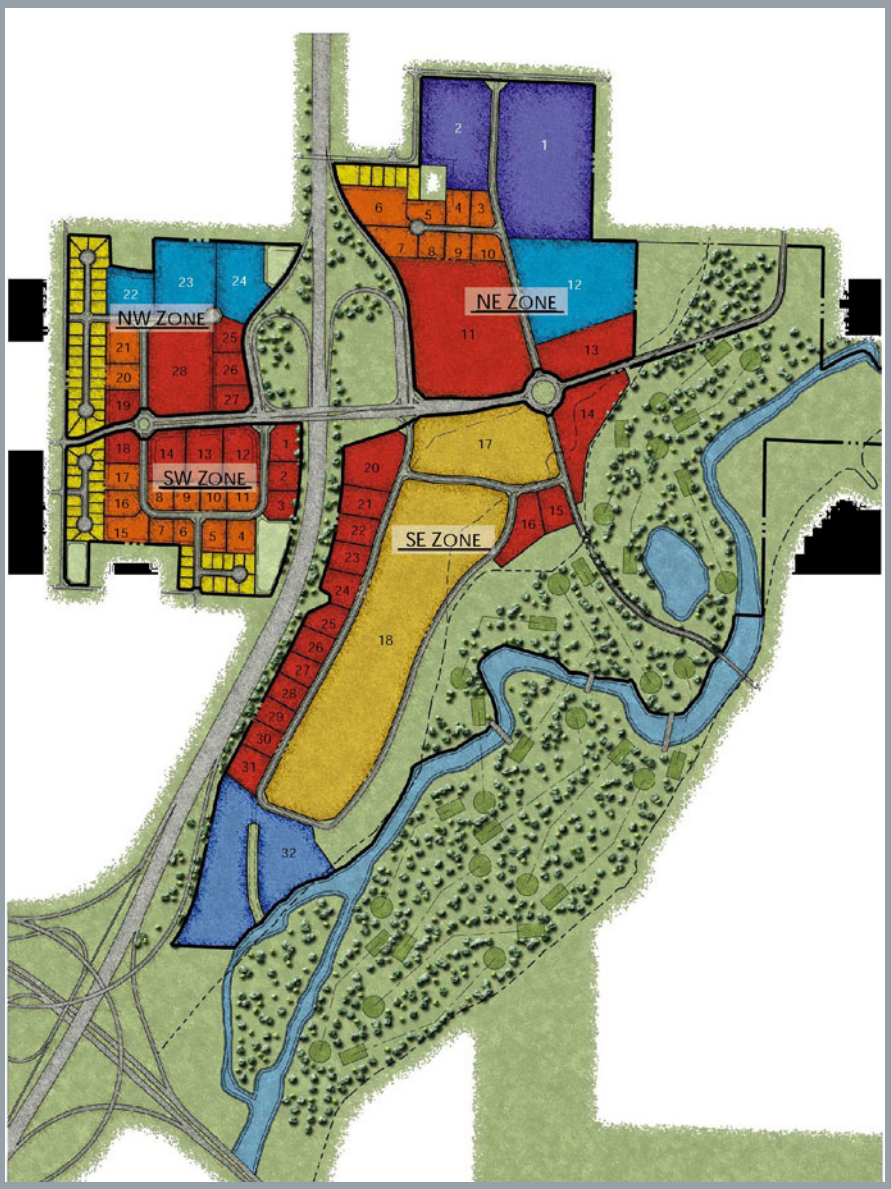

60 / 65 DEVELOPMENT

TRAFFIC IMPACT STATEMENT PHASE I

January 2009

PREPARED FOR

60/65 Development
City of Springfield
Greene County
MoDOT

PREPARED BY

HNTB Corporation

HNTB

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60/65 Development
Phase I - Traffic Impact Statement

1.0 Introduction

60/65 Development is a proposed multi-use development located on approximately 300 acres on the west and east sides of US 65, just north of US 60, in the southeast corner of the City of Springfield. The west side of the development is comprised of single family, multi-family, office and retail land uses. The east side of the development is primarily designated "lifestyle center", which is a higher density of mixed land use of retail, office, and residential. To serve the 60/65 Development, a new interchange on US 65 has been proposed between the existing US 60/65 system interchange on the south and the service interchange at US 65 and Battlefield on the north. A proposed new roadway will connect the interchange to the city street network. The purpose of the Traffic Impact Statement (TIS) is to study the traffic operational impacts of the proposed development on the existing transportation system and to identify improvements to address development traffic as requested by the City of Springfield, Greene County, and MoDOT (Study Team).

In 2007, a detailed operational study was performed for MoDOT of the proposed interchange and traffic operations along US 65. Based on the study, initial concept approval for a new access point was granted by MoDOT contingent upon several factors outlined in a letter dated April 7, 2008 from the District Engineer, as shown in Appendix A. A formal Access Justification Request would be required by the City of Springfield before final approval.

On August 13, 2008, a scoping meeting was held at Springfield City Hall. In attendance at the meeting were representatives from the City of Springfield, Greene County, MoDOT, and the development team. The purpose of the meeting was to identify a traffic impact study scope of services and approach for the proposed project. The Study Team agreed to split the project into two phases. Phase 1 would be required for the zoning of the property. Phase 2 would be required as a condition of the zoning of the property for each phase of development.

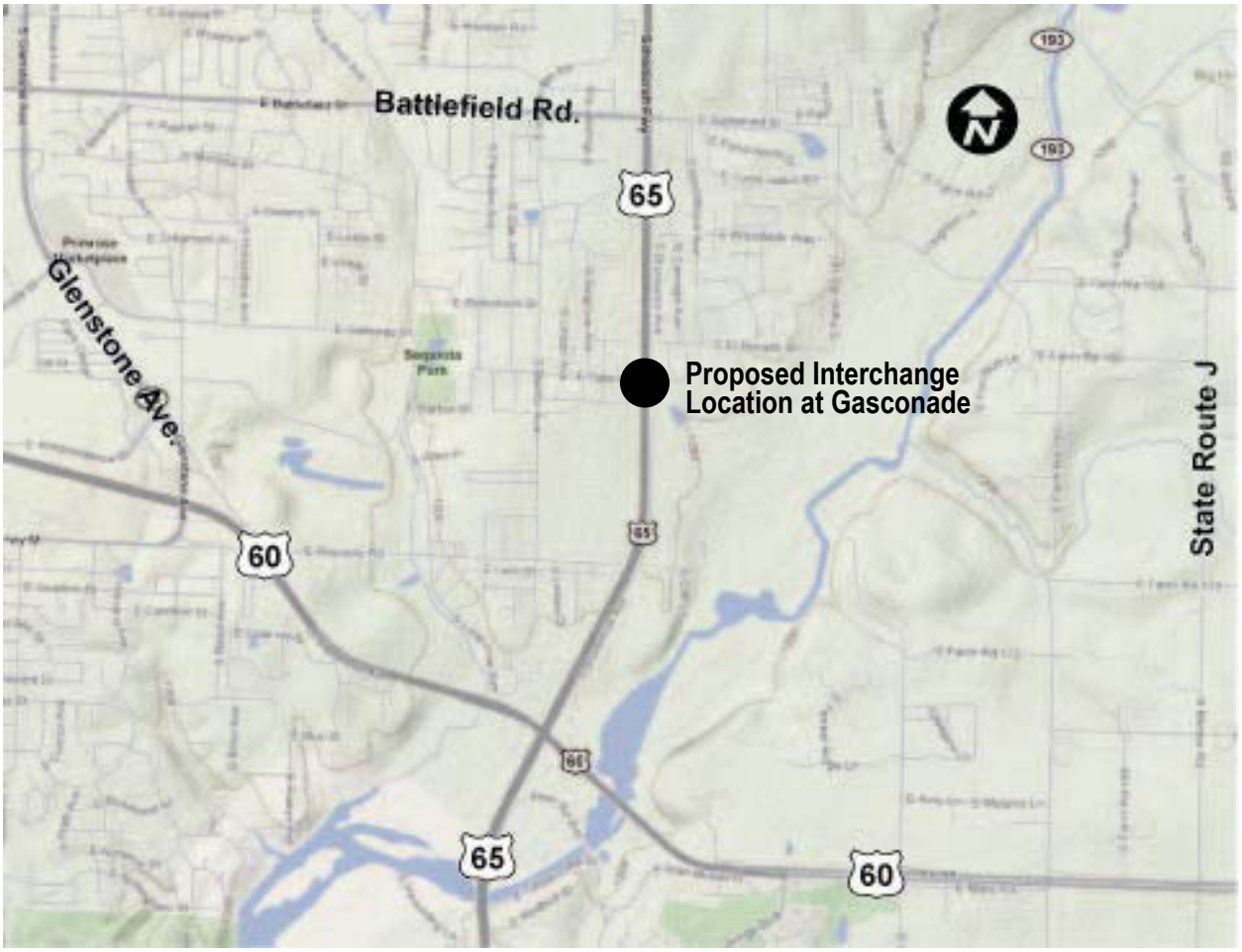
- **Traffic Study Phase 1** – Identify the number of total trips on a future 2033 roadway network including the number related to the proposed development. Identify roadway lane needs using Appendix C of the Springfield Travel Demand Model Calibration and Application Report.

- **Traffic Study Phase 2** – Evaluate the operational impacts of development trips on a future 2033 roadway network and develop a Traffic Impact Statement report for each phase of development. Phase 2 may also include a Traffic Impact Study for the new interchange and impacts on US Highway 65 as required for gaining final approval from MoDOT for an access justification request (AJR) on US Highway 65.

The City will use the Phase 1 report to identify the proposed development's level of impact on the surrounding street system. Phase 1 information will also be used to perform a more detailed analysis of transportation improvement needs in Phase 2. Phase 2 would provide a detailed assessment of transportation improvement needs on the local roadway network.

As requested by the Study Team, the initial study area for the Traffic Impact Statement shall be bounded by Battlefield Road/FR 164, State Route J, US Highway 60, and Glenstone Ave. (see Figure 1). The Phase 2 study area may be revised based on Phase 1 results.

Figure 1: Study Area



2.0 Methodology

Phase 1 began with an inventory of existing traffic data in the study area. Both the City of Springfield and Greene County provided recent daily traffic counts to be used in the study. A summary of this data can be found in Exhibit 1.

Next, trip generation was updated for the latest development scenario using the seventh edition of the ITE *Trip Generation Manual (2003)* and the *Trip Generation Handbook* (Oct, 1998). The land use mix was changed from the 2007 study which resulted in fewer vehicle trips. Based on the revised land use, daily trips were reduced by 7.5%, AM peak hour trips were reduced by 42.8% and PM peak hour trips were reduced by 11.4%. Trip rates were compared to new rates in the latest Trip Generation Manual (Version 8, 2008). While some rates changed since the last version, no change was significant enough to affect the overall results of the study.

Exhibit 1
60/65 Development
Existing Traffic Counts

0 950 1,900 2,850

Feet

N

Existing Traffic Count Data

Year

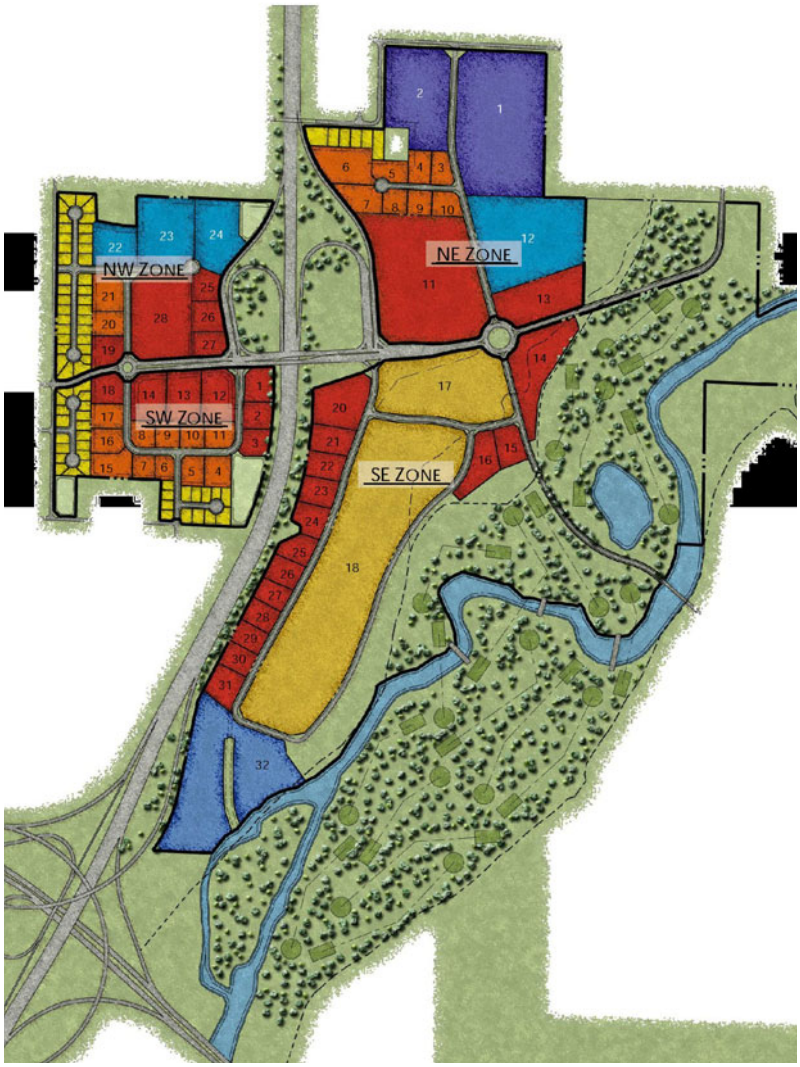
- 2005
- 2006
- 2007
- 2008

Battlefield
Lone Pine
Galloway
Luster
GLENSTONE AVE
Gasconade
Mentor
Republic
60
65
FR 164
FR 187
FR 172
FR 193
FR 189
FR 170
Hwy J

32576 30672 25270 24940 3183 23399 4835 33186 35125 8482 5075 33798 9015 25373 28540 7033 460 3328 330 556 3289 33867 14570 7012 17686 7110 28666 26236 29478 12617 32024 4614 4296 7665 3602 42232 56641 6870 24639 14475 8437 9388 24853 4995 3184 920 27884 3267 24410 8548 28022 6165 7834 27889 19434 5257 7269 55602 7665 4150 8886 6958 3117 10369 4244 65414 422 447 3384 3777 1293 1081 466 2678 446 2811 3745 1982 1311 48658 58775 44363 883 6036 25175 32053 11906 38003 44946 55875 34059 233 96 835 737 1199

The land use assumed for the trip generation is illustrated in Figure 2. The site was divided into two halves – east and west – in order to match the zone structure of the Springfield travel demand model.

Figure 2: 60/65 Development



Part of the east side of the development was designated "lifestyle center", which is a mixed land use of retail, office, and residential. A major benefit of a lifestyle center is that residents can live, work, and shop all in the same location. While this is largely convenient for the residents, it also helps area traffic by reducing the number of vehicle-trips to the development. Many trips can be combined or can be completed as walking-trips. To account for this and other combined trips, an internal trip reduction within each development half was taken using the methodology described in the Trip Generation Handbook. A pass-by trip reduction was also calculated using the Trip Generation Handbook methodology. It was assumed that all pass-by trips would be diverted from US 65.

The Springfield travel demand model was used to determine trip distribution based on the regional locations from which vehicles will access the development site. A select zone analysis was run on the two model zones comprising the new development to determine how vehicles access those zones. The results were modified using local knowledge of the area as well as input from the study team to arrive at a distribution mutually agreeable to the study team. This distribution from each half of the development (east and west) can be found in Appendix B.

The Springfield travel demand model was used to develop daily background trips for the three scenarios analyzed and their land use and roadway network inputs. The model includes all projects identified in the region's Long-Range Transportation Plan (LRTP). Table 1 shows the roadway and land use assumptions for each of the scenarios evaluated.

Table 1: Evaluation Scenario Roadway and Land Use Assumptions

	Land Use and Roadway Network Inputs			
	60/65 Development	New Interchange	Local Street Construction[1]	Springfield LRTP
Scenario 1				
Future No-Build Interchange without 60/65 Development	No	No	No	Yes
Scenario 2				
Future Interchange Build without 60/65 Development	No	Yes	Yes	Yes
Scenario 3				
Future Build Interchange with 60/65 Development	Yes	Yes	Yes	Yes

1 Local Street Construction is the addition of relocated and improved Republic arterial from Glenstone Ave. to US 65, west of US 65 and from US 65 to FR 187 east of US 65. In addition, a new north/south arterial extending FR 189 to cross Lake Springfield.

The No-Build scenario (Scenario 1) traffic forecast was determined using the Springfield travel demand model to calculate the traffic growth between the 2000 base and 2030 future No-Build models. The annual growth was then applied to existing traffic counts (grown to a base year of 2008) to yield 2033 No-Build adjusted volumes. The Build without new development scenario (Scenario 2) traffic forecast was determined using the travel demand model and coding in a new interchange along US 65 and comparing the results to the 2030 future No-Build raw model volumes. The difference of the two models was added to the No-Build adjusted volumes of Scenario 1. The Build with new development scenario (Scenario 3) was calculated by taking Scenario 2 volumes and manually adding development trips based on the trip generation and trip distribution (Appendices B and D).

Finally, Level of Service (LOS) and lane needs for each segment of the study area were determined using *Roadway Geometrics and Daily Roadway Capacities, Appendix C* from the *Springfield Travel Demand Model Calibration and Application Report* dated 01/30/2006 prepared in support of the Springfield-Greene County Transportation Plan. This table can be found in Appendix C.

3.0 Trip Generation

Table 2 shows the net external trip generation (in number of vehicles) for each half of the development for daily AM and PM peak hour traffic. This represents the trip generation after internal trip reduction, but before pass-by trips are removed. These are the number of trips that access the development site.

Table 2: 60/65 Development Trips Accessing the Development

Development Half	Daily	AM			PM		
		Total	Enter	Exit	Total	Enter	Exit
West of US 65	15,241	750	501	249	1,537	656	880
East of US 65	36,609	1,346	837	509	3,446	1,593	1,850
Total	**51,850**	**2,095**	**1,338**	**758**	**4,982**	**2,250**	**2,731**

The Trip Generation Handbook describes the methodology to calculate pass-by trips for retail land use only in the PM peak. The percentage of trips that are pass-by trips are calculated based on the total number of retail trips and the volume of adjacent roadway traffic. The calculated 734 total pass-by trips (18% of trips to the site) in the afternoon are trips already being made along US 65, but that are diverted to the development site. Therefore, new trips added to the roadway network do not include the 734 pass-by trips, because those trips were already being made. Table 3 shows the resulting trip generation after pass-by trips are removed, which represents trips that are added to the roadway network.

Table 3: 60/65 Development Trips Added to Network

Development Half	Daily	AM			PM		
		Total	Enter	Exit	Total	Enter	Exit
West of US 65	15,241	750	501	249	1,329	557	772
East of US 65	36,609	1,346	837	509	2,919	1,345	1,572
Total	**51,850**	**2,095**	**1,338**	**758**	**4,248**	**1,902**	**2,344**

The full trip generation tables along with all documented assumptions can be found in Appendix D.

4.0 Trip Assignment and Level of Service

Roadway traffic volumes were developed for each of the three scenarios based on the methodology described above. The following section provides those traffic assignments and a summary of the changes in travel patterns. Selected link assignment volumes are shown in Table 4. Based on the roadway link traffic volumes, roadway level of service for each scenario was calculated using capacity thresholds from the Roadway Geometrics and Daily Roadway Capacities table in Appendix C. The scenario traffic volumes and levels of service are displayed in Exhibits 2, 3, and 5. Exhibit 4 shows the 60/65 Development Trips in the study area.

Table 4: Assignment Summary

	Land Use and Roadway Network Inputs			
	US 65 north of US 60	US 60 west of US 65	Battlefield west of US 65	Glenstone North of US 60
Scenario 1				
Future No-Build Interchange without 60/65 Development	120,950	104,100	47,272	57,976
Scenario 2				
Future Interchange Build without 60/65 Development	117.751	96,005	39,693	54,074
Scenario 3				
Future Build Interchange with 60/65 Development	142,609	109,272	41,890	56,879

1 Local Street Construction is the addition of relocated and improved Republic arterial from Glenstone Ave. to US 65, west of US 65 and from US 65 to FR 187 east of US 65. In addition, a new north/south arterial extending FR 189 to cross Lake Springfield.

Scenario 1 – 2033 No-Build

Exhibit 2 shows the 2033 No-Build Adjusted Volumes and level of service. These volumes were calculated using the methodology described above, then adjusted manually based on input from the City of Springfield and local knowledge of the area. Some traffic was shifted from Glenstone to Fremont to account for the underutilization of Fremont in the model. The volume from the northwest quadrant of the Glenstone / James River Freeway interchange was reduced after the City of Springfield agreed that the land use assumed in the model for that area was too intense. Volumes on the freeways (US 60 and US 65) were adjusted to match the results of MoDOT's 2007 study of the US 60/65 interchange. Also, traffic volumes on county roads east of Lake Springfield were modified to account for the future proposed consolidation of access at Highway J.

Exhibit 2 shows traffic volumes on the major highways of US 60 and US 65 as well as the major city arterials of Glenstone and Battlefield showing a significant growth in traffic from existing conditions. Traffic demand on the city arterials of Glenstone and Battlefield nearly double in 25 years. In addition, Greene county roads, such as Highway J, also see a substantial increase in traffic.

Based on the growth in traffic volumes, US 60 and US 65 highways as well as Glenstone, Battlefield and Highway J may warrant additional capacity beyond what is identified in the regions Long-Range Transportation Plan based on the capacity thresholds identified in the Roadway Geometrics and Daily Roadway Capacities table in Appendix C. At the very least, these roadways should be evaluated in more detail in the Phase 2 traffic study.

Exhibit 2
60/65 Development
Scenario 1
2033 No Build
Adjusted Volume and LOS

0 950 1,900 2,850
Feet

LOS

- A - C
- D
- E
- F

Centroid Connectors (Not Roads)

Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

Scenario 2 – Build without 60/65 Development

Exhibit 3 shows projected 2033 volumes and level of service when the proposed new interchange and arterial are built, but with the same land use as the 2033 No-Build scenario. The proposed 60/65 Development is not built in this scenario.

Compared to No-Build volumes, traffic volumes for this scenario were reduced on a majority of the roadways in the study area, particularly those parallel to the new arterial such as Battlefield and US 60. Volumes on Glenstone, Highway J, and Galloway are also reduced with some increases on US 65 and other roadways perpendicular to the new arterial near the new interchange such as Lone Pine, Mentor, and Woodstock.

Level of service for the Build without development scenario is similar to the No-Build, except that Highway J is relieved of its heavy volumes and improves to an acceptable LOS. Because volumes generally decrease, some other roadways would improve somewhat, but not enough to improve the LOS designation. Based on the roadway links showing undesirable level of service, these roadways may warrant additional capacity beyond what is identified in the regions Long-Range Transportation Plan based on the capacity thresholds identified in the Roadway Geometrics and Daily Roadway Capacities table in Appendix C. At the very least, these roadways should be evaluated in more detail in the Phase 2 traffic study.

Scenario 3 – Build with 60/65 Development

Exhibit 4 shows the assumed traffic distribution of development trips over the study area network. Because the development is intended to be a regional generator, most trips accessing the development will utilize the freeway system – US 65 and US 60. Medium distance trips will likely travel via the major arterials of Glenstone and Battlefield. Trips with origins or destinations more local to the development are assumed to use local collector streets such as Lone Pine and Mentor. Assuming that the daily traffic volume is ten times the peak hour volume, the roadways shown in the exhibit in gray or green will likely have fewer than 100 peak hour vehicles added. Roadways shown in yellow, orange, or red will probably be impacted by greater than 100 peak hour vehicles and include the freeways (US 65 and US 60) and the major arterials (Battlefield, Glenstone, the proposed new arterial, and Highway J).

Exhibit 5 shows projected 2033 volumes and level of service with the proposed new interchange and arterial as well as the proposed 60/65 development. While traffic volumes on many roadways dropped when the new interchange and arterial were added, increasing volumes due to the new development result in a net change in volumes from the No-Build that is mixed increasing and decreasing throughout the study area. Volumes on US 65 and US 60 west of US 65 have a net volume increase. Volumes on Galloway, Republic, Highway J, and US 60 east of US 65 have net volume decreases. Volumes on Glenstone and Battlefield fluctuate up or down by about 1,500 daily trips or fewer, which is about three percent of the projected daily volume on these roadways.

Exhibit 3
60/65 Development
Scenario 2
2033 Build Without Development
Adjusted Volume and LOS

0 950 1,900 2,850
Feet

N

LOS

- A - C
- D
- E
- F
- Centroid Connectors (Not Roads)
- Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

Battlefield
Lone Pine
Galloway
Luster
GLENSTONE AVE
Gasconade
Mentor
Republic
FR 164
FR 187
FR 170
FR 172
FR 193
FR 189
Hwy J
65
60

Exhibit 4
60/65 Development
Development Trips

0 950 1,900 2,850

Feet

N

Daily Trips

- 0
- 1 - 1,000
- 1,001 - 10,000
- 10,001 - 20,000
- 20,001 - 40,000

Battlefield
Lone Pine
Galloway
Luster
GLENSTONE AVE
Gasconade
Mentor
Republic
FR 164
FR 187
FR 189
FR 193
FR 170
FR 172
Hwy J
65
60

Exhibit 5
60/65 Development
Scenario 3
2033 Build With Development
Adjusted Volume and LOS

0 950 1,900 2,850
Feet

N

LOS

- A - C
- D
- E
- F

Centroid Connectors (Not Roads)

Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

In the Build with development scenario, the same roadway links that have undesirable level of service in the Build without development scenario are affected. While the levels of service are reported nearly the same in both scenarios, operations in the Build with development scenario will be slightly worse because of increased volumes across nearly all study area roadways. Based on the roadway links showing undesirable level of service, these roadways may warrant additional capacity beyond what is identified in the regions Long-Range Transportation Plan based on the capacity thresholds identified in the Roadway Geometrics and Daily Roadway Capacities table in Appendix C. At the very least, these roadways should be evaluated in more detail in the Phase 2 traffic study.

5.0 Roadway Lane Needs

The number of lanes needed to achieve LOS D was determined for each study area roadway link in each scenario and compared to lane needs in previous scenarios. Lane needs in the No-Build were compared to proposed 2030 laneage of the Long-Range Transportation Plan. Lane needs in the two build scenarios – with and without US 60/65 development – were compared to the number of lanes needed in the No-Build scenario to achieve LOS D. Dashed lines on the exhibits denote no change in number of lanes needed while solid lines indicate a change in lane needs.

Scenario 1 – 2033 No-Build

Exhibit 6 shows lane needs for the 2033 No-Build scenario. It indicates that eight lanes are needed (four in each direction) on US 65 as well as on US 60 between US 65 and Glenstone. It suggests that Glenstone be widened to eight lanes, Battlefield to six, and Highway J to three lanes. These results do not necessarily mean that gridlock will result if the lane needs are not met. The lane needs are dictated by general roadway capacities defined in the Roadway Geometrics and Daily Roadway Capacities table in Appendix C and do not account for the individual characteristics of each roadway. From a high level view, these roadways have the potential to operate poorly if improvements are not made.

Also to note are some spot locations where it appears more lanes are needed, such as on Ingram Mill (Mentor) south of Battlefield and on Lone Pine north of Galloway. Analyzing collector roadways in a regional model becomes difficult because of how the street network and land use is represented. Because every building, every driveway, and every street cannot be modeled in a regional model, representative roadways are used to model several streets. For example, Ingram Mill Road in the model could also be representing Parkview Avenue or other roadways in the real world with the volumes shown in the model actually split among the various streets. Again, these results should be interpreted as meaning that these roadways *have the potential* to operate poorly if improvements are not made and some of these improvements could be made at the intersection rather than the roadway link.

Scenario 2 – Build without 60/65 Development

Exhibit 7 shows lane needs for the 2033 Build Without Development scenario. Most of the differences in lanes needed are actually lane reductions from the 2033 No-Build scenario. The extra third lane on Highway J in the No-Build scenario is no longer needed with the interchange and new arterial built. Aside from the new lanes needed on the new arterial and ramps, a third lane may be needed on Lone Pine

north of the new arterial. Volumes on US 65 north of Battlefield and on US 60 west of Glenstone are projected to increase enough to push the volumes over the threshold and possibly recommend additional lanes.

Scenario 3 – Build with 60/65 Development

Exhibit 8 shows lane needs for the 2033 Build With Development scenario. Perhaps most significant is the indication that five lanes are needed in each direction on US 65 between interchanges and three lanes in each direction on US 60 west of Glenstone. Again, this does not mean that US 65 will fail if it is not a ten-lane facility by 2033, but that it should be analyzed in more detail (as was done in the 2007 MoDOT study). Very few additional lanes (beyond those needed for 2033 No-Build) are expected to be needed on the local street network except perhaps on the arterials near the interchanges.

6.0 Conclusions

Based on the study methodology and analysis results presented above, the following conclusions are provided in this Phase 1 report. Phase 2 of the traffic study would evaluate the study results in more detail and provide recommendations for local and regional transportation improvements related to the proposed US 65 interchange and 60/65 Development.

- The 2033 Future No-Build scenario (Scenario 1) showed undesirable level of service and the potential for additional lane needs on US 65, US 60, Glenstone, Battlefield, and Highway J. More detailed operational analysis has already been completed on US 60 and US 65 for MoDOT.

- The future Build without new development scenario (Scenario 2) showed similar results to the No-Build with some areas of operational improvements, particularly on Highway J.

- The future Build with new development scenario (Scenario 3) shows some degradation and some operational improvements compared to the No-Build scenario. Additional freeway lane needs are anticipated when using capacities defined in the Roadway Geometrics and Daily Roadway Capacities table. With few exceptions, lane needs on local roadways are consistent with future No-Build lane needs.

- Phase 2 operational analysis should focus on the arterial roads that indicated capacity improvement needs as a result of the proposed US 65 interchange and the 60/65 Development. These arterials include: Glenstone, Battlefield and Highway J.

Exhibit 6
60/65 Development
Scenario 1
2033 No Build Lane Needs for LOS D
Compared to 2000 Base

0 950 1,900 2,850
Feet

N

Total Number of Lanes Needed to Achieve LOS D

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8

Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

Notes:

Freeways are by direction.

Dashed line denotes no change in number of lanes from 2000 Base to 2033 No-Build

Battlefield
Lone Pine
Galloway
Luster
GLENSTONE AVE
Gasconade
Mentor
Republic
FR 164
FR 187
FR 189
FR 193
FR 170
FR 172
Hwy J
65
60

Exhibit 7
60/65 Development
Scenario 2
2033 Build Without Development
Lane Needs for LOS D
Compared to 2033 No Build

0 950 1,900 2,850

Feet

N

Total Number of Lanes Needed to Achieve LOS D

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8

Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

Notes:

Freeways are by direction.

Dashed line denotes no change in number of lanes from 2033 No-Build to 2033 Build Without Development.

Battlefield
Lone Pine
Luster
Galloway
Gasconade
Mentor
Republic
GLENSTONE AVE
FR 164
FR 187
FR 170
FR 172
FR 193
FR 189
Hwy J
65
60

Exhibit 8
60/65 Development
Scenario 3
2033 Build With Development
Lane Needs for LOS D
Compared to 2033 No Build

0 950 1,900 2,850
Feet

N

Total Number of Lanes Needed to Achieve LOS D

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8

Analyzed in Greater Detail in 60/65 Interchange Study (2007) and Gasconade Interchange Study (2007)

Notes:

Freeways are by direction.

Dashed line denotes no change in number of lanes from 2033 No-Build to 2033 Build With Development

Battlefield
Lone Pine
Galloway
Gasconade
Mentor
Luster
GLENSTONE AVE
Republic
FR 164
FR 187
FR 189
FR 170
FR 172
FR 193
Hwy J
65
60

Appendices

A. MoDOT Access Break Letter (4/7/08)
B. Trip Distribution for Development (2 Exhibits)
C. Roadway Geometrics and Daily Roadway Capacities
D. Trip Generation

Missouri Department of Transportation

MoDOT

Kirk E. Juranas, P.E., District Engineer

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Toll free 1-888 ASK MoDOT

April 7, 2008

Mr. Bob Cumley
City Manager
City of Springfield
P. O. Box 8368
Springfield, MO 65802

Dear Mr. Cumley:

Recently, MoDOT has reviewed various proposals for an access break on Route 65 between Route 60 and Battlefield Road. The request to break access at this location could only be made by the City of Springfield, however before going into a great amount of design, the potential developers asked MoDOT to give an indication if an access break would even be possible. The developer retained a roadway-design consulting firm to analyze various layouts. Their goal was to develop a layout that would allay MoDOT's concerns of adding congestion to Route 65.

MoDOT has been shown various options for interchange layouts and has also reviewed traffic simulation models. While we believe that the close proximity between the interchanges makes it nearly impossible to have no adverse effect to Route 65, we could concur with Alternate Five as presented with the following modifications and additions. I have enclosed a copy of Alternate Five for your reference.

The southbound "on" ramp radius must be increased so that a speed differential no greater than 10 mph would occur between the ramp entering traffic and Route 65 traffic.

The queuing and lane change distances on Gasconade cannot accommodate the number of vehicles attempting to access the southbound "on" ramp. There is not enough distance between the development entrance, which lies opposite the northbound ramps, and the southbound ramps. We believe that routing all the traffic to the one approach to the east of the northbound ramps would better provide the space needed to accommodate the movements and the queues.

In addition, under the current layout, the northbound "off" ramp widens from a single lane into five lanes where it intersects Gasconade Road. This would create confusion on lane positioning at the intersection. By eliminating the development entrance directly across from the northbound ramps, the number of lanes at the end of the northbound off ramp can be reduced which will make it less confusing for drivers to find the lane they need to be in.

However, even with better queuing distances on Gasconade Road, we believe that the underlying problem is inadequate capacity for the southbound "on" ramp. Resolving the inadequate capacity by queuing the drivers on Gasconade will handle the vehicles, but will lead to longer delays causing driver frustration.

The geometrics of the western-most intersection pose a safety concern. Locating a signal on this curve could pose problems with the visibility of the signal heads. We believe consideration should be given to moving the entrance further west.

Finally, MoDOT's concurrence with allowing a break in access at this location also includes connection of the adjoining roadway system. This means road connections, adequate for the traffic volumes proposed, would be made to Republic Road and to Farm Road 170. We are aware that this will entail much further involvement on the part of the City of Springfield as well as Greene County as the requirements for these roadways are detailed.

We look forward to working together on this request. Please feel free to contact Linda Bokel at 895-7600 if you need additional information.

Sincerely,

Kirk E. Juranas, P.E.
District Engineer

cc: Mr. Dan Smith, Greene County
Mr. Bill Killian, The Killian Group of Companies
Mr. Geoff Butler, Butler Rosenbury & Partners
Mr. James Kinder, HNTB
Mac Finley and Llans Taylor(MoDOT)

J:Jobs1/Gasconade/letter to City 4-2008 Alt 5 with revsions.doc

Appendix B
60/65 Development
Development Trip Distribution
West Half Development

0 1,250 2,500 5,000 Feet

N

Sunshine St.

Battlefield

GLENSTONE AVE

60

65

FR 164

FR 187

FR 170

FR 172

FR 193

FR 189

X% = Percent of Development Trips Using Roadway

Centroid

Appendix B
60/65 Development
Development Trip Distribution
East Half Development

Feet
0 1,250 2,500 5,000

Sunshine St.
Battlefield
GLENSTONE AVE
60
65
FR 164
FR 187
FR 170
FR 172
FR 193
FR 189

X% = Percent of Development Trips Using Roadway

Centroid

Appendix C: Roadway Geometrics and Daily Roadway Capacities

Facility Type	Group Code / # Lanes	Ideal Sat Flow	RT Fac	LT Fac	Thru g/C	Turn g/C	Total Pk Hr Cap (2-way)	LOS C Pk Hr Cap (x0.8)	LOS D Pk Hr Cap (x0.9)	LOS E Pk Hr Cap (x1.0)	Daily LOS D Urban (x10)	Daily LOS D Suburban (x12.5)	Daily LOS D Rural (x9)
Freeways										Speed=>	60	60	70
Freeway (4-lane)	1-4						6,000	4,800	5,400	6,000	59,000	67,500	54,000
Expressways										Speed=>	45	45	55
Expressway (4-lane)	2-4	1,800	0.85	0.95	0.42	0.1	3,348	2,680	3,020	3,240	30,200	37,800	27,200
(5-lane)	2-5											47,150	33,950
Primary Arterials													
										Speed=>	35	45	45
Boulevards / Divided Arterial (4-lane)	3-4	1,800	0.85	0.95	0.31	0.2	2,880	2,230	2,600	2,880	26,000	32,500	23,400
(6-lane)	3-6										39,000	48,800	35,100
										Speed=>	35	40	40
Five Lane Streets (5-lane)	5-5	1,800	0.85	0.95	0.36	0.2	2,740	2,200	2,460	2,740	24,600	30,800	22,100
										Speed=>	30	35	40
Four Lane Streets (4-lane)	4-4	1,800	0.85	0.95	0.32		2,082	1,430	1,720	2,080	17,600	22,000	15,800
Collectors & Secondary Arterials										Speed=>	25	30	35
Two Lane One Way	6-1	1,800	0.85	0.95	0.28		2,732	2,080	2,460	2,740	11,200	14,000	10,100
Three Lane Streets*	6-3	1,800	0.85	0.95	0.37	0.1	1,403	820	1,120	1,400	11,200	14,000	10,100
Two Lane Streets	6-2	1,800	0.85	0.95	0.32		1,041	520	780	1,040	7,800	9,800	7,000
Ramps												35	
Ramp (1-lane)	7-1						1,800	1,440	1,720	1,920		10,800	
Connectors										Speed=>		30	
Connector	0											20,000	

Source: URS

* Three lane streets include 2-1 thru lane, 2 way CTL, and controlled access

** Calculate daily by multiplying LOS peak hour capacity by area type factor (eg. x 10 for urban)

Appendix D: Trip Generation

Trip Generation

	Size	Units	ITE Code	Daily	AM			PM		
					Total	Enter	Exit	Total	Enter	Exit
Northwest/Southwest				**17,346**	**750**	**501**	**249**	**1,719**	**747**	**971**
Retail	285	sq.ft.x1000	820	13,425	294	179	114	1,251	600	650
Office	164	sq.ft.x1000	750	2,122	329	293	36	305	43	262
Single Family	65	dwelling units	210	700	55	14	41	73	46	27
Apartments	139	dwelling units	221	1,099	72	15	57	90	59	32
Southeast/Northeast				**41,064**	**1,346**	**837**	**509**	**3,879**	**1,810**	**2,068**
Retail	1,160	sq.ft.x1000	820	33,403	681	415	266	3,156	1,515	1,641
Hotel/Motel[+]	300	rooms	310	2,676	204	118	86	199	98	102
Office	119	sq.ft.x1000	750	1,650	251	223	28	250	35	215
Apartments	174	dwelling units	221	1,278	87	18	68	110	71	38
Single Family	6	dwelling units	210	78	14	3	10	9	5	3
Senior Living	289	dwelling units	251	1,335	70	26	43	106	64	41
Golf Course[+]	18	holes	430	643	40	32	8	49	22	28
Total				**58,410**	**2,095**	**1,338**	**758**	**5,597**	**2,558**	**3,040**

Internal Trip Reduction*

Daily	PM		
	Total	Enter	Exit
2,105	**182**	**91**	**91**
1,031	89	43	46
414	27	13	14
257	30	16	14
403	36	19	17
4,455	**433**	**217**	**218**
2,211	212	128	85
958	83	37	46
322	45	11	35
458	46	20	25
28	4	2	2
478	44	19	24
0	0	0	0
6,560	**615**	**308**	**309**

Net External Trips (After Internal Trip Reduction)

	Size	Units	ITE Code	Daily	AM			PM		
					Total	Enter	Exit	Total	Enter	Exit
Northwest/Southwest				**15,241**	**750**	**501**	**249**	**1,537**	**656**	**880**
Retail	285	sq.ft.x1000	820	12,394	294	179	114	1,162	557	604
Office	164	sq.ft.x1000	750	1,708	329	293	36	278	30	248
Single Family	65	dwelling units	210	443	55	14	41	43	30	13
Apartments	139	dwelling units	221	696	72	15	57	54	39	14
Southeast/Northeast				**36,609**	**1,346**	**837**	**509**	**3,446**	**1,593**	**1,850**
Retail	1,160	sq.ft.x1000	820	31,192	681	415	266	2,944	1,387	1,556
Hotel/Motel[+]	300	rooms	310	1,718	204	118	86	116	61	55
Office	119	sq.ft.x1000	750	1,328	251	223	28	205	24	180
Apartments	174	dwelling units	221	821	87	18	68	64	51	13
Single Family	6	dwelling units	210	50	14	3	10	5	4	1
Senior Living	289	dwelling units	251	857	70	26	43	62	45	17
Golf Course[+]	18	holes	430	643	40	32	8	49	22	28
Total				**51,850**	**2,095**	**1,338**	**758**	**4,982**	**2,250**	**2,731**

Pass-By Trip Reduction[#]

PM		
Total	Enter	Exit
208	**100**	**108**
208	100	108
0	0	0
0	0	0
0	0	0
526	**248**	**278**
526	248	278
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
734	**348**	**386**

Daily, AM & PM Final External Trips

	Size	Units	ITE Code	Daily	AM			PM		
					Total	Enter	Exit	Total	Enter	Exit
Northwest/Southwest				**15,241**	**750**	**501**	**249**	**1,329**	**557**	**772**
Retail	285	sq.ft.x1000	820	12,394	294	179	114	954	458	496
Office	164	sq.ft.x1000	750	1,708	329	293	36	278	30	248
Single Family	65	dwelling units	210	443	55	14	41	43	30	13
Apartments	139	dwelling units	221	696	72	15	57	54	39	14
Southeast/Northeast				**36,609**	**1,346**	**837**	**509**	**2,919**	**1,345**	**1,572**
Retail	1,160	sq.ft.x1000	820	31,192	681	415	266	2,417	1,139	1,278
Hotel/Motel[+]	300	rooms	310	1,718	204	118	86	116	61	55
Office	119	sq.ft.x1000	750	1,328	251	223	28	205	24	180
Apartments	174	dwelling units	221	821	87	18	68	64	51	13
Single Family	6	dwelling units	210	50	14	3	10	5	4	1
Senior Living	289	dwelling units	251	857	70	26	43	62	45	17
Golf Course[+]	18	holes	430	643	40	32	8	49	22	28
Total				**51,850**	**2,095**	**1,338**	**758**	**4,248**	**1,902**	**2,344**

Percent Reduction for Pass-By Trips
18

+ Average rates used for daily hotel/motel and all golf course time periods. All others use fitted curve equations.

* There are no factors for internal reduction in the AM peak.

[#] 18% of pass-by trip reduction to shopping center trips, PM peak hour only.

11/26/2008