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University of Kansas
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Sustainability

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Assessment Report

Pedestrian, Bicycle, and Transit

City Of Lawrence, Kansas 19th Street from Iowa to Barker

March 26, 2015



Practical Road Safety Assessment



Summary

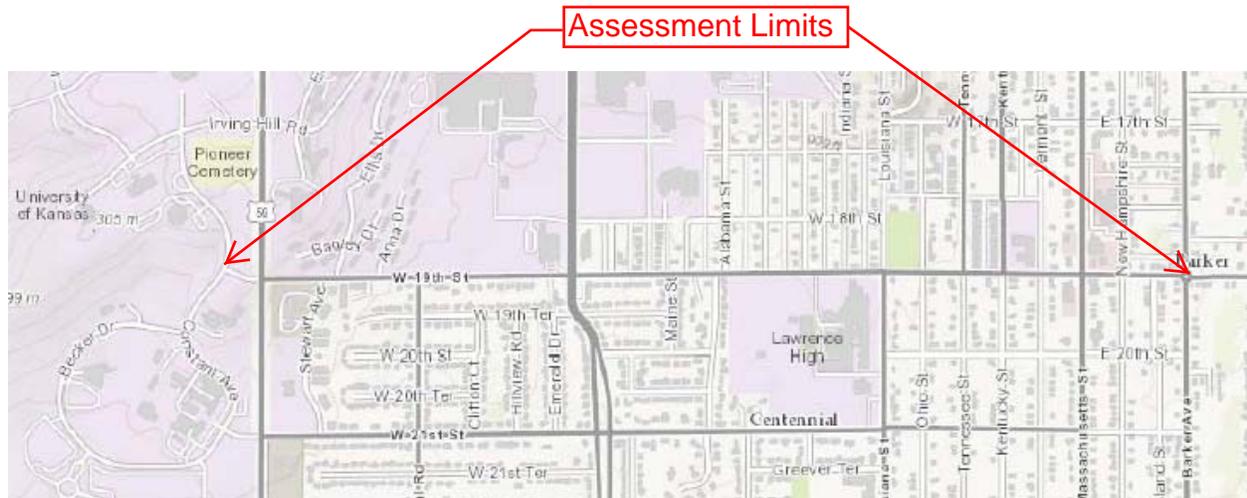
The U.S. Department of Transportation (DOT) launched an initiative to reduce the growing number of pedestrian and bicyclist injuries and fatalities through a comprehensive approach that addresses infrastructure safety, education, vehicle safety, and data collection. As part of this initiative, road safety assessments (RSA) focused on pedestrian and bicycle safety are being conducted by DOT field offices in every state. The ultimate goal of these RSAs is to help communities build streets that are safer for people walking, bicycling, and taking public transportation through an experiential understanding of the problem. The Federal Highway Administration (FHWA) is the lead DOT agency in Kansas with the Federal Transit Administration (FTA), the National Highway Traffic Safety Administration (NHTSA), and the Federal Motor Carrier Safety Administration (FMCSA) providing expertise in their respective fields.

This initiative is aimed at reversing the recent rise in deaths and injuries among the growing number of Americans who bicycle and walk to their daily activities. In many cases public transportation is used for part of these trips. An initial step in addressing non-motorized transportation safety is to conduct an RSA of a particular location by bringing together interested federal, state and local stakeholders to experience the system from the perspective of those who use the transportation system by foot or on a bike. The immediate goal of this RSA is to focus on a location that has non-motorized safety challenges. It is intended to provide a practical real world environment to open the dialogue, share knowledge, identify patterns that lead to gaps, and build relationships leading to safer pedestrian and bicycle networks over time. It is hoped that this RSA will serve as a model for future efforts in Kansas of this nature.

RSAs have proven to be an effective method of observing safety issues in real time and identifying potential physical and operational improvements through an experiential understanding of the problems. The Kansas Division Office of FHWA is promoting the Practical RSA (PRSA) approach for this assessment generally following KDOT Local Project guidelines developed for safety projects. A PRSA follows a simplified process and does not attempt to gather extensive data other than what is readily available with a simplified report format to document findings.

A PRSA looks at how a corridor is operating in terms of safety. The primary intent is to identify measures depending on available resources, to reduce the potential for fatal or severe injury crashes in the corridor. It is not necessarily intended to lead to the development of a project but to identify low cost solutions which may be implemented by maintenance forces; however, moderate and higher cost solutions may and should be identified so they may be considered by an agency in its planning and project development process. The measures outlined in this report are considered suggestions and are not considered mandates that changes be made. The goal of this effort is to identify a variety of measures that could be taken as resources permit to make improvements to enhance the safety of the corridor.

Based on discussions with key partners in the Kansas Department of Transportation (KDOT) and the City of Lawrence (City), the 19th St. corridor from just west of Iowa St. (U.S. 59) at Constant Ave. east to the roundabout at Barker Ave. would be an ideal location for this effort. 19th St. is a two-lane minor arterial that provides an important east-west connection near the University of Kansas (KU) campus. See assessment area map below.



19th Street Assessment Corridor - Constant Avenue to Barker Avenue

The City and Lawrence-Douglas County MPO had very good readily available data for the 19th St. corridor including bike/pedestrian crash data for the 5 year period including 2009 through 2013. They provided GIS based maps of bike/pedestrian crashes, peak traffic, bike plan, sidewalk defects, sidewalk ramps, bike signs and intersection controls, bus routes/stops, planned Safe Routes to School (SRTS) routes, and street classification. Documentation from the Multimodal Planning Studies covering the 19th St. Corridor was provided to the RSA Team. In addition, the University of Kansas provided documentation of future redevelopment related to the 19th St. corridor.

Information provided shows that the entire corridor is on a bike route. East of Naismith has segments with bike lanes or planned to have bike lanes. East from Maine to Massachusetts St. and at the Barker Roundabout includes proposed SRTS segments. There are six transit routes touching the corridor with numerous bus stops on or adjacent to 19th St. A new transit center is proposed at 21st St. and Iowa St. The City has inventoried its sidewalk and sidewalk ramps noting condition and accessibility. It is clear that the corridor serves a significant number of bicyclists and pedestrians. The peak traffic counts shows that the major (signalized) intersections within the corridor approach or exceed 2000 entering vehicles during peak hours. For the 5-year period noted, there were 8 bicycle injury crashes documented; 2 occurred on the moderate grade approaching Iowa St. between Stewart Ave. and Ousdahl Rd., 1 near Illinois St., 4 occurred between Louisiana St. and Massachusetts where there are intermittent extra lanes to accommodate higher turning volumes, and 1 occurred at the Barker Roundabout. Likewise, there were 10 pedestrian injury crashes with 7 (70% of the total) occurring in a two block (3-intersection) segment from Tennessee St. to Vermont St. This is in the area of intermittent extra lanes noted above in addition to being right at the location of the Cordley Elementary School which was closed this school year for renovation.

This PRSA report includes route-wide issues and site-specific issues as they relate to bicycle, pedestrian and transit. It identifies the location and type of issue being considered; a discussion and photo examples of the issue; and lower, medium, and higher cost suggestions of measures for consideration. The Manual on Uniform Traffic Control Devices (MUTCD) is the national standard for all public roadways and is a source document for many of the suggestions provided.



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Route Wide Issues

Bicycle: Except where there are bike lanes, bicyclists must share the road with high traffic volumes including commercial vehicles. Vehicles were observed not giving the required 3' passing clearance.

Discussion: This is generally a two lane street with a center turn lane from about Alabama St. to Kentucky St. and at other major intersections in the corridor. Two segments have bicycle lanes, between Naismith and Alabama and east of Massachusetts St. Only experienced riders should use 19th St., particularly from west of Tennessee to east of Kentucky where there is less than desirable pavement condition and an auxiliary lane which may cause confusion.

Shared lanes generally work well with low vehicle volumes. A curb lane greater than 14' allows a motorist to pass a bicyclist with an adequate comfort clearance of greater than 3'. Bicycle lanes are used to designate a preferential use of the roadway for bicyclists. The existing roadway does not have adequate width for either wider curb lanes or additional bike lanes in its current configuration.

Suggestions:

Lower Cost: Consider a parallel alternate route on 21st St. for a bicycle boulevard. This much lower volume residential street would be safer and favorable to less experienced riders.

Initiate an education campaign to bring public attention to the 3' passing law. Suggest it correspond with the start of school in September.

Provide "Shared-Lane Marking" to fill gaps between segments with bike lanes particularly where lanes are too narrow for a bicyclist and a motorist to travel side-by-side and to eliminate any confusion as to where a bicyclist should be when extra lanes are present.

Provide timely street cleaning for bike lanes and along curb where a bicyclist will normal ride to remove sand and other debris.

Higher Cost: Reconstruct to 3-lanes with bike lanes (planned between Iowa and Naismith; but bike lanes are not shown on planning map).



Bike lane between Naismith and Alabama.

Pedestrian: Much of the sidewalk in the corridor is less than 4' wide, aging and in poor condition. Pedestrian walk intervals at signalized crossings provided less than 7 seconds to initiate a crossing for both minor and major roadways.



SW Corner of 19th & Kentucky

Discussion: Cracking, faulting, and general deterioration of sidewalks are prevalent. Many curb ramps exhibit these conditions in addition to having running slopes and/or cross slopes greater than desirable with no turning space. Many sidewalk sections have no buffer space.

The MUTCD recommends a pedestrian walk interval of at least 7 seconds along with countdown pedestrian signals to inform pedestrians of the time remaining in the pedestrian change interval. Many of the pedestrian push buttons were not located in accessible locations. Only crosswalks at Louisiana St. had pedestrian countdown signals and accessible pedestrian signals (APS). APS provides information in non-visual format to users with visual disabilities.

Crosswalk Pavement markings were worn at a number of locations. The City uses a continental (longitudinal) crosswalk pavement marking which has greater visibility than the standard marking but this effect diminishes as the markings fade.

Sidewalk from about Illinois St. to Louisiana St. and from about Iowa St. to Constant Ave is 5' wide, fairly new, and in good condition. The poor condition of the remaining sidewalk and narrow right-of-way does not lend itself to low-cost fixes. While a 4' sidewalk is acceptable, a 5' sidewalk with a buffer strip is more pedestrian friendly.

Recommend that sidewalks within the public right-of-way follow the "Proposed Accessibility

Guidelines for Pedestrian Facilities in the Public Right-of-Way" (PROWAG). In general, vertical discontinuities greater than ¼" are undesirable. A 1:1 bevel can be used for those under ½". Those greater than ½" are treated with a 1:12 slope. Cross slopes should not exceed 2% and running slope should not exceed 5% (unless following road grade). Curb ramps are subject to the same cross slope but may have running slope up to 8.33%. Perpendicular curb ramps are generally preferred as they provide a more direct route without requiring maneuvering by those using mobility devices. Parallel curb ramps should be considered where right-of-way is limited. Landings are necessary at the top of parallel and bottom of perpendicular ramps.

Suggestions:

Lower Cost: Update crosswalk markings as necessary to maintain visibility.

Provide recommended pedestrian walk interval of 7 seconds at signalized crossings. Consider longer intervals on minor street crossings.

Moderate Cost: Upgrade to pedestrian countdown signals.

Upgrade to APS.

Higher Cost: Reconstruct with appropriate pedestrian accommodations (planned between Iowa and Naismith, should include pedestrian facilities on both sides of 19th St.



Looking west from the SE corner at Kentucky.



Looking east from the SW corner at Ousdahl.



Transit stop at Anna Drive.



South side of 19th east of high school.



Transit stop at KU dorm near Naismith (Right).

Transit: There is a lack of improved bus stop waiting areas along the corridor. Patrons tended to stand on the curb close to traffic.

Discussion: Concrete pads at bus stops provide patrons room to be a safer distance from the street. A sheltered seating area provides a dedicated space for waiting with greater visibility to a motorist. In addition, greater accessibility to transit services can be achieved with a concrete pad.

Suggestions:
Add concrete pads at transit stops. Consider benches, shelters, bike racks, and trash receptacles.



Site Specific Issues

Constant Avenue

Transit: No bike racks at Constant Avenue transit stop

Discussion: Transit provides bicycle racks on buses but no bike rack accommodation at stop. Space was allocated for racks in bus stop design but not installed at time of construction.

Suggestions:

Lower Cost: Install bike rack.



Constant Transit Stop.

Iowa Street

Bicycle: Poor connectivity across Iowa St.

Discussion: There is an existing multi-use path along the west side of Iowa St. KU is proposing a multi-use path (Jayhawk Trail) which will generally run diagonally on campus from the NE across the intersection to the SE. Crossing Iowa St. with its high volume is a concern.

Suggestions:

Lower Cost: In conjunction with the planned transit center and bicycle boulevard concept discussed under corridor wide issues, create a signalized crossing at 21st St. that connects the transit center and the bicycle boulevard on the east side of Iowa St. with the multi-use paths on west side of Iowa St.

Coordinate KU improvements (Jayhawk Trail) with planned City of Lawrence improvements on 19th St. to address bicyclists crossing Iowa St.

Enhanced pavement markings and signing to support bicycle movements through the intersection. Consider bicycle detection in conjunction with a bike box concept.

Medium Cost: Consider the optional use of a bicycle signal face to control bicycle movements consistent with the MUTCD Interim Approval.



Looking north across 19th at Iowa.

Pedestrian: This is not a pedestrian friendly intersection.

Discussion: Large intersections can be difficult for pedestrians to manage with long exposure times. Large corner radii promote high speed turns. An injury pedestrian crash occurred in a crosswalk at this intersection. An additional challenge of negotiating steep curb ramp grades with lack of level landings in conjunction with the street crossing increases the difficulty.

This intersection provides the connection between the sidewalk along the east, multi-use path along west side of Iowa St., sidewalk on the south side of 19th St., and the proposed Jayhawk Trail. The proposed transit center at 21st St. at Iowa St. could add to pedestrian traffic.

Curb ramps were discussed under "Route Wide Issues," but the sidewalk at this intersection is generally newer and this is a critical intersection in the pedestrian network. Diagonal (corner)



ramps are provided on all quadrants, these are generally undesirable in terms of accessibility as they direct pedestrians into the intersection potentially exposing them to parallel crossing traffic. This is particularly problematic for wheelchair users who then must turn in the roadway. Necessary landings were lacking on all quadrants. Landings provide a staging area and turning space. The elevation difference between the roadway and sidewalk on the NW, NE and SW corners have led to excessive grade on these curb ramps.

There are no cross walk markings across 19th on the east side of Iowa. An offset pavement marked median area is currently provided on Iowa St. for turning traffic on Iowa St.

Suggestions:

Lower Cost: Add crosswalk marking on the east crossing of 19th St.

Provide minimum 7 seconds walk interval and consider more time for 19th St. crossing.

Medium Cost: Consider a pedestrian refuge median for the Iowa St. crossing. See http://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_011.cfm. Provide countdown pedestrian signals.

Re-grade and add landings for curb ramps. Curb ramps should not exceed 15' but a combination ramp should be considered. This is where perpendicular ramp runs are brought to an intermediate landing. Then the ramp is continued in the direction of the sidewalk (parallel). Provide APS.



Looking east across Iowa at 19th.



Looking north across 19th at Iowa.

Iowa to Naismith

Bicycle: Moderate grade approaching Iowa St. heading west.

Discussion: Grade can slow down even the best bicyclists and can be challenging to less experienced riders to maintain a straight path.

Suggestions:

Lower Cost: Add a west-bound bike climbing lane approaching Iowa St. using striping.



Looking west back to Iowa St.

Pedestrian: No sidewalk on the north side of 19th St.

Discussion: This is an area of higher pedestrian volumes. There is no crosswalk to support access to the Anna Drive transit stop. An injury pedestrian crash occurred near the Anna Drive intersection.



Note pedestrian crossing road.

Suggestions:

Lower Cost: Add crosswalk markings at Anna Drive transit stop.

Moderate Cost: Add sidewalk.



Pedestrian was accessing transit stop.

Naismith Drive

Bicycle: No space allocated for a bicyclist queued or moving through this intersection.

Discussion: Naismith Dr. is a major bike route to KU. There are some older style shared lane markings along the curb on Naismith Dr. but a bicyclist is not allocated any dedicated space at intersection.

Suggestions:

Lower Cost: Reallocate space in the cross-section to better accommodate a bicyclist and keep a motorist aware of the mixed use.



At Naismith Dr. looking north

Pedestrian: Crosswalks are not marked across 19th Street.

Discussion: Marked crosswalks give clear direction, increase visibility and inform the driver to be aware of pedestrians.

Suggestions:

Lower Cost: Add crosswalk markings.

Naismith to Louisiana

Pedestrian: No sidewalk on north side of 19th St. between Louisiana and Alabama. No crosswalk to match pedestrian (student) desire to cross 19th St. at high school to the west of Louisiana St.

Discussion: There is a sizable student population attending the high school living in the vicinity. High school students cross 19th St. at locations of opportunity and expediency.



Sidewalks along this area are relatively new and in good shape. The roadway is designed as a 3-lane facility with a center turn lane.

Suggestions:

Lower Cost: Consider a marked & signed mid-block crossing at a suitable location to match student desire lines. If speed is a concern, a raised crosswalk may be helpful.

Implement an education/enforcement campaign in conjunction with the marked crosswalk.

Moderate Cost: Provide pedestrian actuated signals. This could be a rectangular rapid flashing beacon or pedestrian hybrid beacon. Would suggest the hybrid beacon since Lawrence has installed these at a number of locations and should be understood. They also provided additional comfort of a dedicated walk phase.

Consider pedestrian refuge medians in conjunction with marked crosswalk. See http://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_011.cfm.

Add missing sidewalk.

Louisiana to Massachusetts

Bicycle: A majority of the injury bike crashes in the corridor occurred in this segment.

Discussion: There are intermittent added lanes to accommodate high vehicle turning movements. The injury crashes involving bicyclists are indicative of the need to better address a bicyclist needs. Tennessee and Kentucky are paired one-way major collector routes north of 19th but are local two-way streets south of 19th. Overwhelmingly, traffic using Tennessee and Kentucky involves turns to/from 19th St. There is very little desire for east bound right turns from 19th St. yet there is an auxiliary

lane with a starting taper near Ohio St. heading eastbound with an ending taper starting at Kentucky terminating west of Vermont St. This encourages weaving and can lead to unsafe vehicle maneuvers. -



Auxiliary lane termination east of Kentucky

Suggestions:

Lower Cost: Consider a roadway reconfiguration which eliminates the eastbound auxiliary right lane and add bike lanes

Pedestrian: A majority of the injury pedestrian crashes in the corridor occurred in this segment.

Discussion: The 7 injury crashes involving pedestrians in the two block stretch including Tennessee, Kentucky and Vermont is a concern. As noted, Tennessee and Kentucky are one way routes to/from the downtown area. Additional weaving due to the auxiliary lane and high vehicle turning movements creates a poor pedestrian environment. Cordley Elementary School is located between Kentucky and Vermont. While it does not appear any of the pedestrian crashes involved elementary school children, consideration should be given to children walking to school. Data provided shows 19th St. is a proposed route for SRTS planning.



School x-walk sign looking East from Mass. St.

Suggestions:

Lower cost: Implement a SRTS program at Cordley. Consider a walking school element in the SRTS program.

A lane reassignment as discussed above under bicycle considerations for this segment.

Trim trees to keep desirable sight lines to signs.

Massachusetts Street

Pedestrian: Crosswalks are not marked across 19th Street.

Discussion: A marked crosswalk gives clear direction, increases visibility and informs the driver to be aware of pedestrians.

Suggestions:

Lower Cost: Add crosswalk markings.

Barker Avenue

Bicycle: While there are bike lanes approaching this roundabout, a bicyclist must share the lane through the roundabout.

Discussion: Barker Avenue is a relatively low volume residential street. 19th St. is also located in a residential area east of the Massachusetts corridor. However, there are higher traffic volumes than one would expect for the residential area including what appears to be

disproportionate high level of commercial vehicles.

Suggestions:

Lower Cost: Provide bike guidance approaching roundabout and “Shared-Lane Marking” in the roundabout. This includes improving the overall pavement markings at this location.

Restrict through commercial traffic east of Massachusetts St.



Looking east to Barker Roundabout.

Pedestrian: There are no marked crosswalks at this roundabout.

Discussion: The crosswalks are generally defined by bricks and with signing. Colored pavements treatment such as brick do not provide the desired contrast provided by crosswalk lines.

Suggestions:

Lower Cost: Provide transverse crosswalk lines.



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