

**KANSAS STATE UNIVERSITY
MASTER PLAN**

Transportation and Parking

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INTRODUCTION

Kansas State University has the character and feel of a small campus, but with a sizeable university population. As the university grows to become a Top 50 research institution, this character must not only be preserved, but enhanced. An intelligent, thoughtful, and well-planned transportation system will remain at the heart of KSU. A diversity of transportation options will become increasingly important to support growth.

OBSERVATIONS

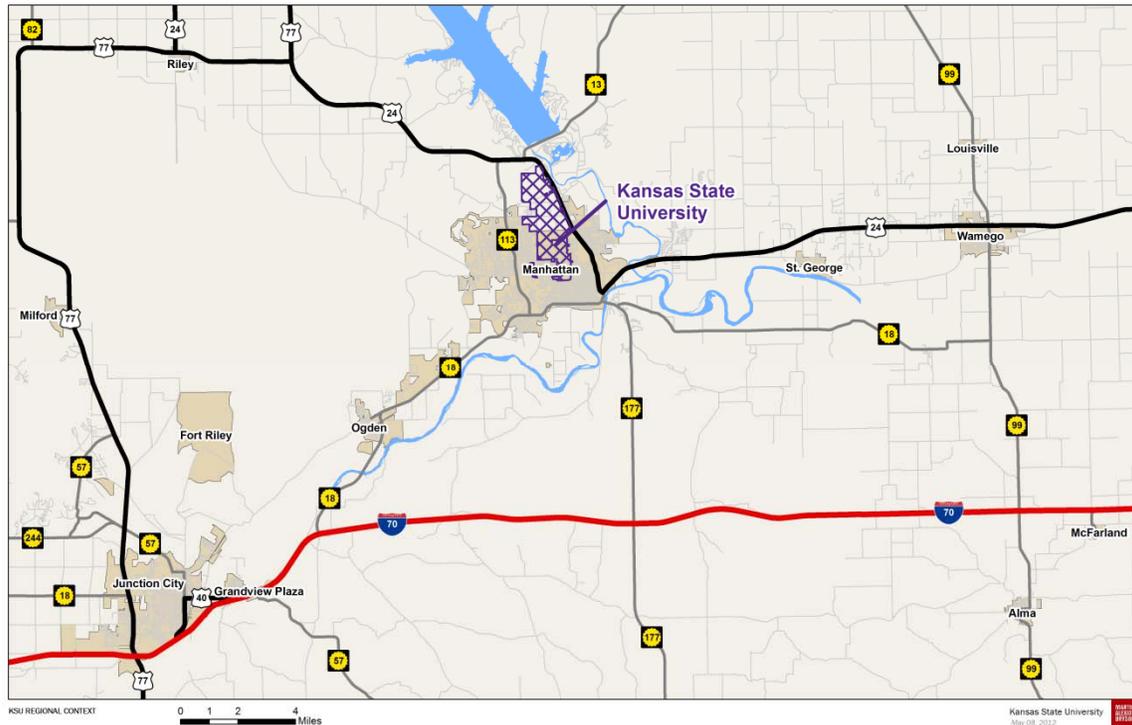
One of the first steps in the master planning process includes an assessment of the existing transportation system, highlighting key strengths and deficiencies. The key observations include:

- There are several areas on and around the campus where conflicts with vehicles are a safety hazard for pedestrians and cyclists. Some areas of concern are Claflin Road, particularly near Umberger Hall; Mid-Campus Drive, particularly near Hale Library; Denison Avenue near the parking lot west of Old Stadium, the residential area south of Claflin Road, and the intersection with Todd Road; Anderson Avenue near Aggieville; and North Manhattan Avenue at most intersections with neighborhood streets to the east and campus roads to the west. In addition to safety improvements, restricting general traffic on some campus streets in conjunction with strategic campus street closures or modifications would enhance the walkability of the campus.
- Bicycling has grown in popularity recently, and many feel that additional bicycling infrastructure would improve safety and further encourage bicycling. Many students and employees live near the campus and could cycle or walk if conditions were improved. Through a University and City partnership, bicycle improvements are being implemented already and more are planned. On the campus, the network of bike routes doesn't clearly differentiate bike and pedestrian zones, leading to potential confusion and conflicts.
- The current transit services on the campus are funded through multiple sources with differing objectives, leading to some route duplication and inefficiencies. In April 2012, a city-wide service began that enables more of the university population to use transit for accessing the campus.
- Overall, the parking supply appears to be adequate; however, access to convenient parking is strained. At the same time, there is a large amount of unused parking in lots adjacent to Snyder Family Stadium. Enhancements to the bicycle and pedestrian infrastructure and transit service, along with an effective Travel Demand Management program can not only reduce the demand for parking, but improve access to the campus.
- Traffic conditions and access to the campus by car is typically not a problem, and municipal improvements are planned that will enhance vehicular access. However, as noted above, traffic on the perimeter streets poses a safety hazard for pedestrians and cyclists.

ROADS AND VEHICLE CIRCULATION

Kansas State University is located northwest of downtown Manhattan, Kansas and extends from central Manhattan to Riley County to the north beyond the city limits (refer to Figure 1). Campus is accessed primarily by using Kansas State Highway 18 (K-18) and U.S. Highway 24 (US 24).

Figure 1 - Regional Campus Context



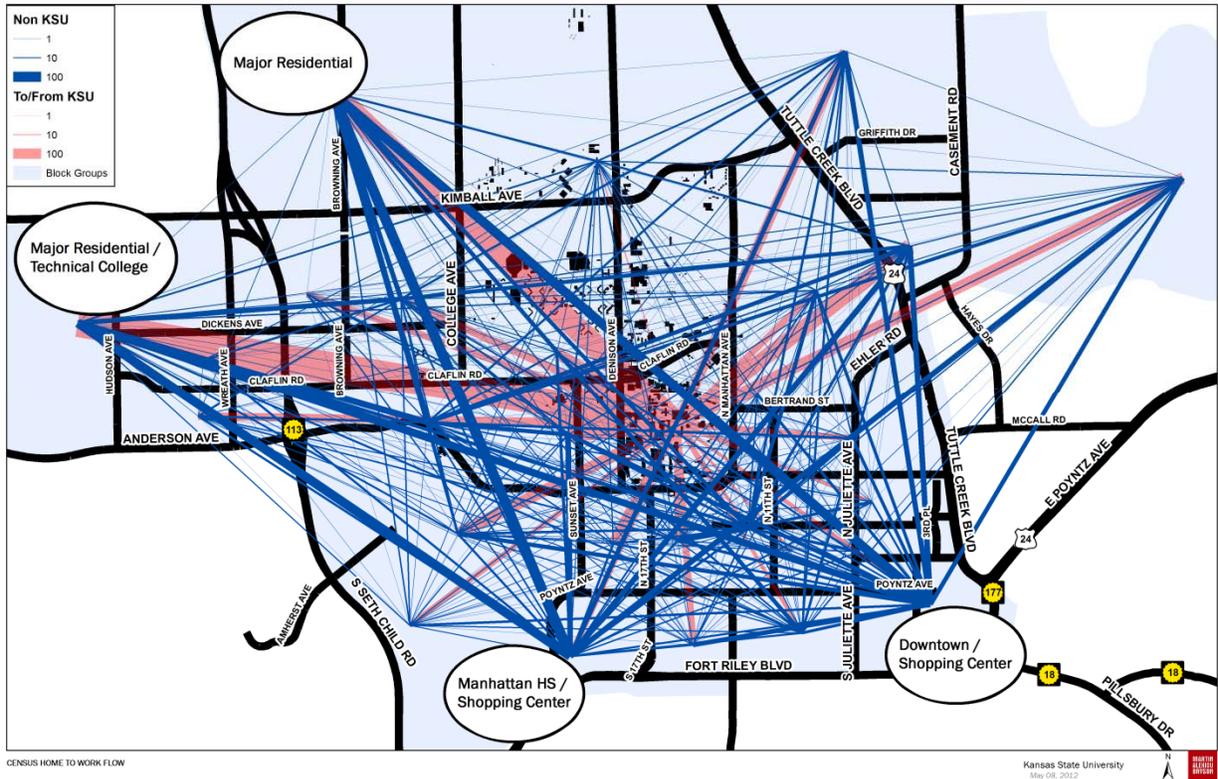
Campus Roads and Traffic

The main part of campus is surrounded by a gridded street system and framed primarily by arterial roads on the north and south, and collector streets on the west and east. Two collector streets, Denison Avenue and Claflin Road, bisect the campus with traffic of roughly 10,000 vehicles per day on each. Mid-Campus Drive cuts through campus from Jardine Drive on the north to Anderson Avenue on the south and is used almost exclusively by the campus community, including student drop-offs, commuters, and campus/service vehicles. 17th Street from Claflin Road to Anderson Avenue is also a major campus road, though its discontinuity limits through traffic. Many commuters use College Heights Road to connect to 17th Street to access the parking garage.

Based on 2009 Census Longitudinal Employer-Household Dynamics (LEHD) data, much of the traffic on Denison Avenue and Claflin Road can also be associated with campus-oriented trips rather than through-trips, as shown on Figure 2. These roads generally function well, with some congestion during peak hours and class changes. In particular, the four-way stop controlled intersection of Claflin Road and Mid-Campus Drive experiences significant congestion as vehicles on the more heavily trafficked Claflin Road must wait for crossing pedestrians as well as vehicles from Mid-Campus Drive. While some efficiency is compromised from a traffic viewpoint, the four-way stop controlled intersection is a safer option for pedestrians than some

alternatives, such as signalization. Jardine Drive to the north stops short of connecting to North Manhattan Avenue. While this limits through traffic, many vehicles use the parking lots as a through route to North Manhattan Avenue, which can be an issue for the safety of pedestrians and motorists. 17th Street experiences congestion during peak hours associated with vehicles entering and leaving the parking garage. Students often queue in the K-State Alumni Center lot across from the garage and the drop-off area just north of the garage waiting for vacancy in the garage. This practice increases congestion and reduces safety for other vehicles and the numerous pedestrians crossing in this area.

Figure 2 - Home to Work Trip Flow by Block Group



Previous Studies

17th Street Corridor Study

A study of 17th Street on the campus was conducted in 2011 to address pedestrian, safety and circulation issues. The resulting report recommended that 17th Street from Claflin Road to the Student Union be closed to general traffic and converted into a busway/bikeway with supporting pedestrian facilities. This would become the major north-south spine of activity along the core of campus. 17th Street south to the Union would remain open for accessing the garage.

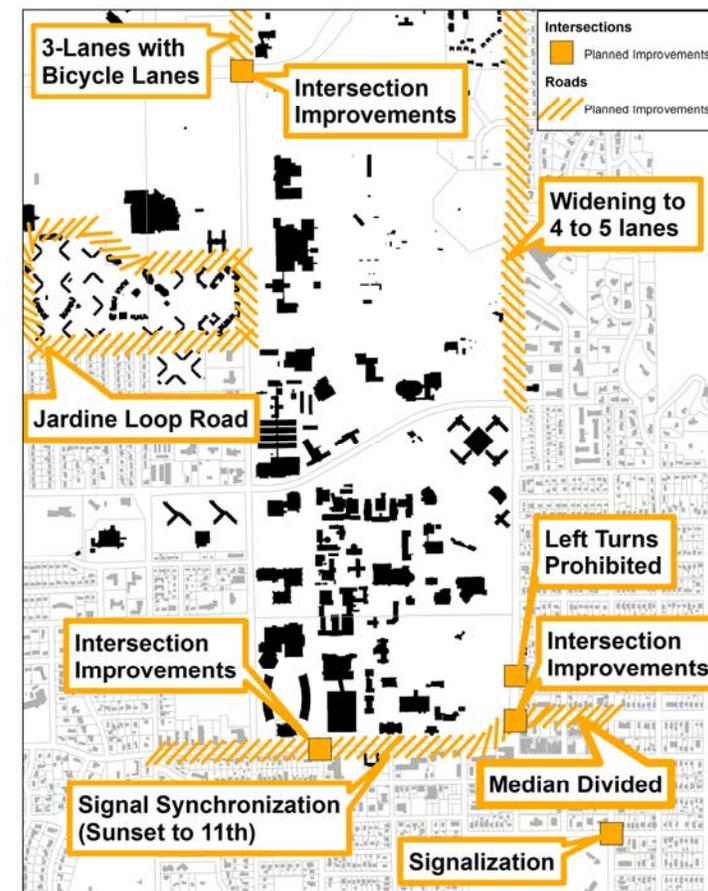
Jardine Apartment Redevelopment Plan

As part of the Jardine Apartment Redevelopment, a perimeter loop road was recently constructed by realigning Kerr Drive further north and extending it west and then south to connect to Jardine Drive, as shown on Figure 3.

Planned Improvements

There are multiple funded or imminent publicly funded projects that involve roadways on or around the KSU campus, as shown on Figure 3. Notably, the widening of North Manhattan Avenue to five lanes (or four median-divided lanes) will provide improved access to the core of campus, in particular the dormitories at Claflin Road and significant amounts of parking to the north of Claflin Road. Signals on Anderson Avenue will be coordinated to allow for dynamic adjustment of their timing and phasing, improving traffic flow and safety. Bluemont Avenue, just east of North Manhattan Avenue will be median-divided to reduce the number of turning and crossing vehicles, reducing the number and severity of crashes in the future and improving traffic flow. The city has discussed prohibiting left turns onto Vattier Street from North Manhattan Avenue and vice versa due to increased delays at the intersection of Anderson Avenue and North Manhattan Avenue to the south. However, university officials have noted that this would severely inhibit ingress and egress to/from campus parking lots on Vattier Street, unless an alternative access is constructed

Figure 3 - Planned Near-Term Improvements



PARKING

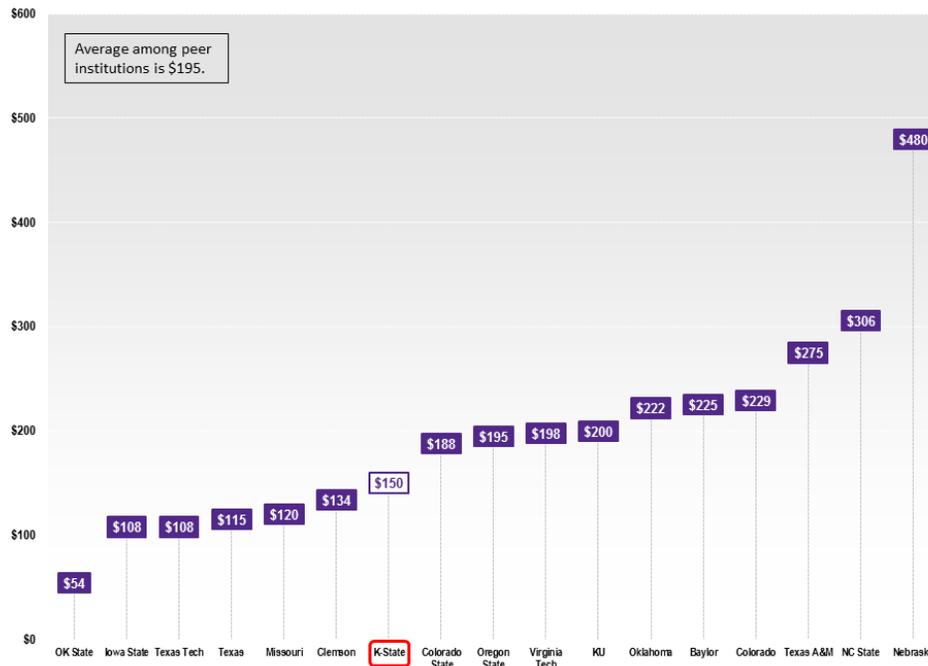
Parking Supply

The university, through KSU Parking Services, maintains approximately 11,900 total parking spaces for commuter, visitor, resident, and service vehicle parking. There are an additional 1,800 spaces administered by the Athletics Department located east of Snyder Family Stadium which must be vacated by 6:00 pm. West of the stadium there are an additional 2,500 spaces, though these are not designated for campus parking use. Within the central core area there are approximately 4,200 spaces comprised of one parking garage with approximately 1,400 spaces and an additional 2,800 surface spaces.

Permits and Fees

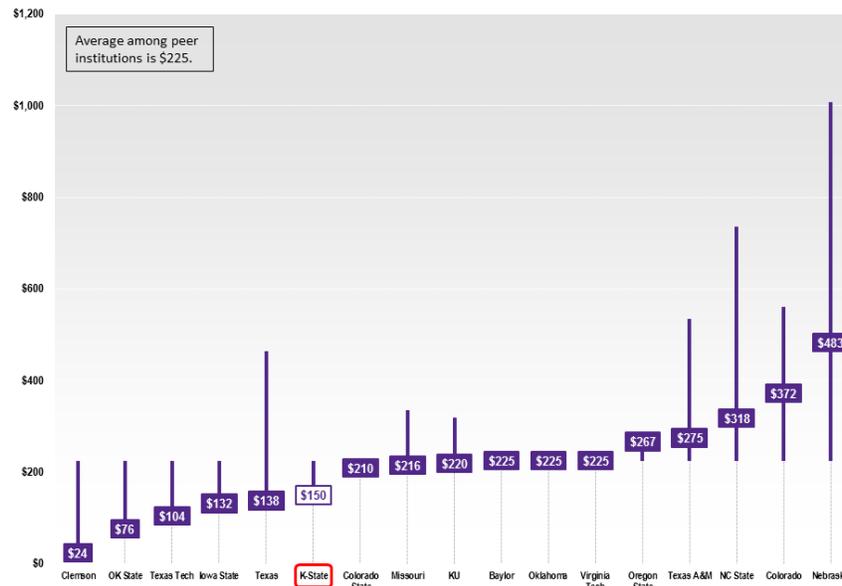
In 2011-2012 the cost of a student parking permit is \$150 for the year regardless of whether the student lives off-campus (“O” permit), on-campus in dormitories (“R” permit), or on-campus in Jardine Apartments (“J” permit). Students may then park in the lots that correspond with their permit. Students can purchase an RFID access card that allows access to the parking garage for an additional \$10. Jardine residents may purchase a “JO” for an additional \$10 that allows parking in areas designated for “J” or “O” permits. As shown on Figure 4, the average cost for a student parking permit among KSU’s peer institutions is \$195, 30% higher than the typical cost for a KSU student permit. Student parking permit fees have been increased to \$170 annually for the 2012-2013 school year. However, for comparative purposes, the permit fee structure for 2011-2012 has been used.

Figure 4 - Commuting Student Permit Fees



Employees may purchase a “W” parking permit for \$150, \$175, or \$190 based on their salary and park in lots that correspond with their permit, or they can purchase preferred/reserved stalls, which range from \$400 to \$1,200. As shown on Figure 5, the average cost for an employee parking permit among KSU’s peer institutions is \$225, 50% higher than the typical cost for a KSU employee permit.

Figure 5 - Employee Permit Fees



The lots designated for student and employee permits are scattered throughout campus and most lots are subdivided to allow for multiple permit types within the same lot. Additionally, “T” lots allow both “O” and “W” permits, further expanding the availability of parking options for some students and employees. While this type of parking system allows for flexibility to park in different areas of campus, it often leads to people having to go from one lot to the next to find an available space and vehicles queuing for parking spaces, both in parking lots and outside of the garage. It also encourages people to drive for short trips among destinations on campus. Visitors may park in the garage for \$1.50 an hour with a \$12 maximum for the day or purchase a parking pass from the information booth for \$4 a day which is valid for O, R, J, T, W, and Z lots.

Parking Policies/Revenue

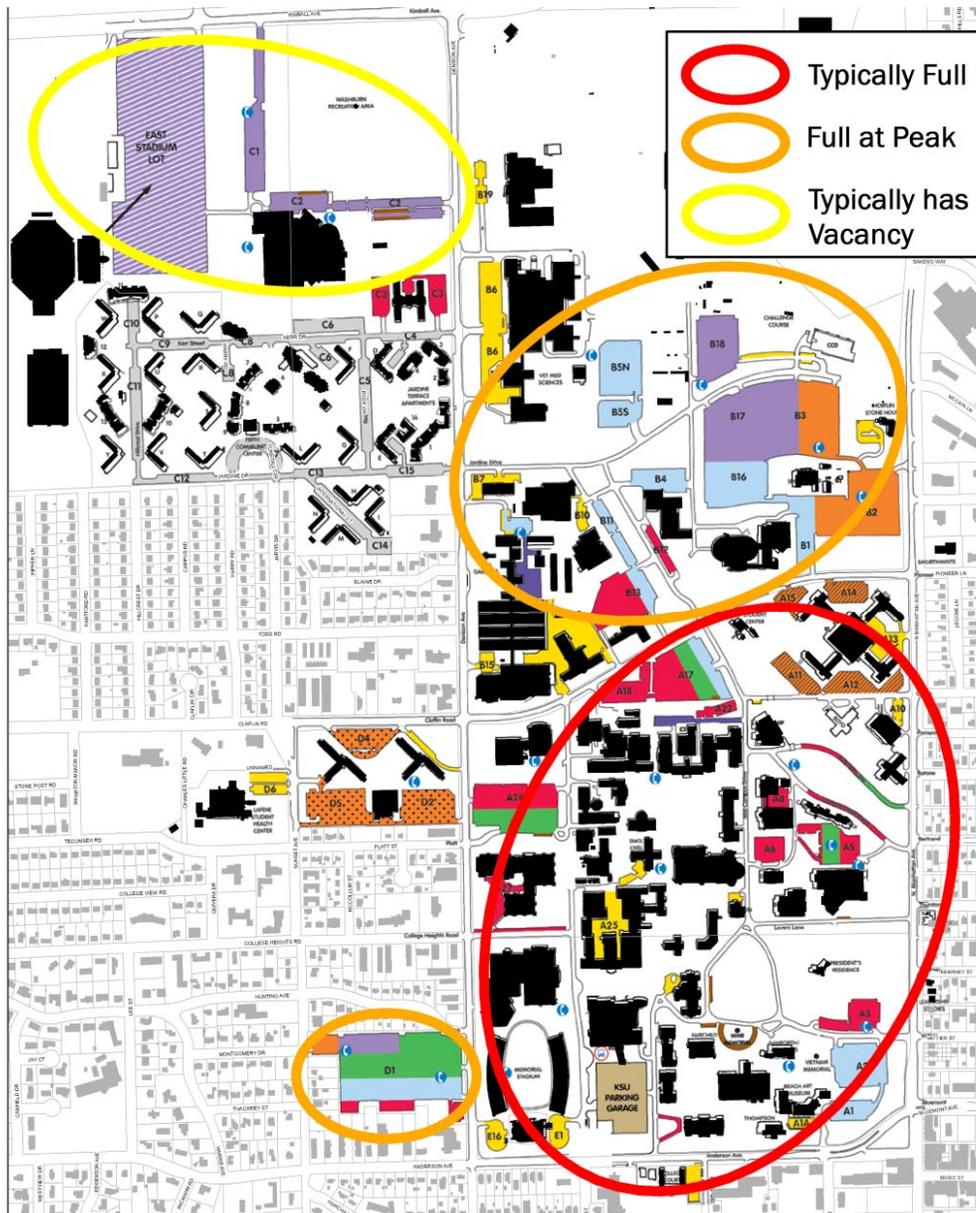
As is common on most campuses, the university sells more permits than there are spaces. For 2011-2012, approximately 14,200 permits were sold for the 11,900 spaces, an oversell ratio of 120%. Some permits, such as Jardine (J) and Residence Hall (R), require nearly a 1:1 ratio, resulting in a higher rate of oversell for commuting students and faculty/staff. However, the general oversell ratio is on par with many other universities and suggests that the parking supply is adequate. If the parking east of Snyder Stadium was included, the oversell ratio would fall to 104%.

Parking Demand and Adequacy

The university has not conducted formal occupancy surveys to determine peak demand for parking. However, based on consultant observation and discussions with multiple parking and university officials, it is

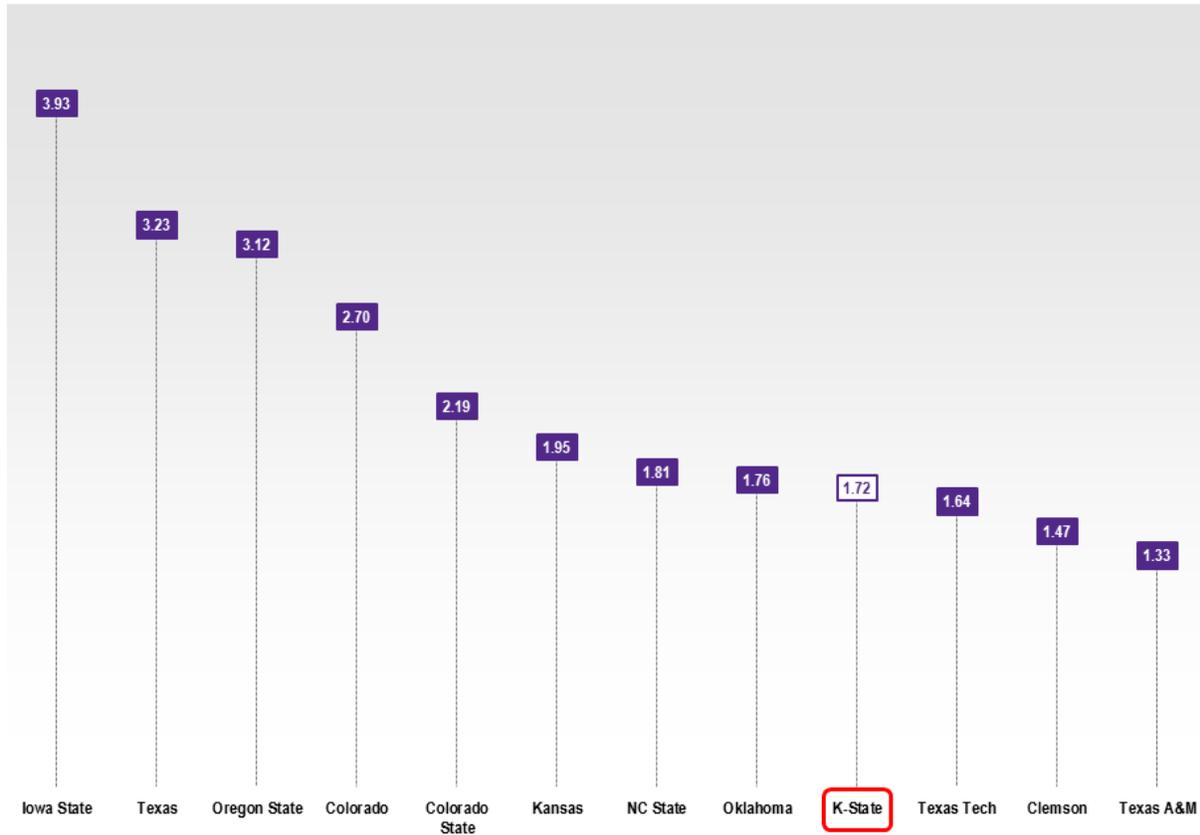
concluded that there would be a surplus of approximately 1,600 spaces if the lot East of Snyder Family Stadium (Athletics Department Parking) were included (i.e., the current demand is for approximately 12,100 spaces). As indicated on Figure 6, parking within the core of campus is typically full every weekday at all daytime hours, and motorists can be observed “cruising” for a space to become empty (particularly evident at commuter lots A17 and A18), while others continue to more remote lots to park. Along the perimeter of the core, most parking spaces are also occupied during peak periods. However, at the same time the East Stadium lot is mainly empty (it is close to a ¼ mile from the shuttle service that runs every 30 minutes between Edwards Hall and the campus core, and therefore is not considered convenient for commuters destined for the core), and the B18 lot north of Jardine Drive lot is often used for construction storage and staging rather than parking.

Figure 6 - General Parking Availability by Area



The university currently has a ratio of 1.72 students per parking space for the 13,700 spaces. Figure 7 indicates that only three peer institutions have a lower parking ratio. Thus, while the availability of parking puts KSU well-positioned among its peers today, high demand combined with an increasing demand will present a challenge as the university grows.

Figure 7 - Students per Parking Space



TRANSIT

Current Service

Currently, there is one transit operator that provides services to KSU, Manhattan, and the Flint Hills region; Flint Hills Area Transportation Agency (ATA). There is the ATA Campus Shuttle and the ATA Housing Shuttle. Additionally, there is a shopping shuttle funded and operated by International Student and Scholar Services (ISSS). ATA and KSU use cutaway style buses that are much smaller than traditional buses and seat fewer than 20 people. Service frequency ranges from 30 minutes to one hour.

The Campus Shuttle (run by ATA) is a linear route which runs between the KSU Foundation, the Student Union, and Edwards Hall. With 30-minute shuttle frequency and the stop at Edwards Hall being over a quarter of a mile walk from the east stadium lot, the shuttle doesn't provide convenient service for those who wish to park in the east stadium lot.

The City of Manhattan commissioned an update to the 2001 Transit Implementation Plan. This update, completed in July, 2010, provided the framework for the ATA daytime fixed routes that were introduced in April, 2012. The fixed-routes as shown on Figure 8 serve Manhattan when KSU is not in session and run with 60 minute headways. In August, 2012 ATA will begin "School In" service with higher frequency and a broader service area as shown on Figure 9. In addition to serving the larger community, parts of these routes will ultimately take the place of the current KSU parking shuttle service, which will be phased out. These routes are funded by Federal and State 5311 funds (up to 70%), with the remaining local match contributed by KSU Parking Services, fare revenue, Riley County, and additional grants, sponsors, and partner agencies.



Figure 8 - ATA Weekday Routes During the Summer and Breaks

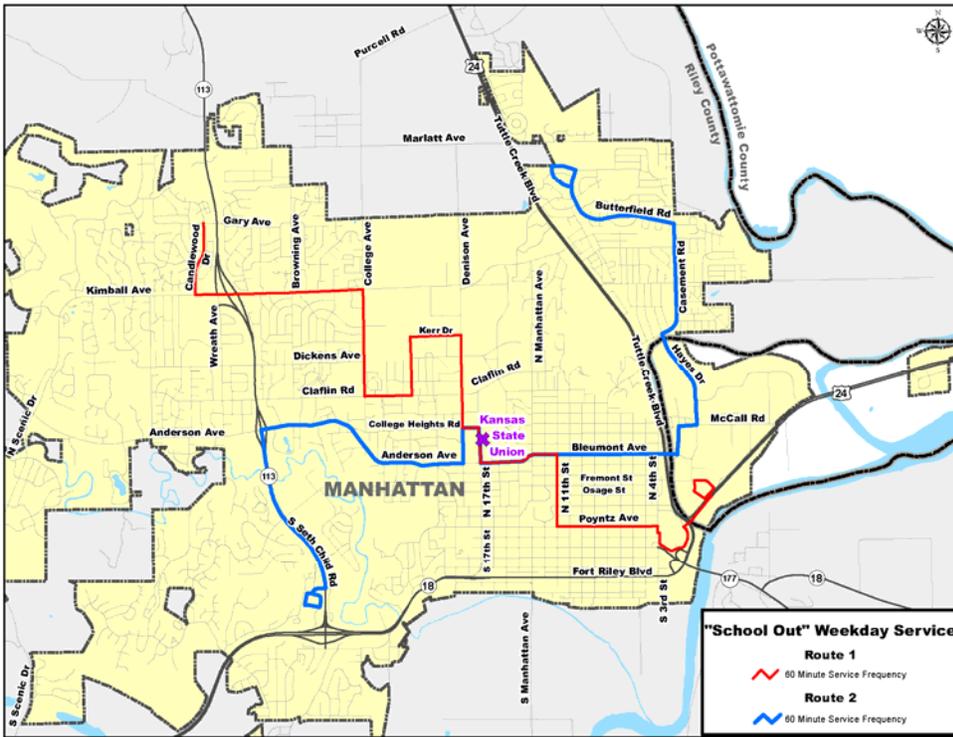
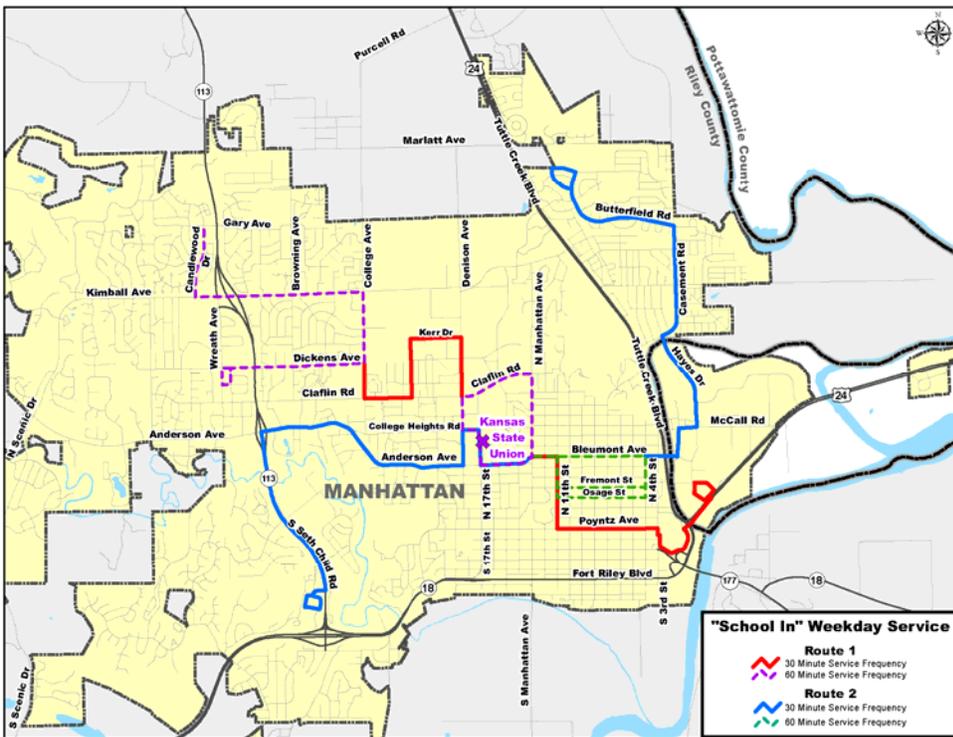


Figure 9 - ATA Weekday Routes During the School Year



ATA also operates two SafeRide routes (East Route and West Route) on Thursday through Saturday evenings, from 11 p.m. until 3 a.m. For the 2012-2013 school year, ATA will begin operating a third route, which extends further from campus than the existing East and West routes. The SafeRide service is funded by the office of Student Activities and Services.

In January 2012 KSU Housing and Dining Services began funding a Jardine Shuttle that is operated by ATA and connects the dining facilities of the three major on-campus residential areas to one another and the Center for Child Development.

ATA also operates a University Crossing (UC) Apartment shuttle that serves UC Apartment residents with peak service to and from Manhattan Area Technical College (MATC) and KSU. This is a deviated fixed route that's open to UC Apartment residents for free and the general public for \$2.00, with 24 hour advance scheduling required for pickups not at UC Apartments, MATC, and KSU.

Current Ridership Characteristics

Available ridership on routes serving the campus community is as follows:

- SafeRide - 11,000 annual trips
- Parking Shuttle – 12,000 trips annually
- Jardine Housing & Dining Shuttle – 2,000 rides in first month of operation
- University Crossing Apartment Shuttle – 22,000 trips annually

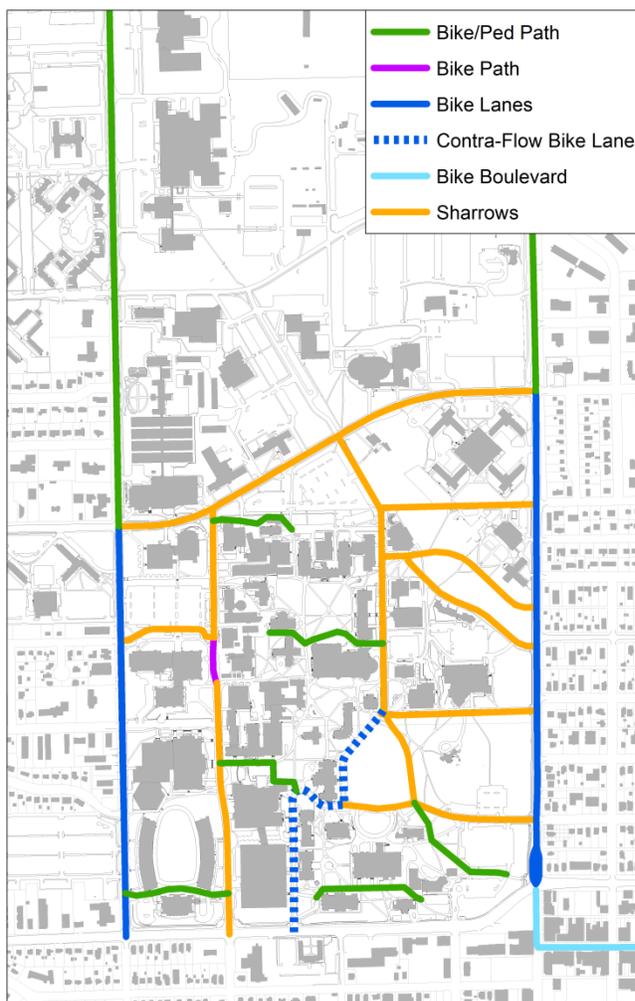
The fixed-route daytime service has not operated while school is in session for a sufficient amount of time to gauge ridership. For the other routes, the ridership numbers seem somewhat low at first glance. However, once considering the service frequency, span of service, and the size of buses used, the average occupancy for most routes is relatively high. For instance, the University Crossing Shuttle averages 11 riders per run which is 2/3 of seating capacity.

BICYCLES

Infrastructure

KSU and the City of Manhattan have taken some steps to accommodate the needs of cyclists by installing bike paths, bike lanes, bike boulevards, sharrows, and multi-use paths as shown on Figure 10. Manhattan recently opened the first bike boulevard in Kansas on Moro Street, which gives right-of-way priority to cyclists, adds pavement markings, wayfinding and street signage, and reduces the speed limit to 20 miles per hour.

Figure 10 - Current Bike Infrastructure



On campus there are a limited number of dedicated bicycle facilities, most notably a short bike path (with separated north and south lanes) on the closed portion of 17th Street between Rathbone and the Power Plant, as shown in the photo. However, some cyclists continue to use the sidewalk on the west side, while some pedestrians are using the bike path.

Bicycling Ridership

Biking and walking as a means of transportation is rather limited across the United States. According to the 2010 Census American Community Survey 5-Year Estimates, in the United States only 2.8% of journey-to-work trips were made on foot, while 0.5% of journey-to-work trips were made by bike. However, college campuses tend to have much higher usage levels, often due to the high costs of owning a car as well as the cost of campus parking permits and campus policies prohibiting certain segments of the student body from parking on campus. The same Census data shows that within the City of Manhattan, 14.8% of journey-to-work trips were by bicycle or on foot, up from 12.6% in 2000. This number would likely be higher when considering KSU exclusively.

A “Bike Culture Survey” was administered to KSU students and employees in December of 2011 by the Office of Sustainability to gauge the current use of different transportation modes and potential to increase bicycle use. Over 400 survey responses were received; distribution was limited to groups on campus willing to assist and as such results may be somewhat biased. Nearly half of respondents indicated they bike at least once a week on average. Over half of respondents indicated that walking is their primary mode of transportation. These numbers are not surprising given that over 60% of off-campus students (and 17% of employees) live within one mile of Hale Library.



Expanded advocacy and infrastructure improvements brought about by the City of Manhattan, Bicycle Advisory Committee, bicycle clubs, and advocacy/informational websites, as well as increased gas prices have led to an increase in bicycling at KSU over the past five years. In May of 2012, Manhattan was named by the League of American Bicyclists as a Bronze Level Bicycle Friendly Community, only the third city in Kansas to achieve such an honor and a further testament to the importance of bicycling to the community.

Safety Concerns

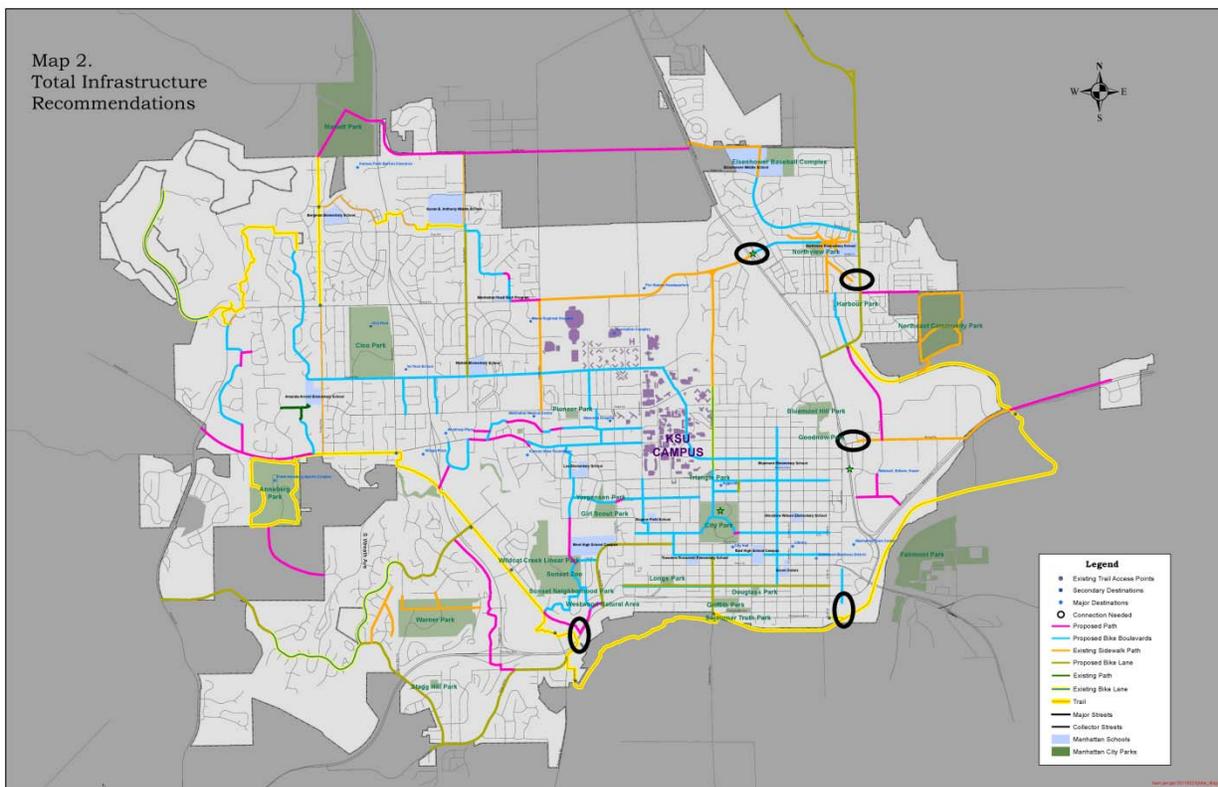
While KSU and the City of Manhattan have taken steps to improve bicycle infrastructure and safety, many respondents to the Campus Master Plan Update website survey expressed safety concerns and desires for improvements to the bicycling experience on campus and adjacent to campus. For bicycling, many stated that the number and speed of vehicles along with a limited network of bike paths and lanes made bicycling on and off campus feel unsafe. Respondents were concerned about bicycle collisions with pedestrians and expressed a desire for more bike routes and paths on campus. While there are currently designated bike routes on

campus, a single route is often a combination of roads, alleys, driveways, parking lots, and circuitous shared paths with little indication “on the ground” of where a bicyclist should and should not go. Providing a more clearly demarcated network of bike-only paths and bike lanes on campus would help reduce the occurrence of bicycling in congested dismount zones in the core of campus, with limited necessary enforcement or signage.

Planned Changes and Improvements

The City of Manhattan adopted the Strategic Five-Year Plan for Bicycling in 2011 that details bicycle related infrastructure improvements and costs planned for the next five years and for build-out. A series of bike boulevards are the crux of the plan, with some bike lanes also to be striped. The build-out plan is shown on Figure 11. The plan recommends funding projects from the City’s Special Street and Highway Fund.

Figure 11 - Bicycle Master Plan Update Total Infrastructure Recommendations



The feasibility of a bike sharing program at KSU was studied within the past year. The study report recommended a “yellow bike” bike sharing program, whereby distinctly painted bikes are located around campus for use. The study sites the benefits of this type of program for KSU, including the low cost, ease of use, and potential to catalyze sustainable transportation at KSU.

PEDESTRIANS

The predominant issue facing KSU pedestrians is one of safety; namely, safe interaction with motor vehicles. Based on the Campus Master Plan Update website survey, discussions with the KSU community, observation, and crash data from the past five years for certain areas, some primary areas of concern for

pedestrian safety are Claflin Road, particularly near Umberger Hall; Mid-Campus Drive, particularly near Hale Library; Denison Avenue near the parking lot west of Old Stadium, the residential area south of Claflin Road, and the intersection with Todd Road; Anderson Avenue near Aggieville; and North Manhattan Avenue at most intersections with neighborhood streets to the east and campus roads to the west.



Claflin Road

While KSU and the City of Manhattan have taken steps to improve pedestrian infrastructure and safety, many respondents to the Campus Master Plan Update website survey expressed safety concerns and desires for improvements to the walking experience on campus and adjacent to campus. Many stated that crossing roads on campus feels unsafe, even at crosswalks, due to the number of vehicles and driver impatience. Several respondents were also concerned about pedestrian safety in and around parking lots. Immediately adjacent to campus, many sidewalks are sporadic, disconnected, narrow, on only one side of the road or change sides, and/or abut the road with no buffer. KSU is fortunate to have a strong partnership with the City of Manhattan, which should be leveraged to facilitate planning and funding for a hierarchal pedestrian network for student and employee residents within walking distance that may currently choose to drive due to safety concerns.

TRAVEL DEMAND MANAGEMENT

Sustainability is a priority for many universities concerned with energy and cost reductions, environmental impacts, and recruitment. A 2012 survey by the Princeton Review found that two thirds of prospective students surveyed were interested in information about a school's commitment to the environment and said it might impact their decision to apply or attend. Sustainability has increasingly become a priority of the university, which created a Director of Sustainability position in 2008 and will soon host the fourth annual Kansas Higher Education Sustainability Conference. Transportation is a pivotal piece of this commitment that should be a focus as the university grows.

Travel demand management (TDM) involves encouragement of transportation alternatives to driving alone in a vehicle. Single occupant vehicles are a burden on roadway congestion, the environment, parking, and other resources. There is currently no formal TDM program on campus. The International Student and Scholar Services has a transportation webpage that states "the most convenient way to get around Manhattan is to have your own car." While this car culture can be difficult to overcome, there is a significant amount of "low hanging fruit" that can reduce the prevalence of driving alone to campus. With 79% of students who live off campus and 39% of employees residing within two miles of Hale Library, the automobile doesn't need to be the primary mode to get to campus.

Bicycle Incentives

There are currently quite a few students, faculty, and staff who walk or bicycle to campus. The Office of International Programs rents bicycles for \$10 a semester, but the program mainly caters to international students and use of the program is minimal. A campus bike-sharing program, such as "yellow bikes," would improve convenience once on campus, but wouldn't affect travel to campus. There are ample opportunities to increase the prevalence of walking and bicycling through improved infrastructure and encouragement.

Transit Incentives

Bus transit is one of the most effective means of reducing drive-alone trips. The introduction of daytime fixed-route transit service in Manhattan provides a timely opportunity for Kansas State University and ATA to work together for mutual benefit. The more the university community can be encouraged to ride buses, the less pressure there is to provide additional parking, which is costly to build and maintain, as the university grows. Simultaneously, with increased ridership, ATA has more justification for additional state and federal funding and further expansion of routes. The current fare is \$1.00 for adults, and free for KSU students, faculty, and staff when travelling between KSU Foundation, KSU Union, and Edwards Hall.

Ridesharing

Vanpools and carpools can be a convenient and cost-saving means of transportation. The KSU community has access to state-owned vans, which can be used at a vanpool mileage rate that covers all operation costs, including gas, oil, repairs, maintenance, and insurance.

Car Sharing

Car sharing programs, such as Zipcar and WeCar have found most success on and around college campuses where car access may be limited and quick local trips are often desired. KSU has one WeCar on campus available to WeCar members, which is parked in the Davenport lot.

RECOMMENDATIONS

Key recommendations include:

- The closure of portions of three roads would triple the size of the core campus car-free pedestrian/bicycle zone.
- Coordination between various campus departments and ATA will be necessary to improve the efficiency of routes and funding sources. Pooling resources and analyzing all bus transit on campus and in Manhattan holistically will improve the convenience and effectiveness of transit service, which will reduce the demand for parking.
- A clearly delineated “grid” of designated campus bike paths coordinated with planned city bike routes would strengthen the bicycle network for KSU and the City of Manhattan.
- Parking at Snyder Stadium is a strong resource that should be utilized as much as possible as a cost-effective means of accommodating much of the anticipated growth in parking demand. If the East Stadium lot is fully utilized, and in conjunction with TDM measures (see previous), the need for additional parking by 2025 will be approximately 850 spaces. This can be accommodated in an additional garage on the east side of the campus between Claflin Road and Jardine Drive.
- Improved ridesharing coordination could capitalize on state-supplied vans, given numerous sizeable residential clusters in nearby towns and communities.
- A package of TDM incentives and policies promoted via a TDM coordinator could reduce demand by 500 or more spaces by 2025.

STREETS AND VEHICLE CIRCULATION

Safety concerns are a significant issue associated with several roads that cut through campus, namely Denison Avenue, Mid-Campus Drive, 17th Street, and Claflin Road. Closing, realigning, or restricting access on the latter three campus roads, as shown in Figures 12 and 13, would significantly expand the core pedestrian zone and improve safety with minor effects on vehicle circulation (emergency and service vehicles would not be restricted, and some or all streets could be open to general traffic at certain times). Major through streets on and around campus, such as Denison Avenue, should be retrofitted to accommodate all users, not simply motorized vehicles.

Mid-Campus Drive

Mid-Campus Drive is a fairly low-volume campus street, used for student drop-offs and other campus traffic. Closing Mid-Campus Drive to public traffic would have little impact on vehicle circulation and would improve safety for pedestrians dramatically. Student drop-offs could use perimeter campus “spoke” streets, as shown on Figure 13.

17th Street

Consistent with the 17th Street Corridor Study, public traffic on 17th Street should be prohibited from the KSU Student Union to Claflin Road and the street redesigned to focus on pedestrian and bicycle movement (in addition to emergency/service vehicles and potentially buses). 17th Street and Mid-Campus Drive would be primary north-south spines for pedestrians and bicyclists.

Claflin Road

Closing or realigning Claflin Road is an idea that has been discussed by the campus community for many years. Based on Longitudinal Employer-Household Dynamics (LEHD) Journey to Work data and some simple traffic counts, it appears that much of the traffic on Claflin Road is coming to or leaving KSU. With Claflin Road closed, through traffic would be accommodated by extending Jardine Drive to North Manhattan Avenue.

Manhattan Avenue

The City of Manhattan has proposed restricting left turns onto Vattier Street for northbound traffic on North Manhattan Avenue. As previously discussed, this would severely restrict access to the southeast part of campus, which is frequented by visitors to McCain Auditorium and Beach Museum. One option is to close the Vattier Street connection to North Manhattan Avenue, widen Lovers Lane and realign it with Thurston Street to provide two-way access to the circle around Anderson Lawn, and develop a more prominent campus entrance at 14th Street with a connection to Lovers Lane. The intersection of Lovers Lane and North Manhattan Avenue should be designed to allow for future signalization should it one day be required. This would improve safety for motorized vehicles, pedestrians, and bicyclists entering and exiting campus and would alleviate the City's concerns of congestion at the intersection of Anderson Avenue and North Manhattan Avenue due to left turning vehicles.

Figure 12 – Current Campus Roads

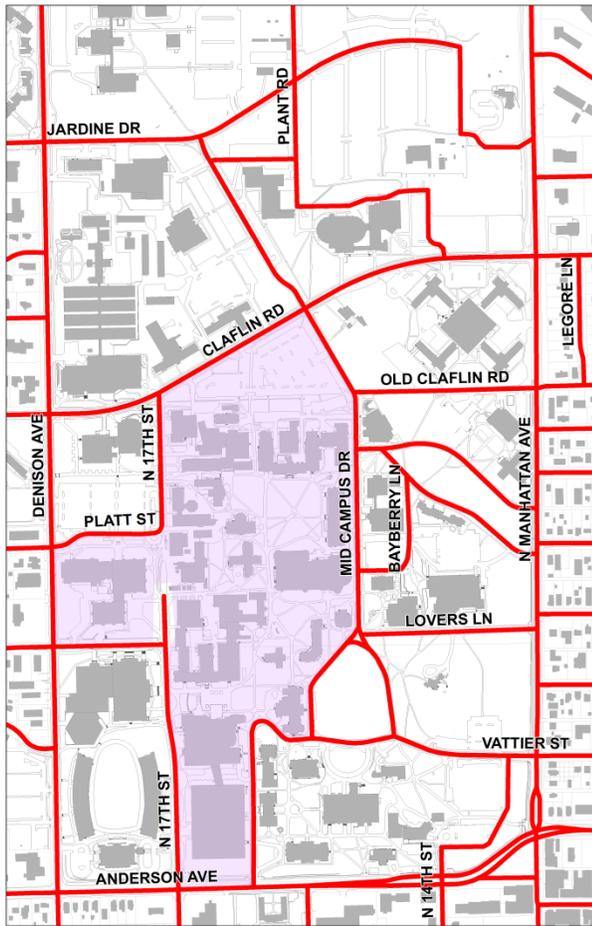
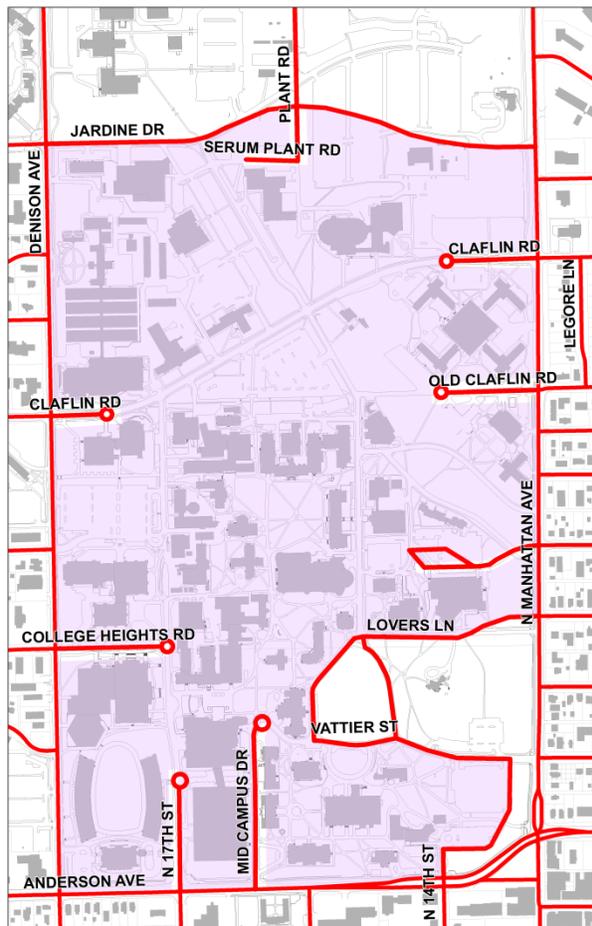


Figure 13 – Future Campus Roads



*Shaded region represents car-free pedestrian zone. Existing campus is shown for current and future roads for comparative purposes. Some campus parking lot and service access roads are not shown on these diagrams.

PARKING

As the campus grows in population, the demand for parking can be expected to rise. Coupled with the likely loss of parking lots for future buildings or open space, and removal of on-street parking to improve the pedestrian environment and aesthetics, future parking shortfalls can be expected. These will need to be addressed via such strategies as modified parking policies, and/or travel demand management (TDM) strategies to reduce parking demand (e.g., increased use of transit, ridesharing, cycling, walking), the use of remote parking and shuttles, and the construction of additional parking facilities.

Availability of funding is a key factor in developing a feasible parking plan. While structured parking facilities minimize the land requirement and therefore could be located in the core, maximizing convenience for users, the cost is very high and represents a long-term financial commitment. The reality is that until the debt obligation for the existing garage is retired (around 2040), no major expenditures on parking improvements are likely. In 2012-2013 parking fees are being raised simply to cover increasing costs of routine maintenance and operations. While the cost of parking at KSU is lower than the average among its peers, substantial

increases to parking fees in order to finance parking garages, or any parking improvements, may not be acceptable given the current economic hardships.

The demand for parking spaces will outstrip the supply as KSU increases enrollment and constructs additional buildings. Given the high costs associated with financing, building, and maintaining structured parking spaces, KSU has a chance to begin changing attitudes and behaviors with regard to driving and parking. This is a low-risk opportunity to dispel the automatic assumption that parking is a “fixed” demand that must be met in direct proportion to campus population.

In any case, a solution that reduces the need for construction of new parking supply also avoids associated capital and maintenance costs, as well as potential environmental impacts, especially those related to water quality and habitat disruption. A non-construction alternative that makes more efficient use of existing parking infrastructure (rather than unnecessarily increasing parking supply) also seems to better support the direction of ongoing campus master planning efforts. In fact, temporary parking losses associated with the construction of new buildings provides an excellent opportunity to introduce some of the parking policy changes and travel demand management (TDM) strategies proposed during the master planning process, and to test their effectiveness on a small scale.

Projected Shortfalls

There are currently 13,700 parking spaces, including the East Stadium Lot. The university anticipates the campus population increasing by about 12% by approximately 2025. Assuming current parking ratios, the corresponding demand would increase by 12% from 12,100 spaces today to 13,550 spaces in 2025. In the same timeframe projected losses associated with the 2025 campus plan are estimated at 1,500 spaces, reducing the supply from 13,700 to 12,200 spaces. Therefore, the 2025 shortfall is estimated at 1,350 spaces. Note that this assumes full use of the Snyder Family Stadium East lot. The potential for growth beyond 2025 significantly adds to the long-term demand and displaces even more parking.

The Snyder Family Stadium East lot is currently available for commuter parking, however there is generally more convenient parking elsewhere on campus and shuttle service is limited. Encouraging use of this lot, which is part of the official campus parking supply and factored into the calculations of future shortfalls, will require improved shuttle service (refer to *Transit* section). Use of the Snyder Family Stadium lots has precedence. Close to 1,000 spaces in the East lot were used while the existing garage was being constructed, served by 10-minute shuttle service. This proved to be popular with commuters.

Strategies

While the current parking supply is adequate to accommodate growth over the next few years, it is imperative that a strategy be formulated for the shortfalls that will occur before 2025 and beyond. There are several options for addressing this shortfall, and the successful solution will be a combination of these measures. At a broad level options include:

- Encourage commuters to use alternative modes for traveling to campus through travel demand management (TDM)
- Implement parking policies that limit the number of or demand for permits issued for parking in and around the core

- Fully utilize the Snyder Family Stadium East lot, with frequent shuttle service to the Core Campus
- Accommodate demand in lots on newly acquired land.
- Construct additional parking garages on or near the core

The TDM options are discussed in the *Travel Demand Management* section, beginning on page 33, which concludes that parking demand could be reduced by 500 spaces by 2025. Achieving this goal would reduce the expected shortfall to 850 spaces. The other options are described in more detail below.

Implement Additional Parking Policies

Many campuses facing parking challenges have implemented policies that restrict or discourage specific groups of users from using prime parking at certain times. This reduces the demand for this parking and thereby the amount that may need to be built. For example, on some campuses, resident students who do not need to use their vehicle on a daily basis may be required to park in a secured lot off-campus (at a reduced rate) that is served by a shuttle. A few campuses do not issue permits to student commuters living within a certain radius of the campus, provided there is a high level of transit service within this area. For example, restricting Jardine apartment residents from purchasing an additional permit to park on the campus would reduce the core demand.

Pricing parking by zone is another strategy to more effectively use the parking supply. Some users will value convenience and be prepared to pay a higher price (potentially increasing parking revenue) to be more assured of finding a space in their preferred lot rather than spending time “hunting” for a space, while others will choose to pay less and take the time to walk or use a shuttle. This strategy, which results in a menu of convenience and permit fees, has the effect of “spreading” the demand so that outlying parking, such as the Stadium lots, is more utilized.

Construct Additional Parking Garage

The shortfall of 850 spaces can be addressed by the construction of garage on the east side of the campus in the area between Claflin Road and Jardine Drive. While garages provide high convenience, the cost will be a major challenge. The capital cost of the existing structure was approximately \$10,000 per space (which is at the lower end of the cost for a garage of that quality).

Alternative Strategies

Other strategies to accommodate future parking needs (possibly longer-term) include:

Utilize Snyder Family Stadium West Lot

The use of the existing Snyder Family Stadium parking lots is a highly cost-effective option. For the West lot to be acceptable and even attractive to commuters it would need to be served with additional shuttles that provide a quick connection to the campus core. While there is a cost associated with operating a more frequent service, the total cost would nevertheless be much lower than building the equivalent number of garage spaces.

A clear advantage of using the 2,500-space Snyder Family Stadium West lot is the flexibility it provides. It entails no major construction costs, and the level of shuttle service can be adjusted based on how many

spaces are needed at any particular time. It allows incremental development of shuttle services in partnership with ATA, and routes and schedules can be adjusted real-time to best match campus needs.

Acquire Land for Surface Parking

There are opportunities for the university to acquire land near the campus that could be used for surface parking without the need for shuttle service (with the exception of in the evening for personal safety reasons). While, in conjunction with an aggressive TDM program, this option could come close to meeting the 2025 parking needs, the cost of the land and building the parking would approach the cost of building structured parking on land the university already owns. This option would make most sense if pursued as part of a land banking strategy.

TRANSIT

Improved transit can serve both internal campus movement as well as provide an alternative to driving to work or class for commuters. Promoting and utilizing the newly instituted ATA fixed routes will be an important component of reducing demand on an increasingly strained parking system as the university grows. Convenient and frequent shuttle service on campus would improve campus circulation as the campus grows in population and the core of campus grows geographically. With 1,800 existing parking spaces at Snyder Family Stadium, improved shuttle service to this lot would enable the university to utilize these spaces for remote parking during the day.

As the City of Manhattan and Kansas State University grow, coordination of transit planning and funding will be vital. Currently, the shuttles serving campus are funded by six different funding sources: four university departments, one private entity, and general ATA funding through state and federal monies. Coordinating planning, funding, and operations would avoid route duplication, improve service frequency and coverage, and simplify route confusion, thereby improving service convenience and increasing ridership.

Campus Parking Shuttle

As the core of campus expands north and more parking is located on the perimeter of the core and the Snyder Family Stadium East lot, frequent bus service to parking lots will become imperative. The parking shuttle could also be utilized as a campus circulator, as shown on Figure 14 and Figure 15, with the route modified as the campus grows. As discussed with the parking options, providing bus service to Snyder Family Stadium is less expensive and more flexible than building structured parking.

It is recommended that the stadium shuttle service run between the hours of approximately 7:00 AM to 10:00 PM, with a higher number of buses running in the peak periods. Given the projected need once the Snyder Family Stadium East lot fills, larger buses will ultimately be required (full size buses compared to the smaller “cutaway” buses now in use). Bus stops should include benches and shelters. An order of magnitude estimation of costs for transit service needed to effectively serve the East Stadium Parking Lot is shown in Appendix A.

Figure 14 - Near-Term Shuttle Route and Coverage



Figure 15 - Long-Term Shuttle Route and Coverage



*The yellow line in each drawing indicates a shuttle route. Yellow shaded areas represent a three to five-minute walk time from potential transit stop locations.

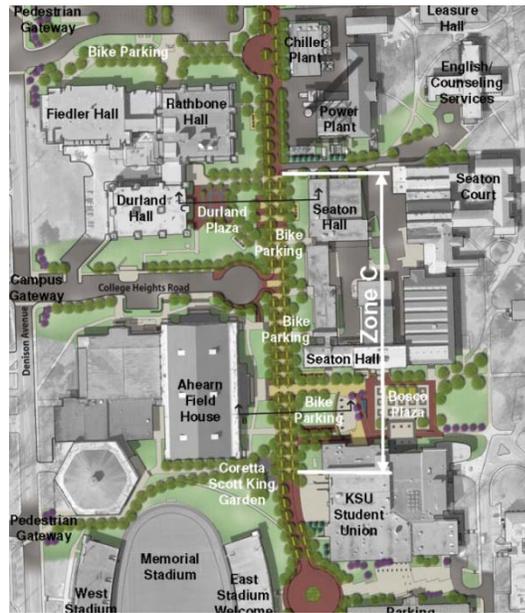
BICYCLES

Research and historical data have shown that an increased prevalence of bicyclists can make motorists more cognizant of their presence, thereby reducing the rate of accidents. Bike sharing programs, bike lockers, covered bike racks, showers, commuter alternative programs that incentivize bicycling, and other amenities help promote bicycling to and around campus, potentially improving safety. Indeed, many of these amenities were listed by respondents of the Campus Master Plan Update website survey as things that would encourage them to bicycle more frequently.

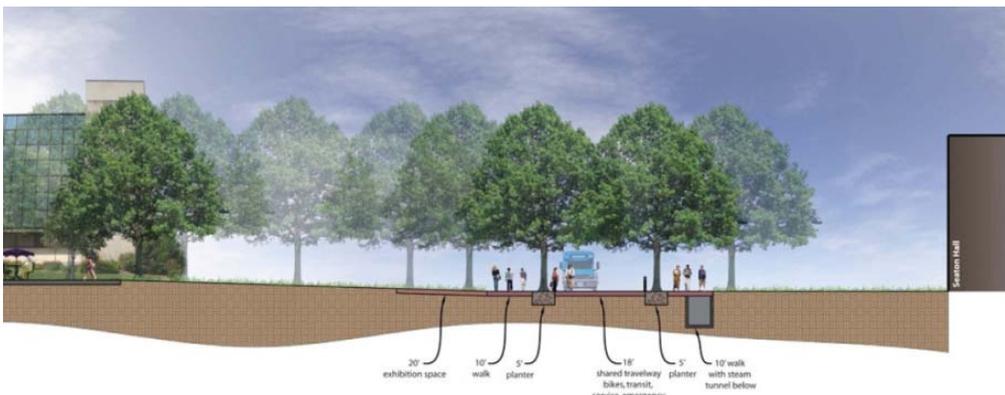
The City of Manhattan recently constructed the first bike boulevard in the state, and has a planned network of bicycle routes, consisting primarily of bike boulevards in the Five Year Bicycle Master Plan Update. There is also a “Bike K-State” map that shows where bikes are permitted to ride on campus; however, on the ground it is difficult to know where bikes are permitted versus where dismount is required. Quite a few respondents on the Campus Master Plan Update website survey expressed their concern of bicycle and pedestrian conflicts on campus, which could be addressed through clearer demarcation of bicycle routes. This can be accomplished through pavement markings or distinct surfaces that differentiate the bike path from sidewalks and pedestrian paths, similar to what’s shown below.



Separate Bike/Ped Facilities at Northern Arizona University



From KSU 17th Street Multi-Modal Corridor Master Plan



KSU 17th Street Multi-Modal Corridor Master Plan Section C Cross-Section – Transit/Bikeway Separated from Pedestrian Path

As the campus grows and evolves, it will be important to coordinate with the City of Manhattan to create bike routes on campus that are cohesive with the city routes. Manhattan has a simple grid pattern of streets surrounding campus while the KSU campus itself is a more loosely organized grid. The recommendations shown on Figure 18 are derived from continuing the surrounding grid pattern onto campus (as shown on Figure 17) to create north-south and east-west bicycle spines that provide continuity with the city’s planned bicycle facilities, despite the less rigid campus grid.

Figure 17 – Conceptual Bike Plan with Grid Continuation

Figure 18 – Existing and Recommended Bicycle Routes



Given the increasing bike culture at KSU and in Manhattan, a bike-sharing program could be successful on campus. The current bike rental program could also be expanded considerably and marketed to a wider campus audience than international students. The addition of a bicycle repair facility, covered bike parking, and more uncovered bike parking combined with a clearly defined bicycle network would encourage many more students, faculty, and staff to travel to and around campus via bicycle.

PEDESTRIANS

The closure of essentially three roads as discussed under *Streets and Vehicle Circulation* triples the size of the car-free pedestrian zone on campus. This not only improves safety for pedestrians, it enables the campus

pedestrian core to expand north to Jardine Drive while maintaining a ten minute walk radius from Hale Library.

Pedestrian improvements on- and off-campus will encourage more walking, particularly for commuting to campus. 22% of students not living on campus live within a 10 minute walk of campus, and 59% of students not living on campus and 14% of employees live within a 20 minute walk.

Denison Avenue

Denison Avenue from Anderson Avenue to Claflin Road is somewhat unpleasant and potentially unsafe for pedestrians and bicyclists. While the right-of-way is fairly constrained and moving the curb and gutter may be prohibitively costly, the following are some things that could be done to make Denison Avenue more “complete” and inviting for all users:

- Refresh pavement markings
- Add bike lanes
- Install crosswalks and vehicle stop bars at all intersecting streets
- Use bushes, shrubs, and other treatments alongside the road to “channelize” pedestrians to marked crosswalks and intersections
- Plant trees in existing planting strips
 - Helps decrease vehicle speed
 - Creates a buffer between pedestrians and vehicles
 - Provides shade
 - Improves appearance and comfort
- Install pedestrian countdown timers at all intersections
- Install pedestrian scale lighting
- Continue 10’ multi-use path south from Claflin Road to Anderson Avenue on the east side of Denison Avenue
- Align and signalize driveways for Kramer Dining Center and A28 lot north of the College of the Engineering
- Bury overhead utility lines and relocate sidewalk to create a 6’ planting strip



Manhattan Avenue

A planted median could be installed on North Manhattan Avenue where feasible and pedestrian refuge islands could be installed to improve safety for crossing pedestrians, similar to the example photo shown below.



TRAVEL DEMAND MANAGEMENT

Given the long-term nature of capital investment in parking facilities and the significant influence they have on the character of the campus, prudence requires consideration of other options that could reduce the demand for parking spaces, now and in the future. Techniques for reducing reliance on the single-occupant vehicle – and, consequently, parking demand – are grouped under the rubric of Travel Demand Management, or TDM.

Parking, automobiles, transit, walking, and bicycling are all interrelated (and land use, urban design, class and work schedules, and pricing policies could also be added to the mix). While it is usually convenient to discuss these elements of the transportation system separately, doing so risks overlooking the effects they have on each other. As an extreme example, a change in parking (say, increased permit fees and a strict park-once policy) could reduce traffic congestion and parking demand, while creating a dramatic increase in bus ridership, which in turn could lead to budget shortfalls in bus operations, and the need to improve sidewalks, streetlights, and bus stops. This interconnectedness makes it difficult to explain a comprehensive transportation plan in a straightforward, linear fashion -- the discussion is always circling back on itself.

TDM provides an overarching framework for addressing all of these complex and interdependent elements, from parking policies to bus routes to roadway improvements to bicycle lockers to flex time to pedestrian safety. However, TDM planning requires a very different view of the campus from that used in the Campus Master Plan. Infrastructure planning takes a broader, long-term, high level view of the campus. TDM, by its very nature, requires a much more detailed, close-up, short-range perspective. For TDM, the devil is very often in the details, which can vary on a weekly basis. Therefore, it is difficult to provide a detailed TDM plan in conjunction with a Campus Master Plan. There are just too many variables, too many unknowns.

To use a transportation analogy, the Campus Master Plan can be thought of as the design for a car, defining its characteristics and emphasizing its most desired features. Most of the transportation elements of the plan, especially those tied to infrastructure, form subsystems of that automotive design. TDM, however, relates to how you drive the car. Extending the analogy, a TDM program falls somewhere between an owner's manual, a driving course, and a map for an important trip. Real TDM occurs in real time, or it is not effective. Therefore, detailed TDM recommendations are not included in this report. Instead, a likely menu of options is described that is consistent with the assumptions and recommendations of the Campus Master Plan. Within the framework established by the Campus Master Plan, an ongoing series of detailed, short-range studies is needed to implement an effective TDM program. These studies should incorporate continuous feedback regarding changing conditions and performance measures.

Establishing a formal TDM program at KSU would “drive the car” and help fulfill sustainability goals of the university by reducing greenhouse gas emissions while potentially reducing traffic congestion, parking demand, and costs. As the university grows, providing parking at current demand ratios will become prohibitively costly, as there will reach a threshold where students, faculty, and staff are more willing to use alternative transportation modes than pay significantly more for parking. Hiring a TDM coordinator will play a pivotal role in successful design and implementation of a TDM program.

Examples of TDM Marketing Materials



Many universities have established packages of incentives for those who choose not to buy a parking permit. These incentives may include parking vouchers for occasional driving, a guaranteed ride home, and preferred parking spaces for carpoolers or vanpoolers. Other measures that encourage use of alternative modes include fare-free or subsidized transit, flexible work schedules/locations, and/or parking restrictions for freshmen or those living close to campus.

A successful TDM program will require a joint commitment by the university and city. A goal of reducing parking demand on campus 500 spaces by the year 2025 will require only a modest TDM program. Many of the “bones” are currently in place to meet this goal, given some additional incentives and promotion.

Car Sharing

The current WeCar car sharing service on campus should be promoted and expanded to include more vehicles as demand increases. The cars should be located in convenient, high-visibility locations on campus.

Bicycle Incentives

Given the relatively flat terrain, mild weather for much of the year, the close proximity of the majority of students to campus, and the growing popularity of bicycling in the region, a little infrastructure will go a long way towards encouraging bicycling as a frequent mode choice. Coupled with parking vouchers to drive on foul weather day, much anxiety associated with not buying a parking pass would be alleviated.

Transit Incentives

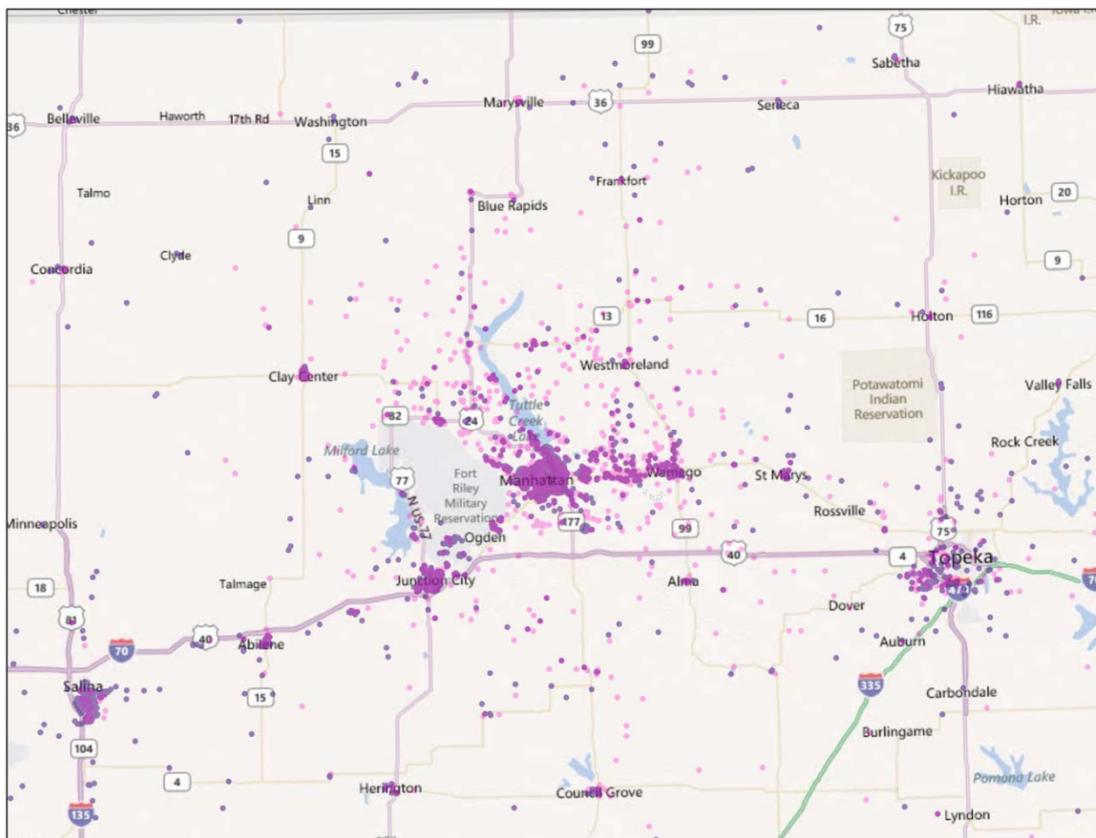
Currently, university students, faculty, and staff may ride the ATA fixed-route service fare-free between Edwards Hall, the Student Union, and the Foundation. The university could work with ATA to provide fare-free or subsidized service for the campus community for the entirety of these two routes. Both ATA and the university would benefit, as ATA must have ridership from the campus community if the fixed-routes are to be successful.

Ridesharing

Carpooling and vanpooling can be a tremendous untapped resource that relies heavily on some form of centralized coordination to be successful. An online service such as Zimride could be utilized to effectively coordinate and promote ridesharing with minimal university effort or expense. Ridesharing is currently coordinated in an ad-hoc manner that doesn't encourage or incentivize ridesharing. Providing preferential parking pricing and/or locations for carpool and vanpool vehicles would further encourage this mode choice.

As shown on Figure 19, there are currently many clusters of commuters to KSU that could benefit from vanpooling or carpooling. For instance, in Wamego, 15 miles from campus, there are over 200 commuters within a one mile radius of one another that could benefit from vanpooling, but may be unaware that it's an option or that so many fellow commuters live so close by.

Figure 19 – Home Address of KSU Students (shown in Purple) and Employees (shown in Pink)



TDM Parking Demand Reduction

A reduction of 500 parking spaces over 12-13 years is roughly a 40-space reduction a year, a fairly modest decrease. The residential locations of the campus community work in favor of this parking demand reduction, as most live within close proximity to campus and/or the newly introduced ATA fixed-route transit service. The following statistics were derived from the geocoded addresses for students, faculty, and staff:

- 3,500 students, faculty, staff live greater than one mile from campus and within ¼ mile of the newly introduced ATA fixed-route transit
- Well over 1,000 live in clusters ideally suited for vanpools or carpools
- Over 15,000 live within one mile of campus, ideally suited for walking
- 5,500 live greater than one mile but less than three miles, ideally suited for bicycling

Within the context of the given statistics, the following theoretical breakdown of annual parking demand reduction (shifting from driving alone to alternative means) seems highly achievable given a formal TDM program and coordinator:

- 20 annually become ATA bus riders
- 15 new annually become carpools or vanpools
- 5 new annually become walking commuters
- 5 new annually become bicycle commuters

The next steps needed to ensure continued growth and success involve promotion and marketing to increase awareness; monitoring results (including surveys and user feedback as well as quantifiable performance measures) to learn what is working; and continuous coordination with both the campus community and with outside transportation agencies, service providers, and the surrounding community. Although developing a comprehensive action plan for parking and travel demand management is outside the scope of a Campus Master Plan (being much more focused on short-term operational issues), this Plan does provide an excellent framework for success.

Hallmarks of a Successful TDM Program

Flexible – offers people a range of choices; responds to opportunities and changes

Comprehensive – provides options that meet a diverse range of needs

Complementary – involves synergistic measures, not conflicting/competing

Dedicated Resources – a firm funding stream and dedicated staff position(s)

Stakeholder Input – before, during, and after developing the program

Marketing & Education – active outreach to the University community

Carrots & Sticks – changing individual behavior and University culture

Targeted – market-based; data driven

Evaluated – monitor, assess, and update

Integrated – with campus plans (long- and short-range), and with the surrounding community (governments, businesses, and non-profits)

Key Performance Indicators for Measuring TDM Effectiveness

| | |
|---------------------------|-------------------------------|
| Mode split | (from travel survey) |
| Carpool participants | (from parking permit records) |
| Parking occupancy | (from sample counts) |
| Shuttle riders | (from sample counts) |
| Vehicle trips generated | (estimated from data) |
| Commuter carbon emissions | (estimated from data) |

SUMMARY

Kansas State University can capitalize on many assets as it grows and evolves to become a Top 50 research institution. Some of the key transportation assets and recommendations are given below.

Key Assets as the University Moves Forward

- A strong partnership with the City of Manhattan
- A strong campus identity, small-campus feel, and walkable campus
- Nearly 80% of the student population located within two miles of Hale Library
- An increasing culture of sustainability
- An increasing bicycling culture in both the City and University
- A newly introduced fixed-route transit system
- Over 4,000 parking spaces at Snyder Stadium that often sit vacant

Key Transportation Recommendations

- The closure of portions of three roads would triple the size of the core campus car-free pedestrian zone.
- Coordination between various campus departments and ATA will be necessary to improve the efficiency of routes and funding sources. Pooling resources and analyzing all bus transit on campus and in Manhattan holistically will improve the convenience and effectiveness of transit service, which will reduce the demand for parking.
- A clearly delineated “grid” of designated campus bike paths coordinated with planned city bike routes would strengthen the bicycle network for KSU and the City of Manhattan.

- Parking at Snyder Stadium is a strong resource that should be utilized as much as possible as a cost-effective means of accommodating much of the anticipated growth in parking demand. If the East Stadium lot is fully utilized, and in conjunction with TDM measures (see below), the need for additional parking by 2025 will be approximately 850 spaces. This can be accommodated in an additional garage on the east side of the campus between Claflin Road and Jardine Drive.
- Improved ridesharing coordination could capitalize on state-supplied vans, given numerous sizeable residential clusters in nearby towns and communities.

APPENDIX A

ORDER-OF-MAGNITUDE TRANSIT AND RELATED COSTS FOR EAST STADIUM SERVICE - 2025 BUILD-OUT (2012 Dollars)

Operating Costs

Assumptions:

- all 1,800 parking spaces in East Stadium lot used
- 35% users arrive/depart in peak hour, or 630 passengers per hour
- 40' bus can accommodate up to 65 passengers in peak (including standees)
- therefore need 10 bus trips in peak hour (bus every 6 minutes)
- 8-10 mph average bus speed, including stops
- 20-22 minute round trip using internal transitway, 28-30 minute using perimeter streets
- therefore need 4 buses in peak hour for internal route, 5 buses using perimeter streets
(4 buses can provide 6 minute service even if round trip on internal route takes 24 minutes)
- for 10-minute service in off-peak periods need 2 buses for internal route, 3 buses using perimeter streets
- all inclusive operating & maintenance costs- assume \$85 per hour, based on the following (all 2010 unless otherwise indicated):
 - City of Lawrence Transit System - \$65/hr
 - Topeka Transit - \$79.50
 - Wichita Transit - \$88.50
 - Blacksburg Transit (VTech) - \$60/hr
 - Charlottesville Area Transit - \$68
 - Chattanooga Transit - \$81
 - Knoxville Transit - \$67
 - Asheville Transit - \$73
 - NCSU - \$80
- 160 operating days per year
- 3 hours of peak service per day (covers 1.5 hours per period), 12 hours non-peak service

Total Operating Cost

| | <i>Internal Streets</i> | <i>Perimeter Streets</i> |
|--------------------------------|-----------------------------|--------------------------|
| Annual peak service cost = | \$163,200 | \$204,000 |
| Annual off-peak service cost = | <u>\$326,400</u> | <u>\$489,600</u> |
| Total | \$489,600 | \$693,600 |

Capital Costs

Buses

| | | |
|-----------------------|-------------|--------------------|
| 40' clean diesel bus | | with 1 spare bus |
| per bus - | \$350,000 | |
| Internal (4 buses) - | \$1,400,000 | \$1,750,000 |
| Perimeter (5 buses) - | \$1,750,000 | \$2,100,000 |

Typical bus lifetime is 10 years

Bus stops

| | |
|---|------------------|
| Cost of typical shelter, bench and concrete pad (varies greatly): | \$10,000 |
| Internal Route (6 stops) | \$60,000 |
| Perimeter Route (11 stops) | \$110,000 |

Cost for Using Lot (possible scenarios)

Option 1 - pay for maintenance only

Annual maintenance costs for surface lot space vary considerably: \$100-\$300

Assume \$200 for Snyder. Does not include cost for operations (enforcement, security, utilities, insurance)

Annual Cost for 1,800 spaces at full cost: **\$360,000**

Option 2 - pay prorated annual cost for 1,800 spaces, 160 school days per yr, 30 events per yr: **\$292,500**

Martin/Alexiou/Bryson, PC
10/03/2012