ................................................................................................................ 40
CONCLUSION ....................................................................................................................... 46

BIBLIOGRAPHY .................................................................................................................... 49
  Books/Articles .................................................................................................................... 49
  Reports ............................................................................................................................... 50
  State Code ......................................................................................................................... 52

RESOURCES .......................................................................................................................... 53
LIST OF FIGURES

Figure 1. Map of the Annandale Campus. ................................................................. 27
Figure 2. Map of Fred W. Beazley Portsmouth Campus. ........................................... 30
Figure 3. Total GHG for Heartland Community College, 2011................................. 32
Figure 4. JJC Greenhouse Gas (GHG) Inventory, 2010-2011........................................ 35
LIST OF TABLES

Table 1. Case Study Data for States ................................................................. 18
Table 2. Case Study Data for Individual Campuses ...................................... 26
Table 3. Estimated Traffic Generated by Unduplicated Students at the Individual Campuses. Based on a 1.3 traffic rate ................................................................. 39
INTRODUCTION

The purpose of this research paper is an evaluation of campus policies and plans and exploration of existing solutions. Community college campuses remain a largely understudied planning area but their growth, both in importance to higher education and physical growth, position community colleges as influential community institutions.

The community college caters to a different student profile than a traditional four-year university student. Community colleges allow students who made need additional academic support to earn college credit, possibly even earn a two-year degree, and then transfer to public four-year universities to finish their college education. Enrollment at two-year colleges includes a greater mix of ages and ethnicities than traditional four-year universities. The median age of community college students was 23, with 45% falling in the 22-39 age cohorts (AACC, 2011). Students at community colleges tend to be working adults, with full-time or part-time jobs. Most campuses do not have campus housing and therefore are commuter campuses. Unlike the traditional university, students at a community college are likely to be from the immediate geographic region, typically a several county area. Community colleges are also less-established, with a construction boom occurring in the post-war decades between 1950 and 1970.

The community college is a rapidly evolving institution, serving a vital role in higher education. Students unable to obtain admittance to a traditional university because of poor grades are able to take classes, earn a higher grade point average, and transfer to finish their
education. Other students are unable to afford a traditional university. For some students, a community college education is all they will need to obtain the requisite skills and education for their career. Students are responding to the appealing character of the community college with their feet. In the fall of 2008, community college students accounted for 44% of all undergraduates (AACC, 2011).

The high growth of the community college is in direct conflict with two other trends: capital financing shortfalls and automobile commuting. Very few community colleges have significant on-campus housing, necessitating commuting to access the campus. The dominant form of transportation for the community college student is the automobile, requiring significant institutional land devoted to its storage. Increased demand on the campus facilities requires additional land for automobile storage and larger facilities, all on limited land and a limited budget.

Community colleges are not the only higher education institutions to face a parking shortage. College parking was recently highlighted by an article in the Chronicle of Higher Education, “Nobel? Sure. Parking Space? Maybe.” The article notes the lack of parking for all on the campus, even the most talented professors. Some of the professors, frustrated by the lack of parking, abandon academia or change institutions. One professor, Mary Lou Rylands-Isaacson, recounted how parking at the University of Connecticut used to be free decades ago but now the higher cost and limited availability forced her into early retirement. Three different approaches are available: increase supply, decrease (or adjust) demand, or “do nothing.” Increasing supply is the traditional approach but is expensive and is unlikely to provide a long-term solution. Decreasing demand, as the author of the Chronicle article, outlined the options available to colleges, known as transportation demand management (TDM) tools. These tools
can help to alleviate parking concerns by convincing the campus community to commute by carpool or public transit, with parking management (e.g., increased parking prices) being one prominent tool. The third option, the “do nothing,” frustrates the entire university community and is unlikely to be considered as either a short or long term solution.

Free parking is considered an amenity for workers and suburban shoppers (Troop, 2011). Universities and downtown commercial centers are significant exceptions to the greatly accepted mantra of free parking. The parking reality at university campuses more accurately reflects the expense of automobile storage. Providing parking spaces, either surface or structured, is expensive and consumes land that could be used for academic purposes, especially for urban universities. For example, a three-level parking facility in an urban area could cost almost $18,000 per space to construct. A complete list of parking costs for different parking facilities can be found in Appendix B.

In evaluating the practices of the selected case studies, there is the expectation in determining the current state of transportation policies at the different campuses. The high growth of community colleges and their nature as serving automobile commuters presents the community college as a significant pollution contributor and a reinforcement of the dominant automobile culture. Modifying the transportation culture at a community college using TDM tools could assist in reducing the dependence of the overall community.

The structure of the research paper follows: Chapter 1 provides a literature review, problem statement, and methodology. This chapter will provide the basic background for the paper and provide an outline for the major research conducted which informed the paper’s conclusions. Chapter 2 is a summary of the case study findings, first by state and then by the individual campus. The state case studies are analyzed together, by topic. Chapter 3 provides
an opportunity to reflect on the case studies, pointing out the main points discovered by studying the different campuses and states.
CHAPTER ONE

LITERATURE REVIEW AND METHODOLOGY

Sustainability has many different definitions, but most definitions return to the basic principle of minimizing current resource consumption to allow for a maintenance or growth of the existing quality of life in future generations. The Victoria Transport Policy Institute’s TDM Encyclopedia contributes a valuable insight onto sustainability, that it “reflects one of the most fundamental human desires supported by virtually all philosophies and religions: to create a better future world.” (VTPI, 2011) This definition can easily be copied to sustainable transportation; the expectation that modes that are the most energy efficient and consume the least amount of land should be encouraged.

Literature Review

Nationwide, formal campus efforts to promote environmental awareness developed in the mid 1990s, following the Tallories Declaration of 1990 (Simpson, 2008). The declaration and the Yale University Campus Earth Summit preceded the publication of several books in 1995 that encouraged sustainability, including Sarah Ceighton’s Greening of the Ivory Tower. The sustainability movement gathered steam during the period beginning with 1995 and has not lost any enthusiasm since (Simpson, 2008).

Two initiatives began in 2007 that established the seriousness with which the higher education community believed in sustainability. First, the American College & University
Presidents’ Climate Commitment (ACUPCC) began in 2006, the brainchild of twelve college presidents, including three community college presidents. The ACUPCC describes its mission as a high-visibility effort to address global climate disruption undertaken by a network of colleges and universities that have made institutional commitments to eliminate net greenhouse gas emissions from specified campus operations, and to promote the research and educational efforts of higher education to equip society to restabilize the earth’s climate. Its mission is to accelerate progress towards climate neutrality and sustainability by empowering the higher education sector to educate students, create solutions, and provide leadership-by-example for the rest of society.\(^1\)

The ACUPCC Letter of Commitment requires not only a commitment to reducing greenhouse gases, but a specific timeline in which to complete tangible actions. One of those tangible actions is to encourage the use of public transportation, a reminder of the role automobile commuting plays in destabilizing the climate. The ACUPCC has been well-received, with over 650 university and college presidents signing the Letter of Commitment and over 400 submitted climate action plans.\(^2\)

The Sustainable Endowments Institute (SEI) created a College Sustainability Report Card (also known as the Green Report Card) to grade the sustainability initiatives of universities with the largest endowments. The SEI created the report card to measure the extent to which universities embraced the ecological and economical benefits of energy efficient design and practice. Data is collected through voluntary surveys sent to the university. The Green Report Card includes a section on transportation and it is given the same weight as the other eight categories. The Green Report Card is considered a valuable resource for researchers and administrators. University administrators respect the report card; annual survey response rates

\(^1\) [http://www.presidentsclimatecommitment.org/](http://www.presidentsclimatecommitment.org/)
\(^2\) [http://www.presidentsclimatecommitment.org/](http://www.presidentsclimatecommitment.org/)
are between 80 to 95 percent. Recently, the Green Report Card was suspended as the SEI begins work on a project that encourages more large-scale investment.

The SEI and other educational research foundations have collaborated with the Association for the Advancement of Sustainability in Higher Education (AASHE) to develop a system to measure the sustainability of a campus, akin to the Leadership in Energy and Environmental Design (LEED) rating system and similar principles contained in the Green Report Card. The new voluntary, self-reporting system, STARS for Sustainability Tracking Assessment & Rating System™, is gaining acceptance among university leaders. Institutions earn credits and the more credits earned, the higher the STARS rating. STARS is the result of several years of work by concerned university stakeholders, including students. STARS is seen as a tool to help gauge progress on sustainable initiatives and also as a guide for future sustainable endeavors (AASHE, 2011). There are many possible benefits of STARS to a university. More sustainable buildings and strategies can reduce the operating costs of a university. Placing the STARS logo on university communication can serve as a good marketing tool. More importantly, inclusion in STARS signals the university’s commitment to providing a well-rounded education to its students; this is not merely a benefit, but a responsibility. Paul Rowland, Executive Director of the AASHE, wrote: “Recently, higher education institutions have also recognized the important role they can play in moving all of us to a more sustainable future, one that will provide prosperity today while ensuring that future generations have resources to meet their needs.” (AASHE, 4) STARS signals the increased role of higher education in promoting sustainability in the larger community.

3 LEED, a product of the United States Green Building council, was originally created to measure the sustainable features of an individual building but now includes rating systems for larger areas, such as entire neighborhoods.
4 STARS counts 192 institutions as current participants. https://stars.aashe.org/institutions/ Of these, 14 are community colleges.
While STARS recognizes the importance of sustainable transportation and better planning, very few points are required in either category to receive a STARS certificate. Of the 300 possible credits, transportation accounts for 12 credits and 18 credits for planning. Scoring is less straightforward than LEED. A STARS score is determined by the average of the percentage of applicable points it earns in each category. Scoring for two subcategories in transportation make it unlikely that an institution will earn full points for transportation efforts. For “Student Commute Modal Split” and “Employee Commute Modal Split,” full points are only earned if all trips “use alternative modes of transportation for getting to and from campus. Incremental points are available based on the percentage of students that use alternative modes.” (AASHE, 172) Only two points are attributed to purchasing alternative fuel fleet vehicles and, just as the modal split, is scaled based on the percentage of the fleet that is alternatively fueled. The STARS system also provides no points for one of the most important sustainable features of a campus: its location. LEED 2009 for New Construction and Major Renovations, however, provides an entire category for sustainable sites, with 26 possible points out of 110 (LEED, 2009). The university is a unique community; a “microcosm of the larger community.” (Cortese, 2003). As a microcosm of the larger community, the university can serve as a demonstrator for plans that may be more progressive, or unpopular, in the general community. These values and behaviors that are taught or promoted in the community can then be transferred to the student’s community or the local community (Cortese, 19). And the university should take the responsibility to encourage more sustainable transportation modes. The authors of Planet U request a transportation revolution as a “bold, but fitting objective” (M’Gonigle and Starke,
2006), a movement to better not just the local community, but the national and international community as well. A revolution requires not just lofty rhetoric, but simple and bold actions. Campuses can move towards sustainability through a variety of initiatives (Cortese, 2004; Aber et al., 2009). Anthony Cortese, former dean of environmental programs at Tufts University, identified four elements for a fully integrated system in higher education: education, university operations, research and the external community (Cortese, 2004). Implementing these initiatives is within the ability of higher education. The question of will and timeframe for completing the necessary changes to promote a sustainable initiative is one that Anthony Cortese questions (Cortese, 2004, 19). Fortunately, some higher education institutions have successful programs and the most successful “are those in which the formal curriculum is an integral part of the other three functions of higher education (Cortese, 2004, 20).” These various initiatives help to promote sustainable efforts that extend beyond the campus and into the lives of former students, who can teach and display these ideas in their daily lives.

Higher education institutions typically target low hanging fruit to maximize limited resources. The low hanging fruit are policies that save money while encouraging sustainable objectives (Peace and Uhl, 2004). Such policies include “asking janitors to turn off lights at night, instituting temperature setbacks during breaks and replacing paper publications with electronic ones.” (Pearce and Uhl, 2004, 56) These policies require minimal capital or operating investment but yield both cost and energy savings. Low hanging fruit is limited, in both number and scope. These strategies can only be part of the solution for a greener campus.

One of the areas STARS focuses on is transportation, and with good reason considering that on many campuses, the automobile remains a primary mode of commuting (Newman and Kenworthy, 1999; Toor and Havlick, 2004; Kollie, 2010). Newman and Kenworthy present some
solutions to the problem of unsustainable transportation in cities: traffic calming; quality transit, bicycling and walking; urban villages; growth management; and taxing transportation (Newman and Kenworthy, 144). These solutions differ slightly from some of the solutions offered to solve campus transportation problems. Transportation on College and University Campuses (TCRP 39, 2001) extolled the virtues of using transportation demand management (TDM) tools to deal with university transportation issues. TDM tools include raising the price of parking permits, limiting access to parking permits, and increasing alternative modes of transportation (TCRP 39, 2001; Toor and Havlick, 2004; Toor 2007; Shoup 2011). For both cities and universities, supporting alternative modes (i.e., bicycling and walking) fosters automobile independence and is a step towards a sustainable community. For some universities, especially urban universities, growth management is an outside influence rather than a specific internal policy. Urban land can be unavailable for universities, either because of cost or because the land is not for sale (Toor, 2004).

The practice of sustainable transportation on campuses is of growing concern to many universities. An increased environmental consciousness is, in part, driving the university sustainability movement. Another reason for the growing interest in sustainable transportation is economical. The landlocked nature of many higher education institutions presents a challenge for these public institutions (Toor and Havlick, 2004). Land for urban campuses is expensive and difficult to acquire (Toor and Havlick, 2004). Increased enrollment and limited (or expensive) land provides universities only a few options to deal with the transportation problem on campus.

Ameliorating campus transportation issues must include the collaboration of the surrounding community. Alternative transportation options can reduce traffic congestion
surrounding the campus. The surrounding community has an investment in improving transportation options on campus. A study of Kent State University congestion revealed that increasing capacity of the roadways might be one solution to the problem of increased traffic from the university; however, it was not the best solution. Instead, the university and the city of Kent examined ways in which the two entities could work together to create a transportation policy that is acceptable and beneficial to both the university and the surrounding community (Kaplan and Clapper, 2007). The university is dependent, typically, on a local or regional governmental entity to provide many transportation options for the university community, including mass transportation service. The university is not in direct control of mass transportation, but the campus administration can utilize its political influence to improve transportation for the university and the surrounding community.

A discussion of campus transportation must start with parking. Most campuses, rural or urban, four year or two year, have a shortage of automobile parking for students, staff, and faculty. Remedying parking availability issues presents the university with few options. One is to increase parking. The cost of adding parking can vary from campus to campus, especially if land is not available for surface parking (Toor and Havlick, 2004). Surface parking is the cheapest option but requires the greatest amount of land to store automobiles. Structured parking allows an institution the ability to build more parking spaces on the same amount of land as surface parking. Structures also allow a university to convert existing surface parking lots into additional spaces, saving the university the expense of acquiring new land for surface lots and shuttles if the lot is offsite. Structured parking is the less land intensive parking option but the most expensive and can burden the university with additional bonds to amortize (Toor and Havlick, 2004; Toor, 2007). Universities running low on available land are unlikely to have land...
available onsite for parking. Offsite parking is an option but requires a shuttle and students, staff, and faculty do not appreciate parking offsite. The second option is to rely on free market forces to address parking (Toor and Havlick, 2004). This option, outlined by Toor and Havlick, allows outside parking facilities to deal with the increased parking demand, also known as the “do nothing stance” (Toor and Havlick, 2004, 20).

The third approach is transportation demand management (TDM). This approach examines transportation from a demand side instead of a supply side. Instead of devoting resources to building new parking structure or surface lots, universities study and implement policies that reduce transportation demand to the campus, including higher parking permit prices, universal transit passes, and additional campus housing (Kaplan and Clapper, 2007; Simpson, 2008; Toor and Havlick, 2004; Toor, 2007). Housing is increasing its importance to creating a greener campus. Instead of staff and students having to travel by automobile to the campus, campus housing allows for the community to ride their bicycles or walk to school (Toor and Havlick, 2007, 170). Recent scholarship focuses on case studies (typically successful) of campuses implementing a sustainable transportation plan or initiative (Toor, 2007). The simple fact is that there are no new revolutionary ideas within academia to change the transportation patterns of a university besides the ones already outlined in the current literature (Appendix C contains a list of all TDM policies). One area that is lacking significant research is transportation on community college campuses.

Community colleges play a significant role in the higher education sphere. They provide a service to a largely underserved population of America at an affordable price (Freeman, 2007; Beebe, 2007). This population is important for the economic vitality of the country because the majority of the population does not hold a bachelor’s degree.
By completing a two-year community college program, students are better prepared for occupations requiring more than high school preparation but less than a four-year degree. Access to community college has been enabled through tuition rates that are relatively lower than those of four year colleges. This new structure, combined with educational reform (e.g., contextual learning), enhances prospects for student success...With the majority of students better prepared and credentialed, future incomes would be enhanced while also addressing labor shortages, which makes every student a winner. (Beebe, 79)

The importance of the community college is only growing in the current economic uncertainty, as is the expansion of enrollment in the community colleges.

Enrollment growth at community colleges is placing demands on the physical campus, requiring expansion of existing campuses or construction of new facilities. Satellite campuses are emerging to fill the need for higher education in underserved geographic areas. Automobile traffic in these communities. The enrollment growth and commuter nature has presented community colleges with a parking shortage at peak times. The growth of the campuses is a more pressing sustainability issue than mitigating transportation demands on four year institutions.

Students at community colleges are largely commuters, as are the faculty and staff (Lords, 1999; Wilson, 2003; Layman, 2005; Jobin, 2010). There are few community colleges with on campus housing, with some exceptions in rural-serving areas (Moeck, 2007). Most of the community college students are using automobiles to commute to and from school, not alternative transportation (Jobin, 2010).

The lack of any existing literature on mitigating traffic on community colleges, through the steps identified by Cortese, is troubling. This study is an attempt to fill the scholarship gap, providing community college administrators, college planners, transportation experts, and
interested students with additional information to learn from the three community college systems examined.

Problem Statement

This research paper examines how (or if) community colleges mitigate traffic generation and encourage environmental awareness through transportation demand management (TDM) practices, campus planning, or other policies. The purpose of this research paper is an evaluation of campus policies and plans and exploration of existing solutions.

Methodology

Primary research through case studies will frame the conclusions in this research paper. After some preliminary research, specific criteria were created to help determine the specific community college systems and campuses. The systems were chosen by number of campuses (should be 2+), enrollment growth (typically >10% annual growth), and enrollment size (>100,000). These statistics are based off preliminary research conducted into the burgeoning Ivy Tech Community College system in Indiana. These criteria were chosen to direct research towards large college systems that are experiencing high growth. Community colleges falling within the selected criteria are facing decisions on expanding existing campuses or establishing new campuses to deal with the rapid growth. Each additional campus or expansion results in added traffic on roads. Based on this criteria, the systems in Indiana (IN), Illinois (IL), and Virginia (VA) were chosen.

The similarities of the systems extend beyond the established metrics, helping to focus the research. Two (IN and VA) are state-controlled systems. Individual campuses have no president or supervisory board, unlike Illinois. The three systems are in areas that experience
four seasons. The inclusion of cold-weather states was deliberate; an attempt to broaden
knowledge of sustainable transportation practices in states other than California and Florida.\(^5\)

These systems also have available documents to aid in the research.

Within each system, two campuses have been chosen for further examination. These
campuses will help to compare the systems and their sustainable transportation methods. The
location of the campus will not be a factor in selection but will be noted for comparison
between urban, suburban, and rural campuses. One campus will be older, possibly the flagship
campus, and that has high enrollment (>10,000). This selection will demonstrate the original
infrastructure of the campus and any modifications made to the campus to increase
sustainability (inclusion of transit stop on campus, showers, etc.). The second campus should be
newer and smaller than the old campus. This new construction is intended to show any
progression within the system or campus organization towards transportation sustainability. I
will choose a second campus that was established or experienced significant expansion recently.
The following six campuses were chosen for further analysis: Annandale Campus and
Portsmouth Campus in VA; North Meridian Center (Indianapolis) and Muncie in Indiana; and
Joliet Community College and Heartland Community College in Illinois.

Chapter Two will contain the results of the data collection for the six case studies, including
details on the individual states. Data collected on each system and campus is outlined in the
Research Proposal. Critical data was determined as the following, with some additional
information required:

- Number of students enrolled (FTE and unduplicated headcount)
- Number of faculty and staff
- Number of parking spaces

\(^5\) Existing literature contains significant research on sustainable transportation in universities, but many of
these universities are in areas that do not experience a harsh winter, with the exception of the University of
Colorado.
• If parking permits are issued
• Planning process for the state
• Any existing plans for the individual campuses, including transportation plans
• Transportation policies
• Relationship between community and campus
• Funding sources

After determining all data needed to be collected, a template was developed to aid in collecting and organizing data.

Time and budget constraints relegated research mostly to those available through the Internet or by phone call. All case studies had documents available online, although to differing levels of success. All three community college systems have institutional research departments or offices, which conduct internal research on each system. For example, the Office of Institutional Research at Ivy Tech Community College “strives to produce reports and information that are useful in improving instruction and support services, increasing retention and graduation rates...and informing numerous other management decisions.” (Ivy Tech Institutional Research, 2011). In addition to the institutional research offices, all three systems produce annual reports or status reports. These reports are meant as both a marketing tool for prospective students and employers, and as a snapshot of the system and its progress.

After conducting a review of available literature on each case study, local college contacts were called in an attempt to gather information on the research gaps. None of the community colleges had a college planning office; instead, facility staff was contacted. Contact was made with staff in Virginia and Illinois but not Indiana. In instances where the college had a parking office or department and information was needed, the parking office was contacted. These phone conversations helped to further the research, although there were still research gaps. The remaining gaps, especially as it pertained to campus plans, could not be filled because
the information did not exist or was not brought to the awareness of the author. The conclusions in this paper were based on the research done on the case studies.

While traditional four-year universities are realizing the costs of an automobile-dominated campus, the case study research will determine the extent in which the three community college systems have recognized its benefits.
CHAPTER TWO

CASE STUDIES

The majority of the primary research is the result of case studies examined by the author. The case study provides a unique opportunity to examine the actual operations of community colleges and compare those case studies with comparable campuses; these were not chosen as best or worst practice case studies. The original motivator behind the case study was to examine individual campuses. The role of the state in influencing the finances of the individual community college required an investigation of the state systems, not just the individual campuses.

States

The three states examined all share at least one powerful tool: financing. Control may remain at the local level for some community college system, but the distribution of state higher education dollars is determined by the state. The distribution system differs depending on the system.

<table>
<thead>
<tr>
<th></th>
<th>Indiana</th>
<th>Illinois</th>
<th>Virginia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>178,806</td>
<td>371,898</td>
<td>286,920</td>
</tr>
<tr>
<td>Number of Districts</td>
<td>23</td>
<td>39</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 1. Case Study Data for States
Control

The state system’s type of control varies from state to state. Each state has a state board that regulates community colleges but the extent of this board’s power varies. In Virginia, control is on the local level. The State Board for Community Colleges sets the policy for colleges but merely controls state dollars and creates individual community college boards. The majority of the operational and policy decisions remain in the hands of the individual colleges. Each individual college has a president and a college board. The decisions of the college board can be reviewed by the State Board and the Chancellor of the Virginia Association of Community College (VACC). In Indiana, Ivy Tech Community College serves as the statewide community college. The Board of Trustees, composed of 14 members, meets bimonthly and controls the policy and budget of the entire college. The Illinois Community College Board (ICCB) oversees the Illinois Community College System. The Board sets goals for the entire system but the local boards administer the individual system. The ICCB coordinates, advises, inspects, and recommends actions; ICCB can only remove recognition of the individual community college, which will cut off state funding. This action would be devastating to most campuses, but not impossible if a community desired to fund the college through local taxes and tuition and fees.6

Funding

Each system depends on a mixture of funding streams. The most common funding method is a combination of tuition and fees, local taxes, and state grants. Federal monies play an important role in community college funding as well. Smaller revenue sources include grants for workforce and economic development. Workforce and economic development funding

---

6 Conversation with Ray Hancock.
could become a growth revenue as these community colleges continue to focus on becoming workforce pipelines for local and regional companies.

Illinois has the most unique funding mechanism. Most of the system is funded through three sources: local property taxes, student fees, and state appropriations. Most individual college systems balance these three categories, but some localities have high enough assessed property taxes to depend much less on state appropriations. Neither Virginia nor Indiana rely on local property taxes to directly fund the different colleges/districts.

The amount of funding is of vital concern to the community college systems. The American Association of Community Colleges (AACC) is the advocacy group for community colleges. The AACC published a report, based on a survey, entitled Funding Issues in U.S. Community Colleges, which found serious concerns over future higher education funding and strong competition for the scarce resources (Katsinas, 2007). This survey occurred before the 2007 market crash. The recession almost certainly worsened the outlook for increased higher education funding at all levels.

All three community college systems recognize the challenging financial issues facing them in the coming years. Virginia published an entire report, The Erosion of State Funding for Virginia’s Public Higher Education Institutions (2009). For Illinois, a backlog of unpaid bills for the State of Illinois directly affects postsecondary institutions. The Fiscal Year 2011 Budget Book for Illinois notes that funding from the American Recovery and Revitalization Act (ARRA) replaced state funding shortfalls but without its renewal or increased state funding, the state operating grants would have to be reduced by $7 million (Fiscal Year 2011, 2010).

The Indiana Commission for Higher Education (CHE) recommends a decrease of 2.5% from 2011 to 2013 but Ivy Tech will see a 6.4% increase because of Performance Funding
monies (Higher Education Budget Recommendation, 2010). Performance Funding Formula uses 7 metrics, with six focused on degree and credit hour changes, including a the category of “Low-income degree attainment change.” Ivy Tech is uniquely positioned to capture those funds, based on its mission to provide affordable education across Indiana; the numbers support that position. Ivy Tech is estimated to capture 35.5% of Performance Funding (Higher Education Budget Recommendation, 2010).

The funding issues for community colleges remain a barrier to initiate any programs beyond the primary objective of providing affordable education. The stable funding could not match surging enrollments and places community colleges in a perilous financial position to continue to meet their primary objective.

Capital Financing

Capital expenses include infrastructure, new buildings, and renovations to existing structures. All three systems make requests to the state legislature for capital financing. For instance, in Illinois, there are three separate state entities, which must approval a capital project before it can be financed and constructed. In Illinois, the local community college can finance smaller capital projects (i.e., less than $25,000) but the responsible state bodies must approve all large capital projects (e.g., room additions, construction greater than $2.5 million) (Capital Projects Manual, 1998). Schools in Indiana should not expect any additional appropriations for capital financing for 2011 to 2013 (Higher Education Budget Recommendation, 2010).

Expenses

Educational instruction remains the largest operating expense for all three systems. In Virginia, instruction, institutional support, and student funding accounted for nearly 60% of the system operating expenses (Achieve 2015, ?) with similar ratios at Illinois and Indiana.
Operation and maintenance of the three systems usually accounts for 10% of operating expenses.

Planning

Virginia and Illinois have an emphasis on planning their campuses. The enacting law in Virginia requires all campuses have a master site plan (Virginia Community Colleges Policy Manual, Section 10). The Capital Facilities Manual in Illinois requires that each district maintain a construction master plan for the purpose of detailing possible permanent sites (Capital Facilities Plan, 4). Planning for new campuses in Illinois does require a feasibility study, as mentioned above, to determine the campus’s impact on the community, including environmental and traffic generation (Capital Facilities Plan, 50). Indiana has no requirement to have plans for the different campuses. Site plans are known to exist, but strictly for the purpose of internal decision-making or promotional purposes. These plans are intended to provide an understanding of the new look of the campus.

Site Selection

The process of choosing a new site for a college campus is more influential in determining the sustainability of transportation of that particular campus. No policies in any of the states specify a desire to develop in infill areas or areas that may have greater access to alternative transportation modes. Site selection for the VCCS requires only that the site have access to a major highway for easy access to the community college and that the site be located as close to the center of the population of the region (Virginia Code, Section 10E). Virginia is the only state of the three that specifies, within its state law, the requirements of a site. Illinois law

---

7 This is not strategic planning but physical or comprehensive planning.
requires that land for the new college be donated by the political subdivision in which it is located (Illinois Code, Article III).

Illinois law has few site acquisition requirements, but the Capital Projects Manual (1998) does outline an administrative process. A feasibility study is recommended for primary sites, but the only transportation feasibility is the site’s access to highways and other major roads (Capital Projects Manual, 3).

Emphasis on Sustainability

There are varying approaches to sustainability among the three states. Efforts in Illinois are moving in the direction towards sustainability. Illinois recently received a federal grant to encourage more green building construction. If there is an effort towards sustainability in Indiana, there is little evidence of it on any website or in any public reports.

Virginia is making significant progress on sustainability, outlined by Governor Tim Kaine’s Executive Order 82 and reinforced by the Task Force on Environmental Sustainability. The order established sustainability as a priority and set high standards for all state agencies and institutions (VCCS, 2009). The governor addressed improved transportation policies numerous times, including an entire section titled “Commuting to Work” which related to state government employees, including the VCCS. In this section, the governor ordered all agencies to implement transit and ridesharing incentive programs, encourage transit use through subsidized passes, and utilize telecommuting as a way to reduce traffic congestion by the VCCS workforce. The governor also addressed site selection, requesting new buildings and leased sites be located within a quarter mile of transit stops, where possible, and that locations with bicycle and pedestrian access should be prioritized (VCCS, Appendix A).

---

8Conversation with Ray Hancock.
VCCS embraced the governor’s order, establishing a task force on Environmental Sustainability. Input, through surveys and public meetings, helped to guide the recommendations issued in a 2009 report, “If not now, when?”. Transportation (Commuting Green) and planning (Designing Green) were featured areas of improvement for VCCS. Two survey questions addressed transportation and respondents provided an enthusiastic response to coordinated carpool efforts and increased student fees to create a more bicycle-friendly campus (VCCS, 2009). Based in part on the survey input, the task force recommended establishing transportation and parking options to mitigate the transportation impact of the system. Some strategies include partnering with the local public transportation systems to provide access to campuses, facilitating carpooling, and providing bicycle facilities to encourage alternative transportation (VCCS, 2009). Appendix A contains the full parking and transportation subsection from the report, provided as an example of the best practice of sustainability among the three states.

Implementation of the recommendations was a critical component to the report. There appears to be no action if a particular campus fails to implement a recommendation. The individual responsible for sustainability fills out a progress report that includes a matrix, with color-coded circles indicating the progress of the campus on that particular recommendation. The March 2011 Report indicated that all the campus systems were progressing as expected on almost all the recommendations, with only three campuses not responding or showing difficulty with implementation. Implementation on the transportation and parking section has seen moderate success. Most of the campuses successfully enhanced alternative transportation options, typically through enhanced bus service, additional bike racks, or creating a shuttle service (VACC, 2011b). The Germana Community College expressed that the rural nature of the
campus presented the system with a fiscal challenge to implement the recommendations. This comment by Germana reveals a barrier presented to many rural community colleges; implementing transportation for rural areas can be very expensive.

**Review of States**

A review of the states displays a tendency to overlook sustainability within the community college system. Virginia is the only state that decided to move beyond rhetoric and encourage sustainable policy with Illinois moving in that direction. The difference between the state philosophies reveals the differing levels of acceptance towards sustainability, with Virginia leading the charge among the three states.

**Individual Campuses**

The state’s emphasis on sustainability may or may not result in implementation at the individual campus level, requiring additional research into the current state of transportation at a few chosen campuses in each state. Six campuses of the three states were investigated; one older and one newer campus in each state. The following chart is the result of data collection performed for each individual campus.
<table>
<thead>
<tr>
<th></th>
<th>Virginia</th>
<th>Illinois</th>
<th>Indiana</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annandale</td>
<td>Joliet</td>
<td>Heartland</td>
</tr>
<tr>
<td>FTE</td>
<td>10,075</td>
<td>24,237</td>
<td>3,986</td>
</tr>
<tr>
<td>Unduplicated</td>
<td>21,330</td>
<td>31,847</td>
<td>10,233</td>
</tr>
<tr>
<td>Employees</td>
<td>395</td>
<td>1,241</td>
<td>448</td>
</tr>
<tr>
<td>Buildings</td>
<td>78</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Acres</td>
<td>16</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Permits</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Parking Spaces</td>
<td>~4,000</td>
<td>3,722</td>
<td>~1,800</td>
</tr>
<tr>
<td>Urbanicity</td>
<td>Large City</td>
<td>Midsize City</td>
<td>Fringe</td>
</tr>
<tr>
<td>Public Transit</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 2. Case Study Data for Individual Campuses

Virginia – Annandale Campus

The Annandale Campus is part of Northern Virginia Community College (NOVA). NOVA serves Arlington, Fairfax, Loudoun, and Prince William counties; and Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park cities (NOVA, 2011b). Annandale opened in 1967. The campus is the largest campus site and offers more than 40 programs of study. The campus includes several classroom buildings, a gymnasium, theater, greenhouse, police station, the Ernst Community Cultural Center, and the Center for Workforce Development and Continuing Education. The sixteen building campus is located south of Washington, D.C. and sits on 78

---

11 Illinois Community College Board, Table III-1, Summary of Annual Unduplicated Headcount, Enrollment by Gender, For Fiscal Year 2011; ICCB, Tables DB II 1,2, & 4. This information is all Total Headcounts for Instructional Teaching Faculty, Adjunct Teaching Faculty, and Civil Service or Classified Staff Employed.
12 Illinois Community College Board, Table III-1, Summary of Annual Unduplicated Headcount, Enrollment by Gender, For Fiscal Year 2011; ICCB, Tables DB II 1,2, & 4. This information is all Total Headcounts for Instructional Teaching Faculty, Adjunct Teaching Faculty, and Civil Service or Classified Staff Employed.
13 Ivy Tech Community College, Annual Unduplicated Headcount Enrollment, Office of Institutional Research.
14 NVCC.edu
acres. As shown by Figure 1, the buildings are organized as a traditional campus but with substantial surface parking on one side.

![Figure 1. Map of the Annandale Campus. Available from the following address: http://www.nvcc.edu/_assets/images/content/maps/annandale.jpg](http://www.nvcc.edu/_assets/images/content/maps/annandale.jpg)

Parking permits are required. Parking permits are $75 per semester, making the permits the most expensive among all case studies. Parking is heavily enforced and the fine for parking without a permit is $75, equivalent to paying for a semester permit. The use of towing is not
employed on campus.\textsuperscript{15} Annandale has approximately 4,000 parking spaces, including a six-level, 825 space parking garage.

The Green Committee of NOVA advises the college on a track towards a sustainable future but fails to include green transportation as one of its principles. In its Statement of Principles, the Green Committee makes no specific mention of promoting sustainable transportation. Instead, the Green Committee wanted to “seek to increase awareness of sustainable principles and practices among its faculty, staff, and students.”\textsuperscript{16} The only mention of transportation is under the Green Links tab on the NOVA Green Committee website, linking to the Commonwealth Commuter Choice Program. This program provides information about alternative modes of transportation available to Annandale commuters. NOVA employees are paid $105 per month if the individual utilizes public transit or vanpool. These benefits are distributed through “Metrochecks”; employees are not allowed to use both the pass and a parking sticker.

Minutes from the February 2010 meeting of the Green Committee indicate some progress on transportation for NOVA. First, the committee discussed adding a shuttle service between the Alexandria and Annandale campus. Data revealed that almost 1,900 students travel between the Alexandria and Annandale campuses, which could be a test project for a shuttle service. The committee members discussed the next step for sustainable transportation. Second, there is some mention of discussing the parking issues of NOVA with an administrator.\textsuperscript{17} The update on progress for the VCCS sustainability principles confirms a continuing parking problem. The sustainability update also provides some background into the transportation philosophy of the college: “The options available are limited due to severe parking overload at

\textsuperscript{15} Conversation with parking manager.
\textsuperscript{16} \url{http://www.nvcc.edu/committees/green/principles.htm}
\textsuperscript{17} \url{http://www.nvcc.edu/committees/green/minutes20100201.htm}
three of the six campuses,” with a note that progress on the VCCS sustainability goal was progressing with challenges (VACC, 2011b).

NOVA is attempting to promote sustainability but has yet to fully embrace the idea of sustainable transportation. The focus, as indicated by available documents, remains on the issue of parking, not promoting alternatives or creating a plan to create a better overall transportation system for the campus community. NOVA’s approach represents the old-style of supply side thinking; if more parking is needed, build the parking. NOVA’s Green Committee has yet to embrace the TDM approach.

**Virginia – Portsmouth Campus**

The Portsmouth Campus is one campus of the Tidewater Community College (TCC). Tidewater Community College serves the communities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach. TCC is the 14th largest community college in the United States and is the second largest provider of undergraduate education in Virginia (TCC, 2011). While the campus has been around since 1968, it relocated in 2009 to 35 acres just north of Portsmouth, Virginia. The four-building campus serves approximately 10,000 students annually with build-out capacity to 16,500. Costs of the new campus totaled $65 million. The college encourages strong ties to the local community, allowing the campus library to be available for community use and a multipurpose space that allows for large gatherings (approximately 250 people) for an open house or career fair, sponsored either by the college or community interests.

The campus has 1,450 parking spaces. As shown in the map below, parking consumes a significant amount of campus property, an indication of the commuter nature of its students. Parking permits are required, but are free to students, staff, and faculty. In 2011, TCC and Hampton Roads Transit (HRT) announced a deal to allow TCC students and employees to ride
HRT vehicles for free. TCC President Deborah M. DiCroce announced the deal as a removing “roadblocks to our students’ success.” The new Portsmouth Campus includes a bus stop at its center, allowing Portsmouth students access to the HRT system. HRT routes around the campus are mainly local bus routes but there are two express routes that students can easily connect to without a transfer.

Figure 2. Map of Fred W. Beazley Portsmouth Campus. Source: Tidewater Community College website, http://www.tcc.edu/welcome/locations/portsmouth/info/map.htm

Although there appears to be no sustainability committee in the central office, the March 2011 Update provides some insight into progress on sustainable transportation. The update notes that the TCC established a shuttle service that connects all four campuses. There is also a note about the ample availability of bicycle parking at all on- and off-campus locations (VCCS, 2011b).

**Illinois – Heartland Community College**

Heartland Community College is located in Normal, Illinois. Founded in 1990, Heartland is the youngest community college in Illinois. Heartland enjoys access to numerous interstates and is home to 40 programs that focus on career training. The 256-acre, 12-building main campus has just expanded, adding a student center, fitness and recreation center, and student bookstore. As one of the founding members of the Illinois Green Economy Network, there is an emphasis on more green jobs.

More than 10,000 full time equivalent (FTE) students attend Heartland. The community college serves the underserved population in the region. Students desiring to remain near home while attending university already had a choice in Illinois State University and Illinois Wesleyan University.

Heartland is a signee of the American College & University Presidents’ Climate Commitment. The institution reports its progress on reducing its carbon footprint through the ACUPCC website, which is available for public viewing. The institution has yet to release a climate action plan but is expected to release one in the near future. Emissions data from the ACUPCC website, as reported by Heartland, provides a preliminary picture of carbon usage on the campus. Figure 1 highlights the GHG emitted by related campus activities. Scope 3 emissions include emissions for commuting to and from campus. Commuting accounts for 90%
of Scope 3 emissions and almost 40% of total emissions for Heartland campus. This information should provide administrators on Heartland campus with ample incentive to introduce TDM policies to mitigate GHG produced from transportation sources.

![Heartland Total GHG 2011](image)

**Figure 3. Total GHG for Heartland Community College, 2011. Source: ACUPCC website, [http://rs.acupcc.org/ghg/1775/](http://rs.acupcc.org/ghg/1775/)**

Other sustainability initiatives include the Heartland Gardens. The two-acre demonstration site demonstrates sustainable landscaping options and is part of the Trees Forever nonprofit organization. Within the Values statement of the college, one of the main values is to “practice ethical decision-making and responsible use of environmental, financial and community resources.”

As part of the Illinois Green Economy Network, the college houses academic programs that are geared towards renewable energies (e.g., solar). There is also a student initiative for sustainability called First Step. The club focuses on raising awareness of sustainable practices and environmental issues.

---

19 [www.heartland.edu/about/mission.jsp](http://www.heartland.edu/about/mission.jsp)
There is one student-led initiative that indicates a desire for alternative transportation – bus passes. Following in the footsteps of its university neighbors, Heartland contracted with the local mass transit provider, Bloomington Normal Public Transportation System (BNPTS), to obtain a free transit pass for Heartland students and staff. The transit pass initiative was funded through a student fee.20

Heartland students, faculty, and staff are not required to purchase parking permits. Charging for parking can be an incentive to utilize alternative transportation modes while funding maintenance and operation of various college functions.

The Planning and Zoning Division of the Town of Normal, Illinois, is responsible for planning the jurisdiction that the Normal campus of Heartland Community College resides within. In the “Goals, Objectives and Policies” chapter of its more recent comprehensive plan, the Town of Normal emphasized a community designed “to meet the needs of people first and business second, while effectively accommodating automobiles and other modes of transportation as well as pedestrians.” (Town of Normal Comprehensive Plan, 34). The Community-Wide Sustainability Plan and 2035 Report directs Normal in a direction of more sustainable transportation to serve the aging population and align the community with a more widespread changing social opinion on single occupant vehicles (SOV).

Presently, Heartland Community College and the directive of the community it resides in are at conflict. Unless the college subscribes to providing more sustainable transportation, it is unlikely that Normal can accomplish its sustainable directive as it regards the college.

20 Bnpts.com/UniversalAccess.aspx
Illinois – Joliet Junior College

The oldest community college in the nation, Joliet Junior College (JJC) was founded in 1901 as a mere experiment in postgraduate high school. JJC was created to serve a specific school district, but the creation of the 1965 Illinois Junior College Act required the JJC to serve a seven county region. The main campus sits on 368 acres and boasts a student population of more than 24,000.

JJC desired to examine the structure of the campus and create a campus that supported its vision for the future. As a result, a new master plan outlined a major expansion effort including a new student center. The master plan reflects the growth of the community college and its importance to the community, as well as its desire to attract new students. Included in the master plan is an estimation of future parking needs, which totals nearly 1,700 new parking spaces. There is no assumption that the college would decrease demand for parking through alternative transportation. One solution they devised to alleviate the parking problem was to narrow the parking stalls, creating an additional 200 parking stalls (Master Plan, 6.9).

The local administration supports sustainable ideas and practices, as reflected by its participation in the ACUPCC and creation of a Sustainable Initiatives Committee. As a product of the ACUPCC signing, JJC released a climate action plan in 2012. The climate action plan details the JJC’s commitment to enacting sustainable policies. A greenhouse gas (GHG) inventory discovered that purchased electricity (18,337 GHGs) emits the most greenhouse gases (GHG), with commuting (2,538) a very distant second place as seen in Figure 1. The inventory informed the goals and objectives of the climate action plan, with commuting objectives seen as a lesser concern. Successful implementation of the almost a dozen commuting mitigation recommendations only targets an overall CO2 reduction of 3%. Considering the high level of
GHG emitted by purchased electricity, the focus on reducing GHG from the main campus and its heating unit is not a surprising move by the university (JJC, 2012).

![Figure 4. JJC Greenhouse Gas (GHG) Inventory, 2010-2011. Source: JJC, 2011.](image)

Another significant accomplishment is the greening of the new JJC Master Plan. The master plan includes an initiative for permeable parking lots and pavement. This is despite the college’s insistence that it wishes to become the “greenest college in America.” There is some mention of creating bike racks and construction of pedestrian paths on the reimagined campus. Pace, the local mass transportation company, serves the campus. Paid parking permits are required on campus. The traffic and parking portion of the JJC website makes note of the various parking rules, including violations that draw a fine.

**Indiana – North Meridian Campus**

North Meridian Campus (NMC) is part of the Central Indiana District of Ivy Tech Community College. The campus began in 1966 with only 367 students but now touts more than 30,000 students. NMC is located at the intersection of Meridian Street and Fall Creek Parkway in Indianapolis, Indiana.
There are five buildings that comprise NMC, including a newly constructed parking garage and library. The campus continues to expand, recently renovating the nearby historic St. Vincent’s Hospital and purchasing the Stouffer’s Hotel building. Both were expansion moves to combat limited academic and support staff while furthering the goals of the college.

There is no outlined transportation or campus plan. Parking permits are required for all Ivy Tech campuses, but enforcement is minimal. The campus has access to several stops of the Indianapolis Public Transportation Corporation (IPTC), or IndyGo. The design of the new parking garage on Illinois Street included a bus stop with cut-in for easy bus access. The Meridian Street stop includes a shelter and bench. IndyGo passes are offered for a reduced amount to Ivy Tech faculty, staff, and students. The availability of the passes are not well-publicized, including no mention of the availability of bus passes in the 2010-2011 Ivy Tech Student Handbook (Student Handbook, 2010).

Ivy Tech Central Indiana runs a shuttle between the NMC and the Lawrence campus, located on the east side of Indianapolis. The shuttle allows students to simply park and take classes at either NMC or the Lawrence campus. NMC houses most of the classes for Central Indiana, but there are some remedial or required classes that are offered at Lawrence. A student can arrange their schedule to attend morning classes at NMC and then ride the shuttle to classes at Lawrence if a similar class at NMC is over enrollment. This is a win-win situation for Ivy Tech and its students; the same class can be offered at Lawrence and the shuttle can minimize hassle for the students. The shuttle schedule is available on the Ivy Tech Central Indiana website, including pickup and drop off times.

NMC is within the jurisdiction of Indianapolis, Indiana, and Marion County, specifically the Indianapolis Department of Metropolitan Development (DMD). There is very little
consideration towards the college’s expansion, probably due to the high capacity and low usage of the adjacent roadways (i.e., Meridian Street, Fall Creek Parkway, Illinois Street).

Indiana – Muncie Campus

The Muncie campus is part of the East Central Region, which has two high growth campuses (Muncie, Anderson). The Muncie campus is not a new campus but it has added additional academic space in downtown Muncie. The original campus is located on Cowan Road on the outskirts of Muncie, Indiana. Annual enrollment is 3,500 FTE students and enrollment has increased 25% over a two-year period. The development of the new campus downtown was seen as an immediate economic impact for downtown Muncie. The Muncie campus is expected to enroll an additional 2,500 students in the next five years and the new space will help to accommodate that growth.21

The addition of nearly two thousand new students, staff, and faculty to downtown Muncie caused some concern about parking issues. A Ball State University graduate student conducted a parking study for downtown Muncie and determined that there was ample existing parking for the influx of new students, at least for another five to ten years (Jarboe, 2010). In analyzing downtown parking, Katherine Jarboe surveyed Ivy Tech students about habits involving time spent at campus, current mode of travel, and other possibilities for travel to downtown Muncie, including a park and ride option. The survey showed a typical split between personal vehicle usage (90%) and transit usage (3.7%) (Jarboe, 59). The ideal situation would be a park and ride solution, allowing students to park in periphery lots and taking a shuttle to the downtown campus. This solution does not require any expensive structured parking while meeting the students’ desires for automobile parking. The surveys did indicate a somewhat

positive response to park and ride lots and free public transit, albeit only if free and high service public transit was the alternative. Overlooked in her analysis was that more people would be willing to carpool than ride transit. Carpooling, in conjunction with park and ride lots, could serve as one of the better options for the downtown campus. Until a transportation plan is developed for the downtown Muncie campus, the Ivy Tech community will use the 400 parking spaces in downtown and still utilize the nearly 1,200 parking spaces at the Cowan campus (Jarboe, 56).

The move to downtown enhances accessibility to education for Muncie students, considering that the new downtown campus is in close proximity to the Muncie Indiana Transit System (MITS) downtown terminal. The Cowan campus does have MITS service, but its location at the periphery translated into a likely transfer for students unless the student lived on the route that served Cowan. The Muncie campus still lacks a transportation plan and there are no outlined TDM tools to encourage students to utilize MITS over the SOV.

**Traffic Impact of Individual Campuses**

The expansion of the individual campuses and dependence on the automobile increase the automobile traffic around each facility. Increased traffic causes congestion and can irritate the community if the congestion becomes too severe. Observation is the best way to determine trip generation. Observation is time consuming and cost prohibitive. The Institute of Traffic Engineer’s *Trip Generation Handbook* is used to estimate trip generation with adequate success, depending on the land use and number of reports. A recent Traffic Impact Analysis performed for the Santa Fe Community College provides some background into community college traffic generation. The actual traffic counts for the campus fell well within the average rate of .93 to 2.16 for community colleges (ITE Code 540) and the consultants determined that the specific
rate for the campus was approximately 1.34. Although each campus will have its own specific traffic generation rates, without observed traffic counts or existing traffic impact reports, the rate of 1.3 will be used for all six campuses to estimate generated traffic (SFCC, 2011).

<table>
<thead>
<tr>
<th>Campus</th>
<th>Virginia</th>
<th>Illinois</th>
<th>Indiana</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annandale</td>
<td>Portsmouth</td>
<td>Heartland</td>
</tr>
<tr>
<td>Unduplicated</td>
<td>21,330</td>
<td>12,118</td>
<td>31,847</td>
</tr>
<tr>
<td>Average Daily Trips</td>
<td>27,729</td>
<td>15,753</td>
<td>41,401</td>
</tr>
</tbody>
</table>

Table 3. Estimated Traffic Generated by Unduplicated Students at the Individual Campuses. Based on a 1.3 traffic rate.

These campuses generate significant traffic onto the roadways. A complete analysis of the traffic impact of these campuses will be incomplete without the existing level of service (LOS) of affected roadways. Since the purpose of this report is not to conduct an accurate traffic impact analysis of the campuses, this information is not determined.

**Review of the Individual Campuses**

The older campuses evaluated are growing steadily and their campus footprint continues to grow. All the campuses provide a means of alternative transportation but the significant provisions for parking (almost all campuses have more than 1,000 parking spaces) reflects the attitude of the automobile as the dominant means of transportation now and in the future. The local transportation network easily accesses each campus. Transportation plans are not available for any of the campuses. Most of the campus sites are located in urban areas, with the exception of the Illinois campuses.
CHAPTER THREE

CASE STUDY COMPARISONS AND CONCLUSIONS

Analyzing the three states and six campuses offered a glimpse into the practices of community colleges. Community colleges are uniquely positioned for the challenges of the twenty-first century. The institutions offer affordable education to students; provide remediation for students wanting to continue to four-year schools; and train new workers in the technical skills needed for local and regional companies. Campus expansion and new campus development have followed the growth in student enrollment.

These conclusions are a result of analyzing the case studies:

- **Parking consumes large swaths of land and remains an issue.** Community college campuses are structured like suburban shopping malls, with buildings surrounded by a large quantity of surface parking. Every individual campus has at least 1,000 parking spaces, with Annandale and Joliet offering more than 3,500 parking spaces at their respective campuses. Despite the large amount of parking spaces available, new parking garages at NMC and Annandale reflect a desire for additional parking for the growing campuses. Even Muncie, with its move downtown, does not lack parking. The new downtown location has access to more than 600 parking spaces, most in surface parking lots.

- **Access to the population to be served by the community college is the primary determinant for site selection.** This position reflects the primary objectives of the
community colleges to provide affordable, accessible education to a specific region. In the case studies, this accessibility meant sites with access to major transportation corridors. Of the three new sites chosen, two were located at large greenfield sites with ample parking and access to interstates. The location of the sites in less dense areas provides a barrier to allow for access to alternative transportation modes. The future of these campuses is entrenched firmly as automobile dependent. Only the move of Ivy Tech in Muncie to a downtown location provided some hope for better transportation access to the students. The perceived need for a large site, both for expansion and parking, is a barrier to advocating for more sustainable sites.

- **Sustainability is a hot topic, transportation is not.** Sustainability is considered a hot topic for higher education in general and community colleges specifically. All three state systems and six campuses noted the importance of sustainable energy jobs, or “green” jobs. Campuses in Virginia and Illinois have tried to infuse sustainability into the curriculum, to educate their student population better, as is being done in traditional four-year universities. Even at campuses with some emphasis on mitigating transportation effects (Annandale, Portsmouth), both campuses recognize a need for matching parking supply with parking demand, instead of attempting to push TDM tools.

- **Some organization is in place for sustainable transportation.** A sustainable committee, populated by students, staff, and faculty, is a good step towards fostering sustainability on campus. Due to the commuting nature of the campus, any sustainable committee will direct its attention to mitigating traffic impact from the campus. Joliet and Annandale established sustainability committees to direct the efforts of the campus. That there is no structural emphasis on sustainable transportation is troubling. Policies
relating to sustainable transportation require time to implement and adopt by the campus community.

- **Transportation plans are available but action appears minimal.** Of the six campuses, only the Indiana campuses did not have some document on transportation, although not as detailed as transportation plans at a traditional four-year university. The Virginia campuses are recommended to implement the policies in the *If not now, when?* Document. Failure to implement the plan does not appear to carry any repercussion. Reporting of implemented actions or policies on the Virginia campuses requires little than filling out an action matrix with details of progress. The Illinois campuses have more detailed information on transportation due to ACUPCC, but only JJC has an available climate action plan and its transportation recommendations reflect a lack of overall concern over commuting. Plans are a result of good leadership and structure, so it is not surprising that many of the campuses, lacking structure, do not have transportation plans.

- **Good leadership translates into action.** The Virginia system created a sustainability plan based on a concern for the climate. The same concern encouraged presidents of Heartland and Joliet in Illinois to sign the ACUPCC. The *If not now, when?* and ACUPCC decisions were key in boosting awareness of sustainability. The leaders that made these decisions helped to place the examined campuses in better environmental condition than other community college campuses.

- **Community colleges face significant financial challenges.** The 2008 recession negatively affected every college system examined. Despite the continued enrollment increases, all three-college systems noted the financial pressures they faced in the future. Limited available financing will mean that all activities not directly related to
educating students will be met with a discerning eye. Initiatives that are not “low hanging fruit” will be difficult to enact.

- **Affordability is driving community college growth.** College costs continue to climb, especially at public four-year colleges. A student attending a public four-year institution would expect to pay $8,830 in tuition and fees annually, not including room and board. By attending the Northern Virginia Community College, that same student would save almost $5,142 in tuition and fees.\(^2^2\) Despite the increased costs, a college education is considered a necessity for a secure financial future.

- **Individual campuses are expanding.** One aspect that was surprising was the size of the campuses, especially Joliet and North Meridian Center (NMC). The perception of community colleges is as single-unit campuses or rented rooms in a building that qualify as a classroom. The older community college campuses are large, with several buildings. Joliet has even taken the steps of constructing a student center in order to attract new students.

- **Free or reduced price access to public transportation is shared by all the campuses.** Every campus, no matter the size or location, provided access via public transportation. Connecting the community college to the larger community is an essential step to providing better access to education for the entire community, regardless of income. The access to public transportation is a good step towards creating a more sustainable community college campus. This is one of the few TDM tools that most campuses have embraced and is a good step towards sustainable transportation. This tool can be standalone but would be more effective as part of a larger TDM strategy.

\(^{22}\) Based on the Cost Calculator on the VCCS website and the State Council of Higher Education for Virginia website. Tuition and fees for Northern Virginia Community College amount to $3,688.
• **No evidence of town-gown conflict.** A strained relationship between the university and the surrounding community due to student parking in residential neighborhoods can drive transportation policies. With the exception of Ivy Tech – Muncie, there is no evidence of a town-gown conflict relating to parking issues. Ample parking space and few residential neighborhoods near the examined community colleges explains why there is little conflict between the two communities. This lack of a conflict removes a motivating factor for the university to improve its transportation policies.

• **Information availability is an issue.** The availability of information can be an obstacle in achieving any level of success with new initiatives. For instance, Ivy Tech Community College offers discounted passes for IndyGo, the local mass transit provider, but that information is not offered in the Student Handbook of 2011-2012. Parking information, however, is offered within the handbook. Ivy Tech did a better job of communicating the availability and schedule of its shuttle over other campuses. At Joliet, the campus action plan could not be located on the main website. Student availability of the climate action plan may help the JJC in pursuing their carbon neutrality goals.

• **A movement towards sustainable transportation is possible, but it will require dedicating additional resources.** The efforts of Joliet and Heartland are encouraging; having a climate action plan can help to frame the discussion about sustainable transportation. Beyond the case studies, there are ample examples of community colleges making strides in mitigating their transportation impact. One example is Delta College. Located in Michigan, this college has focused on environmental issues since the 1970s (Schaffhauser, 2009). Their sustainability efforts include significant inroads into transportation. They have committed to several TDM policies:
  - Partnership with the regional transportation system to provide new bus service (Park-n-Ride Green Line)
- Bus subsidy for bus passes and promotions (earned Delta College 2 Innovation points)
- Carpooling program (I Ride With Strangers)
- Vehicle recharge stations for electric plug-ins
- A four-mile long bicycle trail that connects Delta College with another university and surrounding communities
- Conducted GHG Emissions Inventory

The results have been impressive, especially as ridesharing is concerned. From 2000-2010, Delta College students and staff utilizing ride sharing nearly doubled. Delta’s example provides hope that other community colleges can work to mitigate the environmental cost of commuting and also increase commuting options.23

Sustainable transportation does not have to be expensive. There are numerous TDM tools that are low to moderate cost and can be implemented without much hassle. These strategies can be found in Appendix C.

---

23 This information comes from “Connecting the College to the Community: Collaborating for Green Transportation,” a Powerpoint presentation delivered at the AASHE 2011 Conference. The Powerpoint is in the author’s possession.
CONCLUSION

Sustainability is gaining traction in higher education, including community colleges. Organizations like the AASHE, ACUPCC, and Green Report Card are encouraging better environmental decisions by administrators, staff, and faculty at higher education institutions. Although sustainability is a hot topic, sustainable transportation is still in its infancy.

There is some mitigation of transportation on the individual campuses. Additional effort will be needed for the individual campuses to begin to have an influence on commuting. The examination of the case studies reveals the long road that sustainable transportation has to make at community colleges. Only the two Illinois campuses, prompted by the commitment to the ACUPCC, have measured the GHG emissions on campus. Only Joliet has developed a climate action plan that addresses transportation and only very minimally. Even without a sustainable transportation plan, Virginia campuses lead all campuses in attempting to provide alternative transportation modes and promoting those methods.

The limitations of the community college, including financing and student makeup, are not a significant barrier to implement changes to transportation on the campus. Delta College is a prime example of what steps community colleges can take to implement TDM tools to reduce automobile commuting. There are many low-cost or minimal-cost TDM strategies that a community college can implement. One major barrier to action is a lack of leadership or
established structure. Delta has those in position and the organization provides the framework for strategies and actions.

Each examined individual campus can be successful without implementing TDM strategies. The primary goal of the community college is not to provide sustainable transportation options to its students, but to provide affordable, accessible education. There is significant value in providing sustainable transportation options. Reduced commuting by an individual will reduce GHG emissions of the college. The cost of additional parking may be another value of reduced single vehicle occupant commuting. Alternative transportation can alleviate the demand on parking and the costs of providing additional parking. Most of the examined campuses have enough land to provide additional parking at a low cost, leaving the cost argument as a long-term one for the community college.

Improved transportation for the campus will require coordination with the local community, improving transportation options for both the university and the community. Increased trips by carpool or bus can decrease the need to expand a local roadway. Advocacy for better bus access can improve bus access not just for students, but for the larger community as well. The political influence of the campus, as demonstrated by Delta College, can be used to better the transportation access of its university community and the overall community, including the regional one.

Community colleges face two competing forces: financing issues and increasing enrollment. Transportation plays a significant factor in each issue. The traditional method of approaching transportation issues at a commuter school, increasing parking, is increasing expensive. Sustainable transportation may not be a priority for the examined campuses, but
better transportation options for students can alleviate the economic and environmental issues of increasing the parking supply. A community college has no excuse for not implementing change – a good leader, good plan, and political will can move the community college towards sustainable transportation.
Books/Articles


Jarboe, Katherine (2010). Downtown Muncie Indiana parking study. Masters, College of Architecture and Planning, Ball State University, Muncie, IN. Available online from Cardinal Scholar: [http://cardinalscholar.bsu.edu/handle/123456789/193690](http://cardinalscholar.bsu.edu/handle/123456789/193690)


Reports


Tidewater Community College (2011). *TCC Fact Book, Office of Institutional Effectiveness, December 2011*. Available online:


United States Green Building Council (2011). LEED 2009 for new construction and major renovations rating system with alternative compliance paths for projects outside the U.S. [Report]


State Code

Illinois Code, 110 ILCS 805. Public Community College Act. The law can be found online at the following address: http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=1150&ChapAct=110%26nbsp%3BILCS%26nbsp%3B805%26nbsp%3B&ChapterID=18&ChapterName=HIGHER+EDUCATION&ActName=Public+Community+College+Act
RESOURCES

The following websites were invaluable tools in research and are recommended for persons interested in additional information on sustainability and sustainable transportation.

**American College & University Presidents’ Climate Commitment.**
http://www.presidentsclimatecommitment.org/

This website provides detailed background on the ACUPCC and its activities. The emissions reporting, including submitted climate action plans, is especially valuable.

**Association for the Advancement of Sustainability in Higher Education**
www.aashe.org

This organization provides research on sustainability and also administers the STARS program. The online resource tool contains some good articles, although transportation articles are light.

**College Sustainability Report Card**
www.greenreportcard.org

The first higher education sustainability report card, this website provides detailed records on almost 300 of colleges and universities in the United States and their sustainable practices. The list is reserved for large endowments, excluding all community colleges. Good searchable resource for finding “best practices” for sustainability.

**Victoria Transport Policy Institute**
www.vtpi.org

The Online TDM Encyclopedia is an exceptional resource for researchers, students, administrators, and sustainability staff. The encyclopedia includes academic articles, valuable tables, and links to additional information.
APPENDIX A: Commuting Green

The following is the parking and transportation (commuting green) section from “If not now, when?”, page 14. The report can be accessed here: http://www.vccs.edu/Portals/0/ContentAreas/Facilities/SUSTAINABILITY_Ecological_Commitment_to_Our_Future.pdf

Parking & Transportation (Commuting Green)

Opportunities for improvement exist in transportation planning in order to incorporate sustainable measures in the design, development, and implementation processes. Even the most optimistic developments in sustainable transportation can be rendered counterproductive when the significant role transportation plays in the global economy is undermined. The intention of this recommendation is to help the colleges establish a balance of the needs of all commuters by effectively managing transportation, providing a variety of transportation and parking options and incentives, and investing in low-emitting vehicles.

Recommendation

7. Establish a variety of transportation and parking options and incentives to reduce fuel consumption and carbon emissions.

Implementation Strategies

- Partner with local public transportation systems to provide access to campus facilities.
- Facilitate carpooling and ride-sharing programs for faculty, staff, and students by providing preferred parking, reduced fees, or other incentives within the parameters of the Department of Human Resource Management’s guidelines (consistent with the requirements included in Virginia Executive Order 82, 2009).
- Provide a bulletin board for ride-share postings.
- Provide preferred parking for low-emission vehicles as defined by the American Council for an Energy Efficient Economy (ACEEE) (www.greencars.com).
- Provide motorcycle/scooter parking spaces in preferred locations.
• Provide bike lanes, bike racks, and changing/shower facilities to encourage low emission transportation.

• Encourage pedestrian and bike lane connections throughout the community.

• Purchase low-emitting vehicles for the college fleet.
APPENDIX B: Parking Costs

The following is a spreadsheet and chart detailing the costs of constructing and operating a parking facility. All figures are in 2002 U.S. dollars. The spreadsheet was updated 16 January 2012. The spreadsheet is the product of Todd Litman, Director of the Victoria Transport Policy Institute. The spreadsheet is available at the following website: http://www.vtpi.org/tdm/tdm26.htm

<table>
<thead>
<tr>
<th></th>
<th>Suburban</th>
<th>Urban</th>
<th>CBD</th>
<th>On-Street</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Costs (per acre)</td>
<td>$200,000</td>
<td>$1,000,000</td>
<td>$5,000,000</td>
<td>Varies</td>
<td>This is land acquisition costs.</td>
</tr>
<tr>
<td>Surface Spaces Acre</td>
<td>110</td>
<td>120</td>
<td>130</td>
<td>250</td>
<td>This is the number of parking spaces per acre of surface area (including landscaping and access lanes).</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>Interest rate for long-term capital investments.</td>
</tr>
<tr>
<td>Years of Payments</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>Years of payments.</td>
</tr>
<tr>
<td>Average Days of Use Per Month</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>25</td>
<td>Typical number of days that parking space can be rented each month.</td>
</tr>
</tbody>
</table>

**Facility Costs**

<table>
<thead>
<tr>
<th>Type of Facility</th>
<th>Structured Parking</th>
<th>Land Costs, Per Acre</th>
<th>Land Costs, Per Space</th>
<th>Annualized Land Cost</th>
<th>Construction Costs Per Space</th>
<th>Annualized Construction Costs</th>
</tr>
</thead>
</table>

56
<table>
<thead>
<tr>
<th>Location Type</th>
<th>Land Value</th>
<th>Street Value</th>
<th>Street Rights</th>
<th>Rights Value</th>
<th>Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburban, On-Street</td>
<td>$200,000</td>
<td>$800</td>
<td>$70</td>
<td>$3,000</td>
<td>$262</td>
</tr>
<tr>
<td>Suburban, Surface, Free Land</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$3,000</td>
<td>$262</td>
</tr>
<tr>
<td>Suburban, Surface</td>
<td>$200,000</td>
<td>$1,818</td>
<td>$159</td>
<td>$3,000</td>
<td>$262</td>
</tr>
<tr>
<td>Suburban, 2-Level Structure</td>
<td>$200,000</td>
<td>$909</td>
<td>$79</td>
<td>$15,000</td>
<td>$1,308</td>
</tr>
<tr>
<td>Urban, On-Street</td>
<td>$1,000,000</td>
<td>$4,000</td>
<td>$349</td>
<td>$5,000</td>
<td>$436</td>
</tr>
<tr>
<td>Urban, Surface</td>
<td>$1,000,000</td>
<td>$8,333</td>
<td>$727</td>
<td>$5,000</td>
<td>$436</td>
</tr>
<tr>
<td>Urban, 3-Level Structure</td>
<td>$1,000,000</td>
<td>$2,778</td>
<td>$242</td>
<td>$18,000</td>
<td>$1,569</td>
</tr>
<tr>
<td>Urban, Underground</td>
<td>$1,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$25,000</td>
<td>$2,180</td>
</tr>
<tr>
<td>CBD, On-Street</td>
<td>$5,000,000</td>
<td>$20,000</td>
<td>$1,744</td>
<td>$5,000</td>
<td>$436</td>
</tr>
<tr>
<td>CBD, Surface</td>
<td>$5,000,000</td>
<td>$38,462</td>
<td>$3,353</td>
<td>$5,000</td>
<td>$436</td>
</tr>
<tr>
<td>CBD, 4-Level Structure</td>
<td>$5,000,000</td>
<td>$9,615</td>
<td>$838</td>
<td>$20,000</td>
<td>$1,744</td>
</tr>
<tr>
<td>CBD, Underground</td>
<td>$5,000,000</td>
<td>$0</td>
<td>$0</td>
<td>$35,000</td>
<td>$3,051</td>
</tr>
</tbody>
</table>
Parking Facility Costs

- Operating Costs
- Construction Costs
- Land Costs

- Suburban, On-Street
- Suburban, Surface
- Suburban, 2-Level Structure
- Urban, On-Street
- Urban, Surface
- Urban, 3-Level Structure
- CBD, On-Street
- CBD, Surface
- CBD, 4-Level Structure

Annualized Costs

<table>
<thead>
<tr>
<th>Cost</th>
<th>Suburban, On-Street</th>
<th>Suburban, Surface</th>
<th>Suburban, 2-Level Structure</th>
<th>Urban, On-Street</th>
<th>Urban, Surface</th>
<th>Urban, 3-Level Structure</th>
<th>CBD, On-Street</th>
<th>CBD, Surface</th>
<th>CBD, 4-Level Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$3,500</td>
<td>$3,500</td>
<td>$3,500</td>
<td>$3,500</td>
<td>$3,500</td>
<td>$3,500</td>
<td>$3,500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$4,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$4,500</td>
<td>$4,500</td>
<td>$4,500</td>
<td>$4,500</td>
<td>$4,500</td>
<td>$4,500</td>
<td>$4,500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
</tbody>
</table>
**APPENDIX C: TDM Strategies**

The following is a partial list of TDM Strategies, as presented by the City of Boulder, Colorado, in the *Transportation Master Plan Update* from 2002. The complete TDM document can be found online: [http://www.bouldercolorado.gov/files/Transportation_Master_Plan/TDM_Strategies.pdf](http://www.bouldercolorado.gov/files/Transportation_Master_Plan/TDM_Strategies.pdf)

This list is edited to approximate the table presented in *Transportation & Sustainable Campus Communities* by Will Toor and Spenser Havlick.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description / Implementation to Date (Low / Medium / High implementation)</th>
<th>Dependencies</th>
<th>Opportunities</th>
<th>Limitations</th>
<th>Effectiveness</th>
<th>Cost to Implement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike station</td>
<td>Bike stations provide secure and covered parking for bicyclists. Most effective in dense concentrations of worksites, bike stations can serve as an encouragement to commute to work by bicycle. Medium. Although Boulder has not yet implemented a Bike Station, it has a grant to pursue a Bike Station in the short term.</td>
<td>Bicycle users group; Bicycling promotion</td>
<td>Bike stations have been used to encourage the development of new bicycle riders who are concerned about safety (from theft) and desire complementary services (such as showers, lockers, and other services offered by Bike stations). Downtown Denver bike station projected approximately 170 users per day.</td>
<td>Outside of Downtown Boulder and the University of Colorado, a Bike station will have limited appeal (due to distance from worksite to Bike station). As such, total modal shift is limited. Additional limitations of bicycling promotion, and, bicycle users group apply.</td>
<td>Marginal (modal shift); Low (VMT reduction)</td>
<td>Medium cost, assuming that a private-sector partner is found to provide fee-based products and services onsite.</td>
</tr>
<tr>
<td>Carpool promotion</td>
<td>General promotion and marketing activities oriented towards encouraging commuters to carpool. Marketing messages can include cost savings, stress reduction, socialization, convenience, environmental reasons, and other benefits. Low. The City participates with RideArrangers ridematching services.</td>
<td>Ridematching services and events</td>
<td>Promotion and marketing is extremely important in introducing and educating people in the benefits of carpools. When partnered with ridematching events, carpooling can help provide for trips that are poorly served by transit.</td>
<td>Carpool participation declines over time if marketing programs are not continued. Although carpooling has remained relatively static over time, family members who commute together play an increasing role. As such, carpool promotion efforts may be limited over time.</td>
<td>Low (mode shift); Low (VMT reduction)</td>
<td>Low</td>
</tr>
<tr>
<td>General marketing</td>
<td>Comprehensive marketing of all modal options, and how to best make use of them, are a key component to TDM promotion. Marketing materials can include flyers, brochures, posters, and targeted email messages. High. The City of Boulder and regional partners have excelled at general TDM marketing materials.</td>
<td>Some combination of alternative mode services and/or incentives.</td>
<td>Marketing is more effective when it emphasizes the positive benefits commuters will achieve from using alternative modes, including exercise and financial incentives – themes that have resonance in Boulder. Marketing that supports other TDM strategies that improve transportation choice or provide tangible incentives have been proven to show significant long-term impacts on travel behavior.</td>
<td>The travel impacts of TDM programs that rely only on marketing tend to decline over time as participants lose interest. TDM also faces competition from all other marketing messages. If the marketing misses its target market or carries an uninteresting or confusing message, it will be ineffective.</td>
<td>Medium (mode share); Low (VMT reduction)</td>
<td>Medium cost, depending upon specific campaigns</td>
</tr>
<tr>
<td>Showers and Lockers Facilities</td>
<td>Employer provides shower and locker facilities for employees to use prior to beginning their workday. Showers and locker facilities are provided for each gender, and are secure within the worksite’s interior. Medium. Many employers have elected to provide shower facilities to their employees.</td>
<td>Stand alone.</td>
<td>Boulder is proactive at encouraging alternative modes and providing safe facilities for bicyclists, walkers, and joggers. Providing shower facilities at worksites allows for these users to ‘freshen up’ after getting to work, thereby removing one of the barriers to bicycle commuting.</td>
<td>In new buildings, the infrastructure can be planned and built without great cost; however with existing buildings, it can be expensive to install shower facilities.</td>
<td>Low (mode share); Low (VMT reduction)</td>
<td>Low (for new buildings); Medium (for retrofit)</td>
</tr>
<tr>
<td>Transportation Allowance</td>
<td>A transportation allowance is provided to commuters, for use on whatever modal options they choose. Typically, allowances are used in conjunction with parking pricing and other modal strategies. Limited. City of Boulder is considering implementation for city employees.</td>
<td>Unbundled parking leases</td>
<td>A transportation allowance is very effective at “leveling the playing field” between parking and alternatives. The opportunity to save money and avoid out-of-pocket parking costs is appealing to many travelers. Employers in Washington and California have seen a shift in alternative modes by over 30%.</td>
<td>Spillover parking will occur unless the policy is accompanied by neighborhood parking restrictions. The allowance will work best on multi-modal corridors, and have limited appeal where alternatives are not readily available.</td>
<td>High (mode shift); High (VMT reduction)</td>
<td>Low cost. This assumes the policy is structured to be relatively cost-neutral</td>
</tr>
<tr>
<td>Carsharing</td>
<td>Carsharing involves a pooled fleet of vehicles that are available for limited tasks by either members of a carshare program (similar to a timeshare), or, for a per-use fee. Low. Boulder CarShare is an active non-profit organization (with City grant) providing 3 cars to members in Boulder.</td>
<td>Stand alone.</td>
<td>Carsharing is similar to guaranteed ride home, in that it makes using alternatives easier for travelers. Carsharing can reduce the need for vehicle ownership, which in time, also reduces vehicular use in general.</td>
<td>Carsharing has limited application in the United States, and thus, it is difficult to project the potential effects. Furthermore, cost recovery over time becomes an issue, especially administration and maintenance.</td>
<td>Medium (mode share); High (VMT reduction)</td>
<td>High cost. However, costs may be partially recovered by membership and user fees.</td>
</tr>
<tr>
<td>Commuter Club</td>
<td>Similar in function to “Airline Miles”, a Commuter Club provides either points or cash-based incentives to commuters who use alternative modes of transportation None.</td>
<td>Bicycling, Walking, Transit, Carpool, Vanpool, and/or Telework promotion.</td>
<td>A Commuter Club provides tangible incentives and recognition to those who use alternative modes. Southern California and Aspen have successfully implemented Commuter Clubs that maintain very high alternative mode shares from month to month.</td>
<td>Developing a Commuter Club program has some financial and administrative expenses associated with it. As with other TDM promotions, a Commuter Club will only be as effective as the convenience of available alternatives.</td>
<td>Medium (mode share); Medium (VMT reduction)</td>
<td></td>
</tr>
<tr>
<td>Free bus passes</td>
<td>Implemented as either ECO Passes or group Value Passes, free bus passes are provided to commuters for the use on Community transit and/or regional (RTD) transit High. ECO Passes have been extensively promoted. Transit promotion, transit riders guide ECO Passes or group Value Passes provide travelers with a motivation to use transit. They have been successful in encouraging high transit ridership in downtown Boulder and at CU. ECO passes have received a more difficult reception in recent times – those who are inclined to provide them already do. Residential programs are difficult to maintain over time.</td>
<td>Medium (mode share); Medium (VMT reduction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free bicycle accessories</td>
<td>Providing bicycle accessories to commuters, such as headlamps and helmets, can improve the safety of bicyclists and serve to encourage greater use of bicycle commuting. Unknown Bike riders guide, bike promotion, commuter club Providing accessories can alleviate the safety concerns of bicyclists. Promotes use of bicycling as viable alternative. Equity concerns are most apparent, including the specific vendors and outlets, so as not to compete with Boulder’s retail base. Furthermore, free accessories may only serve to reward those who are already bicycling.</td>
<td>Medium (mode share); Marginal (VMT reduction) Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>A Guaranteed Ride Home program provides a free taxi ride home to those who fall ill, have an emergency, or are left stranded by a carpool. High. Guaranteed Ride Home is a standard benefit with RideArrangers and ECO Pass participation. Carpool, vanpool transit, bicycling, walking promotion As cited by most commuters, having a guaranteed way to avoid being “stuck at the office” is a desirable incentive. Guaranteed Ride Home allows for employees to always have a ride home, regardless of the emergency or situation. Interestingly, GRH is rarely abused nationwide. The main limitation is ensuring an appropriate commute trip reduction program is implemented for GRH to be effective. Employers may also hesitate to provide GRH due to costs and liability, however costs are usually low and GRH is included in ECO pass and/or RideArrangers participation.</td>
<td>Medium (mode share); Low (VMT reduction) Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking cash out</td>
<td>Allows employees the opportunity to choose a parking space or receive cash equivalent of the space. Works best when parking spaces are unbundled from leases None. Unbundled parking leases Similar to a transportation allowance, parking cash out is very effective at “leveling the playing field” between parking and alternatives. The opportunity to save money and avoid out-of-pocket parking costs is Potential problem is that employees may claim to commute by alternative modes but actually drive by themselves and park off-site, creating spillover parking problems. Overcoming various</td>
<td>High (mode share); High (VMT reduction) Neutral (if parking is unbundled from leases)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Taxation incentives</strong></td>
<td>Provide and/or promote the availability of tax benefits for the use of alternatives. Currently, federal tax law permits pre-tax allocation of certain alternative transportation expenses. Medium. Boulder has received recognition for leadership in promoting Commuter Choice benefits</td>
<td>Stand alone</td>
<td>Commuter Choice benefits offer up to $100 per month for transit or vanpool expenses and up to $180 per month for parking. Commuter Choice initiatives have shown to be effective with employers nationwide.</td>
<td>The Commuter Choice programs and regulations are sometimes difficult to interpret, and require the ability to declare pre-tax expenditures on payroll. As such, implementation by small and medium sized employers will be limited.</td>
<td>Medium (mode share); Medium (VMT reduction)</td>
<td>Neutral. Employers may actual save money on reduced payroll taxes.</td>
</tr>
<tr>
<td><strong>Vanpool empty seat subsidy</strong></td>
<td>As vanpools lose riders over time, such as when someone changes jobs, it is important to ensure other riders maintain a consistent user fee. The empty seat subsidy covers the cost of the lost rider in the van until a new rider can be found to replace that individual, or at least for a minimum period of time. None.</td>
<td>Vanpool promotion; ridematching services</td>
<td>The empty seat subsidy ensures that the cost for other users will not increase for users who continue in the vanpool. Vanpooling tends to have the lowest cost per passenger-mile of any motorized mode of transportation, since it makes use of a vehicle seat that would otherwise be empty</td>
<td>To be effective, the empty seat subsidy should expire, in order to provide incentive for actually finding a replacement rider. This will require an efficient matching system</td>
<td>Low (mode share); Medium (VMT reduction)</td>
<td>Low cost (typically $100 per month per empty seat).</td>
</tr>
<tr>
<td><strong>Vanpool subsidy</strong></td>
<td>Subsidizing the monthly cost for using a vanpool greatly increases the cost-savings incentive for participating in a vanpool. A typical subsidy is 30% to 50% the per-seat cost. Unknown</td>
<td>Vanpool promotion; ridematching services</td>
<td>Provides financial incentive to first-time users of vanpool to allow a ‘trial’ period. The trial period allows the user to be able to directly compare personal cost savings by not driving versus the eventual cost for use of the van.</td>
<td>Requires efficient matching system to be effective.</td>
<td>Low (mode share); Medium (VMT reduction)</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Bike Loan Program</strong></td>
<td>A bike loan program provides a set of bicycles for general employer/Community use. These bicycles are associated with either an individual or organization, for tracking and maintenance purposes. Low. Boulder implemented a Community bike program in the mid 1990s, however, it was not associated with users directly.</td>
<td>Bicycle promotion, bicycle users guide</td>
<td>Greater flexibility for those who do not use SOV as their preferred commute method and provided an alternative for short distance errands.</td>
<td>Program requires administration to ensure safety and security of bicycles is maintained.</td>
<td>Low (mode share); Low (VMT reduction)</td>
<td>Medium</td>
</tr>
<tr>
<td>Strategy</td>
<td>Effectiveness</td>
<td>Mix Share</td>
<td>Mix Reduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>-----------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parking fees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking fees can be set for cost-recovery, or, variable based upon time of day and length of parking. High. Downtown Boulder and University Hill have had parking fees for over a decade.</td>
<td>Stand alone</td>
<td>High</td>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking fees are effective in providing a disincentive for traveling alone to work. If convenient alternatives are available, a shift of up to 25% to alternative modes is possible as a result of parking pricing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spillover traffic will be a concern, unless an aggressive parking permit program is pursued. Furthermore, the “sting” effect of parking charges wears off over time, reducing long term effectiveness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (mode share); High (VMT reduction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Clustered parking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clustered parking (including parking structures) reduces pedestrian distance between buildings and improves ambient quality for pedestrians. Low. Clustered parking has been utilized in certain situations; however, zoning code has no specifications.</td>
<td>Stand alone</td>
<td>Low</td>
<td>Low, depending upon cost-recovery plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creates safer, more attractive pedestrian friendly environment behind buildings and encourages clustering of buildings. Safer environments have been proven to attract greater numbers of pedestrians and cyclists.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoning and development codes may need to be rewritten to support these parking practices.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (mode share); Low (VMT reduction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High Occupancy Vehicle (HOV) priority</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aside from constructing separate HOV facilities, HOV priority systems offer signal “queue jumping” for buses and vanpools. Priority systems make use of the same signal prioritization technology as utilized by emergency vehicles. Low. Although Boulder has deployed the use of similar technology, queue jumping has not been implemented</td>
<td>Stand alone.</td>
<td>High</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOV lanes, queue jumps, and other related improvements provide a travel-time savings to transit, carpool and vanpool users. Experience has shown that even poorly performing HOV facilities save more VMT and reduce more SOV usage than if the facilities were open to general purpose traffic.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOV lanes sometimes are considered to increase total automobile travel compared to no additional road capacity. Queue jumps are difficult to accommodate on certain facilities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (mode share); Medium (VMT reduction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Incidental Use Parking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental use parking spaces are those that are dedicated for use by an “irregular” driver – such as transit rider or carpooler who must drive to work on occasion. These spaces are used in conjunction with parking maximums to ensure that parking is not overprovided. Low. Informal adoption only.</td>
<td>Parking maximum ratios</td>
<td>Low</td>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental use parking spaces are very effective in managed or priced parking lots. One downtown Denver employer increased transit use by over 10% by providing a free parking space for occasional use to transit riders (as an added incentive similar to Guaranteed Ride Home).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental use parking has limited effectiveness without a strictly enforced parking maximum and/or parking pricing of some kind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium (mode share); Low (VMT reduction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Onsite amenities

Onsite amenities provide retail services to employees, without requiring a trip. Examples include ATMs, convenience retail, childcare, food services, and cleaners – all located within easy walking distance, preferably onsite. Low. Some large employment sites offer onsite amenities

| Stand alone | Increases convenience for employees so that trips during the workday are reduced since all services are within walking distance. | If the employee population does not support an onsite amenity, it can create a “blight” on the development or worksite. | Marginal (mode share); Low (VMT reduction) | Neutral |

### Parking management

Parking management strategies utilize a variety of factors to balance the availability of parking with the availability of modal alternatives. Residential and commercial parking permits, parking pricing, shared use parking, time restrictions, and other strategies are included in general parking management. Low. Parking management strategies are concentrated in the high density areas of Boulder, including downtown and the Hill

| Parking maximum ratios, preferential parking, clustered parking | Limits the availability of free and subsidized parking. As with transportation allowances, parking management levels the playing field, thereby allowing greater use of alternatives, as they are perceived to be more convenient. | Parking that is difficult to find, inadequate, inconvenient or expensive will frustrate users and can contribute to spillover parking problems in other areas. | Medium (mode share); Medium (VMT reduction) | Neutral |

### Parking maximum ratios

The establishment of parking maximum ratios ensures that a development site does not oversupply parking, thereby creating an imbalance between modal options. Parking maximums are typically implemented in areas where modal options are apparent to users. Low. Parking maximum ratios have been established previously in the PUD process

| Stand alone | Easy to implement in most communities by adjusting zoning codes and development policies. If developments occur on multi-modal corridors, it is easier to justify parking maximum ratios. Cities across the United States have used maximums to varying levels of success in reducing SOV traffic. | Often times, parking maximums do not have immediate results. Even established sites with excellent transit service can be overrun with vehicles demanding parking (such as the Peaberry’s / Einstein Bagels at Baseline and Broadway). | Low (mode share); Low (VMT reduction) | Neutral. May provide cost savings to developer. |

### Preferential parking

Preferential parking programs provide parking spaces for carpoolers and vanpoolers near the front entrances. These reserved spaces typically require a hang-tag or other identification mechanism for use. Unknown

<p>| Carpool and vanpool promotion | Provides incentives for those in carpools and vanpools to have the most desired parking spaces. Preferential parking has been successfully implemented at employers nationwide, including MCI Worldcom, Hewlett Packard, and Agilent Technologies in Colorado. | Parking that is difficult to find, inadequate, inconvenient or expensive will frustrate users and can contribute to spillover parking problems in other areas. | Low (mode share); Low (VMT reduction) | Low cost (parking signs and hang tags run less than $100 per space) |</p>
<table>
<thead>
<tr>
<th>TDM Friendly Site Design</th>
<th>General promotion of land use and site design elements that facilitate the use of modal alternatives. Elements can include preferential parking for carpoolers, drop off locations close to the main entrance, bicycle parking improvements, and various other strategies. Low. TDM friendly improvements have been incorporated at some sites on a limited basis.</th>
<th>Stand alone</th>
<th>Grant programs can provide incentives for TDM site friendly design. Supports TDM objectives.</th>
<th>Zoning codes and development practices need to be revised to allow and encourage TDM friendly site design.</th>
<th>Low (mode share); Low (VMT reduction)</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unbundled parking leases</td>
<td>Separating parking from building leases provides an opportunity for employers to offer a transportation allowance or other cost-neutral promotion of alternatives, without incurring any additional cost for “wasted” parking. Medium. Downtown and University Hill districts have unbundled parking.</td>
<td>Stand alone</td>
<td>Unbundling parking prices from building leases allows for the opportunity to pursue transportation allowances or parking cash-out.</td>
<td>Spillover parking need to be addressed on surrounding streets. Without parking cash out or transportation allowances, unbundling leases will not accomplish SOV or VMT reduction goals.</td>
<td>Low (mode share); Low (VMT reduction)</td>
<td>Neutral, depending upon cost-recovery plan</td>
</tr>
</tbody>
</table>