Transportation Plan

June 2009

Prepared for :

City of Carl Junction



TranSystems

EXPERIENCE | Transportation

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1. Executive Summary

This transportation plan will address the operational needs and opportunities for the City's roadway system and consider the desire to balance the movement of people through the City to best serve the community. The city street network represents a significant investment of public resources that will continue to be vital for both the growth and stability of Carl Junction.

During the development of the plan, the operational conditions of the street network in conjunction with the community profile and land use was reviewed and the available forecast data and planning growth assumptions were employed to identify short-term and long-term improvement needs. The previous Joplin Area Transportation Study Organization's Long-Range Transportation Plan and the City of Carl Junction's Comprehensive Plan were used as a starting point for this analysis. A survey was conducted to identify the goals of the community for consideration in setting long term transportation priorities by obtaining some perspective on the daily experience to the motorists, the character of the community, and future development aspirations.

The following summarizes the recommendations:

Short-range Improvements

Fir Road - *Provide shoulders and possibly left turn lanes at the intersections along Fir Road; investigate the long term benefits of constructing full-width/full-depth shoulders to accommodate additional traffic lanes in the future; investigate realignment of Lone Elm Drive and Fir Road to make opposing lanes match up; and, consider if it is feasible to provide a two-way left turn lane (TWLTL) from Joplin Street to 171 along Fir Road; however, this could wait until development happens in the area because current movements limited to the existing intersections would not merit this type of facility.*

Pennell Street - *Provide a signal at Missouri Route 171 and Pennell Street which is tied into the railroad crossing signals to improve safety; consider providing a channelized right turn lane at Missouri Route 171 (if space allows); investigate all way stop control at Pennell Street and Joplin Street, rotating stop signs which could be put into place during school hours, or possibly adding a roundabout; and, consider the need for a 4-way stop at Pennell Street and Route JJ; however, due to the potential for t-bone accidents at such a location, a roundabout may be a more viable solution.*

Non-Motorized - *Determine desired typical section specific to each transportation facility to provide appropriate pedestrian and bicycle access.*

North-South Connector - *Determine desired typical section and proactively begin corridor preservation with advanced right-of-way acquisition.*

Long-range Strategies

Fir Road - *Potential widening of Fir Road to a 4 or 5 lane road depending on the need for a TWLTL; need for signals or a roundabout at Fir Road and Briarbrook Drive as well as Lone Elm Drive and Fir Road, respectively; and, an all way stop at Fir Road and Peace Church Avenue and possibly Joplin Street and Fir Road depending on development areas.*

Pennell Street - *Install a 3-way stop at Joplin Street and Pennell Street; and, investigate the potential for a roundabout at Route JJ and Rte Z/Pennell Street/Walnut Street.*

Non-Motorized - *Install appropriate pedestrian and bicycle access in conjunction with concurrent roadway improvements and throughout community as appropriate.*

North-South Connector – *Construct parkway facility to connect Fir Road to Pennell Street with structure across Center Creek.*

2. Previous Plans and Studies

2.1 City of Carl Junction Comprehensive Plan

Several relevant recommendations regarding the road network in Carl Junction and anticipated growth are provided below. These selected recommendations were derived from the Carl Junction Comprehensive Plan, dated February 2003:

Recommendation #1: Encouragement of redevelopment of the core downtown
Carl Junction is not essentially a commercial community. But, it does have a core downtown that offers residents the convenience of local shopping. Added to this convenience is the historic nature of the remaining buildings in the downtown area. Redevelopment of the area along with encouragement to property owners to restore their buildings would be an investment in the community.

Recommendation #3: Redevelopment of Pennell Street
Pennell Street is a major thoroughfare in Carl Junction. It is in need of attention. A long term project should be enacted to include curbing and guttering, installation of sidewalks, resurfacing, and appropriate signage along its entire route.

Recommendation #4: Additional access to Highway 171
Access to Highway 171 from Pennell Street is sometimes blocked by rail traffic. Highway 171 physically divides the City. Additional access to the highway should be a priority over the next decade.

Recommendation #5: Street Project
A major effort should be made to upgrade the quality of streets in Carl Junction. The project may include a bond issue, involve several years, and should include curb and guttering.

Recommendation #6: Walking paths/Sidewalks
Carl Junction is a residential community with many families. The city should explore walking paths and/or sidewalks that link the schools with the commercial core downtown, housing developments, and the parks.

Recommendation #8: Briarbrook link
Street access to Center Creek Park from Briarbrook Subdivision would help the many families who transport their children to and from activities in the park and at the ball fields. The current distance and road size prohibits older children from riding their bikes from home to the park.

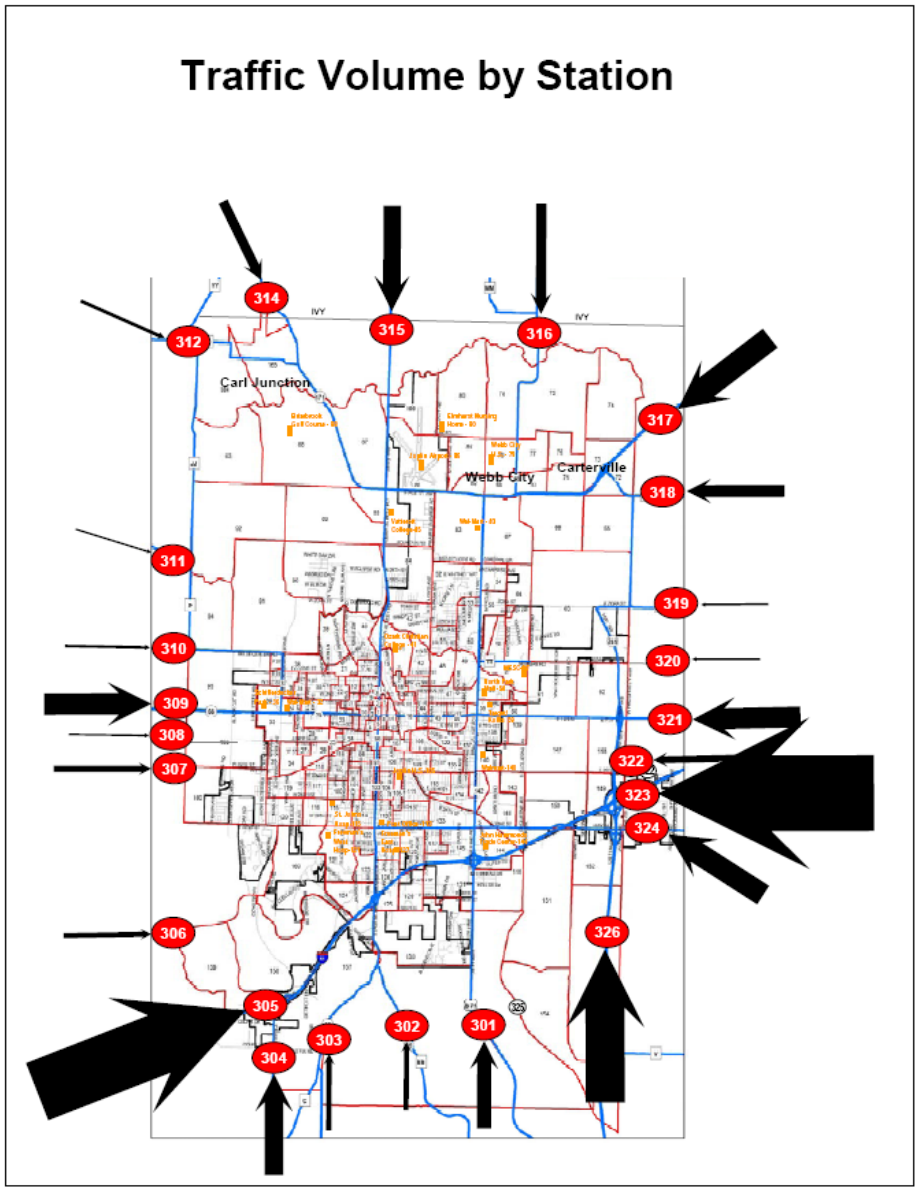
Recommendation #9: Parks and recreation development
Carl Junction has a natural waterway. This is an opportunity the City should not overlook. Center Creek Park could be extended to follow the creek with hiking trails and wildlife habitat preservation. To enact a project of this size a Parks Director would be required.

Recommendation #10: City-wide retail development
As a residential community, Carl Junction has a responsibility to provide retail availability and convenience to its residents. A shopping area along Route 171 where it borders the City would provide access to the three major areas of Carl Junction as well as be available to the traffic that travels between Pittsburg, Kansas and Joplin, Missouri.

2.2 Joplin 2007 Regional O/D Survey

This study was completed by ETC Institute, under contract to the Joplin Area Metropolitan Planning Organization with traffic counts conducted by CJW Transportation Consultants. While the purpose of this study was to determine travel characteristics and trends in the Joplin Region, this data provided a foundation to understand the through traffic along the perimeter routes of Carl Junction including but not limited to Route JJ and Missouri Route 171. The findings illustrated in the figures and tables of the O/D survey shown below helped in identifying appropriate locations in and around Carl Junction for traffic counts for this transportation plan as well as provided initial areas of focus based on the relevant concentrations of area travel directly impacting Carl Junction's transportation system.

Figure 2-1: Total Traffic Volume by Station



Source: ETC Insitute

Table 2-1: Distribution of Trips at the Interview Stations

		Local Trips	*Through Trips*	*Total Trips*
Interview Station	**Location**	**Total**	**Total**	**Total**
*301	BS 71 (Rangeline South)	6365	392	6757
302	Route NN	2155	248	2403
303	Highway 86	2441	174	2615
*304	Highway 43 (South Side)	8055	1382	9437
305	Interstate 44 (West Side)	10394	18869	29263
306	Bagdad Road	2343	106	2449
*307	20th Street (West Side)	2816	156	2972
308	Junge Blvd	754	53	807
*309	Rt 66 (7th St - West Side)	9582	798	10380
310	Belle Center Road	1122	4	1126
311	Route P	708	52	760
*312	Route Z	1531	87	1618
313	Route JJ	1932	207	2139
*314	Highway 171 (West Side)	4085	615	4700
*315	Highway 43 (North Side)	7828	656	8484
*316	Route D	4628	352	4980
*317	Highway 171 (East Side)	10909	727	11636
318	Route HH	5212	568	5780
319	Route AA	830	116	946
320	Newman Road	1178	18	1196
321	Rt 66 (7th St - East Side)	9899	354	10253
322	20th Street (East Side)	2854	372	3226
323	Interstate 44 (East Side)	16899	20413	37312
324	Route FF (32nd St)	9688	1049	10737
325	Warner Road	456	273	729
*326	US Highway 71	11474	7663	19137
Total Trips[1]		136138	55704	191842
Total Traffic		126812	27852	163990
[1] Each Through Trip is counted twice in Total Trips (once as it enters the area and again when it leaves). Thru trips are only counted once in Total Traffic.				
Source: ETC Institute				

Table 2-1: Distribution of Trips by Trip Purpose

Interview Station	Home	Work	Work Related	Shopping	School (K-12)	School (University)	Friends Relatives Home	Medical / Dental
*301	1123	1987	435	1822	77	78	523	369
302	170	977	57	419	46	0	126	277
303	285	952	244	364	154	0	48	183
*304	2198	2408	566	1892	69	137	548	1278
305	3852	2509	10871	4296	308	0	377	618
306	377	323	233	620	46	0	35	579
*307	582	696	287	560	37	21	205	501
308	43	350	20	226	24	0	5	90
*309	1904	2181	727	2936	84	182	476	742
310	119	409	58	305	61	0	32	70
311	31	246	84	199	8	0	76	9
*312	414	306	123	364	30	30	71	183
313	506	368	391	276	184	0	92	115
*314	1072	1237	716	722	20	99	318	267
*315	1222	2186	991	1449	112	227	454	963
*316	735	1521	186	1002	424	152	394	111
*317	3118	2276	1526	1835	119	474	646	747
318	559	2042	235	1213	596	0	157	315
319	261	254	106	90	66	0	50	4
320	217	254	135	191	131	0	91	24
321	1613	2792	1284	2136	744	0	484	176
322	119	1383	86	897	267	0	113	163
323	6185	3448	11513	4919	157	0	312	2354
324	1110	4863	634	2055	239	0	160	792
325	101	239	16	181	31	0	34	25
*326	4449	4425	4306	2144	27	536	1077	1314
Subtotal	32365	40632	35830	33113	4061	1936	6904	12269
ALL								
Source: ETC Institute								

Interview Station	Airport	Tourist Attraction	Recreation (not tourist)	Change Mode	Volunteer Service	Church	School Related	Other	Total
*301	22	0	45	0	0	22	0	254	6757
302	0	18	82	0	6	6	5	214	2403
303	0	6	209	0	0	12	6	152	2615
*304	0	0	120	0	17	0	0	204	9437
305	0	2270	3508	0	0	0	173	481	29263
306	0	0	0	0	0	15	0	221	2449
*307	6	0	20	0	0	20	0	37	2972
308	0	5	24	0	0	0	0	20	807
*309	126	0	378	0	0	28	28	588	10380
310	0	0	12	0	0	4	0	56	1126
311	0	0	31	0	0	4	0	72	760
*312	5	0	30	11	0	0	10	41	1618
313	0	0	23	0	0	0	0	184	2139
*314	30	10	79	0	20	10	0	100	4700
*315	0	0	597	0	0	0	0	283	8484
*316	26	0	237	9	0	36	9	138	4980
*317	34	17	471	0	0	17	34	322	11636
318	0	0	191	0	0	0	0	472	5780
319	0	0	10	0	0	0	0	105	946
320	0	0	99	0	0	0	0	54	1196
321	0	26	191	0	0	12	0	795	10253
322	0	0	70	0	0	0	0	128	3226
323	0	2094	2299	52	52	105	0	3822	37312
324	0	16	283	15	0	32	16	522	10737
325	0	0	24	0	0	0	0	78	729
*326	0	26	403	0	0	54	54	322	19137
Subtotal	249	4488	9436	87	95	377	335	9665	191842
ALL									
Source: ETC Institute									

3. Survey



A survey was developed and distributed to key community leaders and stakeholders to organize and accommodate community input into the development of this transportation plan. Participants were asked to share their perspective regarding access, delays, community character, future development and priorities. In addition to answering the questions as presented, participants were asked to provide additional comments. The input assisted in identifying the goals of the community for consideration in setting long term transportation priorities. This transportation plan is intended to aid investment decisions for future improvements. Additionally, the survey allowed the community, as represented by the respondents, to be a part of the decision-making process. The results of this survey noted within the format by which the survey was distributed may be found in Appendix A. Within the document to follow, relevant results of the survey have been noted in the appropriate sections.

4. Existing Conditions

As part of the process of creating a transportation plan for Carl Junction, it is first necessary to look at the existing conditions of the roadway network. This analysis needs to not only take into account the condition of the existing street network, but also the way that it is used by the residents and visitors of Carl Junction.

4.1 Study Area

To assess the needs of the City of Carl Junction it was necessary to determine the existing travel patterns in the area based upon the current roadway network. These travel patterns help to identify where the deficiencies in the system are located and what degree of improvements may be necessary at this time and in the future. Based upon the roadway classifications discussed above, it was determined that it would be appropriate to evaluate the intersections where arterials meet as well as where Briarbrook Drive intersects with Joplin Street on the west and with Fir Road on the south. The existing study intersections are as follows:

- Fir Road and Joplin Street
- Fir Road and N. Peace Church Avenue
- Fir Road and Briarbrook Drive
- Fir Road and Lone Elm Drive
- Fir Road and Missouri Route 171
- Joplin Street and Briarbrook Drive
- Joplin Street and Route Z (Pennell Street)
- Route Z (W. Walnut Street) and Route JJ
- Route Z (Pennell Street) and Missouri Route 171

4.2 Street Network

The American Association of State Highway and Transportation Officials (AASHTO) has outlined a hierarchy of roadway classifications which are intended to help in the transportation planning process as well as helping to define the geometric design recommendations for each class. The City of Carl Junction's roadway network consists of the following arterial and collector streets as they apply within its City Limits:

Principal Arterials – Missouri Highway 171

Minor Arterials – Missouri Route JJ, Route Z/Pennell Street, Fir Road, Joplin Street

Collector Streets – Briarbrook Drive, Lone Elm Drive, and Gum Road

A principal arterial carries most of the trips to and from an urban area as well as being the primary route for trips which bypass the city. Most trips which are longer in duration or exit the region entirely will be conducted on these types of routes. As it relates to Carl Junction, Missouri Route 171 is the only route which falls into this category. It has also been classified as a principal arterial by MoDOT in the functional classification system for the Joplin area.

Minor arterials such as the ones listed above are generally those routes which provide connectivity to the community from the principal arterials. Minor arterials generally allow for more land access than the principal arterials and allow for more access points for businesses and sometimes residences without penetrating any identifiable neighborhoods. While only Route Z/Pennell Street is considered a minor arterial by the Joplin area plan, Route JJ, Fir Road and Joplin Street could be considered minor arterials in the manner in which they serve the City of Carl Junction. These roads in conjunction with Missouri Route 171 carry all of the traffic that enters or leaves Carl Junction and are the most important corridors to be considered for commercial growth in the City.

The collector street system provides circulation within neighborhoods, commercial districts and industrial areas. These routes collect traffic from the local street network and channel trips to the arterials while also distributing trips from the arterials to their final destinations.

All of the other streets in Carl Junction are local streets which consist of all facilities not in the other categories and provide direct access to private entrances while discouraging through traffic. Local residential streets should provide sidewalks, good lighting and other landscaping, where possible, to offer a sense of security to the neighborhoods. Local commercial streets should provide wide roads for truck access.

4.3 Traffic Counts

A.M. and P.M. peak hour traffic volumes were collected at the existing study intersections from December 2, 2008 through December 5, 2008. Manual traffic counts including turning movements at several intersections were obtained from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Additionally, machine tube counts were collected over a 3-day period at the intersection of Briarbrook Drive with Joplin Street and on N. Peace Church Avenue and Lone Elm Avenue. The counts were taken while school was in session to provide a more accurate picture of the daily volumes which would be expected. These counts may be found in Appendix B.

In general, the A.M. peak hours for all study intersections were determined to be from 7:30 a.m. to 8:30 a.m. In the afternoon, the peak hour times varied widely with the intersections in the general vicinity of the Carl Junction schools having peak times starting around 3:00 P.M. and the intersections located along Fir Road and Missouri Route 171 having peak hours between 4:45 p.m. to 5:45 p.m.

4.4 Traffic Analysis

4.4.1 Traffic Operation Assessment

The study intersections were evaluated based on the methodologies outlined in the Highway Capacity Manual (HCM), 2000 Edition, published by the Transportation Research Board. The HCM "provides a collection of state-of-the art techniques for estimating the capacity and determining the level of service for transportation facilities, including intersections and roadways as well as facilities for transit, bicycles and pedestrians"[1]

The operating conditions at an intersection are graded by the "level of service" experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from "A" to "F." LOS A represents the most desirable condition with free-flow movement of traffic with minimal delays. LOS F generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Delay is measured in seconds per vehicle. Table 4-1 shows the upper limit of delay associated with each level of service for signalized and unsignalized intersections.

Table 4-1: Intersection Level of Service Delay Thresholds

Level of Service (LOS)	Signalized	Unsignalized
A	< 10 Seconds	< 10 Seconds
B	< 20 Seconds	< 15 Seconds
C	< 35 Seconds	< 25 Seconds
D	< 55 Seconds	< 35 Seconds
E	< 80 Seconds	< 50 Seconds
F	≥ 80 Seconds	≥ 50 Seconds

While one of the primary measurements of traffic operations, LOS, applies to both signalized and unsignalized intersections, there are significant differences between how these intersections operate and how they are evaluated. LOS for signalized intersections reflects the operation of the intersection as a whole. While the individual movements may operate with varying LOS ratings, that is largely a function of the signal timings and how the intersection is operating relative to other signals in the vicinity. In this instance, there are not currently many signals functioning in the vicinity of Carl Junction and the signal at Missouri Route 171 and Fir Road operates as a standalone signal. Higher levels of delay at this intersection could mean that additional improvements need to be investigated, such as changes to signal timings or additional turn or through lanes.

Unsignalized intersections, in contrast, are evaluated based on the movement groupings which are required to yield to other traffic. Typically, this includes the left-turns off the major street and the side-street approaches for two-way stop-controlled intersections. Lower LOS ratings (D, E and F) do not, in themselves, indicate significant difficulties or the need for additional improvements. In these cases other factors such as volume to capacity ratios and traffic queues must also be considered to determine necessary improvements. Many times there are convenient alternative paths drivers could choose which would help to avoid the longer delays. Other times, the volumes on the unsignalized approaches are relatively minor when compared to the major street traffic and these delays are considered acceptable because of the need to provide capacity to the heavier through movement.

The decision to install a traffic signal, which is often considered when lower LOS ratings are projected, should be based on engineering studies and the warrants for traffic signal installation as outlined in the Federal Highway Administration's Manual on Uniform Traffic Control Devices. Signals are typically not recommended in locations where there are convenient alternative paths, or the installation of a traffic signal would have negative impacts on the surrounding transportation system. For instance, if the new signalized intersection is located too close to existing traffic signals it may not be recommended despite meeting the minimum warrants.

In addition to delay (and the corresponding Level of Service), a secondary means of evaluation is often utilized to assess the overall capacity of the intersection or unsignalized movement. This evaluation is a ratio of volume to capacity (*v/c*) that reflects, regardless of delay, the ability to accommodate the existing or projected traffic volumes over the course of a peak hour. A *v/c* ratio of 1.00 reflects that the intersection or movement has reached its capacity.

Lastly, traffic queues are evaluated as part of the analyses. Long traffic queues which extend beyond the amount of storage available, either between intersections or within turn lanes, can have significant impacts on operations. The projected vehicular queues are analyzed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes.

The LOS rating deemed acceptable varies by community, facility type and traffic control device. In communities similar to Carl Junction, a LOS C for signalized intersections is often found to be acceptable. However, at unsignalized intersections LOS D, E and above are often accepted for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection or the location has been deemed undesirable for signalization for other reasons, e.g. the close proximity of an existing traffic signal or the presence of a convenient alternative path.

The Synchro software package was used to evaluate signalized and stop controlled intersections. Documented results are based on HCM methodology and have been included in Appendix C.

4.4.2 Existing Traffic Conditions

The results of the intersection analysis for the existing conditions during A.M. and P.M. peak hour are summarized in Table 4-2.

Table 4-2: Intersection Operational Analysis Existing Conditions

Intersection	A.M. Peak Hour				P.M. Peak Hour			
Movement	LOS[1]	Delay[2]	v/c[3]		LOS[1]	Delay[2]	v/c[3]	
Fir Road and Joplin Street								
Eastbound Left	*A*	*1.5*	*0.01*		*A*	*2.0*	*0.02*	
Southbound	*B*	*13.4*	*0.40*		*B*	*13.1*	*0.31*	
Fir Road and N. Peace Church Avenue								
Westbound Left	*A*	*3.2*	*0.07*		*A*	*2.8*	*0.06*	
Northbound	*B*	*14.5*	*0.20*		*B*	*14.7*	*0.31*	
Fir Road and Briarbrook Drive								
Eastbound Left	*A*	*0.5*	*0.01*		*A*	*2.3*	*0.05*	
Southbound	*C*	*16.9*	*0.52*		*C*	*17.1*	*0.34*	
Fir Road and N. Lone Elm Avenue								
Westbound Left	*A*	*3.2*	*0.05*		*A*	*2.6*	*0.08*	
Northbound	*C*	*17.6*	*0.39*		*D*	*34.8*	*0.70*	
Fir Road and Missouri Route 171								
All Movements (Signalized Intersection)	*B*	*11.1*	*0.36*		*B*	*14.2*	*0.55*	
Briarbrook Drive and Joplin Street								
Southbound Left	*A*	*1.6*	*0.04*		*A*	*2.6*	*0.05*	
Westbound	*B*	*10.8*	*0.24*		*A*	*9.7*	*0.08*	
Route Z and Route JJ								
Westbound Left	*A*	*4.5*	*0.04*		*A*	*5.1*	*0.07*	
Northbound	*B*	*10.6*	*0.27*		*B*	*11.0*	*0.13*	
Southbound	*B*	*14.9*	*0.25*		*B*	*11.8*	*0.06*	
Route Z/Pennell Street and Joplin Street								
Westbound Left	*A*	*1.2*	*0.04*		*A*	*2.1*	*0.05*	
Northbound	*C*	*21.9*	*0.46*		*B*	*14.0*	*0.23*	
Route Z/Pennell Street and Missouri Route 171								
Eastbound	*B*	*11.8*	*0.36*		*C*	*16.3*	*0.44*	
Westbound	*D*	*26.4*	*0.07*		*C*	*24.0*	*0.02*	
Northbound Left	*A*	*8.0*	*0.16*		*A*	*8.8*	*0.27*	

Source: Transystems

1 – Level of Service
2 – Delay in seconds per vehicle
3 – Volume/Capacity Ration

No Action required
Long-range strategies may be considered
Short-range improvements needed

At present, all the intersections are stop controlled intersections with the exception of the new signal at Fir Road and Missouri Route 171. This peak hour analysis shows that all the intersections perform at acceptable level of service during the peak hours in existing conditions.

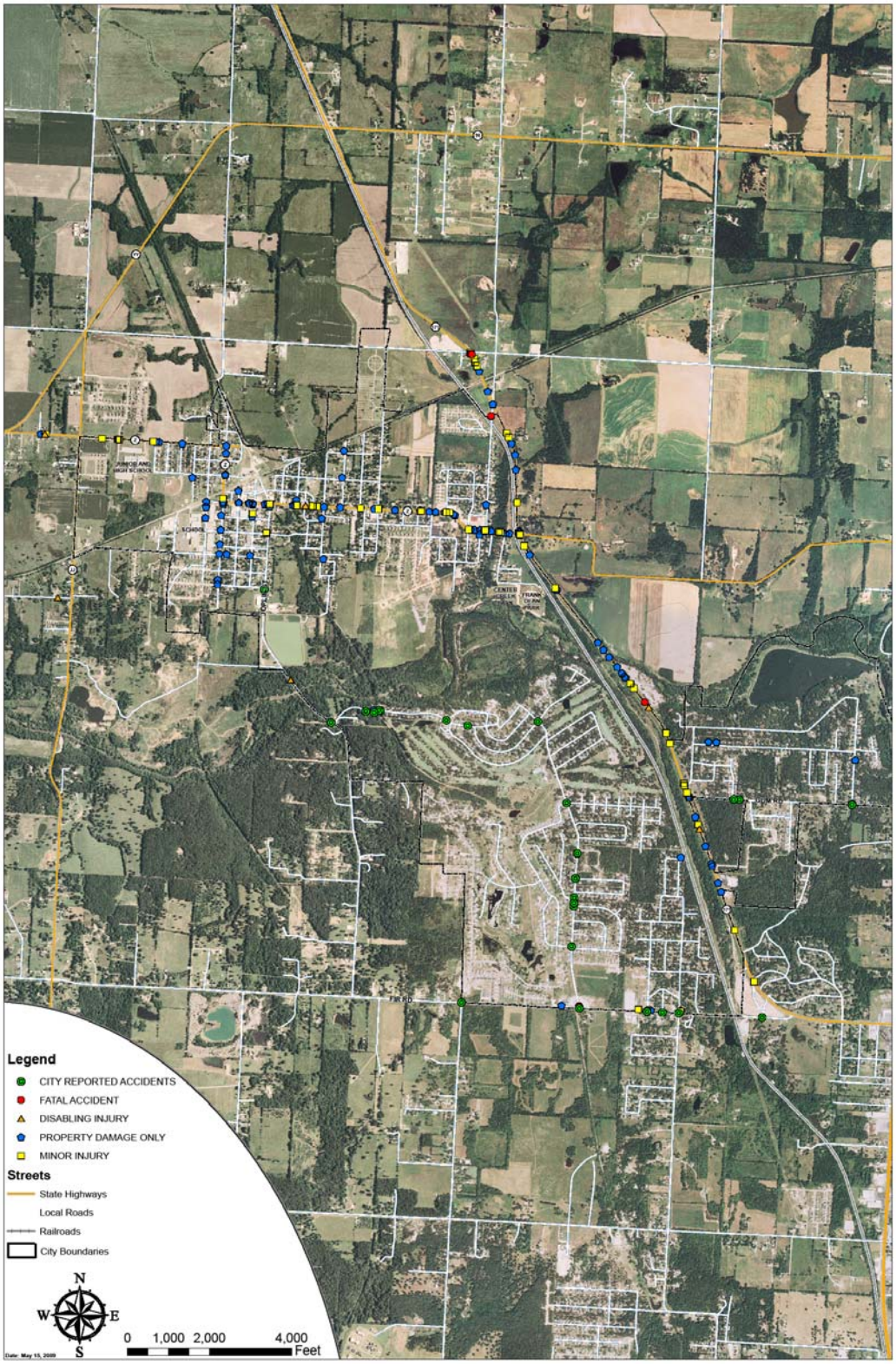
4.5 Safety

Carl Junction's Vision Statement indicates striving to "provide a safe environment in which to live, to work and to play." There are always opportunities to improve transportation safety for pedestrians and drivers throughout any community. According to the survey of community leaders and stakeholders, the residents of Carl Junction have concerns for the safety of pedestrian and motorized travelers. At the top of that list of concerns is improving access to schools and the parks and playing fields. The railroad crossings also were noted as a potential opportunity for improvement. In terms of the roadways, Fir Road got the most mention. Survey respondents often sited high traffic volumes and high speed as potential safety concerns on Fir Road. While the traffic analysis does support the notion of higher volumes on Fir Road and some potential to experience delays, the perceived delays of today are projected to increase significantly in the future based on the projected growth discussed in Section 6. High speeds cause motorist concern especially with the physical characteristics of Fir Road which is currently two lanes with no



Figure 4-1 illustrates the locations of recorded traffic accidents that have occurred according to 2003-2007 crash data. This assisted in identifying areas with documented safety issues. Travel along Pennell Street and Missouri Route 171 actually presents the most incidents as recorded by law enforcement. However, Fir Road incidents, though minimal, do support the safety concerns at intersections along Fir road. This crash data in addition to the traffic analysis present the baseline for the operational conditions of the street network.

Figure 4-1: Carl Junction Crash Data



Source: Transystems

4.6 Reality versus Perception

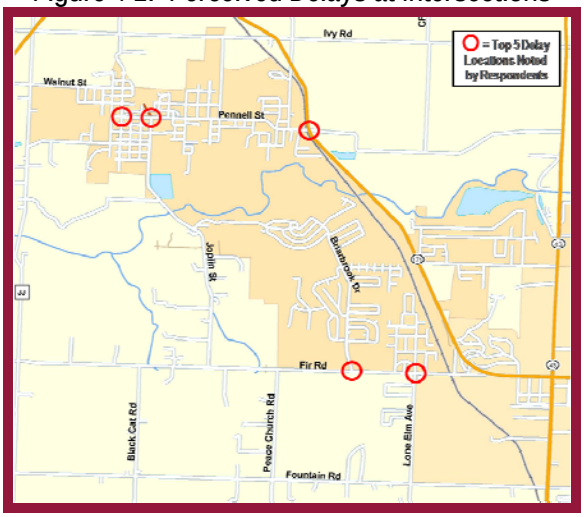
Travel from Route 171 to Pennell Street across the railroad tracks is perceived as having safety issues though there haven't been as many accidents as would be expected. This is often explained by the tendency of the community to adapt to the conditions of its surroundings. For example, the photo below shows the railroad crossing at Ivy Road. Poor sight distance due to the grade or curvature of a roadway is a consideration accepted by the regular motorist at a particular location and drivers often alter driving patterns to compensate for these deficiencies.



This is a minor sight distance issue when compared to the Pennell Street railroad crossing and approach to Missouri Route 171. The railroad crossing presents steep grades in addition to the hazards of the queuing vehicles potentially backing up near the tracks during periods of delays. Again, Carl Junction motorists are accustomed to this scenario and choose alternate routes or accommodate the physical characteristics by reducing their speed and/or providing more distance between their vehicle and the vehicle ahead. While the crash data doesn't present a safety concern at the railroad crossings, evaluation of the design of the facility and community perception and modified driving habits do support such claims.

Another transportation perception is motorist delay. This is always relative in terms of what is perceived as tolerable to each individual motorist and the size of the community. The reality of the technical data presented previously in Table 4-2 shows the intersection operational analysis for the existing conditions does not present significant delays. All but two locations are depicted as operating without much delay. However, the survey respondents highlighted five locations, as shown in Figure 4-2, as presenting delays to motorists. Such tolerances unique to individual communities are taken into consideration when evaluating transportation conditions.

Figure 4-2: Perceived Delays at Intersections



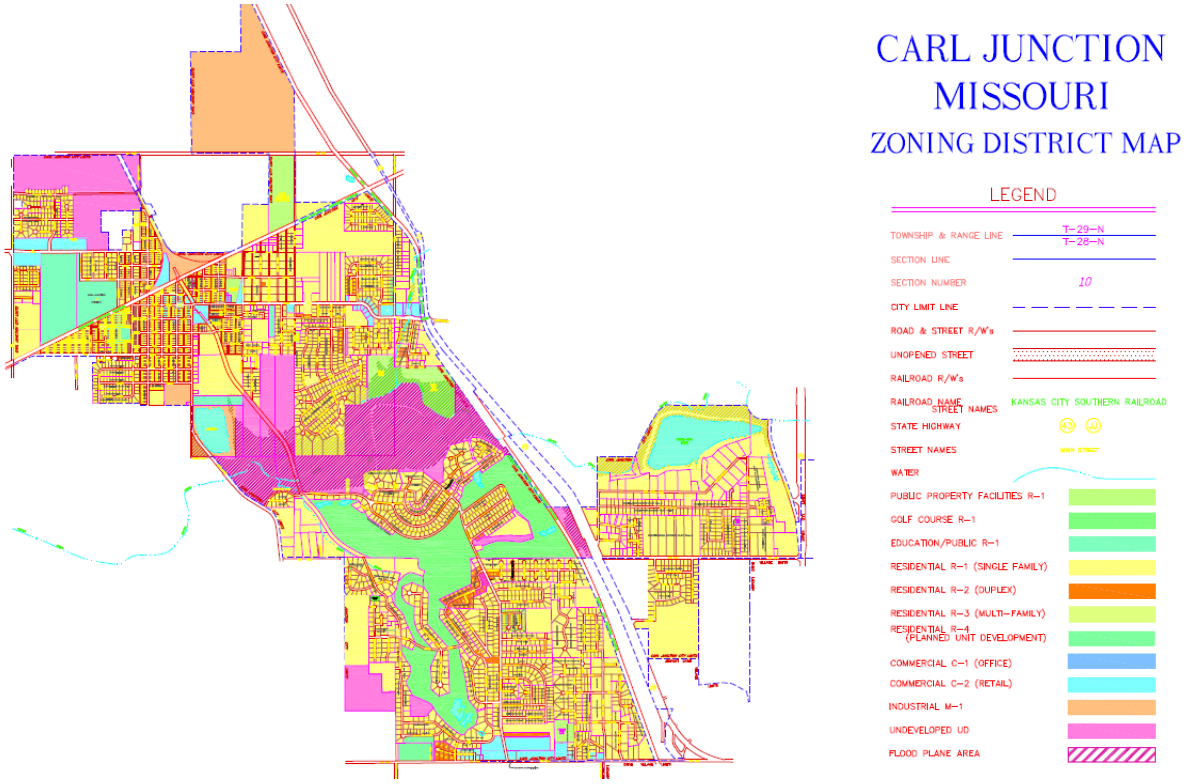
Source: Transystems

5. Future Needs

5.1 Growth and Development

Existing development is clearly defined by the City's current zoning map shown below in Figure 5-1. In general, the commercial areas are found along Fir Road between Lone Elm Drive and Peace Church Avenue (primarily on the north side of the street), near the industrial zoned region along State Highway Z where it crosses the railroad track, and along Pennell Street adjacent to Highway 171. Industrial uses may also be found along State Highway Z where it crosses the railroad track.

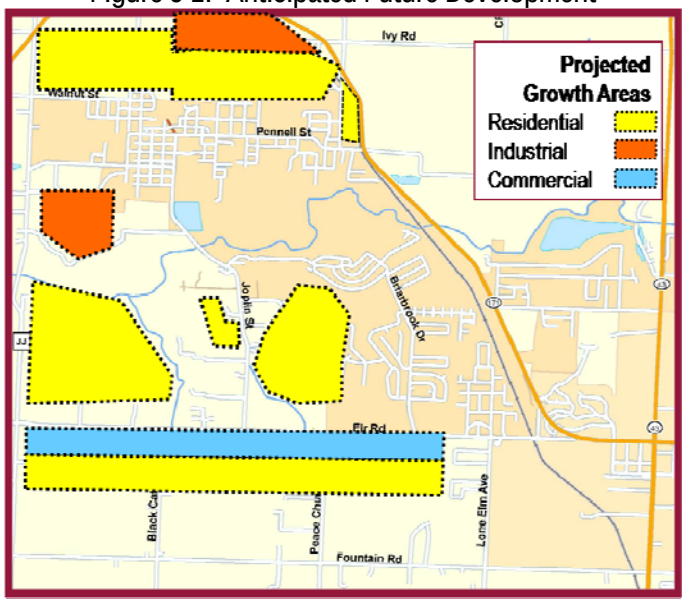
Figure 5-1: Existing Conditions Zoning Map



Source: Allegeier Martin and Associates, July 2008

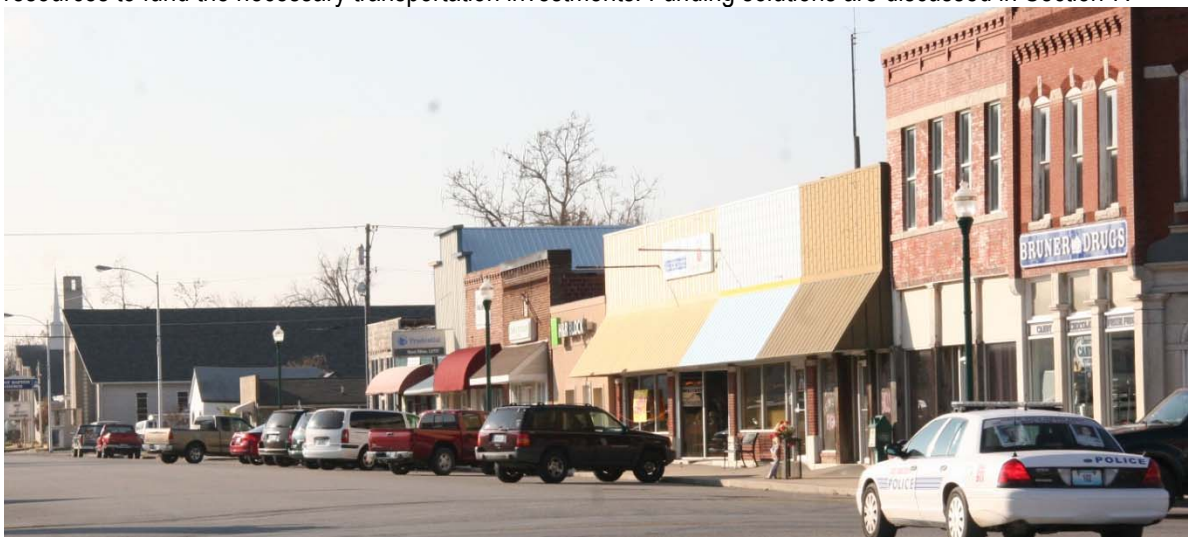
To project future development, the current trends based on overall growth in the City within the existing zoning were reviewed and input from community leaders and stakeholders in addition to actual developer interest were applied to those trends. Community profile and land use were expanded using the available forecast data and planning growth assumptions. All assumptions were verified and agreed upon by community leadership and stakeholders. Figure 5-2 highlights the areas where growth in industry, commercial and residential development is anticipated for Carl Junction.

Figure 5-2: Anticipated Future Development



Source: Transystems

The goal for the community, according to the findings of the survey administered to key community leaders and stakeholders, is to promote more services and retail offered in Carl Junction such as grocery stores, department stores, general business services and/or restaurants rather than remain as-is, a residential suburb of Joplin. The basis of this goal is driven by a desire to increase the tax base to support improvements to Carl Junction rather than losing the tax money to Joplin. This will reduce Carl Junction's reliance on Joplin and could provide resources to fund the necessary transportation investments. Funding solutions are discussed in Section 7.



5.2 Traffic Projections

Based on available forecast data for population growth and the community development profile, growth rates were applied to the traffic data presented in the previous section to project the impacts of the anticipated future growth on the existing transportation system. Over the next one to five years (2010-2014), the assumed growth rate for Carl Junction is 5% per year. Between the following six to twenty years (2015-2029), the growth rate is anticipated to be 3% per year. This methodology provided traffic projections on the existing system if no other improvements were made for the year 2029, as shown in Table 5-1.

Table 5-1: Intersection Operational Analysis Future Projections 2029

Intersection	A.M. Peak Hour				P.M. Peak Hour			
Movement	LOS[1]	Delay[2]	v/c[3]		LOS[1]	Delay[2]	v/c[3]	
Fir Road and Joplin Street								
Eastbound Left	*A*	*1.7*	*0.03*		*A*	*2.3*	*0.05*	
Southbound	*F*	*121.4*	*1.16*		*F*	*77.5*	*1.00*	
Fir Road and N. Peace Church Avenue								
Westbound Left	*A*	*4.8*	*0.18*		*A*	*4.0*	*0.14*	
Northbound	*F*	*112.3*	*0.99*		*F*	*>180*	*1.29*	
Fir Road and Briarbrook Drive								
Eastbound Left	*A*	*0.7*	*0.02*		*A*	*4.4*	*0.16*	
Southbound	*F*	*>180*	*2.11*		*F*	*>180*	*2.00*	
Fir Road and N. Lone Elm Avenue								
Westbound Left	*A*	*5.2*	*0.16*		*A*	*5.0*	*0.22*	
Northbound	*F*	*>180*	*1.91*		*F*	*>180*	*4.64*	
Fir Road and Missouri Route 171								
All Movements (Signalized Intersection)	*F*	*39.8*	*0.90*		*F*	*66.2*	*1.07*	
Briarbrook Drive and Joplin Street								
Southbound Left	*A*	*2.4*	*0.09*		*A*	*3.3*	*0.12*	
Westbound	*C*	*21.3*	*0.65*		*B*	*12.6*	*0.21*	
Route Z and Route JJ								
Westbound Left	*A*	*4.8*	*0.08*		*A*	*5.6*	*0.14*	
Northbound	*C*	*19.4*	*0.66*		*C*	*18.1*	*0.40*	
Southbound	*F*	*>180*	*1.22*		*C*	*19.0*	*0.21*	
Route Z/Pennell Street and Joplin Street								
Westbound Left	*A*	*2.7*	*0.10*		*A*	*3.8*	*0.15*	
Northbound	*F*	*>180*	*2.82*		*F*	*124.3*	*1.06*	
Route Z/Pennell Street and Missouri Route 171								
Eastbound	*F*	*101.5*	*1.11*		*F*	*>180*	*4.74*	
Westbound	*F*	*>180*	*2.15*		*F*	*>180*	*0.28*	
Northbound Left	*A*	*9.7*	*0.36*		*C*	*15.6*	*0.68*	

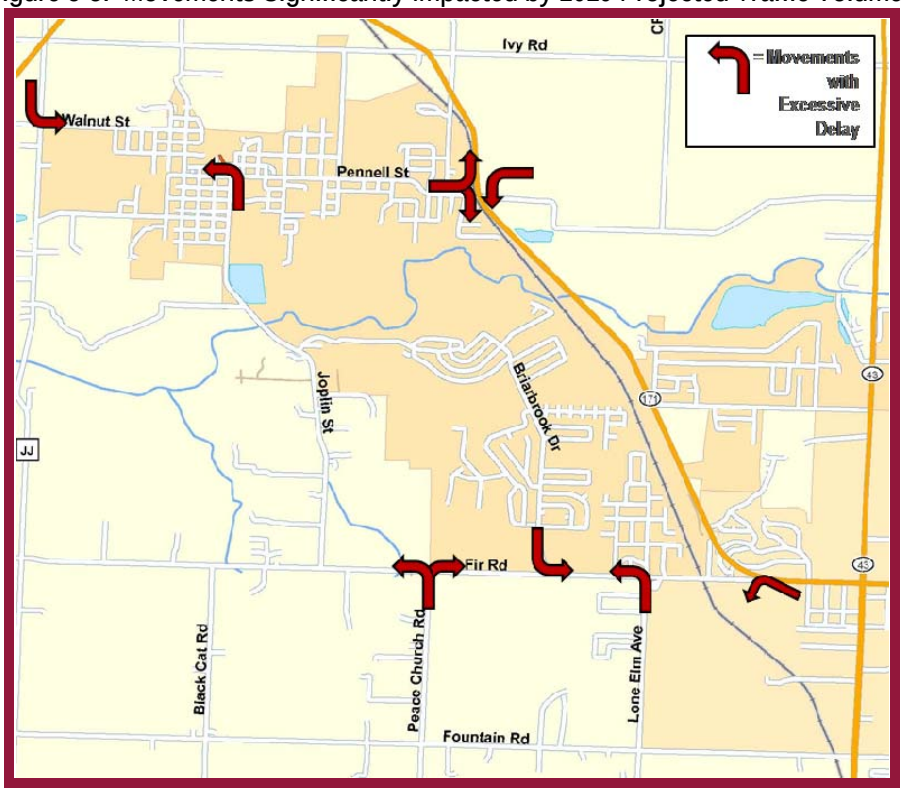
Source: Transystems

1 – Level of Service
2 – Delay in seconds per vehicle
3 – Volume/Capacity Ration

No Action required
Long-range strategies may be considered
Short-range improvements needed

To illustrate the findings for the intersection operations in 2029, Figure 5-3 shows the movements that will experience major delays with these future traffic volumes under current intersection configurations.

Figure 5-3: Movements Significantly Impacted by 2029 Projected Traffic Volumes



Source: Transystems

5.3 Non-Motorized Mobility Needs

Promoting non-motorized travel is essential for communities such as Carl Junction to cater to needs of all citizens. Building an interconnected network of pedestrian accessible transportation system promotes social, physical and economical health of any community. One of the objectives of Transportation Master Plan is to provide an assessment of the sidewalk connectivity and recommend improvements.

A cursory review was conducted for all streets identifying existence or absence of sidewalks by manual inspection. Data on the condition of the sidewalk was not collected. Generally, arterials and collectors do not have sidewalks even on at least one side of the road. This prevents pedestrians and bicyclists from making connections to neighborhoods, schools, parks and trails.

The following factors should be considered when prioritizing sidewalk/trail needs:

- Roadway Classification – Depending on the roadway classification, typical cross-sections were recommended. Sidewalks on both sides of the street are recommended for the arterials and collectors. Sidewalks on at least one side of the road are recommended for local streets.

- Pedestrian Activity – Generally, the land use surrounding the streets dictates the level of pedestrian activity. For example, streets leading to schools and parks have a high potential for pedestrian activity and therefore, priority should be given to incorporate sidewalk facilities in these areas.

- Traffic Volume on Adjacent Streets – As the traffic on a street increases, the safety of pedestrians and bicyclists decreases unless good sidewalks and crosswalks are provided.

- Connectivity – Good connectivity between different pedestrian and bicyclist destinations is important to encourage regular walking or biking. Connectivity between housing developments, schools and commercial centers including the downtown core center should be a priority.

6. Recommended Transportation Improvements and Strategies

Based on the existing conditions as well as the 2029 projections coupled with the future growth anticipated and community goals, Carl Junction is faced with the following opportunities and challenges for the future:

- Opportunities
  - Increasing safety via wider shoulders along roadways; Pennell Street, Fir Road and Joplin Street could be improved based on an adopted typical section.
  - Proposing a new north/south connection through Carl Junction (the two parts of the city are disconnected. A north/south connector would improve access for the residential development with the city services (parks, community center) and retail in the north.
  - Reducing delays at school entrances (As traffic increases on the major roads, school entrances will need to be observed and possible improvement made).
  - Improving sidewalks along major streets based on typical section
  - Encouraging growth by improving the transportation system surrounding retail development; specifically restaurants.
  - Providing paths for bicycles via bike trails to and in parks.
- Challenges
  - Development will cause a demand for an improved transportation system; which would require investment and dedicated funding for improvements.
  - Pennell Street and Fir Road are currently two lanes with limited shoulders. As Carl Junction continues to grow, these roads may experience capacity and safety issues.
  - North/south connector considerations Areas for connections are developing. Cost and the flood plain running through the center of the City are also challenges to consider.
  - Several intersections will require improvements in the future based on projected growth. This must be a long term cost evaluation. For example, traffic signals are initially less expensive than roundabouts; however signals require a high degree of maintenance.
  - Future improvements will likely be required on Route Z in front of the school due to growth and increased traffic in the City.
  - The railroad crossing at Pennell Street and Missouri Route 171 (Vertical alignment, difficult to eliminate at grade crossing).

6.1 Short-range Improvements

Short-range improvements generally target current deficiencies at specific locations with potential solutions and budget level opinions of cost. The following outlines the short-range improvements for Carl Junction:

Fir Road Improvements

- *Provide shoulders and possibly left turn lanes at the intersections along Fir Road.*
- *Investigate the long term benefits of constructing full-width/full-depth shoulders to accommodate additional traffic lanes in the future.*
- *Investigate realignment of Lone Elm Drive and Fir Road to make opposing lanes match up.*
- *Consider if it is feasible to provide a two-way left turn lane (TWLTL) from Joplin Street to 171 along Fir Road; however, this could wait until development happens in the area because current movements limited to the existing intersections would not merit this type of facility.*
- *Note: Any short term improvements or long term strategies for Fir Road will require agency/municipality coordination. Modifications to the signals at/or connections to Missouri Route 171 require MoDOT cooperation. The south side of Fir Road exists on County right-of-way; therefore any improvements to Fir Road will require coordination with the County.*

Pennell Street Improvements

- *Provide a signal at Missouri Route 171 and Pennell Street which is tied into the railroad crossing signals to improve safety.*
- *In conjunction with the above improvement, consider providing a channelized right turn lane at Missouri Route 171 (if space allows).*
- *Investigate all way stop control at Pennell Street and Joplin Street, rotating stop signs which could be put into place during school hours, or possibly adding a roundabout.*
- *Consider the need for a 4-way stop at Pennell Street and Route JJ; however, due to the potential for t-bone accidents at such a location, a roundabout may be a more viable solution.*

Non-Motorized Improvements

- *Determine desired typical section specific to each transportation facility to provide appropriate pedestrian and bicycle access.*

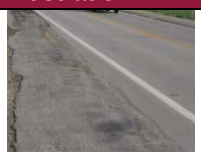
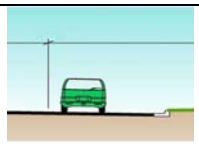
North-South Connector

- *Discussed further in Section 6.3, determine desired typical section and proactively begin corridor preservation with advanced right-of-way acquisition.*

6.2 Budget Level Opinions of Cost

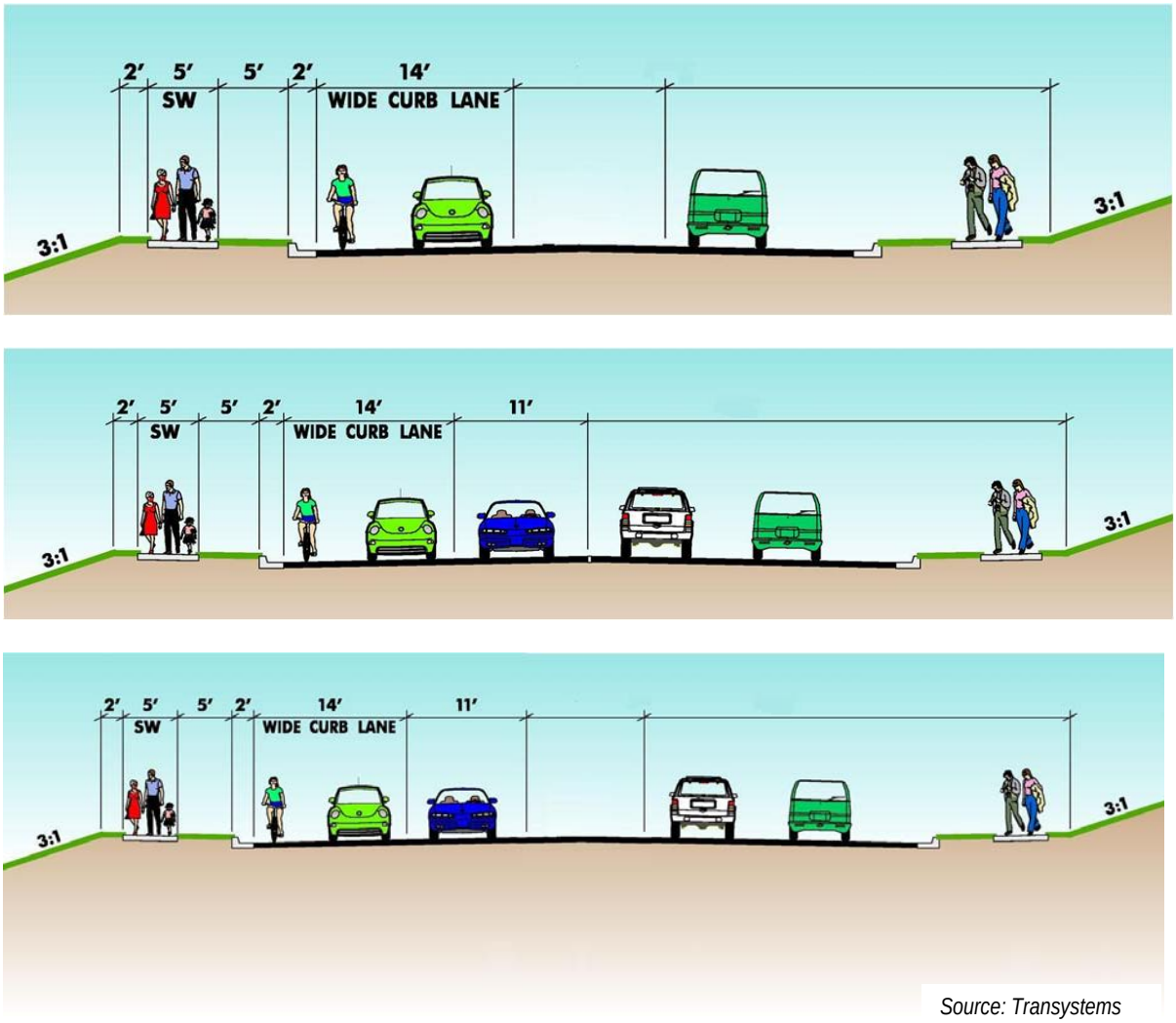
In order to program the transportation improvements prioritized in the short term, cost estimates must be developed to determine how they match with budgetary constraints. Table 6-1 provides a summary of budget level opinions of cost that may be applied to the potential solutions. The additional design considerations for traffic calming measures are not included in these costs.

Table 6-1: Potential Measures for Enhancing Carl Junction Transportation System

Improvement	Description	Illustration	Budgetary Cost
Shoulders	Add shoulders to existing 2-lane for added safety. Shoulders provide for additional width for vehicle recovery and refuge for disable vehicles to minimize lane blockages.		$30 to $45 per square yard
Full Depth Shoulders	Construct full-width/full-depth shoulders to provide for future roadway expansion to be used for driving lane when capacity is needed. Cost is typically 80% of the cost of constructing a lane.		$800K per mile
Add-A-Lane	Increase facility capacity by adding lanes. See typical sections in Figure 6-1.		$IM per lane mile
New Parkway	Construct a new parkway facility to provide new system access via a new corridor. Proactive corridor preservation may be required to keep this a viable alternative for a north/south connection.		$I.2 M per lane mile plus the cost of the bridge structure over Center Creek
Signalized Intersection	Install signals to control traffic flow. The cost of signalization varies whether it is a signal for a 2-3 lane road or a 4-5 lane intersection. This does not include regular maintenance and operations costs required of the signals or the cost of the additional lanes at the intersection.		$150K to $ 200K per intersection
Roundabout	Install roundabout to direct traffic flow. Roundabouts offer increased safety (compared to signals) and reductions in delay (not only in peak hour performance but in off-peak times) and don't require the additional maintenance and operations costs as do signals.		$400K for single lane roundabout to $ IM for multi-lane roundabouts
Sidewalks	Install sidewalks (4" deep concrete) with curb and gutter along major routes.		$65 per square yard
Marked Crosswalk	Install thermoplastic markings at street corners. Midblock crossings may be appropriate near school complex.		$0.50 to $5 per linear foot
Pedestrian Count Down Timer Signal	Install supplemental pedestrian signal control to indicate the time remaining before crossing vehicles get 'green' signal indication. These may be appropriate near school complex in addition to some signalized intersections.		$1000 to $5000 each

Source: Transystems

Figure 6-1: Typical Sections for 3-Lane, 4-Lane and 5-Lane Facilities



Source: Transystems

6.3 Long-range Strategies

Long-range strategies include the facilities needed to support future development and complete the major street system within the City. These long-range strategies include some specific location improvements and also more general guidelines for future upgrades for both motorized and non-motorized transportation facilities. The following outlines the long-range strategies for Carl Junction:

Fir Road Improvements

- *Potential widening of Fir Road to a 4 or 5 lane road depending on the need for a TWLTL.*
- *Potential need for signals or a roundabout at Fir Road and Briarbrook Drive as well as Lone Elm Drive and Fir Road, respectively. These signals should be interconnected to the existing signal at Fir Road and 171. Timing modifications to the Fir Road and 171 signal depending on traffic pattern changes may be required.*

- *All-way stop at Fir Road and Peace Church Avenue and possibly Joplin Street and Fir Road depending on development areas.*

Note: If a N-S connector is built into the Briarbrook subdivision, this could also accelerate the need for improvements at the intersections of Fir Road with Briarbrook Drive and Joplin Street and Briarbrook Drive if traffic patterns change.

Pennell Street Improvements

- *Install a 3-way stop at Joplin Street and Pennell Street.*
- *Investigate the potential for a roundabout at Route JJ and Rte Z/Pennell Street/Walnut Street. May depend on traffic changes and development, could be greatly impacted as could everything else if the west side connector is built along JJ as this could have a major impact on existing traffic patterns and growth.*

Non-Motorized Improvements

- *Install appropriate pedestrian and bicycle access in conjunction with concurrent roadway improvements and throughout community as appropriate.*

North-South Connector

Center Creek divides the city of Carl Junction and there are currently only three main roads - Route JJ, Joplin Street and Missouri Route 171, which provide North/South mobility. This is a safety, community cohesion and system connectivity issue for the City. A north-south connector solves a quality of life issue:

- *Safety* - Improved emergency access increases community safety as new access across Center Creek, not affected by high water or railroad crossings like the existing access, would provide reliable, intra-community travel for reduced response times.

- *Community Cohesion* - Currently the community is divided with the area to the south of Center Creek currently accommodating the majority of the residences and tax base and yet the community government and recreation facilities are located north of the creek. New residential development is occurring on to the north so this dominance may shift; however, that does not remedy the issue of community cohesion that the connector roadway would provide.

- *System Connectivity* - A bridge crossing over Center Creek would benefit both the fire and rescue as well as help the businesses in town as residents will more easily be able to travel from their neighborhood into town for business rather than going elsewhere.

There is a lot of seasonal traffic into Frank Dean Park to access the ball fields. This presents safety issues due to the lack of adequate parking. The adjacent residents and pedestrians exiting their vehicles along the roadway are presented with hazards of narrow roadways congested with vehicles and no sidewalks. Using the residential drive to access Pennell Street from the park presents challenges of poor sight distance as well as back-ups due to delays accessing Missouri Route 171. To avoid these deficiencies, motorists often opt for the unpaved, gravel road through adjacent Center Creek Park which is limited by the one-lane bridge crossing an unreliable access due to flooding. This seasonal traffic issue could benefit with access through Center Creek with a paved, improved roadway.

The recommended facility for this north-south connection is a parkway similar to the one shown in the photo to the right. A parkway would offer adequate capacity yet would keep the look and feel of the adjacent residential and park areas. In addition to the functionality of a traditional parkway, other traffic calming measures could be implemented to deter higher speed through traffic from being attracted to this facility rather than using the more appropriate perimeter facilities. Appendix D provides examples of such traffic calming measures. These would aid in ensuring this facility operates more as a collector rather than an arterial like Joplin Street.



7. Funding

Obtaining the resources necessary for the City of Carl Junction to fund any of the transportation system improvements will require a variety of funding sources. Various sources of funds that could be pursued to make improvements financially feasible are discussed here:

Capital Improvements Sales Tax

Section 94.577, RSMo., authorizes cities to impose a sales tax of one-eighth, one-fourth, three-eighths or one-half of one percent on all retail sales in the municipality for the purpose of funding capital improvements, including operation and maintenance. The sales tax must be authorized by the City Council and approved by a simple majority of the voters at an election. The City may issue bonds to be retired from revenues derived from the capital improvements sales tax. This revenue source can be used to construct transportation improvements and to maintain those improvements anywhere in the City

City Sales Tax

Section 94.510, RSMo. authorizes cities, by a majority vote of its governing body, to impose a city sales tax; provided that the voters of the City, at a public election, by a majority of those voting, approve the imposition of the sales tax. The tax may be imposed at the rate of one-half or seven-eighths of one percent or one percent from the receipts from the retail sale of all tangible personal property or taxable services at retail. Like the real estate tax, this revenue source can be used for any legitimate governmental purpose to fund costs arising or programs located anywhere in the City.

Real Property Tax

Mo. Const. art. X, §§ 1; 11(b) and 11(c) and Section 94.400, RSMo., authorize the City to levy taxes on real and tangible personal property for general municipal purposes. This tax may be imposed annually and is limited to one dollar per $100 of assessed valuation. The property tax rate may be increased above this limit for a period not to exceed four years; provided however, that the rate and purpose for the increase has been approved by a 2/3 vote of the City's qualified electors and that the rate is not increased more than thirty cents per $100 of assessed valuation at any election.

Transportation Sales Tax

Sections 94.700 through 94.755, RSMo. also authorize cities, by a majority vote of the City Council, to pass an ordinance imposing a sales tax at a rate not to exceed one-half of one percent on the receipts from the retail sale of all tangible personal property or taxable services within the City. That ordinance, however, does not take effect until a majority of the electorate voting on the issue approves the imposition of the sales tax. The proceeds of the tax must be used for transportation purposes, which is defined to include the construction, reconstruction, repair and maintenance of; the acquisition of lands and right-of-way for; and planning and feasibility studies for streets, roads and bridges; and the financial support of public mass transportation systems and publicly-owned airports.

General Obligation Bonds

Subject to certain constitutional and statutory limitations, primary of which is a constitutional limit on the total amount of debt the City can incur based upon a set percentage of its assessed valuation, the City has the ability to raise funds for street improvements by the issuance of general obligation bonds. General obligation bonds are long-term obligations of the City backed by the full faith and credit of the City. This means that the City has an obligation to raise whatever revenue, from any source available, to pay the yearly principal and interest payments on the bonds.

Revenue Bonds

The City may issue revenue bonds for limited purposes pursuant to Mo. Const. art. VI, §§ 27(a) and 27(b). Revenue bonds are distinct from general obligation bonds primarily for the reason that the bonds are retired from a source of revenue other than real estate property taxes, such as from utility rates, user fees and sales taxes.

Excise Tax

An excise tax is a method of raising revenue by levying a tax on a particular activity. An excise tax has been defined as a tax that is measured by the amount of business done, income received, or by the extent to which a privilege may have been enjoyed or exercised by the taxpayer, irrespective of the nature or value of the taxpayer's assets or investments in business. It is different from a property tax, which is a tax on the assessed value of property. An excise tax is not subject to the benefit or nexus requirements of a fee imposed pursuant to a city's police power, as is a street user or impact fee (see below). This means that it is not required that there be a rational relationship between the tax imposed and the demand for public services created by the activity upon which the tax is imposed for the tax to be legal.

Right-of-Way Exactions

Exactions are those aspects of development regulations that allow the City to require a person seeking development approval to give something to the City as a condition of that approval. Traditionally, cities, through the exercise of their police powers, have required developers to dedicate right-of-way for streets within the development and for streets abutting the development as a condition of a specific development's approval. Typically, these right-of-way exactions have been imposed at the time of plan or subdivision plat approval, with the understanding that the dedication would take place at no cost to the entity requiring the dedication. A right-of-way exaction is one specific type of exaction. In reality, there are many different types of exactions, including, for example, park land dedication requirements and requirements that a developer construct a facility, such as a sanitary sewer, water line or street.

Impact or Street User Fees

A street user or impact fee is a system of monetary exactions on new development that is imposed as a part of the development approval process. Generally speaking, all fees collected by the City from an individual fee payer must be spent for improvements to the street network that benefit that fee payer. The amount of the fee collected with respect to each development cannot exceed an amount that reflects the cost of constructing those improvements to the street network that are caused by the development. To ensure this legal requirement is met, separate zones or services areas must be created throughout the City. The configuration of these service areas is established by determining an area within which all owners of undeveloped property will benefit from any street improvements made in the area.

Federal/State Programs

The Missouri Department of Transportation administers federal sub-allocated programs that utilize funds provided under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). These programs are typically funded on an 80% federal match/20% local match basis. The federal sub-allocated programs are briefly described below:

A. Surface Transportation Program (STP): The STP provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System (NHS), bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities.

B. Transportation Enhancements: Transportation enhancements (TE) are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of the Nation's intermodal transportation system. The transportation enhancements program provides for the implementation of a variety of non-traditional projects, with examples ranging from the restoration of historic transportation facilities, to bike and pedestrian facilities, to landscaping and scenic beautification, and to the mitigation of water pollution from highway runoff.

C. High Priority Demonstration Projects: The High Priority Projects Program provides designated funding for specific projects (commonly referred to as demonstration projects) identified by Congress. The designated funding can only be used for the project as described in the law.

D. State Infrastructure Banks (SIB): The NHS Designation Act (P.L. 104-59, Section 350) authorized the DOT to establish the SIB pilot program. A SIB is a State (or multistate) revolving fund that can offer loans and non-grant forms of credit assistance to public and private sponsors.

E. Off-System Bridge Replacement and Rehabilitation Program: This program funds bridge replacement and rehabilitation projects on deficient bridges that are functionally classified as a local road and rural minor collectors. The transportation bill mandates that at least 15 percent and no more than 35 percent of the state's total bridge appropriation be allocated to the counties for use on off-system bridges. The Missouri Highways and Transportation Commission approved 15 percent of the bridge funds for this program. MoDOT administers this program and distributes funding to Missouri counties for project selection.

F. On-System Bridge Replacement and Rehabilitation Program: This program funds bridge replacement and rehabilitation projects on deficient bridges that are functionally classified as urban collectors, rural major collectors and arterials.

Transportation Corporations

Sections 238.300 through 238.367, RSMo. provide for the creation of non-profit transportation corporations. Transportation corporations are private entities formed to "fund, promote, plan, design, construct, improve, maintain, and operate one or more [transportation] projects or to assist in such activity." Transportation corporations are created by submission of an application signed by at least three registered voters to the Missouri Highways and Transportation Commission requesting that the Commission authorize creation of a transportation corporation to act within a designated area. The application must include preliminary plans and specifications, including the proposed plan for financing a project. Projects are limited to those that will be a part of the state highways and transportation system. The transportation corporation is governed by a board of directors appointed by the Commission.

Community Improvement Districts

Sections 67.1401 through 67.1571, RSMo. authorize the creation of Community Improvement Districts (CID). A CID may be initiated by petition signed by 1) property owners collectively owning more than 50% by assessed value of the real property within the boundaries of the proposed district and 2) more than 50% per capita of all owners of real property within the boundaries of the proposed district. The petition must include a five-year plan stating a description of the purposes of the proposed district, the services it will provide, the improvements it will make and an estimate of costs of these services and improvements to be incurred. The petition must also include the maximum rates of real property taxes that may be submitted to the qualified voters in the district for approval, the maximum rates of special assessments and the methods of assessment that may be proposed by petition, and any other proposed limitations on the powers of the district. The statutes require the City Council to hold a public hearing on a proposed CID within 45 days after the petition is filed. The CID may be established by ordinance by the City Council after the public hearing.

Industrial Development Bonds

Sections 100.010 through 100.200, RSMo. authorize cities or industrial development authorities established by cities to issue industrial development bonds. The basic concept is that the City issues bonds to finance acquisition of real and/or personal property (equipment) for a development project for a private company. The City retains ownership of the real and/or personal property and leases it back to the company under a lease-purchase arrangement whereby by at the end of the term of the bonds, the company acquires ownership of the property. Typically, the rent paid by the private company corresponds to the required payments on the bonds.

Neighborhood Improvement Districts

Sections 67.453 through 67.475, RSMo. authorize the creation of Neighborhood Improvement Districts (NID). Under the NID statutes, particular areas of land may be designated by the City Council as a "neighborhood" that will benefit from a particular public improvement or improvements, including streets and parks. Landowners within each designated neighborhood must authorize the formation of the NID either by a vote of approval or by submission of a petition to the City Council signed by the owners of record of at least two thirds, by area, of all real property located within the proposed NID.

Special Assessment Districts

Chapter 88 of the state statutes authorizes the creation of special assessment districts to finance public improvements, including street improvements. The statutes provide that a city must draw a district and determine the improvements to be made that will benefit the district. The City then assigns a portion of the total cost of the improvements within that area to each parcel in the district. Special tax bills are issued and are payable in sixty days or in installments over a period of up to ten years. Tax bills paid in installments include interest. .

Special Business Districts

Sections 71.790 through 71.808, RSMo. authorize cities to establish special business districts for specified areas of the City upon petition by one or more owners of real property in the proposed district. The purpose of the law is to grant to these districts the power to levy special fees and taxes in each district for the maintenance and improvement of the special business district. Property owners in the district may be taxed on an ad valorem basis at the rate of $.85 per $100 of assessed valuation. Businesses may be assessed a license tax (subject to a protest by businesses representing a majority of the total license taxes). The taxes and fees may be used for the purpose of maintaining and improving public facilities in the district, including the opening of new streets or the widening of narrow existing streets.

Tax Increment Financing

The basic concept behind tax increment financing (TIF) is that the redevelopment of the area approved as a redevelopment district will increase the equalized assessed valuation of the property, thereby generating new revenues to a city that can be used to pay for specified costs of a redevelopment project. These costs may include installation, repair, construction and reconstruction of streets and acquisition and construction of other public facilities within a redevelopment area. Property taxes and other revenues generated by the existing development in a legislatively defined redevelopment district are frozen when the redevelopment is approved by the City Council and the increased property tax and a portion of other revenues generated by the new development are captured and placed in a special fund to pay for the costs of redeveloping the area. Authority for TIF is located at Sections 99.800 through 99.865, RSMo.

Missouri Downtown and Rural Economic Stimulus Act

MODESA, the Missouri Downtown and Rural Economic Stimulus Act, (Sections 99.915 to 99.1060, RSMo.) was recently in Missouri to provide an alternative financing mechanism to state and local tax increment financing. MODESA is designed to provide financing for a "major initiative" redevelopment projects in a city's downtown/central business district area. MODESA is similar to state and local tax increment financing (TIF) in that incremental increases in tax revenues are captured to fund redevelopment project costs. MODESA, however, incorporates some changes and greater flexibility, including, but not limited to, changes regarding state appropriation and the state tax increments that may be utilized.

Transportation Development Districts

Sections 238.200 through 238.275, RSMo, authorize a city to create transportation development districts (TDD) encompassing all or a portion of the City. The statutorily-stated purpose of a TDD is to fund, promote, plan, design, construct, improve, maintain, and operate one or more transportation projects or to assist in such activity. Once created, a TDD is a separate political subdivision of the state with powers such as condemnation, the power to contract with parties, to lease or purchase real or personal property, and to sue and be sued. A city has no control or jurisdiction over TDD projects, unless the control is agreed to by contract. However, the board of directors of the district cannot increase or decrease the number of projects in the district without first obtaining

authorization of the voters and the approval of the Missouri Highways and Transportation Commission and/or the city, depending on the project.

Urban Redevelopment Corporations (Chapter 353)

Any Missouri city may establish an Urban Redevelopment Corporation to redevelop areas that have been designated as blighted due to age, obsolescence or physical deterioration. The designated redevelopment area may be very large or as small as a single lot or building. The corporation may acquire land through eminent domain. The governing body retains discretion to approve or deny these grants. Under this program, up to 100% of improvements to real property may be exempt from state and local property taxes for the first 10 years. For the next 15 years (after the initial 10 year period), 50% of the real property taxes on both the land and improvements are abated.

Appendix A – Transportation Plan Survey and Survey Results Summary Mark-Up

Transportation Plan Survey: *We want your input.*

Stakeholders, community leaders and interested parties:

The City of Carl Junction has contracted us, TranSystems, to develop a transportation plan for the City. The plan will address the operational needs and opportunities for the City's roadway system and consider the desire to balance the movement of people through the City to best serve the community. The city street network represents a significant investment of public resources that will continue to be vital for both the growth and stability of Carl Junction.

During the development of the plan, TranSystems will review the operational condition of the street network in conjunction with the community profile and land use, employ available forecast data and planning growth assumptions, identify short-term and long-term improvement needs and identify priorities. The previous Joplin Area Transportation Study Organization's Long-Range Transportation Plan and the City of Joplin's Comprehensive Plan will be used as a starting point for the analysis.

Attached is a four page survey to allow you to be part of this process. We are asking that you share your perspective regarding access, delays, community character, future development and priorities. In addition to answering the questions as presented, please provide additional comments in the space provided on the last page and feel free to use the back of the paper or attach additional sheets if needed. Your input will assist in identifying the goals of the community for consideration in setting long term transportation priorities. The transportation plan will aid investment decisions for future improvements and we want you to be a part of that decision-making process.

If you have any questions, do not hesitate to contact the project manager from TranSystems, Kyle Kittrell, via email at krkittrell@transystems.com or by phone at (314) 997-2459.

Thanks, in advance, for participating in this survey

Transportation Plan Survey: *Your Daily Experience*

Center Creek divides the city of Carl Junction and there are currently only three main roads, Route JJ, Joplin Street and Highway 171, which provide North/South mobility. Is North/South mobility an issue for you and/or the community? Yes No

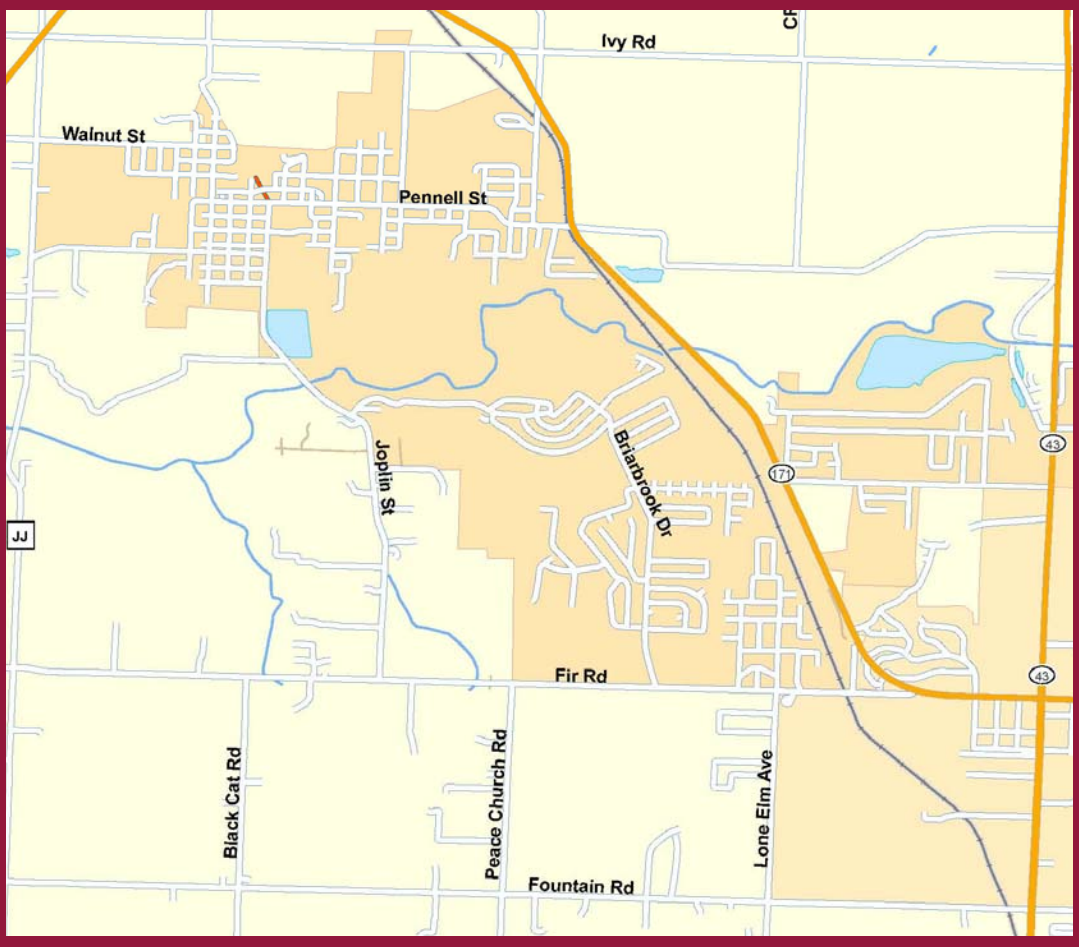
If yes, on a scale of 1 to 5, where 1 means not important and 5 means very important, which of these ways of solving the mobility issue are important?

More roadway connections	1	2	3	4	5
Bike trail or bike path connections	1	2	3	4	5
More sidewalk connections	1	2	3	4	5
Other: _____	1	2	3	4	5

There are opportunities to improve transportation safety for pedestrians and drivers throughout the community. Do you feel like safety is an issue? Yes No

If yes, on a scale of 1 to 5, where 1 means not concerned and 5 means very concerned please rate the categories below on the impact they have you.

Railway crossings	1	2	3	4	5
Access to schools (paths, roadways sidewalks…)	1	2	3	4	5
Access to parks/playing fields (paths, roadways sidewalks…)	1	2	3	4	5
Other: _____	1	2	3	4	5



Residents of Carl Junction use Highway 171 as their primary route to/from Joplin and surrounding areas. Pennell St., Rte JJ, Joplin St., Fir Rd. and others provide access within the community to /from work and school.

Please indicate on the map below areas where you experience delay (on a fairly regular basis) while traveling in and around Carl Junction.

Some examples might be the intersection of Highway 171 and Pennell Street or at some of the railroad crossings.

Transportation Plan Survey: Character of the Community

Would you like to see Carl Junction remain as it is, a residential suburb of Joplin, or would you like to see more services and retail offered in Carl Junction such as grocery stores, department stores, general business services or restaurants? Please circle one.

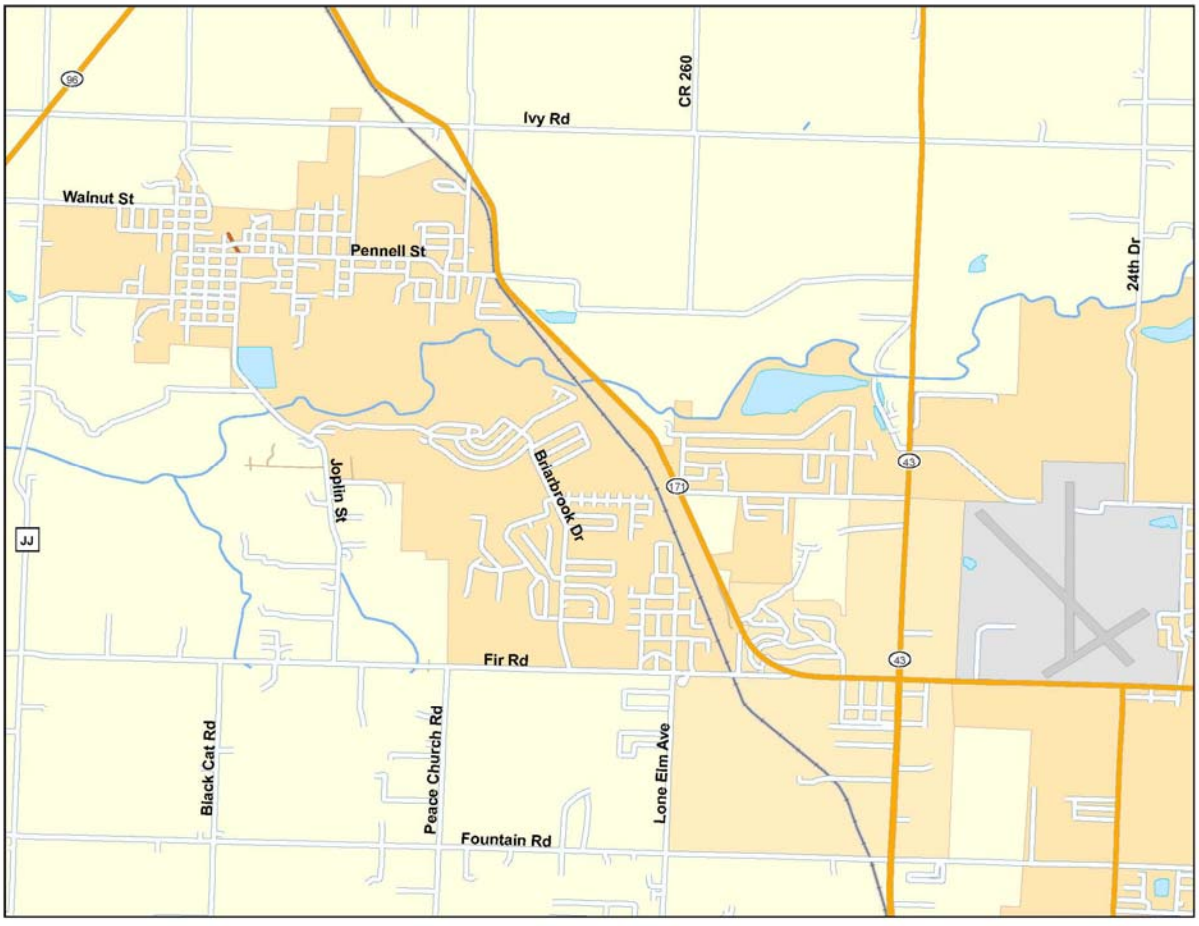
A. Remain as a residential suburb and continue to travel to Joplin for services
B. Develop more services in Carl Junction

If you answered B, on a scale of 1 to 5, with 1 being the least important and 5 being very important, what kind of services do you think are most important?

Grocery	1	2	3	4	5
Retail Department /Discount Stores	1	2	3	4	5
Clothing Stores	1	2	3	4	5
Business Services (Banks, Accountants etc…)	1	2	3	4	5
Restaurants	1	2	3	4	5
Other: _____	1	2	3	4	5

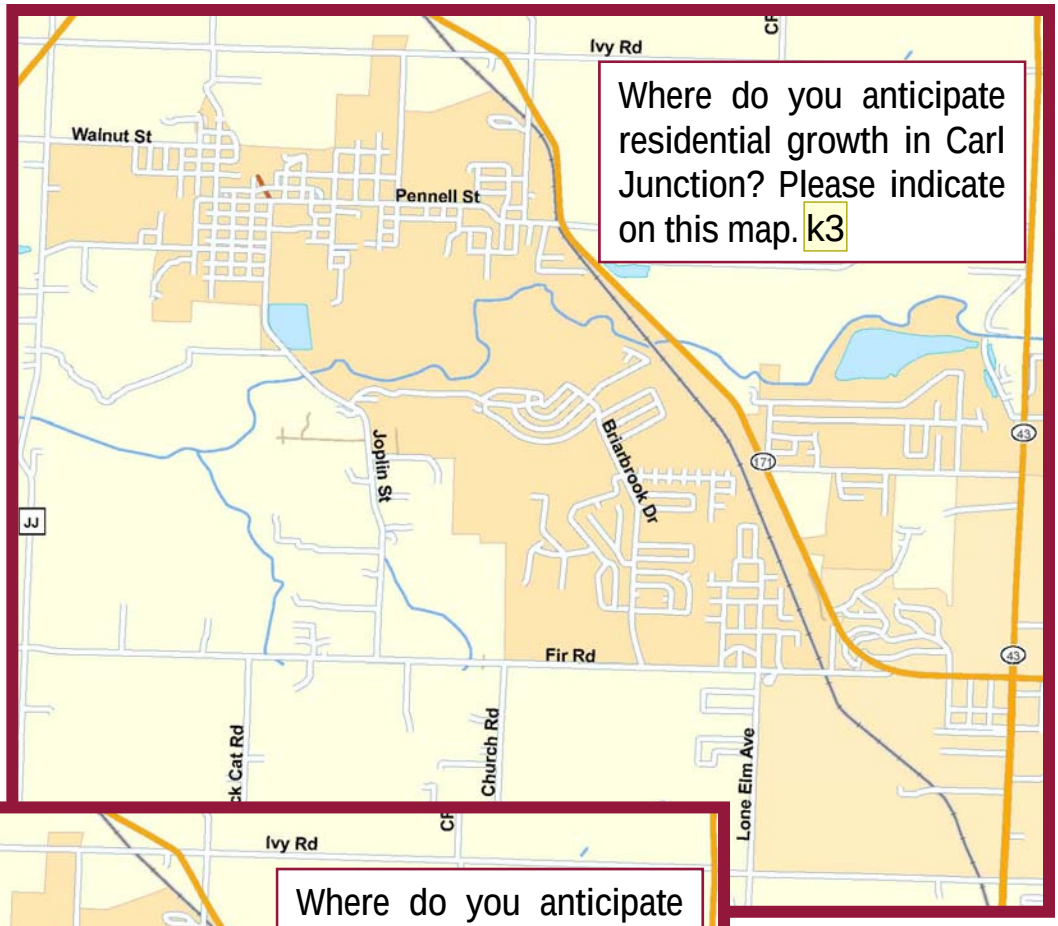
If you would like to see more commercial services in Carl Junction, please indicate on this map where you think is the best location for these services.

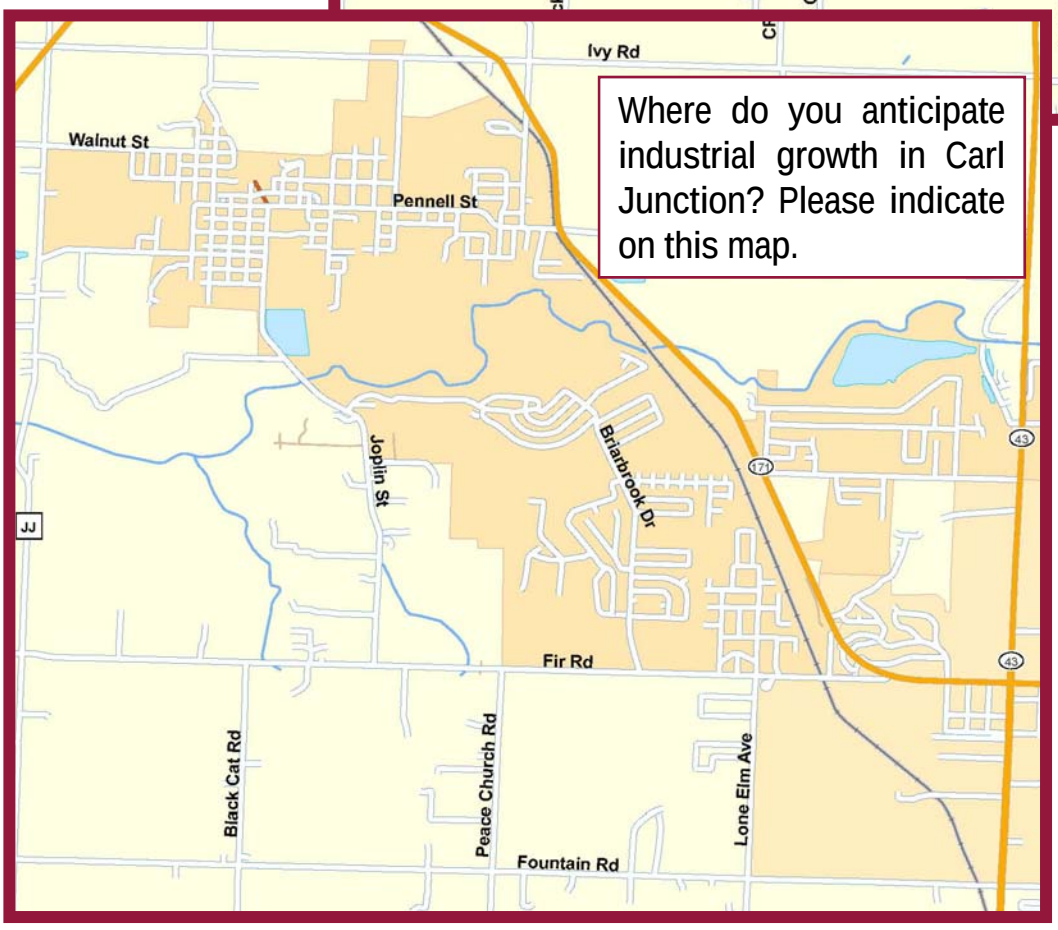
Also please indicate with a " ☆ " what you perceive as the "Entrance" to Carl Junction .



Transportation Plan Survey: *Future Development*

Comments:____





Comments:____

Transportation Plan Survey: *Priority Goals for the Plan*

There are many alternatives that could be included in a transportation plan for Carl Junction. On items, 1-6 below, circle issues that you feel are important to Carl Junction. Don't limit yourself to only one choices per category; feel free to circle all that are important to you and apply to your community.

1. Reducing delays
    - A. School entrances
    - B. Access to and from work
    - C. Railroad Crossings
    - D. Other:_____
2. Improvements to sidewalks
    - A. Along major streets
    - B. To parks
    - C. Around schools
    - D. Other: _____
3. Improving paths for bicycles
    - A. Bike trails in parks
    - B. Bike lanes on commercial streets
    - C. Bike lanes on residential streets
    - D. Other: _____
4. Improve safety
    - A. Wider shoulders along roadways
    - B. Pedestrian crossings
    - C. Intersection improvements
    - D. Other: _____
5. Improve retail development within the City
    - A. Grocery
    - B. Shoes and Apparel
    - C. Restaurants
    - D. Other: _____
6. Improvement of access to specific areas
    - A. Center Creek Park/Frank Dean Park
    - B. North/South connection
    - C. Schools
    - D. Other:_____

From items 1-6 above please select the top two goals/strategies that you think are important for this region and explain why these two are the most important.

Choice 1. _____ Why?_____
_____
_____

Choice 2. _____ Why? _____
_____
_____

Additional Comments:
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for responding to our survey!

Transportation Plan Survey: *Your Daily Experience*

Center Creek divides the city of Carl Junction and there are currently only three main roads, Route JJ, Joplin Street and Highway 171, which provide North/South mobility. Is North/South mobility an issue for you and/or the community? Yes No *14/15 indicated "Yes"*

If yes, on a scale of 1 to 5, where 1 means not important and 5 means very important, which of these ways of solving the mobility issue are important?

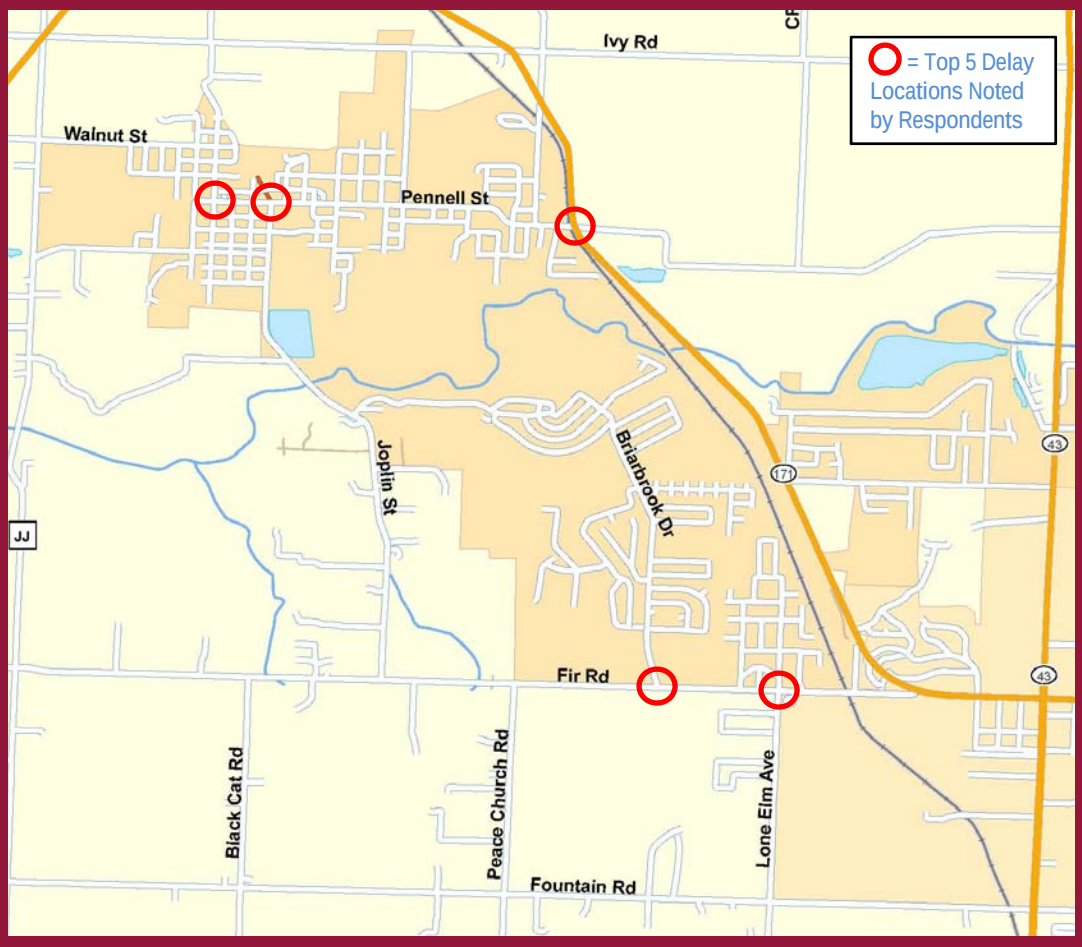
	Avg. Score					
More roadway connections	4.00	1	2	3	4	5
Bike trail or bike path connections	3.80	1	2	3	4	5
More sidewalk connections	3.47	1	2	3	4	5
Other: _____		1	2	3	4	5

There are opportunities to improve transportation safety for pedestrians and drivers throughout the community. Do you feel like safety is an issue? Yes No *15/15 indicated "Yes"*

If yes, on a scale of 1 to 5, where 1 means not concerned and 5 means very concerned please rate the categories below on the impact they have you.

	Avg. Score					
Railway crossings	3.00	1	2	3	4	5
Access to schools (paths, roadways sidewalks…)	4.40	1	2	3	4	5
Access to parks/playing fields (paths, roadways sidewalks…)	4.40	1	2	3	4	5
Other: __Major Intersections along Fir_	0.33	1	2	3	4	5

Results



Residents of Carl Junction use Highway 171 as their primary route to/from Joplin and surrounding areas. Pennell St., Rte JJ, Joplin St., Fir Rd. and others provide access within the community to /from work and school.

Please indicate on the map below areas where you experience delay (on a fairly regular basis) while traveling in and around Carl Junction.

Some examples might be the intersection of Highway 171 and Pennell Street or at some of the railroad crossings.

Transportation Plan Survey: Character of the Community

Would you like to see Carl Junction remain as it is, a residential suburb of Joplin, or would you like to see more services and retail offered in Carl Junction such as grocery stores, department stores, general business services or restaurants? Please circle one.

A. Remain as a residential suburb and continue to travel to Joplin for services 1/15

B. Develop more services in Carl Junction 14/15

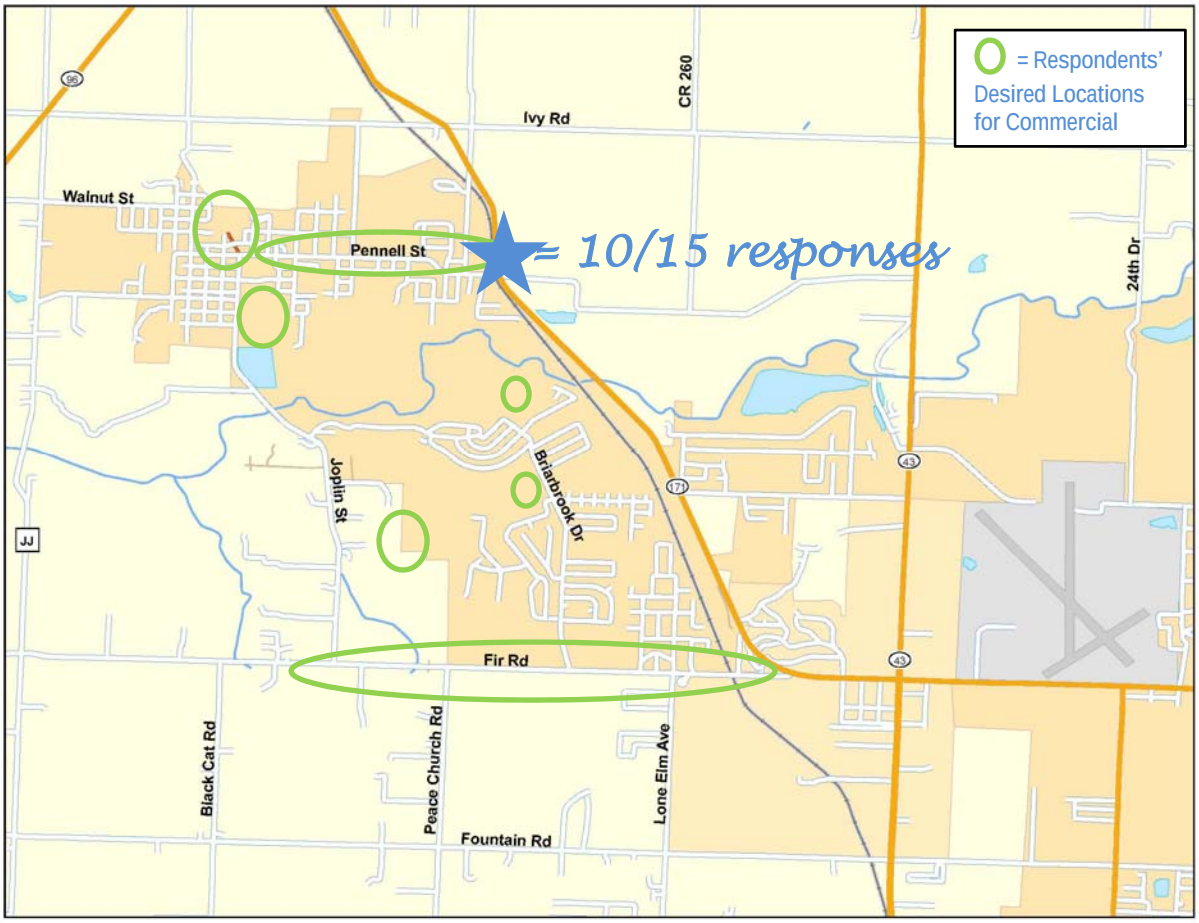
Most respondents desire more services to increase tax base to support improvements to Carl Junction rather than patronage in Joplin.

If you answered B, on a scale of 1 to 5, with 1 being the least important and 5 being very important, what kind of services do you think are most important?

	Avg. Score					
Grocery	3.80	1	2	3	4	5
Retail Department /Discount Stores	3.20	1	2	3	4	5
Clothing Stores	2.27	1	2	3	4	5
Business Services (Banks, Accountants etc…)	3.80	1	2	3	4	5
Restaurants	4.67	1	2	3	4	5
Other: __Unique Retail Shops, Dry Cleaners, Healthcare___	0.33	1	2	3	4	5

If you would like to see more commercial services in Carl Junction, please indicate on this map where you think is the best location for these services.

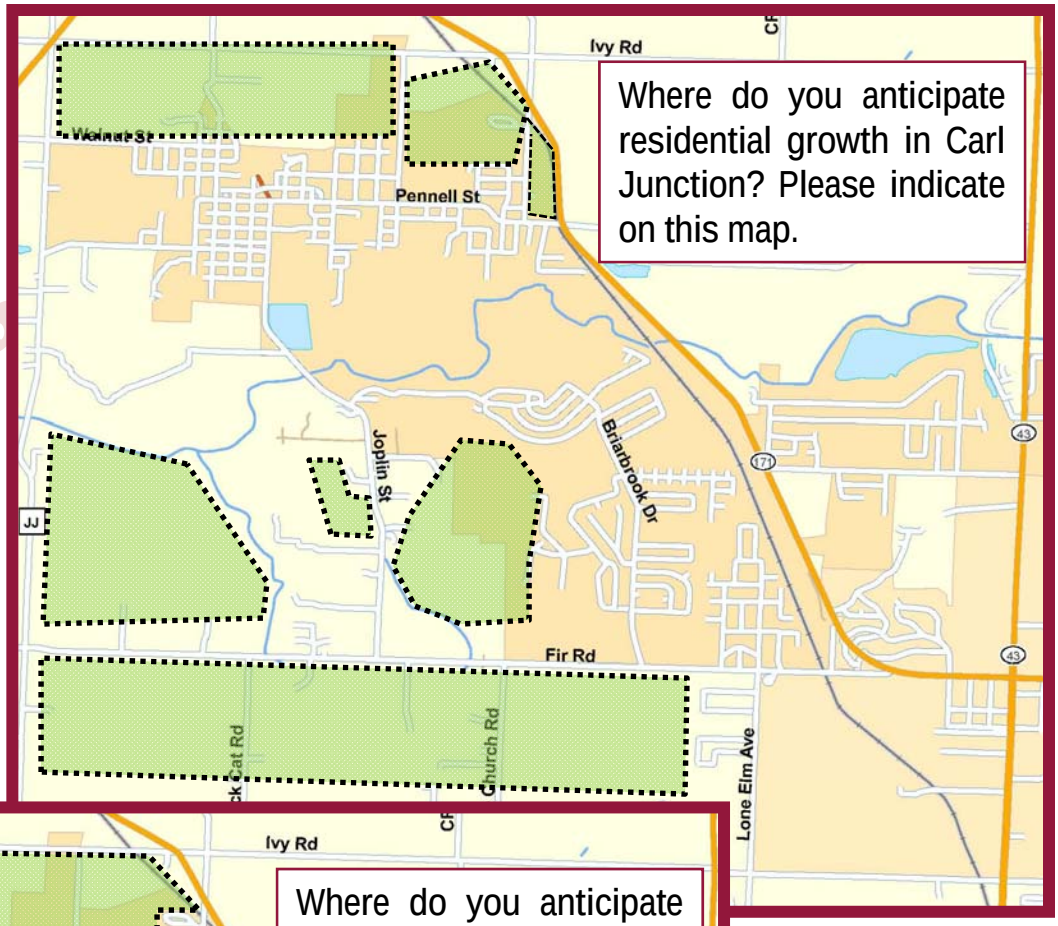
Also please indicate with a " ☆ " what you perceive as the "Entrance" to Carl Junction .

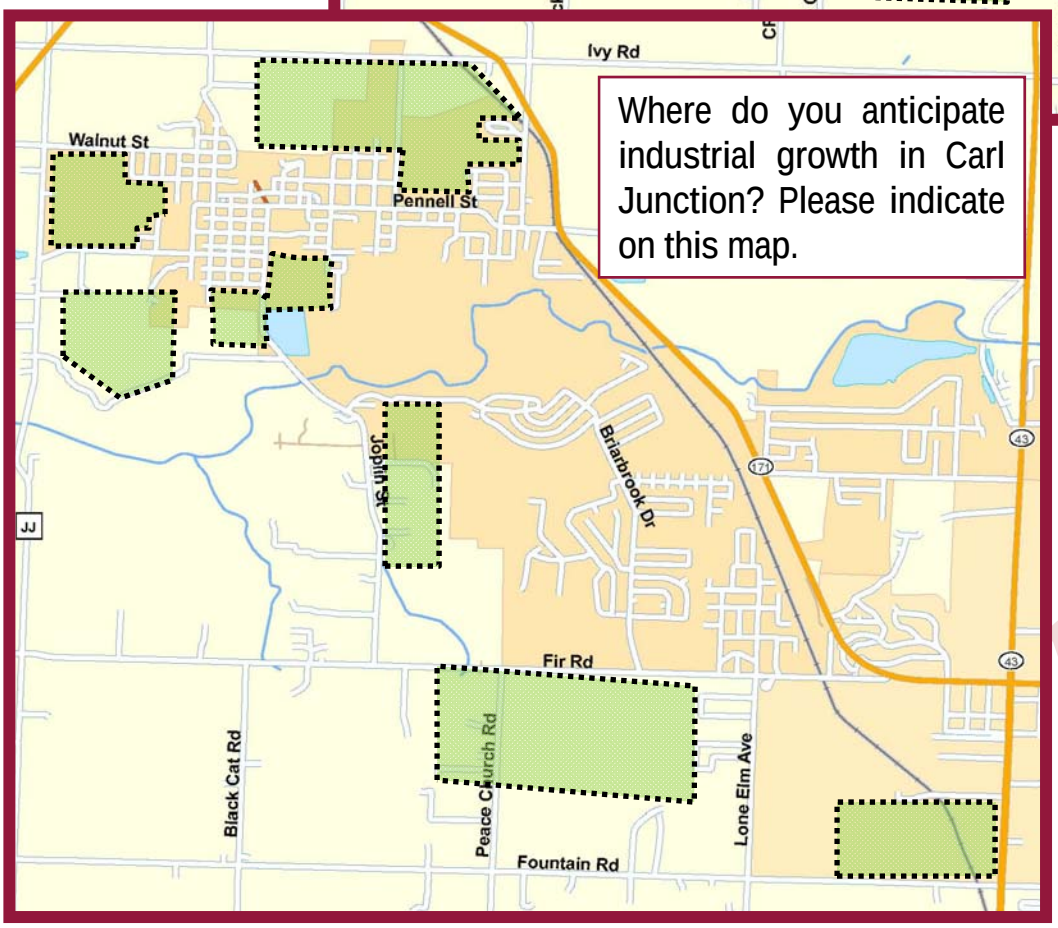


Results

Transportation Plan Survey: *Future Development*

Comments:_____





Comments:_____

Results

Transportation Plan Survey: *Priority Goals for the Plan*

There are many alternatives that could be included in a transportation plan for Carl Junction. On items, 1-6 below, circle issues that you feel are important to Carl Junction. Don't limit yourself to only one choices per category; feel free to circle all that are important to you and apply to your community.

Results

1. Reducing delays — No. of Votes
   - A. School entrances — 12
   - B. Access to and from work — 7
   - C. Railroad Crossings — 6
   - D. Other:_____
2. Improvements to sidewalks
   - A. Along major streets — 13
   - B. To parks — 9
   - C. Around schools — 11
   - D. Other: _____
3. Improving paths for bicycles
   - A. Bike trails in parks — 14
   - B. Bike lanes on commercial streets — 4
   - C. Bike lanes on residential streets — 8
   - D. Other: __School____ — 1
4. Improve safety — No. of Votes
   - A. Wider shoulders along roadways — 12
   - B. Pedestrian crossings — 7
   - C. Intersection improvements — 9
   - D. Other: _Fir Rd., Traffic Signals__ — 1
5. Improve retail development within the City
   - A. Grocery — 9
   - B. Shoes and Apparel — 4
   - C. Restaurants — 13
   - D. Other: __Variety Discount, Office Space, Unique Retail, Dry Cleaner, Bank, Healthcare___ — 1 ea.
6. Improvement of access to specific areas
   - A. Center Creek Park/Frank Dean Park — 6
   - B. North/South connection — 11
   - C. Schools — 4
   - D. Other:_Briarbrook & Fir Area__ — 1

From items 1-6 above please select the top two goals/strategies that you think are important for this region and explain why these two are the most important.

Choice 1. *#4.* Why? Safety is a concern especially on Fir as it has 4500 cars a day (more than Pennell) causing major delays at all intersections from Joplin east to Lone Elm. Fir needs wider shoulders as do Pennell and Joplin. The main roads throughout town have no curbing or shoulders and they can be dangerous for motorists. Travel from Rotue 171 to Pennell across the RR tracks is perceived as having safety issues though there haven't been has many accidents as would be expected. Fir and Briarbrook also have high traffic and safety issues.

Choice 2. *#6.B.* Why? The N/S connector solves a quality of life issue. South of the river is over 50% of the residences and tax base and yet the area only has one small park and most capital expenditures have been invested in services north of the river. Access across Center Creek that would not be effected by high water or cross the RR tracks would connect the whole city and improve emergency access. N/S access is very limited. There is a lot of traffic into Frank Dean Park which could benefit with access through Center Creek with a paved, improved roadway. A bridge connecting N to S would benefit both the fire and rescue as well as help the businesses in town as residents will more easily get to travel from their neighborhood into town for business rather than going elsewhere.

Additional Comments:

Add a third lane to Fir from Joplin Street to Lone Elm; Add signal at Lone Elm/Fir and Briarbrook/Fir; Add signal at Joplin/Pennell; Increase access to parks and recreation; 60% of the area kids have no place to ride a bike especially if they live along Fir Rod.; Too much traffic and high speeds on Copper Oaks Drive; Limit future development in Briarbrook without through access to Fir or Joplin; Need more retail to increase sales tax revenues; Trail s are already in progress; More sidewalks would be nice where possible and could be repaired where needed - this can be ongoing progress; More pedestrian access could benefit students walking or biking to school; Reduce delays to provide better access in or out of town with fast connections in all directions; CJ needs to keep its tax dollars in CJ rather than spending in Joplin in order to fund more improvements; Include long range planning on transportation issues that affect CJ 20 years down the road like the west bypass and how CJ will connect to it; Add sidewalks along Pennell; Improved tax base will reduce tax levy base.

Thank you for responding to our survey!

Appendix B – December 2008 Traffic Counts

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Fir Road and Joplin Street
AM

File Name : Joplin & Fir-AM
Site Code : 00000000
Start Date : 12/2/2008
Page No : 1

Groups Printed- Unshifted

	JOPLIN From North					FIR From East					JOPLIN From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	6	0	27	0	33	9	19	0	0	28	0	0	1	0	1	0	8	3	0	11	73
07:15 AM	5	0	33	0	38	13	27	0	0	40	0	0	0	0	0	0	18	3	0	21	99
07:30 AM	11	0	50	0	61	39	42	0	0	81	0	0	0	0	0	0	33	3	0	36	178
07:45 AM	8	0	34	0	42	48	28	0	0	76	0	0	0	0	0	0	18	4	0	22	140
Total	30	0	144	0	174	109	116	0	0	225	0	0	1	0	1	0	77	13	0	90	490
08:00 AM	8	0	74	0	82	36	10	0	0	46	0	0	0	0	0	0	18	7	0	25	153
08:15 AM	2	0	72	0	74	7	9	0	0	16	0	0	0	0	0	0	8	4	0	12	102
08:30 AM	3	0	23	0	26	13	8	0	0	21	0	0	0	0	0	0	12	2	0	14	61
08:45 AM	0	0	21	0	21	9	9	0	0	18	0	0	0	0	0	0	11	1	0	12	51
Total	13	0	190	0	203	65	36	0	0	101	0	0	0	0	0	0	49	14	0	63	367
Grand Total	43	0	334	0	377	174	152	0	0	326	0	0	1	0	1	0	126	27	0	153	857
Apprch %	11.4	0	88.6	0		53.4	46.6	0	0		0	0	100	0		0	82.4	17.6	0		
Total %	5	0	39	0	44	20.3	17.7	0	0	38	0	0	0.1	0	0.1	0	14.7	3.2	0	17.9	

	JOPLIN From North					FIR From East					JOPLIN From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	11	0	50	0	61	39	42	0	0	81	0	0	0	0	0	0	33	3	0	**36**	**178**
07:45 AM	8	0	34	0	42	**48**	28	0	0	76	0	0	0	0	0	0	18	4	0	22	140
08:00 AM	8	0	**74**	0	**82**	36	10	0	0	46	0	0	0	0	0	0	18	**7**	0	25	153
08:15 AM	2	0	72	0	74	7	9	0	0	16	0	0	0	0	0	0	8	4	0	12	102
Total Volume	29	0	230	0	259	130	89	0	0	219	0	0	0	0	0	0	77	18	0	95	573
% App. Total	11.2	0	88.8	0		59.4	40.6	0	0		0	0	0	0		0	81.1	18.9	0		
PHF	.659	.000	.777	.000	.790	.677	.530	.000	.000	.676	.000	.000	.000	.000	.000	.000	.583	.643	.000	.660	.805

TRANSYSTEMS

2400 Pershing Road
Suite 400
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Carl Junction Transportation Plan
P104070047
Fir Road and Joplin Street
PM

File Name : Joplin & Fir-PM
Site Code : 00000000
Start Date : 12/2/2008
Page No : 1

Groups Printed- Unshifted

	JOPLIN From North					FIR From East					JOPLIN From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	3	0	18	0	21	34	21	0	0	55	0	0	0	0	0	0	14	2	0	16	92
03:15 PM	11	0	40	0	51	34	20	0	0	54	0	0	0	0	0	0	21	5	0	26	131
03:30 PM	7	0	64	0	71	29	16	0	0	45	0	0	0	0	0	0	22	9	0	31	147
03:45 PM	3	0	31	0	34	40	17	0	0	57	0	0	0	0	0	0	26	5	0	31	122
Total	24	0	153	0	177	137	74	0	0	211	0	0	0	0	0	0	83	21	0	104	492
04:00 PM	1	0	30	0	31	33	20	0	0	53	0	0	0	0	0	0	15	4	0	19	103
04:15 PM	2	0	33	0	35	39	16	0	0	55	0	0	0	0	0	0	22	5	0	27	117
04:30 PM	3	0	54	0	57	38	14	0	0	52	0	0	0	0	0	0	21	7	0	28	137
04:45 PM	6	0	42	0	48	39	24	0	0	63	0	0	0	0	0	0	27	6	0	33	144
Total	12	0	159	0	171	149	74	0	0	223	0	0	0	0	0	0	85	22	0	107	501
05:00 PM	1	0	42	0	43	44	30	0	0	74	0	0	0	0	0	0	24	7	0	31	148
05:15 PM	3	0	32	0	35	50	17	0	0	67	0	0	0	0	0	0	21	11	0	32	134
05:30 PM	4	0	20	0	24	33	18	0	0	51	0	0	0	0	0	0	19	6	0	25	100
05:45 PM	2	0	22	0	24	42	18	0	0	60	0	0	0	0	0	0	16	7	0	23	107
Total	10	0	116	0	126	169	83	0	0	252	0	0	0	0	0	0	80	31	0	111	489
Grand Total	46	0	428	0	474	455	231	0	0	686	0	0	0	0	0	0	248	74	0	322	1482
Apprch %	9.7	0	90.3	0		66.3	33.7	0	0		0	0	0	0		0	77	23	0		
Total %	3.1	0	28.9	0	32	30.7	15.6	0	0	46.3	0	0	0	0	0	0	16.7	5	0	21.7	

	JOPLIN From North					FIR From East					JOPLIN From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**3**	**0**	54	0	57	38	14	0	0	52	0	0	0	0	0	0	21	7	0	28	137
04:45 PM	6	0	42	0	48	39	24	0	0	63	0	0	0	0	0	0	27	6	0	**33**	144
05:00 PM	1	0	42	0	43	44	**30**	0	0	**74**	0	0	0	0	0	0	24	7	0	31	**148**
05:15 PM	3	0	32	0	35	**50**	17	0	0	67	0	0	0	0	0	0	21	**11**	0	32	134
Total Volume	13	0	170	0	183	171	85	0	0	256	0	0	0	0	0	0	93	31	0	124	563
% App. Total	7.1	0	92.9	0		66.8	33.2	0	0		0	0	0	0		0	75	25	0		
PHF	.542	.000	.787	.000	.803	.855	.708	.000	.000	.865	.000	.000	.000	.000	.000	.000	.861	.705	.000	.939	.951

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Briarbrook Drive and Fir Road
AM

File Name : Briarbrook & Fir-AM
Site Code : 00000000
Start Date : 12/2/2008
Page No : 1

Groups Printed- Unshifted

	BRIAR BROOK From North					FIR From East					BRIAR BROOK From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	10	0	50	0	60	5	31	0	0	36	0	0	0	0	0	0	36	2	0	38	134
07:15 AM	11	0	65	0	76	13	41	0	0	54	0	0	0	0	0	0	52	3	0	55	185
07:30 AM	20	0	83	0	103	11	62	0	0	73	0	0	0	0	0	0	69	3	0	72	248
07:45 AM	12	0	62	0	74	10	42	3	0	55	0	1	0	0	1	0	54	4	0	58	188
Total	53	0	260	0	313	39	176	3	0	218	0	1	0	0	1	0	211	12	0	223	755
08:00 AM	7	0	29	0	36	14	25	0	0	39	0	2	1	0	3	0	45	7	0	52	130
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	4	0	44	0	48	10	22	0	0	32	0	0	0	0	0	0	29	2	0	31	111
08:45 AM	6	0	36	0	42	18	15	0	0	33	0	0	0	0	0	0	34	1	0	35	110
Total	17	0	109	0	126	42	62	0	0	104	0	2	1	0	3	0	108	10	0	118	351
Grand Total	70	0	369	0	439	81	238	3	0	322	0	3	1	0	4	0	319	22	0	341	1106
Apprch %	15.9	0	84.1	0		25.2	73.9	0.9	0		0	75	25	0		0	93.5	6.5	0		
Total %	6.3	0	33.4	0	39.7	7.3	21.5	0.3	0	29.1	0	0.3	0.1	0	0.4	0	28.8	2	0	30.8	

	BRIAR BROOK From North					FIR From East					BRIAR BROOK From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**10**	**0**	**50**	**0**	**60**	**5**	**31**	**0**	**0**	**36**	**0**	**0**	**0**	**0**	**0**	**0**	**36**	**2**	**0**	**38**	**134**
07:15 AM	**11**	**0**	**65**	**0**	**76**	13	41	0	0	54	0	0	0	0	0	0	52	3	0	55	185
07:30 AM	20	0	83	0	103	11	**62**	0	0	**73**	0	0	0	0	0	0	**69**	3	0	**72**	**248**
07:45 AM	12	0	62	0	74	10	42	**3**	0	55	0	**1**	0	0	**1**	0	54	**4**	0	58	188
Total Volume	53	0	260	0	313	39	176	3	0	218	0	1	0	0	1	0	211	12	0	223	755
% App. Total	16.9	0	83.1	0		17.9	80.7	1.4	0		0	100	0	0		0	94.6	5.4	0		
PHF	.663	.000	.783	.000	.760	.750	.710	.250	.000	.747	.000	.250	.000	.000	.250	.000	.764	.750	.000	.774	.761

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Briarbrook Drive and Fir Road
PM

File Name : Briarbrook & Fir-PM
Site Code : 00000000
Start Date : 12/2/2008
Page No : 1

Groups Printed- Unshifted

	BRIAR BROOK From North					FIR From East					BRIAR BROOK From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	6	0	11	0	17	33	34	0	0	67	0	0	0	0	0	0	31	3	0	34	118
03:15 PM	8	0	22	0	30	27	39	0	0	66	0	0	0	0	0	0	54	3	0	57	153
03:30 PM	7	0	24	0	31	48	36	0	0	84	0	0	0	0	0	0	68	7	0	75	190
03:45 PM	5	0	28	0	33	39	51	0	0	90	0	0	0	0	0	0	51	6	0	57	180
Total	26	0	85	0	111	147	160	0	0	307	0	0	0	0	0	0	204	19	0	223	641
04:00 PM	4	0	22	0	26	44	36	0	0	80	0	0	0	0	0	0	44	4	0	48	154
04:15 PM	6	0	26	0	32	54	37	0	0	91	0	0	0	0	0	0	38	15	0	53	176
04:30 PM	6	0	18	0	24	35	43	0	0	78	0	0	0	0	0	0	53	6	0	59	161
04:45 PM	4	0	33	0	37	53	51	0	0	104	0	0	0	0	0	0	47	17	0	64	205
Total	20	0	99	0	119	186	167	0	0	353	0	0	0	0	0	0	182	42	0	224	696
05:00 PM	10	0	31	0	41	51	43	0	0	94	0	0	0	0	0	0	55	16	0	71	206
05:15 PM	4	0	27	0	31	85	58	0	0	143	0	0	0	0	0	0	44	16	0	60	234
05:30 PM	7	0	29	0	36	80	38	0	0	118	0	0	0	0	0	0	40	12	0	52	206
05:45 PM	5	0	39	0	44	70	52	0	0	122	0	0	0	0	0	0	36	7	0	43	209
Total	26	0	126	0	152	286	191	0	0	477	0	0	0	0	0	0	175	51	0	226	855
Grand Total	72	0	310	0	382	619	518	0	0	1137	0	0	0	0	0	0	561	112	0	673	2192
Apprch %	18.8	0	81.2	0		54.4	45.6	0	0		0	0	0	0		0	83.4	16.6	0		
Total %	3.3	0	14.1	0	17.4	28.2	23.6	0	0	51.9	0	0	0	0	0	0	25.6	5.1	0	30.7	

	BRIAR BROOK From North					FIR From East					BRIAR BROOK From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	10	0	31	0	41	51	43	0	0	94	0	0	0	0	0	0	55	16	0	71	206
05:15 PM	4	0	27	0	31	**85**	**58**	0	0	**143**	0	0	0	0	0	0	44	16	0	60	**234**
05:30 PM	7	0	29	0	36	80	38	0	0	118	0	0	0	0	0	0	40	12	0	52	206
05:45 PM	5	0	**39**	0	**44**	70	52	0	0	122	0	0	0	0	0	0	36	7	0	43	209
Total Volume	26	0	126	0	152	286	191	0	0	477	0	0	0	0	0	0	175	51	0	226	855
% App. Total	17.1	0	82.9	0		60	40	0	0		0	0	0	0		0	77.4	22.6	0		
PHF	.650	.000	.808	.000	.864	.841	.823	.000	.000	.834	.000	.000	.000	.000	.000	.000	.795	.797	.000	.796	.913

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Fir Road and Route 171
AM

File Name : Route 171 & Fir-AM
Site Code : 00000000
Start Date : 12/3/2008
Page No : 1

Groups Printed- Unshifted

	171 From North					FIR From East					171 From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	9	70	0	0	79	0	4	3	0	7	0	57	15	0	72	81	2	9	0	92	250
07:15 AM	6	111	0	0	117	0	0	3	0	3	0	82	35	0	117	61	0	14	0	75	312
07:30 AM	9	136	0	0	145	0	5	3	0	8	0	54	23	0	77	93	0	10	0	103	333
07:45 AM	12	97	1	0	110	2	0	2	0	4	0	56	32	0	88	73	1	13	0	87	289
Total	36	414	1	0	451	2	9	11	0	22	0	249	105	0	354	308	3	46	0	357	1184
08:00 AM	11	69	1	0	81	2	2	0	0	4	0	68	36	0	104	53	0	8	0	61	250
08:15 AM	11	79	1	0	91	1	1	2	0	4	0	50	28	0	78	51	2	11	0	64	237
08:30 AM	12	81	0	0	93	1	0	0	0	1	0	49	23	0	72	44	2	3	0	49	215
08:45 AM	10	71	0	0	81	0	1	1	0	2	0	31	18	0	49	46	1	5	0	52	184
Total	44	300	2	0	346	4	4	3	0	11	0	198	105	0	303	194	5	27	0	226	886
Grand Total	80	714	3	0	797	6	13	14	0	33	0	447	210	0	657	502	8	73	0	583	2070
Apprch %	10	89.6	0.4	0		18.2	39.4	42.4	0		0	68	32	0		86.1	1.4	12.5	0		
Total %	3.9	34.5	0.1	0	38.5	0.3	0.6	0.7	0	1.6	0	21.6	10.1	0	31.7	24.3	0.4	3.5	0	28.2	

	171 From North					FIR From East					171 From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**9**	**70**	**0**	**0**	**79**	**0**	**4**	3	0	7	0	57	15	0	72	81	2	9	0	92	250
07:15 AM	6	111	0	0	117	0	0	3	0	3	0	82	35	0	**117**	61	0	**14**	0	75	312
07:30 AM	9	**136**	0	0	**145**	0	**5**	3	0	**8**	0	54	23	0	77	**93**	0	10	0	**103**	**333**
07:45 AM	**12**	97	**1**	0	110	**2**	0	2	0	4	0	56	32	0	88	73	1	13	0	87	289
Total Volume	36	414	1	0	451	2	9	11	0	22	0	249	105	0	354	308	3	46	0	357	1184
% App. Total	8	91.8	0.2	0		9.1	40.9	50	0		0	70.3	29.7	0		86.3	0.8	12.9	0		
PHF	.750	.761	.250	.000	.778	.250	.450	.917	.000	.688	.000	.759	.750	.000	.756	.828	.375	.821	.000	.867	.889

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Fir Road and Route 171
PM

File Name : Route 171 & Fir-PM
Site Code : 00000000
Start Date : 12/3/2008
Page No : 1

Groups Printed- Unshifted

	171 From North					FIR From East					171 From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	5	64	1	0	70	1	0	2	0	3	1	81	46	0	128	34	0	10	0	44	245
03:15 PM	8	66	1	0	75	1	0	0	0	1	0	90	61	0	151	42	1	9	0	52	279
03:30 PM	14	103	2	0	119	0	1	0	0	1	1	82	68	0	151	49	2	7	0	58	329
03:45 PM	14	106	0	0	120	0	0	1	0	1	0	83	62	0	145	55	1	15	0	71	337
Total	41	339	4	0	384	2	1	3	0	6	2	336	237	0	575	180	4	41	0	225	1190
04:00 PM	7	80	0	0	87	0	0	0	0	0	1	87	62	0	150	52	2	15	1	70	307
04:15 PM	7	99	0	0	106	0	1	0	0	1	1	86	67	0	154	51	2	10	0	63	324
04:30 PM	8	112	1	0	121	0	0	1	0	1	1	115	54	0	170	55	0	11	0	66	358
04:45 PM	11	88	0	0	99	0	1	0	0	1	2	106	69	0	177	45	1	10	0	56	333
Total	33	379	1	0	413	0	2	1	0	3	5	394	252	0	651	203	5	46	1	255	1322
05:00 PM	9	89	1	0	99	0	1	2	0	3	0	118	73	0	191	46	0	7	0	53	346
05:15 PM	11	107	1	0	119	0	3	0	0	3	1	140	104	0	245	50	3	16	0	69	436
05:30 PM	15	88	0	0	103	1	0	1	0	2	0	112	88	0	200	58	0	16	0	74	379
05:45 PM	15	90	1	0	106	0	1	1	0	2	0	91	66	0	157	64	2	14	0	80	345
Total	50	374	3	0	427	1	5	4	0	10	1	461	331	0	793	218	5	53	0	276	1506
Grand Total	124	1092	8	0	1224	3	8	8	0	19	8	1191	820	0	2019	601	14	140	1	756	4018
Apprch %	10.1	89.2	0.7	0		15.8	42.1	42.1	0		0.4	59	40.6	0		79.5	1.9	18.5	0.1		
Total %	3.1	27.2	0.2	0	30.5	0.1	0.2	0.2	0	0.5	0.2	29.6	20.4	0	50.2	15	0.3	3.5	0	18.8	

	171 From North					FIR From East					171 From South					FIR From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**9**	**89**	1	0	99	0	1	2	0	3	0	118	73	0	191	46	0	7	0	53	346
05:15 PM	11	107	1	0	**119**	0	**3**	0	0	3	**1**	**140**	**104**	0	**245**	50	**3**	**16**	0	69	**436**
05:30 PM	**15**	88	0	0	103	**1**	0	1	0	2	0	112	88	0	200	58	0	16	0	74	379
05:45 PM	15	90	1	0	106	0	1	1	0	2	0	91	66	0	157	**64**	2	14	0	**80**	345
Total Volume	50	374	3	0	427	1	5	4	0	10	1	461	331	0	793	218	5	53	0	276	1506
% App. Total	11.7	87.6	0.7	0		10	50	40	0		0.1	58.1	41.7	0		79	1.8	19.2	0		
PHF	.833	.874	.750	.000	.897	.250	.417	.500	.000	.833	.250	.823	.796	.000	.809	.852	.417	.828	.000	.863	.864

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Joplin Road and Pennel
AM

File Name : Joplin & Pennel-AM
Site Code : 00000000
Start Date : 12/4/2008
Page No : 1

Groups Printed- Unshifted

	JOPLIN From North					PENNEL From East					JOPLIN From South					PENNEL From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	0	0	0	0	0	40	15	0	55	4	1	6	0	11	14	32	0	0	46	112
07:15 AM	1	0	1	0	2	0	72	10	0	82	10	1	21	0	32	11	39	0	0	50	166
07:30 AM	0	1	0	0	1	0	110	12	0	122	8	1	35	0	44	9	46	0	0	55	222
07:45 AM	0	1	0	0	1	0	140	12	0	152	15	0	36	0	51	18	78	0	0	96	300
Total	1	2	1	0	4	0	362	49	0	411	37	3	98	0	138	52	195	0	0	247	800
08:00 AM	1	0	0	0	1	0	68	8	0	76	17	1	24	0	42	27	96	1	0	124	243
08:15 AM	0	0	0	0	0	0	26	9	0	35	17	0	9	0	26	12	56	0	0	68	129
08:30 AM	0	0	0	0	0	0	18	5	0	23	7	0	4	0	11	8	30	0	0	38	72
08:45 AM	0	1	0	0	1	1	18	7	0	26	8	0	4	0	12	5	34	0	0	39	78
Total	1	1	0	0	2	1	130	29	0	160	49	1	41	0	91	52	216	1	0	269	522
Grand Total	2	3	1	0	6	1	492	78	0	571	86	4	139	0	229	104	411	1	0	516	1322
Apprch %	33.3	50	16.7	0		0.2	86.2	13.7	0		37.6	1.7	60.7	0		20.2	79.7	0.2	0		
Total %	0.2	0.2	0.1	0	0.5	0.1	37.2	5.9	0	43.2	6.5	0.3	10.5	0	17.3	7.9	31.1	0.1	0	39	

	JOPLIN From North					PENNEL From East					JOPLIN From South					PENNEL From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	1	0	1	0	2	0	72	10	0	82	10	1	21	0	32	11	39	0	0	50	166
07:30 AM	0	**1**	0	0	1	0	110	**12**	0	122	8	1	35	0	44	9	46	0	0	55	222
07:45 AM	0	1	0	0	1	0	**140**	12	0	**152**	15	0	**36**	0	**51**	18	78	0	0	96	**300**
08:00 AM	1	0	0	0	1	0	68	8	0	76	**17**	1	24	0	42	**27**	**96**	**1**	0	**124**	243
Total Volume	2	2	1	0	5	0	390	42	0	432	50	3	116	0	169	65	259	1	0	325	931
% App. Total	40	40	20	0		0	90.3	9.7	0		29.6	1.8	68.6	0		20	79.7	0.3	0		
PHF	.500	.500	.250	.000	.625	.000	.696	.875	.000	.711	.735	.750	.806	.000	.828	.602	.674	.250	.000	.655	.776

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P10104070047
Joplin Road and Pennel
PM

File Name : Joplin & Pennel-PM
Site Code : 00000000
Start Date : 12/4/2008
Page No : 1

Groups Printed- Unshifted

	JOPLIN From North					PENNEL From East					JOPLIN From South					PENNEL From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	0	1	1	0	2	0	80	15	0	95	15	0	9	0	24	46	93	0	0	139	260
03:15 PM	0	0	0	2	2	0	41	11	0	52	31	0	14	0	45	21	105	1	4	131	230
03:30 PM	0	0	1	1	2	0	40	9	0	49	7	0	5	0	12	13	51	3	0	67	130
03:45 PM	0	0	0	0	0	0	55	20	0	75	19	0	10	0	29	6	60	0	2	68	172
Total	0	1	2	3	6	0	216	55	0	271	72	0	38	0	110	86	309	4	6	405	792
04:00 PM	0	0	2	0	2	1	58	11	0	70	23	0	5	0	28	11	63	0	0	74	174
04:15 PM	0	1	0	0	1	0	43	10	0	53	25	0	10	0	35	13	68	0	0	81	170
04:30 PM	0	0	1	0	1	1	53	13	0	67	16	0	13	0	29	21	49	0	3	73	170
04:45 PM	0	0	0	1	1	1	57	16	0	74	17	1	8	0	26	4	63	0	0	67	168
Total	0	1	3	1	5	3	211	50	0	264	81	1	36	0	118	49	243	0	3	295	682
05:00 PM	0	0	0	0	0	0	80	8	0	88	33	0	5	0	38	6	49	0	1	56	182
05:15 PM	1	1	0	0	2	0	61	16	0	77	16	0	15	0	31	5	47	1	0	53	163
05:30 PM	0	0	1	0	1	1	80	16	0	97	26	0	15	1	42	9	34	0	1	44	184
Grand Total	1	3	6	4	14	4	648	145	0	797	228	1	109	1	339	155	682	5	11	853	2003
Apprch %	7.1	21.4	42.9	28.6		0.5	81.3	18.2	0		67.3	0.3	32.2	0.3		18.2	80	0.6	1.3		
Total %	0	0.1	0.3	0.2	0.7	0.2	32.4	7.2	0	39.8	11.4	0	5.4	0	16.9	7.7	34	0.2	0.5	42.6	

	JOPLIN From North					PENNEL From East					JOPLIN From South					PENNEL From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	**0**	1	1	0	2	0	80	15	0	**95**	15	0	9	0	24	**46**	93	0	0	**139**	**260**
03:15 PM	0	0	0	**2**	2	0	41	11	0	52	**31**	0	**14**	0	**45**	21	**105**	1	**4**	131	230
03:30 PM	0	0	1	1	2	0	40	9	0	49	7	0	5	0	12	13	51	**3**	0	67	130
03:45 PM	0	0	0	0	0	0	55	**20**	0	75	19	0	10	0	29	6	60	0	2	68	172
Total Volume	0	1	2	3	6	0	216	55	0	271	72	0	38	0	110	86	309	4	6	405	792
% App. Total	0	16.7	33.3	50		0	79.7	20.3	0		65.5	0	34.5	0		21.2	76.3	1	1.5		
PHF	.000	.250	.500	.375	.750	.000	.675	.688	.000	.713	.581	.000	.679	.000	.611	.467	.736	.333	.375	.728	.762

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Route 171 and Route Z
AM

File Name : Route 171 & Route Z-AM
Site Code : 00000000
Start Date : 12/3/2008
Page No : 1

Groups Printed- Unshifted

	171 From North					Z From East					171 From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	41	0	0	41	0	0	2	0	2	0	32	27	0	59	42	2	0	0	44	146
07:15 AM	0	40	0	0	40	1	0	1	0	2	0	55	42	0	97	73	0	3	0	76	215
07:30 AM	0	59	0	0	59	0	1	1	0	2	0	39	50	0	89	70	1	0	0	71	221
07:45 AM	0	40	0	0	40	0	1	2	0	3	0	35	52	0	87	52	0	2	0	54	184
Total	0	180	0	0	180	1	2	6	0	9	0	161	171	0	332	237	3	5	0	245	766
08:00 AM	2	21	0	0	23	0	4	1	0	5	1	37	58	0	96	63	0	2	0	65	189
08:15 AM	1	28	0	0	29	0	1	0	0	1	0	45	39	0	84	68	0	1	0	69	183
08:30 AM	3	35	0	0	38	0	0	1	0	1	0	34	17	0	51	47	0	0	0	47	137
08:45 AM	1	37	0	0	38	0	0	0	0	0	0	24	19	0	43	50	0	2	0	52	133
Total	7	121	0	0	128	0	5	2	0	7	1	140	133	0	274	228	0	5	0	233	642
Grand Total	7	301	0	0	308	1	7	8	0	16	1	301	304	0	606	465	3	10	0	478	1408
Apprch %	2.3	97.7	0	0		6.2	43.8	50	0		0.2	49.7	50.2	0		97.3	0.6	2.1	0		
Total %	0.5	21.4	0	0	21.9	0.1	0.5	0.6	0	1.1	0.1	21.4	21.6	0	43	33	0.2	0.7	0	33.9	

	171 From North					Z From East					171 From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**0**	**40**	**0**	**0**	**40**	1	0	1	0	2	0	55	42	0	97	73	0	**3**	0	**76**	215
07:30 AM	0	**59**	0	0	**59**	0	1	1	0	2	0	39	50	0	89	70	**1**	0	0	71	**221**
07:45 AM	0	40	0	0	40	0	1	**2**	0	3	0	35	52	0	87	52	0	2	0	54	184
08:00 AM	**2**	21	0	0	23	0	**4**	1	0	**5**	**1**	37	**58**	0	96	63	0	2	0	65	189
Total Volume	2	160	0	0	162	1	6	5	0	12	1	166	202	0	369	258	1	7	0	266	809
% App. Total	1.2	98.8	0	0		8.3	50	41.7	0		0.3	45	54.7	0		97	0.4	2.6	0		
PHF	.250	.678	.000	.000	.686	.250	.375	.625	.000	.600	.250	.755	.871	.000	.951	.884	.250	.583	.000	.875	.915

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Route 171 and Route Z
PM

File Name : Route 171 & Route Z-PM
Site Code : 00000000
Start Date : 12/3/2008
Page No : 1

Groups Printed- Unshifted

	171 From North					Z From East					171 From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	2	33	0	0	35	0	0	0	0	0	0	39	62	0	101	35	1	1	0	37	173
03:15 PM	3	44	0	0	47	0	0	0	0	0	0	40	59	0	99	62	3	2	0	67	213
03:30 PM	12	48	0	0	60	0	1	0	0	1	0	26	44	0	70	71	4	10	0	85	216
03:45 PM	2	46	0	0	48	0	2	0	0	2	0	46	50	0	96	57	1	4	0	62	208
Total	19	171	0	0	190	0	3	0	0	3	0	151	215	0	366	225	9	17	0	251	810
04:00 PM	3	49	0	0	52	0	0	0	0	0	0	41	51	0	92	41	0	1	0	42	186
04:15 PM	1	66	0	0	67	0	0	0	0	0	0	45	52	0	97	45	0	2	0	47	211
04:30 PM	2	56	0	0	58	0	1	0	0	1	0	48	72	0	120	70	1	3	0	74	253
04:45 PM	2	48	1	0	51	1	1	0	0	2	0	42	81	0	123	48	1	3	0	52	228
Total	8	219	1	0	228	1	2	0	0	3	0	176	256	0	432	204	2	9	0	215	878
05:00 PM	3	67	0	0	70	0	0	0	0	0	1	41	65	0	107	56	1	3	0	60	237
05:15 PM	0	71	0	0	71	0	0	0	0	0	0	51	106	0	157	34	1	5	1	41	269
05:30 PM	2	58	0	0	60	0	2	0	0	2	1	42	81	0	124	52	0	5	0	57	243
05:45 PM	3	56	0	0	59	0	1	0	0	1	0	37	68	0	105	47	1	0	0	48	213
Total	8	252	0	0	260	0	3	0	0	3	2	171	320	0	493	189	3	13	1	206	962
Grand Total	35	642	1	0	678	1	8	0	0	9	2	498	791	0	1291	618	14	39	1	672	2650
Apprch %	5.2	94.7	0.1	0		11.1	88.9	0	0		0.2	38.6	61.3	0		92	2.1	5.8	0.1		
Total %	1.3	24.2	0	0	25.6	0	0.3	0	0	0.3	0.1	18.8	29.8	0	48.7	23.3	0.5	1.5	0	25.4	

	171 From North					Z From East					171 From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**2**	**56**	**0**	**0**	**58**	**0**	1	0	0	1	0	48	72	0	120	70	1	3	0	74	253
04:45 PM	2	48	**1**	0	51	**1**	1	0	0	**2**	0	42	81	0	123	48	1	3	0	52	228
05:00 PM	**3**	67	0	0	70	0	0	0	0	0	**1**	41	65	0	107	56	1	3	0	60	237
05:15 PM	0	**71**	0	0	**71**	0	0	0	0	0	0	**51**	**106**	0	**157**	34	1	**5**	**1**	41	**269**
Total Volume	7	242	1	0	250	1	2	0	0	3	1	182	324	0	507	208	4	14	1	227	987
% App. Total	2.8	96.8	0.4	0		33.3	66.7	0	0		0.2	35.9	63.9	0		91.6	1.8	6.2	0.4		
PHF	.583	.852	.250	.000	.880	.250	.500	.000	.000	.375	.250	.892	.764	.000	.807	.743	1.000	.700	.250	.767	.917

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Route JJ and Route Z
AM

File Name : Route z & Route JJ-AM
Site Code : 00000000
Start Date : 12/4/2008
Page No : 1

Groups Printed- Unshifted

	JJ From North					Z From East					JJ From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	6	8	0	14	0	3	5	0	8	13	5	8	0	26	7	13	0	0	20	68
07:15 AM	0	8	11	0	19	3	7	6	0	16	21	9	4	0	34	11	3	0	0	14	83
07:30 AM	0	20	24	0	44	1	10	11	0	22	52	3	3	0	58	13	22	0	0	35	159
07:45 AM	0	17	20	0	37	2	9	26	0	37	83	11	4	0	98	9	21	0	0	30	202
Total	0	51	63	0	114	6	29	48	0	83	169	28	19	0	216	40	59	0	0	99	512
08:00 AM	0	6	2	0	8	0	4	9	0	13	14	11	8	0	33	4	6	1	0	11	65
08:15 AM	0	1	1	0	2	1	4	2	0	7	3	5	8	0	16	7	6	1	0	14	39
08:30 AM	0	6	0	0	6	1	2	2	0	5	4	6	5	0	15	5	9	0	0	14	40
08:45 AM	0	2	1	0	3	0	5	4	0	9	4	3	5	0	12	3	10	0	0	13	37
Total	0	15	4	0	19	2	15	17	0	34	25	25	26	0	76	19	31	2	0	52	181
Grand Total	0	66	67	0	133	8	44	65	0	117	194	53	45	0	292	59	90	2	0	151	693
Apprch %	0	49.6	50.4	0		6.8	37.6	55.6	0		66.4	18.2	15.4	0		39.1	59.6	1.3	0		
Total %	0	9.5	9.7	0	19.2	1.2	6.3	9.4	0	16.9	28	7.6	6.5	0	42.1	8.5	13	0.3	0	21.8	

	JJ From North					Z From East					JJ From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**0**	**6**	**8**	**0**	**14**	**0**	**3**	**5**	**0**	**8**	**13**	**5**	8	0	26	7	13	0	0	20	68
07:15 AM	0	8	11	0	19	3	7	6	0	16	21	9	4	0	34	11	3	0	0	14	83
07:30 AM	0	20	24	0	**44**	1	**10**	11	0	22	52	3	3	0	58	**13**	**22**	0	0	**35**	159
07:45 AM	0	17	20	0	37	2	9	**26**	0	**37**	**83**	**11**	4	0	**98**	9	21	0	0	30	**202**
Total Volume	0	51	63	0	114	6	29	48	0	83	169	28	19	0	216	40	59	0	0	99	512
% App. Total	0	44.7	55.3	0		7.2	34.9	57.8	0		78.2	13	8.8	0		40.4	59.6	0	0		
PHF	.000	.638	.656	.000	.648	.500	.725	.462	.000	.561	.509	.636	.594	.000	.551	.769	.670	.000	.000	.707	.634

TRANSYSTEMS

2400 Pershing Road
Suite 400
Kansas City, Mo 64108

Carl Junction Transportation Plan
P104070047
Route Z and Route JJ
PM

File Name : Route z & Route JJ-PM
Site Code : 00000000
Start Date : 12/4/2008
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Groups Printed- Unshifted

	JJ From North					Z From East					JJ From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	0	9	3	0	12	4	8	40	0	52	8	4	1	0	13	6	7	0	0	13	90
03:15 PM	0	8	1	0	9	8	10	35	0	53	7	9	3	0	19	3	9	0	0	12	93
03:30 PM	0	6	0	0	6	2	7	14	0	23	8	14	5	0	27	7	7	0	0	14	70
03:45 PM	1	1	3	0	5	3	8	7	0	18	10	7	8	0	25	4	7	0	0	11	59
Total	1	24	7	0	32	17	33	96	0	146	33	34	17	0	84	20	30	0	0	50	312
04:00 PM	0	6	2	0	8	4	14	5	0	23	6	6	5	0	17	8	6	0	0	14	62
04:15 PM	0	6	2	0	8	4	12	8	0	24	9	6	6	0	21	3	18	0	0	21	74
04:30 PM	0	9	0	0	9	4	8	7	0	19	7	14	5	0	26	5	8	0	0	13	67
04:45 PM	1	7	3	0	11	2	10	3	0	15	7	12	9	0	28	7	18	0	0	25	79
Total	1	28	7	0	36	14	44	23	0	81	29	38	25	0	92	23	50	0	0	73	282
05:00 PM	0	4	1	0	5	1	6	5	0	12	6	8	4	0	18	8	15	0	0	23	58
05:15 PM	1	9	0	0	10	1	6	5	0	12	12	18	8	0	38	10	19	0	0	29	89
05:30 PM	0	8	3	0	11	2	9	4	0	15	8	10	5	0	23	5	18	0	0	23	72
05:45 PM	0	5	3	0	8	2	14	4	0	20	11	5	5	0	21	7	18	0	0	25	74
Total	1	26	7	0	34	6	35	18	0	59	37	41	22	0	100	30	70	0	0	100	293
Grand Total	3	78	21	0	102	37	112	137	0	286	99	113	64	0	276	73	150	0	0	223	887
Apprch %	2.9	76.5	20.6	0		12.9	39.2	47.9	0		35.9	40.9	23.2	0		32.7	67.3	0	0		
Total %	0.3	8.8	2.4	0	11.5	4.2	12.6	15.4	0	32.2	11.2	12.7	7.2	0	31.1	8.2	16.9	0	0	25.1	

	JJ From North					Z From East					JJ From South					Z From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	**0**	9	3	0	12	4	8	40	0	52	8	4	1	0	13	6	7	0	0	13	90
03:15 PM	0	8	1	0	9	**8**	**10**	35	0	**53**	7	9	3	0	19	3	**9**	0	0	12	**93**
03:30 PM	0	6	0	0	6	2	7	14	0	23	8	**14**	5	0	**27**	**7**	7	0	0	**14**	70
03:45 PM	**1**	1	3	0	5	3	8	7	0	18	**10**	7	**8**	0	25	4	7	0	0	11	59
Total Volume	1	24	7	0	32	17	33	96	0	146	33	34	17	0	84	20	30	0	0	50	312
% App. Total	3.1	75	21.9	0		11.6	22.6	65.8	0		39.3	40.5	20.2	0		40	60	0	0		
PHF	.250	.667	.583	.000	.667	.531	.825	.600	.000	.689	.825	.607	.531	.000	.778	.714	.833	.000	.000	.893	.839

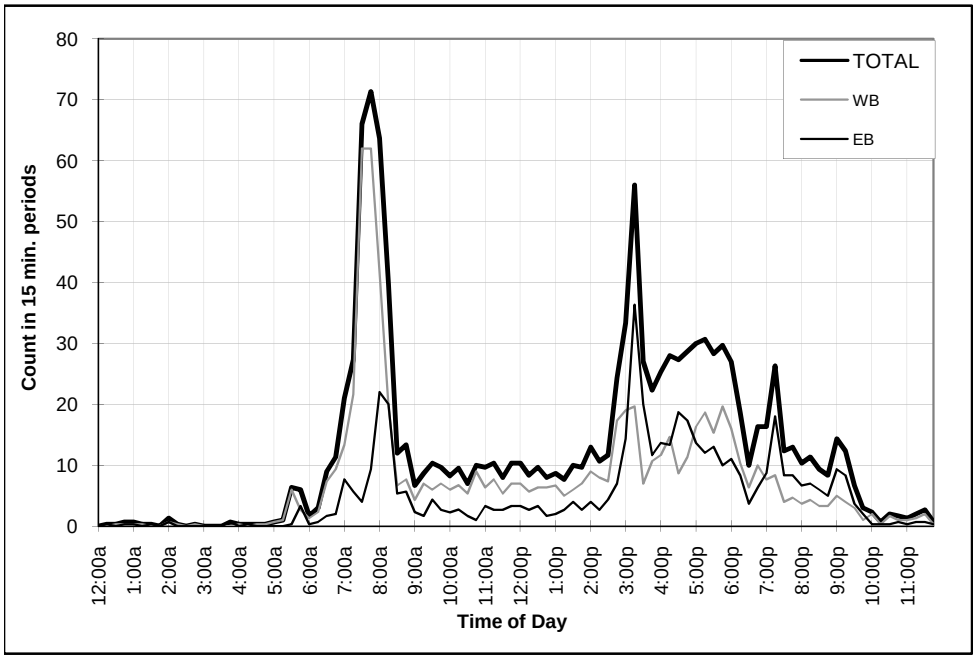
Daily Traffic Count

Carl Junction Transportation Plan

Carl Junction, Missouri

Location: **Briarbrook Rd. east of Joplin St.**

Period Start	WB	EB	TOTAL
12:00a	0	0	0
12:15a	0	0	0
12:30a	0	0	0
12:45a	0	0	1
1:00a	0	0	1
1:15a	0	0	0
1:30a	0	0	0
1:45a	0	0	0
2:00a	1	1	1
2:15a	0	0	0
2:30a	0	0	0
2:45a	0	0	0
3:00a	0	0	0
3:15a	0	0	0
3:30a	0	0	0
3:45a	0	1	1
4:00a	0	0	0
4:15a	0	0	0
4:30a	0	0	0
4:45a	0	0	0
5:00a	1	0	1
5:15a	1	0	1
5:30a	6	0	6
5:45a	3	3	6
6:00a	1	0	2
6:15a	2	1	3
6:30a	7	2	9
6:45a	9	2	11
7:00a	13	8	21
7:15a	22	6	27
7:30a	62	4	66
7:45a	62	9	71
8:00a	42	22	64
8:15a	20	20	40
8:30a	7	5	12
8:45a	8	6	13
9:00a	4	2	7
9:15a	7	2	9
9:30a	6	4	10
9:45a	7	3	10
10:00a	6	2	8
10:15a	7	3	10
10:30a	5	2	7
10:45a	9	1	10
11:00a	6	3	10
11:15a	8	3	10
11:30a	5	3	8
11:45a	7	3	10
12:00p	7	3	10
12:15p	6	3	8
12:30p	6	3	10
12:45p	6	2	8
1:00p	7	2	9
1:15p	5	3	8
1:30p	6	4	10
1:45p	7	3	10
2:00p	9	4	13
2:15p	8	3	11
2:30p	7	4	12
2:45p	17	7	24
3:00p	19	14	33
3:15p	20	36	56
3:30p	7	20	27
3:45p	11	12	22
4:00p	12	14	25
4:15p	15	13	28
4:30p	9	19	27
4:45p	11	17	29
5:00p	16	14	30
5:15p	19	12	31
5:30p	15	13	28
5:45p	20	10	30
6:00p	16	11	27
6:15p	10	8	19
6:30p	6	4	10
6:45p	10	6	16
7:00p	8	9	16
7:15p	8	18	26
7:30p	4	8	12
7:45p	5	8	13
8:00p	4	7	10
8:15p	4	7	11
8:30p	3	6	9
8:45p	3	5	8
9:00p	5	9	14
9:15p	4	8	12
9:30p	3	4	7
9:45p	1	2	3
10:00p	2	0	2
10:15p	0	0	1
10:30p	2	0	2
10:45p	1	1	2
11:00p	1	0	1
11:15p	1	1	2
11:30p	2	1	3
11:45p	0	0	1



HOURLY TOTALS

Period Start	WB	EB	TOTAL
12:00a	1	1	1
1:00a	1	1	1
2:00a	1	1	2
3:00a	0	1	1
4:00a	1	0	1
5:00a	10	4	14
6:00a	20	5	25
7:00a	159	27	186
8:00a	76	53	129
9:00a	24	11	35
10:00a	27	8	35
11:00a	26	12	38
12:00p	25	11	36
1:00p	25	11	36
2:00p	42	18	60
3:00p	56	82	139
4:00p	46	63	109
5:00p	70	49	119
6:00p	43	29	72
7:00p	25	43	68
8:00p	15	25	39
9:00p	13	23	36
10:00p	5	2	7
11:00p	5	2	7

Approach	Count Start Date	AM Peak 7:30a - 8:30a	Mid-day Peak 2:30p - 3:30p	PM Peak 2:45p - 3:45p	Totals
Westbound	Wed 12/2/09 10:00 AM	185	63	63	716
Eastbound	Wed 12/2/09 10:00 AM	55	62	78	480
TOTAL		241	125	141	1,196

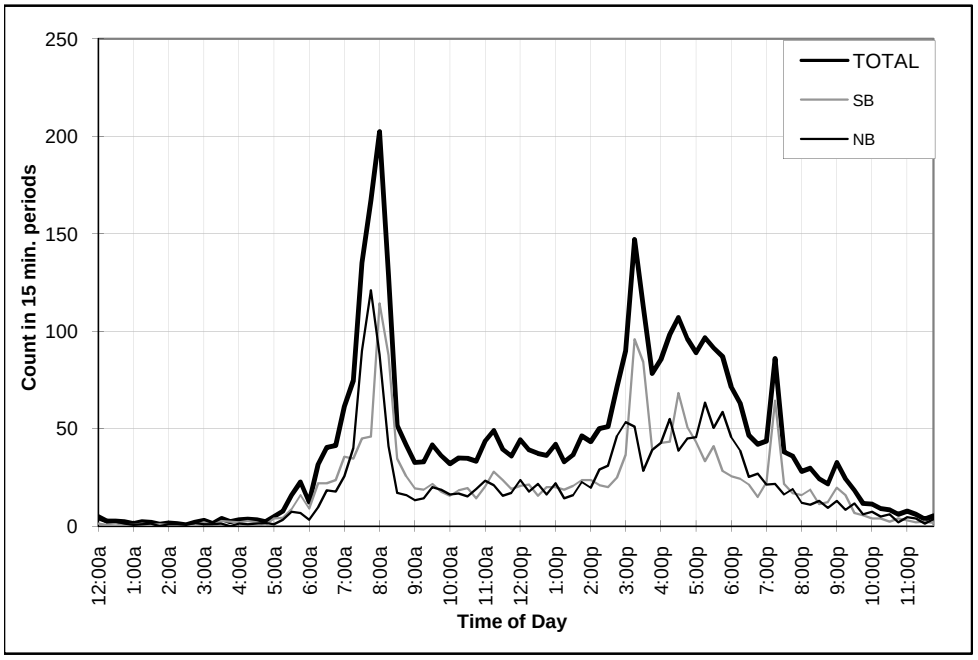
Daily Traffic Count

Carl Junction Transportation Plan

Carl Junction, Missouri

Location: Joplin St. north of Briarbrook Rd.

Period Start	SB	NB	TOTAL
12:00a	1	4	5
12:15a	1	2	3
12:30a	0	2	3
12:45a	1	1	2
1:00a	1	1	1
1:15a	1	1	2
1:30a	1	1	2
1:45a	1	0	1
2:00a	1	1	2
2:15a	0	1	1
2:30a	0	1	1
2:45a	0	2	2
3:00a	2	1	3
3:15a	0	1	1
3:30a	3	1	4
3:45a	2	0	2
4:00a	2	1	3
4:15a	3	1	4
4:30a	2	1	3
4:45a	1	2	2
5:00a	4	1	5
5:15a	4	3	8
5:30a	9	7	16
5:45a	16	7	23
6:00a	9	3	12
6:15a	22	10	32
6:30a	22	18	40
6:45a	24	18	41
7:00a	36	26	61
7:15a	35	40	75
7:30a	45	90	135
7:45a	46	121	167
8:00a	114	88	202
8:15a	88	41	129
8:30a	35	17	52
8:45a	26	16	42
9:00a	19	13	33
9:15a	19	14	33
9:30a	22	20	42
9:45a	18	19	36
10:00a	16	16	32
10:15a	18	17	35
10:30a	20	15	35
10:45a	14	19	33
11:00a	20	23	44
11:15a	28	21	49
11:30a	24	16	39
11:45a	19	17	36
12:00p	21	24	44
12:15p	21	18	39
12:30p	16	22	37
12:45p	20	16	36
1:00p	20	22	42
1:15p	19	14	33
1:30p	21	16	37
1:45p	24	23	46
2:00p	24	20	43
2:15p	21	29	50
2:30p	20	31	51
2:45p	25	46	71
3:00p	37	53	90
3:15p	96	51	147
3:30p	84	28	113
3:45p	39	39	78
4:00p	43	43	85
4:15p	43	55	98
4:30p	68	39	107
4:45p	51	45	96
5:00p	43	46	89
5:15p	33	63	97
5:30p	41	50	91
5:45p	28	59	87
6:00p	26	46	71
6:15p	24	39	63
6:30p	21	25	47
6:45p	15	27	42
7:00p	22	21	44
7:15p	64	22	86
7:30p	22	16	38
7:45p	17	19	36
8:00p	16	12	28
8:15p	19	11	30
8:30p	11	13	24
8:45p	12	9	22
9:00p	20	13	33
9:15p	16	8	24
9:30p	7	12	18
9:45p	6	6	12
10:00p	4	7	11
10:15p	4	5	9
10:30p	2	6	8
10:45p	4	2	6
11:00p	3	5	8
11:15p	2	4	6
11:30p	2	1	4
11:45p	2	4	5



HOURLY TOTALS

Period Start	SB	NB	TOTAL
12:00a	3	9	13
1:00a	4	3	7
2:00a	1	4	6
3:00a	7	3	11
4:00a	7	5	13
5:00a	33	18	51
6:00a	77	49	126
7:00a	161	277	438
8:00a	262	162	424
9:00a	77	66	144
10:00a	68	67	135
11:00a	91	77	168
12:00p	78	79	157
1:00p	83	75	158
2:00p	90	126	216
3:00p	256	172	428
4:00p	205	181	387
5:00p	146	218	364
6:00p	86	137	223
7:00p	125	78	204
8:00p	58	45	104
9:00p	48	39	87
10:00p	14	20	35
11:00p	9	14	23

Approach	Count Start Date	AM Peak 7:30a - 8:30a	Mid-day Peak 2:30p - 3:30p	PM Peak 3:00p - 4:00p	Totals
Southbound	Wed 12/2/09 10:30 AM	293	178	256	1,992
Northbound	Wed 12/2/09 10:30 AM	340	182	172	1,927
TOTAL		633	359	428	3,918

Daily Traffic Count

Carl Junction Transportation Plan

Carl Junction, Missouri

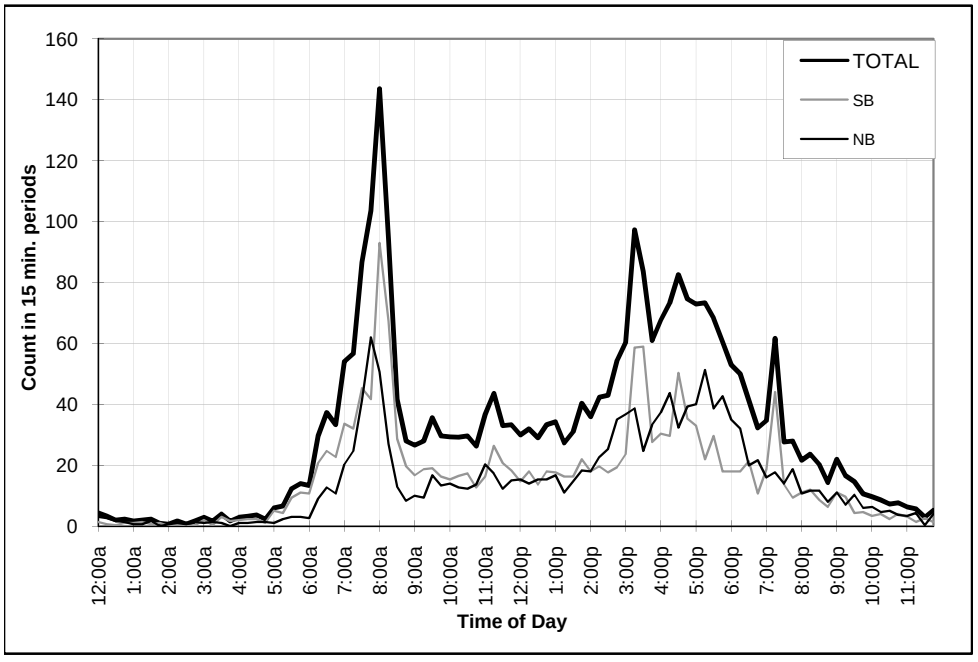
Location: Joplin St. south of Briarbrook Rd.

Period Start	SB	NB	TOTAL
12:00a	1	3	4
12:15a	1	3	3
12:30a	0	2	2
12:45a	1	1	2
1:00a	1	1	2
1:15a	1	1	2
1:30a	1	2	2
1:45a	1	0	1
2:00a	0	1	1
2:15a	1	1	2
2:30a	0	1	1
2:45a	0	1	2
3:00a	2	1	3
3:15a	0	1	2
3:30a	3	1	4
3:45a	2	0	2
4:00a	2	1	3
4:15a	2	1	3
4:30a	2	1	4
4:45a	1	1	2
5:00a	5	1	6
5:15a	4	2	7
5:30a	9	3	12
5:45a	11	3	14

Period Start	SB	NB	TOTAL
6:00a	11	3	13
6:15a	21	9	30
6:30a	25	13	37
6:45a	23	11	33
7:00a	34	20	54
7:15a	32	25	57
7:30a	45	41	87
7:45a	42	62	104
8:00a	93	51	144
8:15a	67	27	94
8:30a	29	13	42
8:45a	20	8	28
9:00a	17	10	27
9:15a	19	9	28
9:30a	19	17	36
9:45a	16	13	30
10:00a	15	14	29
10:15a	17	13	29
10:30a	17	12	30
10:45a	13	14	26
11:00a	16	20	37
11:15a	26	17	44
11:30a	21	12	33
11:45a	18	15	33

Period Start	SB	NB	TOTAL
12:00p	15	15	30
12:15p	18	14	32
12:30p	14	15	29
12:45p	18	15	33
1:00p	18	17	34
1:15p	16	11	27
1:30p	16	15	31
1:45p	22	18	40
2:00p	18	18	36
2:15p	20	23	42
2:30p	18	25	43
2:45p	19	35	54
3:00p	24	37	60
3:15p	59	39	97
3:30p	59	25	84
3:45p	28	33	61
4:00p	30	37	68
4:15p	30	44	73
4:30p	50	32	83
4:45p	35	39	75
5:00p	33	40	73
5:15p	22	51	73
5:30p	30	39	68
5:45p	18	43	61

Period Start	SB	NB	TOTAL
6:00p	18	35	53
6:15p	18	32	50
6:30p	21	20	41
6:45p	11	22	32
7:00p	19	16	35
7:15p	44	18	62
7:30p	14	14	28
7:45p	9	19	28
8:00p	11	11	22
8:15p	12	12	24
8:30p	9	12	20
8:45p	6	8	14
9:00p	11	11	22
9:15p	10	7	17
9:30p	4	10	15
9:45p	5	6	11
10:00p	3	6	10
10:15p	4	5	9
10:30p	2	5	7
10:45p	4	4	8
11:00p	3	3	6
11:15p	1	4	6
11:30p	3	0	3
11:45p	1	4	5



HOURLY TOTALS

Period Start	SB	NB	TOTAL
12:00a	3	9	12
1:00a	4	3	7
2:00a	1	4	5
3:00a	7	3	10
4:00a	8	5	12
5:00a	30	9	39
6:00a	79	35	114
7:00a	153	148	301
8:00a	209	99	308
9:00a	71	49	120
10:00a	62	53	115
11:00a	82	65	147
12:00p	64	60	124
1:00p	72	61	133
2:00p	75	101	176
3:00p	169	133	302
4:00p	146	153	298
5:00p	103	173	275
6:00p	68	109	177
7:00p	86	66	152
8:00p	38	42	80
9:00p	30	34	64
10:00p	14	20	33
11:00p	8	12	20

Approach	Count Start Date	AM Peak 7:30a - 8:30a	Mid-day Peak 2:30p - 3:30p	PM Peak 3:15p - 4:15p	Totals
Southbound	Wed 12/2/09 10:30 AM	247	119	176	1,579
Northbound	Wed 12/2/09 10:30 AM	181	136	134	1,445
TOTAL		428	255	310	3,024

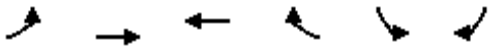
Appendix C – Synchro Results



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	402	209	156	301	136	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	437	227	170	327	148	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			664		1217	551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			664		1217	551
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		9	91
cM capacity (veh/h)			925		163	534

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	664	497	193
Volume Left	0	170	148
Volume Right	227	0	46
cSH	1700	925	195
Volume to Capacity	0.39	0.18	0.99
Queue Length 95th (ft)	0	17	210
Control Delay (s)	0.0	4.8	112.3
Lane LOS		A	F
Approach Delay (s)	0.0	4.8	112.3
Approach LOS			F

Intersection Summary			
Average Delay	17.8		
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	23	419	351	78	517	106
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	455	382	85	562	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	466				929	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466				929	424
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				0	82
cM capacity (veh/h)	1095				290	630

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	480	466	677
Volume Left	25	0	562
Volume Right	0	85	115
cSH	1095	1700	321
Volume to Capacity	0.02	0.27	2.11
Queue Length 95th (ft)	2	0	1241
Control Delay (s)	0.7	0.0	535.7
Lane LOS	A		F
Approach Delay (s)	0.7	0.0	535.7
Approach LOS			F

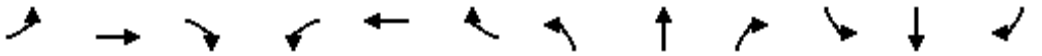
Intersection Summary			
Average Delay	223.6		
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	617	319	101	196	231	93
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	671	347	110	213	251	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1017		1277	844
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1017		1277	844
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		0	72
cM capacity (veh/h)			682		154	363

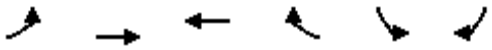
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1017	323	352
Volume Left	0	110	251
Volume Right	347	0	101
cSH	1700	682	185
Volume to Capacity	0.60	0.16	1.91
Queue Length 95th (ft)	0	14	650
Control Delay (s)	0.0	5.2	470.0
Lane LOS		A	F
Approach Delay (s)	0.0	5.2	470.0
Approach LOS			F

Intersection Summary			
Average Delay	98.8		
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	92	6	612	22	17	5	209	485	0	2	823	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1780	1583		1790		1770	1863		1770	1863	1583
Flt Permitted		0.77	1.00		0.85		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1433	1583		1554		1770	1863		1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	7	665	24	18	5	227	527	0	2	895	78
RTOR Reduction (vph)	0	0	403	0	4	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	107	262	0	43	0	227	527	0	2	895	69
Turn Type	Perm		Perm	Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)		15.8	15.8		15.8		15.9	58.1		0.7	42.9	42.9
Effective Green, g (s)		15.8	15.8		15.8		15.9	58.1		0.7	42.9	42.9
Actuated g/C Ratio		0.18	0.18		0.18		0.18	0.67		0.01	0.50	0.50
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		261	289		284		325	1250		14	923	784
v/s Ratio Prot							c0.13	0.28		0.00	c0.48	
v/s Ratio Perm		0.07	c0.17		0.03							0.04
v/c Ratio		0.41	0.91		0.15		0.70	0.42		0.14	0.97	0.09
Uniform Delay, d1		31.3	34.7		29.8		33.1	6.5		42.7	21.2	11.5
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.1	29.7		0.2		6.4	1.0		4.7	23.1	0.2
Delay (s)		32.3	64.4		30.0		39.5	7.6		47.3	44.4	11.8
Level of Service		C	E		C		D	A		D	D	B
Approach Delay (s)		59.9			30.0			17.2			41.7	
Approach LOS		E			C			B			D	

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	36	153	178	259	458	58
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	166	193	282	498	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	193				579	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	193				579	334
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				0	91
cM capacity (veh/h)	1380				464	708

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	205	475	561
Volume Left	39	0	498
Volume Right	0	282	63
cSH	1380	1700	482
Volume to Capacity	0.03	0.28	1.16
Queue Length 95th (ft)	2	0	505
Control Delay (s)	1.7	0.0	121.4
Lane LOS	A		F
Approach Delay (s)	1.7	0.0	121.4
Approach LOS			F

Intersection Summary			
Average Delay		55.1	
Intersection Capacity Utilization		74.2%	ICU Level of Service D
Analysis Period (min)		15	



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	516	129	84	776	231	100
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	561	140	91	843	251	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			701		1657	631
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			701		1657	631
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		0	77
cM capacity (veh/h)			896		97	481

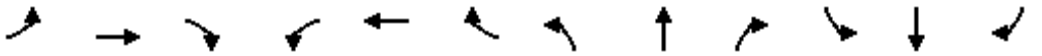
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	701	935	360
Volume Left	0	91	251
Volume Right	140	0	109
cSH	1700	896	127
Volume to Capacity	0.41	0.10	2.82
Queue Length 95th (ft)	0	8	828
Control Delay (s)	0.0	2.7	895.9
Lane LOS		A	F
Approach Delay (s)	0.0	2.7	895.9
Approach LOS			F

Intersection Summary			
Average Delay	162.8		
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	100	471	338	9	20	338
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	512	367	10	22	367
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	377				1102	372
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377				1102	372
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				90	45
cM capacity (veh/h)	1181				213	674

Direction, Lane #	SE 1	NW 1	SW 1
Volume Total	621	377	389
Volume Left	109	0	22
Volume Right	0	10	367
cSH	1181	1700	601
Volume to Capacity	0.09	0.22	0.65
Queue Length 95th (ft)	8	0	117
Control Delay (s)	2.4	0.0	21.3
Lane LOS	A		C
Approach Delay (s)	2.4	0.0	21.3
Approach LOS			C

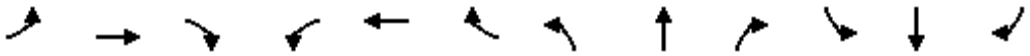
Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	2	513	9	12	2	402	330	2	0	318	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	2	558	10	13	2	437	359	2	0	346	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1587	1580	346	2138	1585	360	351			361		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1587	1580	346	2138	1585	360	351			361		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	97	20	0	81	100	64			100		
cM capacity (veh/h)	54	70	697	5	69	685	1208			1198		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	575	25	437	361	346	5
Volume Left	15	10	437	0	0	0
Volume Right	558	2	0	2	0	5
cSH	517	12	1208	1700	1198	1700
Volume to Capacity	1.11	2.15	0.36	0.21	0.00	0.00
Queue Length 95th (ft)	469	100	42	0	0	0
Control Delay (s)	101.5	1176.1	9.7	0.0	0.0	0.0
Lane LOS	F	F	A			
Approach Delay (s)	101.5	1176.1	5.3		0.0	
Approach LOS	F	F				

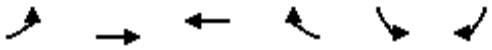
Intersection Summary				
Average Delay	52.6			
Intersection Capacity Utilization	81.8%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	117	79	95	58	12	37	56	337	125	101	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	127	86	103	63	13	40	61	366	136	110	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	76			213			501	453	170	843	489	70
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			213			501	453	170	843	489	70
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			89	87	58	3	75	100
cM capacity (veh/h)	1523			1357			367	464	874	140	443	993

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	213	179	467	246
Volume Left	0	103	40	136
Volume Right	86	13	366	0
cSH	1523	1357	708	201
Volume to Capacity	0.00	0.08	0.66	1.22
Queue Length 95th (ft)	0	6	125	319
Control Delay (s)	0.0	4.8	19.4	183.3
Lane LOS		A	C	F
Approach Delay (s)	0.0	4.8	19.4	183.3
Approach LOS			C	F

Intersection Summary			
Average Delay	49.7		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	62	185	168	340	338	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	201	183	370	367	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	183				703	367
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	183				703	367
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				4	96
cM capacity (veh/h)	1392				384	678

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	268	552	396
Volume Left	67	0	367
Volume Right	0	370	28
cSH	1392	1700	396
Volume to Capacity	0.05	0.32	1.00
Queue Length 95th (ft)	4	0	303
Control Delay (s)	2.3	0.0	77.5
Lane LOS	A		F
Approach Delay (s)	2.3	0.0	77.5
Approach LOS			F

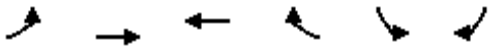
Intersection Summary			
Average Delay	25.7		
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	361	160	134	298	210	87
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	392	174	146	324	228	95
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			566		1095	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			566		1095	479
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		0	84
cM capacity (veh/h)			1006		202	586

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	566	470	323
Volume Left	0	146	228
Volume Right	174	0	95
cSH	1700	1006	250
Volume to Capacity	0.33	0.14	1.29
Queue Length 95th (ft)	0	13	411
Control Delay (s)	0.0	4.0	196.7
Lane LOS		A	F
Approach Delay (s)	0.0	4.0	196.7
Approach LOS			F

Intersection Summary			
Average Delay	48.1		
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	101	347	380	569	251	51
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	110	377	413	618	273	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1032				1319	722
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1032				1319	722
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				0	87
cM capacity (veh/h)	674				145	427

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	487	1032	328
Volume Left	110	0	273
Volume Right	0	618	55
cSH	674	1700	164
Volume to Capacity	0.16	0.61	2.00
Queue Length 95th (ft)	14	0	633
Control Delay (s)	4.4	0.0	515.5
Lane LOS	A		F
Approach Delay (s)	4.4	0.0	515.5
Approach LOS			F

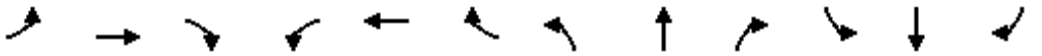
Intersection Summary			
Average Delay	92.8		
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	453	145	187	581	368	98
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	492	158	203	632	400	107
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			650		1609	571
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			650		1609	571
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			78		0	80
cM capacity (veh/h)			936		90	520

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	650	835	507
Volume Left	0	203	400
Volume Right	158	0	107
cSH	1700	936	109
Volume to Capacity	0.38	0.22	4.64
Queue Length 95th (ft)	0	21	Err
Control Delay (s)	0.0	5.0	Err
Lane LOS		A	F
Approach Delay (s)	0.0	5.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	2545.5		
Intersection Capacity Utilization	109.9%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	9	433	8	9	2	657	916	2	6	743	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1781	1583		1800		1770	1862		1770	1863	1583
Flt Permitted		0.73	1.00		0.88		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1356	1583		1621		1770	1862		1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	10	471	9	10	2	714	996	2	7	808	109
RTOR Reduction (vph)	0	0	405	0	2	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	125	66	0	19	0	714	998	0	7	808	94
Turn Type	Perm		Perm	Perm			Prot			Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Actuated Green, G (s)		12.6	12.6		12.6		29.0	64.6		0.8	36.4	36.4
Effective Green, g (s)		12.6	12.6		12.6		29.0	64.6		0.8	36.4	36.4
Actuated g/C Ratio		0.14	0.14		0.14		0.32	0.72		0.01	0.40	0.40
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		190	222		227		570	1337		16	753	640
v/s Ratio Prot							c0.40	0.54		0.00	c0.43	
v/s Ratio Perm		c0.09	0.04		0.01							0.06
v/c Ratio		0.66	0.30		0.08		1.25	0.75		0.44	1.07	0.15
Uniform Delay, d1		36.7	34.7		33.7		30.5	7.7		44.4	26.8	17.0
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		8.0	0.8		0.2		127.6	3.8		18.0	54.2	0.5
Delay (s)		44.6	35.5		33.8		158.1	11.6		62.3	81.0	17.4
Level of Service		D	D		C		F	B		E	F	B
Approach Delay (s)		37.4			33.8			72.7			73.3	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	614	171	109	430	75	143
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	667	186	118	467	82	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			853		1465	760
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			853		1465	760
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			85		32	62
cM capacity (veh/h)			786		120	406

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	853	586	237
Volume Left	0	118	82
Volume Right	186	0	155
cSH	1700	786	223
Volume to Capacity	0.50	0.15	1.06
Queue Length 95th (ft)	0	13	259
Control Delay (s)	0.0	3.8	124.3
Lane LOS		A	F
Approach Delay (s)	0.0	3.8	124.3
Approach LOS			F

Intersection Summary			
Average Delay	18.9		
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	142	333	243	14	16	100
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	154	362	264	15	17	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				942	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				942	272
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				93	86
cM capacity (veh/h)	1283				257	767

Direction, Lane #	SE 1	NW 1	SW 1
Volume Total	516	279	126
Volume Left	154	0	17
Volume Right	0	15	109
cSH	1283	1700	602
Volume to Capacity	0.12	0.16	0.21
Queue Length 95th (ft)	10	0	20
Control Delay (s)	3.3	0.0	12.6
Lane LOS	A		B
Approach Delay (s)	3.3	0.0	12.6
Approach LOS			B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	8	413	0	3	2	645	361	2	2	481	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	9	449	0	3	2	701	392	2	2	523	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2326	2324	523	2776	2338	393	538			395		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2326	2324	523	2776	2338	393	538			395		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	27	19	100	72	100	32			100		
cM capacity (veh/h)	10	12	554	0	12	655	1030			1164		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	488	5	701	395	525	15
Volume Left	30	0	701	0	2	0
Volume Right	449	2	0	2	0	15
cSH	103	19	1030	1700	1164	1700
Volume to Capacity	4.74	0.28	0.68	0.23	0.00	0.01
Queue Length 95th (ft)	Err	20	141	0	0	0
Control Delay (s)	Err	254.5	15.6	0.0	0.1	0.0
Lane LOS	F	F	C		A	
Approach Delay (s)	Err	254.5	10.0		0.1	
Approach LOS	F	F				

Intersection Summary				
Average Delay	2297.6			
Intersection Capacity Utilization	105.3%	ICU Level of Service	G	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	59	41	192	65	34	34	67	65	14	48	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	64	45	209	71	37	37	73	71	15	52	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	108			109			621	611	86	700	615	89
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108			109			621	611	86	700	615	89
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			86			88	79	93	94	85	100
cM capacity (veh/h)	1483			1482			316	351	972	247	349	969

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	109	316	180	70
Volume Left	0	209	37	15
Volume Right	45	37	71	2
cSH	1483	1482	454	326
Volume to Capacity	0.00	0.14	0.40	0.21
Queue Length 95th (ft)	0	12	47	20
Control Delay (s)	0.0	5.6	18.1	19.0
Lane LOS		A	C	C
Approach Delay (s)	0.0	5.6	18.1	19.0
Approach LOS			C	C

Intersection Summary			
Average Delay	9.4		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D – U.S. Department of Transportation Traffic Calming Definitions

Devices and Techniques	Descriptions	Pictures
Bike Lanes	A portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists	
Bulbouts/Neckdowns/ Chokers	Curb extensions at intersections that reduce curb-to-curb roadway travel lane widths - This increases pedestrian safety and could define roadway parking where appropriate.	
Center Islands	Raised islands located along the centerline of a roadway that narrow the width at that location	
Chicanes/Lateral Shifts	Curb extensions that alternate from one side of the roadway to the other, forming s-shaped curves	
Median Barriers	Raised islands located along the centerline of a roadway and continuing through an intersection to block cross traffic.	

Devices and Techniques	Descriptions	Pictures
Police Enforcement	Involve employing the services of law enforcement agencies to impose the local safe vehicle laws, including those for posted speeds and traffic signal/signs	
Realigned Intersections	Changes in alignments that convert T-intersections with straight approaches into curving roadways meeting at right angles	
Roundabouts	Circular intersection with yield control of all entering traffic and appropriate geometrics to ensure travel speeds less than 30 mph	
Speed Humps	Rounded raised pavement devices placed across roadways to slow and/or discourage traffic	
Speed Tables/ Textured Pavement/ Raised Crossings	Flat-topped speed humps often constructed with a textured material to slow traffic	

Source: www.fhwa.dot.gov/environment/tcalm/