

# **EASTGATE COMMERCE CENTER TRAFFIC IMPACT ANALYSIS**

January 27, 2022

Prepared For:  
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1-27-22



January 27, 2022

Mr. Chris Chancellor  
Director of Engineering  
NorthPoint Development  
4825 NW 41<sup>st</sup> Street, Suite 500  
Riverside, Mo 64150

RE: EastGate Commerce Center – Independence, Missouri

Dear Mr. Chancellor:

In response to your request, Priority Engineers, Inc. has completed a traffic impact study for the above referenced project. The purpose of the analysis is to determine the potential traffic impacts associated with this development on the intersections and streets surrounding this site, primarily during the AM and PM peak hours of the development. The following report documents our analysis and recommendations.

We appreciate the opportunity to work with you on this project. Please contact us with any questions or if you require additional information.

Sincerely,

PRIORITY ENGINEERS, INC.

A blue ink handwritten signature, appearing to read 'Jesse J Skinner', is written over a horizontal line.

Jesse J Skinner, P.E., PTOE  
Senior Transportation Engineer

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## 1) INTRODUCTION

The purpose of this study is to examine the potential traffic impacts associated with the proposed Northpoint EastGate Commerce Center Development (previously known as the I-70 Commerce Center. The proposed development site is located within the city limits of Independence, Missouri and is located in Jackson County. The development is approximately 4 miles northeast of the Interstate 70 interchange with Little Blue Parkway.

The study area is shown in Figure 1. The site layout is shown in Figure 2.

## 2) EXISTING CONDITIONS

The proposed development site is approximately 1,216 acres in size. The site is undeveloped and the predominant current use is agricultural in nature. The proposed development is located along Little Blue Parkway north of RD Mize Road, along Missouri Route 78 east of Little Blue Parkway, and along Missouri Route 7 south of the round-a-bout.

Missouri Route 78, within the study area, is a four-lane facility with paved shoulders and an open drainage system. The posted speed limit is 55 MPH. The Mid America Regional Council (MARC) has assigned this roadway a functional classification of Principal Arterial.

Truman Road, within the study area, is a two-lane facility with an open drainage system. The posted speed limit is 35 MPH west of Missouri Route 78, 40 MPH between Missouri Route 78 and Little Blue Parkway and 45 MPH east of Little Blue Parkway. The Mid America Regional Council (MARC) has assigned this roadway a functional classification of Minor Arterial.

Little Blue Parkway, within the study area, is a four-lane facility with an open drainage system and paved shoulders. The posted speed limit is 50 MPH. The Mid America Regional Council (MARC) has assigned this roadway a functional classification of Freeway / Expressway.

Currently, the intersection of Missouri Route 78 and Truman Road has a four-way STOP condition. The intersection of Missouri Route 78 and Little Blue Parkway and the intersection of Little Blue Parkway and Truman Road are both signalized. The intersection of Missouri Route 78 and Bly Road currently has a STOP condition for the minor movement. The intersection of Missouri Route 78 and Missouri Route 7 is currently configured as a single lane roundabout with a radius of approximately 230 feet in length.

Peak Hour turning movement counts for the intersections of Missouri Route 78 and Truman Road, Missouri Route 78 and Little Blue Parkway, Missouri Route 78 and Bly Road, Missouri Route 78 and Missouri Route 7, and Little Blue Parkway and Truman Road were collected on December 9<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> of 2021 between 7:00 and 9:00 AM and 4:00 and 6:00 volumes. The AM Peak Hour for the study area was found to be 7:00 to 8:00 AM. The PM Peak for the study area was found to be 4:15 to 5:15 PM. The traffic counts, including existing truck percentages, are shown in Appendix II. The adjusted peak hour traffic volumes and existing lane configurations are shown in Figures 3-6 of Appendix I.

### 3) PROPOSED DEVELOPMENT

The proposed development will consist of four phases. In the first phase, buildings A2, A3, and B1-B4 will be constructed. In total, 2,093,000 SF of building space will be constructed. These buildings are all located along Little Blue Parkway to the west of Truman Road. The current design location of Buildings B1 and B2 conflicts with the existing alignment of Truman Road between Missouri Route 78 and Little Blue Parkway. It is anticipated that an agreement can be established, in which a portion of Truman Road is closed.

In the second phase buildings A1 located on Little Blue Parkway and buildings B5-B12 located along Missouri Route 78 will be constructed. In total, 4,203,000 SF of building space will be constructed. In the third phase of the construction, buildings B13-B20 will be built along Missouri Route 78 and Route 7. In this phase, 4,211,000 SF of building space will be constructed.

Additionally, this development plan has identified six retail development sites along Little Blue Parkway totaling 82 acres to be constructed in a final fourth phase. Due to the overall size of the development combined with the preliminary nature of the site plan, exact building sizes and additional entrance locations have not yet been identified for the retail development.

The proposed site plan is shown in Figure 2.

### 4) TRIP GENERATION

In 2019, Priority Engineers previously collected data at five other Northpoint developments. The locations included Edgerton, KS (LPKC facility), Kansas City, MO (Three Trails facility), Riverside, MO (Horizons facility), Birmingham, MO (NLP facility), Hazelwood, MO (Hazelwood facility). Twenty-one facilities of a similar configuration (cross-dock facilities) were monitored for a 24-hour period, along with the adjacent streets. For each facility, the daily trips vs. sq footage, AM Peak Hour (adjacent street) vs sq footage, and PM Peak Hour (adjacent street) vs sq footage was calculated. These calculations are shown in Appendix III along with the most current (Institute of Transportation Engineers' Trip Generation, 11<sup>th</sup> Edition) values for related land use 150 (Warehousing) and land use 154 (High-Cube Transload and Short-Term Storage Warehouse).

The daily trips for land use 150 can be generated by either a fitted curve  $T=1.58X+38.29$  ( $R^2=0.92$ ) or an average rate of 1.71 (Standard Deviation 1.48). Land use 154 daily trips can be generated by using an average rate of 1.40 (Standard Deviation 0.86). Northpoint's developments were found to have an average daily trip generation rate of 1.42 (Standard Deviation 1.27).

The AM Peak Hour (adjacent street) trips for land use 150 can be generated by either a fitted curve  $T=0.12X+23.62$  ( $R^2=0.69$ ) or an average rate of 0.17 (Standard Deviation 0.19). Land use 154 AM Peak Hour (adjacent street) trips can be generated by using an average rate of 0.08 (Standard Deviation 0.05). Northpoint's developments were found to have an average AM Peak Hour (adjacent street) trip generation rate of 0.07 (Standard Deviation 0.07).

The PM Peak Hour (adjacent street) trips for land use 150 can be generated by either a fitted curve  $T=0.12X+26.48$  ( $R^2=0.65$ ) or an average rate of 0.18 (Standard Deviation 0.18). Land use 154 PM Peak Hour (adjacent street) trips can be generated by using an average rate of

0.10 (Standard Deviation 0.06). Northpoint's Developments were found to have an average PM Peak Hour (adjacent street) trip generation rate of 0.09 (Standard Deviation 0.09).

Based upon the Northpoint's developments having trip generation rates that compare to land use 154, that was the land use selected as most appropriate for the trip generation for phases 1 through 3. Since the proposed site development plan is preliminary in nature, a rate of 7,500 SF of retail space per acre of retail development site was used to estimate trips generated by the fourth retail phase of the development.

The estimated AM and PM Peak Hour traffic volumes associated with phase 1 are shown below in Table 1.

<b>Table 1: Trip Generation - Phase 1</b>								
<b>Land Use</b>	<b>Intensity</b>	<b>Daily</b>	<b>A.M. Peak Hour</b>			<b>P.M. Peak Hour</b>		
			<b>Total</b>	<b>In</b>	<b>Out</b>	<b>Total</b>	<b>In</b>	<b>Out</b>
<i>(Phase 1)</i>								
High-Cube Transload and Short-Term Storage	2,093,000 SF	2,930	168	129	39	209	59	150
<i>Trucks</i>		460	42	20	22	21	10	11
Passenger Cars		2,470	126	109	17	188	49	139
<i>Trucks</i>		460	42	20	22	21	10	11
<b>Total</b>		<b>2,930</b>	<b>168</b>	<b>129</b>	<b>39</b>	<b>209</b>	<b>59</b>	<b>150</b>

The estimated AM and PM Peak Hour traffic volumes associated with the combined phase 1 and phase 2 traffic are shown below in Table 2.

<b>Table 2: Trip Generation - Phase 2</b>								
<b>Land Use</b>	<b>Intensity</b>	<b>Daily</b>	<b>A.M. Peak Hour</b>			<b>P.M. Peak Hour</b>		
			<b>Total</b>	<b>In</b>	<b>Out</b>	<b>Total</b>	<b>In</b>	<b>Out</b>
<i>(Phase 1)</i>								
High-Cube Transload and Short-Term Storage	2,093,000 SF	2,930	168	129	39	209	59	150
<i>Trucks</i>		460	42	20	22	21	10	11
<i>(Phase 2)</i>								
High-Cube Transload and Short-Term Storage	4,203,000 SF	5,662	324	249	75	405	113	292
<i>Trucks</i>		924	81	40	41	41	19	22
Passenger Cars		7,208	369	318	51	552	143	409
<i>Trucks</i>		1,384	123	60	63	62	29	33
<b>Total</b>		<b>8,592</b>	<b>492</b>	<b>378</b>	<b>114</b>	<b>614</b>	<b>172</b>	<b>442</b>

The estimated AM and PM Peak Hour traffic volumes associated with the combined phase 1, phase 2, and phase 3 traffic are shown below in Table 3.

<b>Table 3: Trip Generation - Phase 3</b>								
<b>Land Use</b>	<b>Intensity</b>	<b>Daily</b>	<b>A.M. Peak Hour</b>			<b>P.M. Peak Hour</b>		
			<b>Total</b>	<b>In</b>	<b>Out</b>	<b>Total</b>	<b>In</b>	<b>Out</b>
<i>(Phase 1)</i>								
High-Cube Transload and Short-Term Storage	2,093,000 SF	2,930	168	129	39	209	59	150
<i>Trucks</i>		460	42	20	22	21	10	11
<i>(Phase 2)</i>								
High-Cube Transload and Short-Term Storage	4,203,000 SF	5,662	324	249	75	405	113	292
<i>Trucks</i>		924	81	40	41	41	19	22
<i>(Phase 3)</i>								
High-Cube Transload and Short-Term Storage	4,211,000 SF	6,118	349	269	80	437	122	315
<i>Trucks</i>		927	87	42	45	43	20	23
Passenger Cars		12,399	631	545	86	946	245	701
<i>Trucks</i>		2,311	210	102	108	105	49	56
<b>Total</b>		<b>14,710</b>	<b>841</b>	<b>647</b>	<b>194</b>	<b>1,051</b>	<b>294</b>	<b>757</b>

The retail portion of the proposed development was estimated using Land Use 820, Shopping Center > 150K. The estimated AM and PM Peak Hour traffic volumes associated with the combined phase 1, phase 2, phase 3 and phase 4 traffic are shown below in Table 4.

**Table 4: Trip Generation - Phase 4**

Land Use	Intensity	Daily	A.M. Peak Hour			P.M. Peak Hour		
			Total	In	Out	Total	In	Out
<i>(Phase 1)</i>								
High-Cube Transload and Short-Term Storage	2,419,000 SF	3,387	194	149	45	242	68	174
Trucks		532	48	23	25	24	11	13
<i>(Phase 2)</i>								
High-Cube Transload and Short-Term Storage	8,152,000 SF	11,323	647	502	150	809	226	583
Trucks		1,779	162	79	83	81	38	43
<i>(Phase 3 Retail)</i>								
Shopping Center	616,500 SF	21,961	497	308	189	2,091	1,004	1,087
Trucks		55	6	3	3	0	0	0
Passenger Cars		34,305	1,122	854	273	3,037	1,249	1,788
Trucks		2,366	216	105	111	105	49	56
<b>Total</b>		<b>36,671</b>	<b>1,338</b>	<b>959</b>	<b>384</b>	<b>3,142</b>	<b>1,298</b>	<b>1,844</b>

## 5) TRIP DISTRIBUTION AND ASSIGNMENT

Trips generated by the Northpoint EastGate Commerce Center were distributed based on existing traffic flows and a general analysis of the surrounding area for passenger vehicles. The anticipated trips were distributed onto the existing street system approximately as follows:

- 2 percent to and from the north on Missouri Route 7
- 3 percent to and from the south on Missouri Route 7
- 20 percent to and from the north on Little Blue Parkway
- 30 percent to and from the south on Little Blue Parkway
- 5 percent to and from the west on Truman Road
- 40 percent to and from the southwest on Missouri Route 78

Truck traffic was similarly estimated using the existing traffic patterns and general analysis of the surrounding area. The anticipated trips were distributed onto the existing street system approximately as follows:

- 5 percent to and from the north on Little Blue Parkway
- 80 percent to and from the south on Little Blue Parkway
- 15 percent to and from the southwest on Missouri Route 78

**6) LEVEL OF SERVICE AND VOLUME/CAPACITY ANALYSES**

Capacity analysis was used to quantify the impacts of the increased traffic on the intersections studied. The methodology outlined in the Highway Capacity Manual, 6th Edition, was used as a basis to perform the analysis for this study. Capacity analysis defines the quality of traffic operation for an intersection using a grading system called Level of Service (LOS). The LOS is defined in terms of average vehicle delay. Levels of service A through F have been established with A representing the best and F the worst.

<b>Table 5: Level of Service Definitions</b>		
<b>Level of Service</b>	<b>Unsignalized Intersection</b>	<b>Signalized Intersection</b>
A	< 10 Seconds	< 10 Seconds
B	< 15 Seconds	< 20 Seconds
C	< 25 Seconds	< 35 Seconds
D	< 35 Seconds	< 55 Seconds
E	< 50 Seconds	< 80 Seconds
F	≥ 50 Seconds	≥ 80 Seconds

The study intersections were evaluated using SIDRA and Synchro, which are based in part on Highway Capacity Manual methods. The analysis reports are included in Appendix II.

**Existing Conditions**

The levels of service, lane configuration, and queue lengths for existing conditions are shown in Figures 5-6 in Appendix I.

The two signalized intersections have an overall level of service C in both Peak Hours for existing conditions. The roundabout operates at an overall level of service A during both Peak Hours. The four-way STOP controlled intersection at Missouri Route 78 and Truman Road has a level of service B or better for all individual movements and the minor movement at the STOP controlled intersection of Missouri Route 78 and Bly Road.

**Existing Conditions with closing Truman Road**

This scenario evaluates what would happen with existing traffic volumes if Truman Road was closed between Missouri Route 78 and Little Blue Parkway. Traffic traveling along the existing alignment of Truman Road between Missouri Route 78 and Little Blue Parkway travel approximately 0.45 miles. If this traffic was diverted along Little Blue Parkway and Missouri Route 78 this trip would be approximately 0.65 miles in length.

The levels of service, lane configuration, and queue lengths for the Existing scenario with a closed Truman Road are shown in Figures 9 and 10 in Appendix I.

The signalized intersection at Missouri Route 78 and Little Blue Parkway is anticipated to have an unchanged overall level of service. The intersection of Little Blue Parkway and Truman Road is anticipated to operate at an improved overall level of service B in the AM Peak Hour and an improved level of service A in the PM Peak Hour.

The intersection of Missouri Route 78 and Missouri Route 7 and the intersection of Missouri Route 78 and Bly Road have unchanged levels of service in this scenario. The intersection of Truman Road and Missouri Route 78 was evaluated as both a STOP controlled condition for the minor movement and as an all way STOP condition. All individual movements operate at a level of service B or better for both STOP controlled scenarios.

***Existing + Proposed Conditions***

Phase 1

The traffic volumes, levels of service, lane configuration, and queue lengths for the first phase are shown in Figures 11-18.

All signalized intersections have an overall level of service C or better in both Peak Hours. The roundabout experiences a level of service A in both Peak Hours. All STOP controlled movements perform at a level of service C or better in both Peak hours.

Phase 2

The traffic volumes, levels of service, lane configuration, and queue lengths for the first phase are shown in Figures 19-26. For this Phase the intersection of Missouri Route 78 and Little Blue Parkway has the pavement markings reconfigured to add dual left turn lanes on Little Blue Parkway.

All signalized intersections have an overall level of service C or better in both Peak Hours. The roundabout experiences a level of service A in both Peak Hours. All STOP controlled movements perform at a level of service C or better in both Peak hours.

Phase 3

The traffic volumes, levels of service, lane configuration, and queue lengths for the first phase are shown in Figures 27-34.

All signalized intersections have an overall level of service C or better in both Peak Hours. The roundabout experiences a level of service A in both Peak Hours. All STOP controlled movements perform at a level of service C or better in both Peak hours.

Phase 4

The traffic volumes, levels of service, lane configuration, and queue lengths for the first phase are shown in Figures 35-42. For this phase, the southwestbound left turn lanes were lengthened at the intersection of Missouri Route 78 and Little Blue Parkway. The intersection of Missouri Route 78 and Truman Road is signalized.

All signalized intersections have an overall level of service D or better in both Peak Hours. The roundabout experiences a level of service A in both Peak Hours. All STOP controlled movements perform at a level of service D or better in both Peak hours with the exception drive A3 which is a level of service F in the PM Peak Hour. It is important to note that the analysis for this phase is based upon a preliminary site plan without exact building sizes, drive locations or more specific land uses and is based upon an average building size per acre estimate. As the development plans progress and more information becomes available additional analysis should be performed on the individual retail development sites.

## **7) FUTURE CONDITIONS**

A 20-year horizon of 2042 was selected for the analysis of future traffic in regards to the capacity analysis of the study area, a growth rate of 2.0 percent per year was selected for this analysis. A 2.0 percent annual growth rate represents an 48.6% increase over 20 years, which allows for significant development to occur in the area. The background traffic volumes, levels of service, lane configuration, and queue lengths for the Future Conditions are shown in Figures 43-50 of Appendix I.

All STOP-controlled minor movements are anticipated to operate with an acceptable level in the AM Peak hour. In the PM Peak Hour, Drive B8 and Drive A3 have undesirable levels of Service. All Signalized intersections operate with an acceptable overall level of service. The roundabout operates at an overall level of service A in both Peak Hours.

With the traffic volumes associated with this scenario, it may be desirable to add an additional northeastbound right turn lane at Missouri Route 78 and Little Blue Parkway. It may also be desirable to restripe a second southbound left turn lane at Little Blue Parkway and Truman Road by restriping the intersection.

## **8) SIGNAL WARRANTS**

In the Fourth Phase of the development, in the PM Peak Hour, if the intersection of Missouri Route 78 and Truman Road remains unsignalized, it was anticipated to have a level of service F with a 17.6 vehicle design queue length. The approach control delay is 248.3 seconds per vehicle.

While Warrant 3, the Peak Hour Warrant is intended to primarily intended for office complexes, manufacturing plants and industrial complexes it was selected as the most appropriate warrant given the level of details available for analysis. Section 902.3.5 allows for consideration of a signal if one of two conditions is met. The first category requires 5 vehicle hours for a two-lane minor approach, with a volume of at least 150 vehicles per hour and a total entering volume of over 650 vehicles. This location in the PM Peak Hour has a delay of approximately 19.4 vehicle hours of delay with 284 vehicles approaching the minor approach and 1,438 vehicles entering the intersection. All three factors of this category are met.

The other condition is the approaching volumes exceed the threshold in plotted curve in section 902.3.5 of the EPG. Since the posted speed is greater than 40 MPH, the 70% factor is allowed. At this location, both the threshold in figure 902.3.5.2 (70% factor) and figure 902.3.5.1 are exceeded.

## **9) AUXILLIARY TURN LANES**

The proposed site plan has twenty entrances associated with the industrial portion of the development. For the purposes of the evaluation of the retail portion of the development it was assumed that three additional right in-right out entrances would be constructed to help facilitate traffic circulation into and out of the retail portion of the development.

EPG section 940.9 gives guidance for where left and right turn lanes are should be installed.

For entrances along Missouri Route 78 the left turn lanes are governed by section 940.9.4 (55 MPH) for the two-lane section of Missouri Route 78 and section 940.9.6 for the four-lane section of Missouri Route 78. Right turns are governed by section 940.9.9. For entrances along Little Blue Parkway section 940.9.9 still governs right turn lanes and section 940.9.6 applies for left turn lanes. For entrances along Bly Road the appropriate left turn lane guidance is found in section 940.9.1 and the right turn lane guidance is found in section 940.9.8. Similarly, the guidance for Truman Road is found in section 940.9.8 for the right turn lane and section 940.9.2 for the left turn lane.

The following entrances warrant the installation of a left turn lane: A1, A3, B3, B4, B6-1, B6-2, B-8 (Bly Road) in both directions, B 10, and B14.

The following right turn lanes are warranted B2-1, B14. If the fourth retail development phase is completed without modification of the development site plan beyond the assumptions in this report, right turn lanes would also be warranted for entrances R1 and R3.

Per EPG section 233.2, turn lanes on Little Blue Parkway should have at a minimum, 210' in length with a taper of 100'. Left turn lanes on Missouri Route 78 should have at a minimum, a 255' turn lane with a 180' taper and right turn lanes need, at a minimum, a 200' turn lane with a 180' taper.

## **10) SIGHT DISTANCE**

Sight Distance at entrances should meet both intersection and stopping sight distance. Typical sight distance obstructions occur due to horizontal or vertical curvature of the roadway or by either vegetation, structures or other fixed objects.

Due to the preliminary nature of the site plan, there are retail entrances that have not been designed yet and entrances into the first three phases whose locations have not been finalized to the degree that field evaluations can be currently made. As the design plans are finalized, sight triangles should be preserved near entrances and the intersection and stopping sight distance should be measured in the field.

## **11) RECOMMENDATIONS & CONCLUSIONS**

This study documents the impact of the proposed Northpoint EastGate Commerce Center Development.

By the second phase of the development the intersection of Missouri Route 78 and Little Blue Parkway should have the pavement markings reconfigured to add dual left turn lanes on Little Blue Parkway.

With the fourth phase of the development, the southwestbound left turn lanes need to be lengthened at the intersection of Missouri Route 78 and Little Blue Parkway. With the fourth phase of the development, the intersection of Missouri Route 78 and Truman Road should be signalized.

As the phases are constructed, the entrances that were listed in section 9 of this report should be constructed with right or left turn lanes with the appropriate turn lane length and taper as specified by the EPG.

When the design and configuration of entrances of the first three phases are finalized, the intersection and stopping sight distance should be verified.

As the site development plan evolves and further defines the retail developments, additional level of service evaluations should be made for each of the entrances into the retail development and the intersection and stopping sight distance should be field verified.

## APPENDIX I

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