DRAFT
Indirect Effects Technical Report
ArDOT JOB NO. CA0602

I-30 (From I-530/I-440 to I-40) and
I-40 (From Hwy. 365/MacArthur Dr. to Hwy. 67)
Pulaski County, Arkansas
May 2018

U.S. Department of Transportation
Federal Highway Administration

ARDOT ARKANSAS DEPARTMENT OF TRANSPORTATION

CONNECTING ARKANSAS PROGRAM CAP

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1.0 INTRODUCTION

Approved by Arkansas voters, the Arkansas Department of Transportation (ArDOT) is implementing an accelerated state highway construction and improvement program named the Connecting Arkansas Program (CAP).

A major component of the CAP is to implement a project to improve a portion of Interstate 30 (I-30) from Interstate 530 (I-530) and Interstate 440 (I-440) to Interstate 40 (I-40), including the Arkansas River Bridge, and a portion of I-40 from Highway (Hwy.) 365 (MacArthur Drive) to Hwy. 67. This project is ArDOT job number CA0602: I-530 - Hwy. 67 (Widening & Reconstruction) (I-30 & I-40), commonly known as the 30 Crossing project. **Figure 1** illustrates the proposed 7.3-mile project limits.

1.1 Existing Facility

I-30 is one of the critical links of the Central Arkansas Freeway System. It connects communities within the Central Arkansas Region and serves local, regional and national travelers with varied destinations and trip purposes.

The I-30 corridor generally consists of three main lanes in each direction with parallel one-way discontinuous frontage roads on each side of the interstate. In the northern portion of the project limits, the I-40 corridor consists of three to four main lanes in each direction with parallel one-way frontage roads on each side of the interstate between the I-30/I-40 interchange and North Hills Boulevard (Blvd.). Within the 7.3-mile corridor, there are four system interchanges located at the following locations:

- I-30 with I-530 and I-440
- I-30 with I-630
- I-30 with I-40
- I-40 with Highways 67/167

Figure 1: Project Limits Map

1.2 Proposed Alternatives

1.2.1 No-Action Alternative

The No-Action Alternative represents the case in which the proposed project is not constructed, but could include future projects identified through the long-range planning process for maintaining a state of good repair as funding becomes available.

1.2.2 Action Alternatives

Two different main lane configurations are under consideration. Both would include the replacement of the Arkansas River Bridge.

- Eight-Lane General Purpose (GP) Alternative would provide four main lanes in each direction with no Collector Distributor (C/D) lanes.

- Six-Lane with C/D Lanes Alternative would reconstruct the existing six-lane (three in each direction) roadway while adding two decision lanes on each side that ultimately feed into a C/D system located at the Arkansas River Bridge.

The current Hwy. 10 (Cantrell Rd.) interchange provides direct access to the downtown business district of Little Rock. Its proximity to the Arkansas River Bridge and the I-30 interchange with I-630 creates a unique level of complexity. In order to balance various project goals, two interchange concepts are being considered for replacement of this interchange:

- An elevated Single Point Urban Interchange (SPUI) constructed in the same location as the current interchange;
- A Split Diamond Interchange (SDI) constructed south of the existing interchange at 4th and 9th Streets.

Combining the two main lane configurations with the two Hwy. 10 (Cantrell Rd.) interchange concepts results in the four Action Alternatives as follows:

Alternative 1A: 8-Lane GP with SPUI Alternative
Alternative 1B: 8-Lane GP with SDI Alternative
Alternative 2A: 6-Lane with C/D Lanes with SPUI Alternative
Alternative 2B: 6-Lane with C/D Lanes with SDI Alternative

For detailed information on the Action Alternatives, refer to the **30 Crossing Environmental Assessment** (EA).

2.0 INDIRECT EFFECTS

The Council of Environmental Quality (CEQ) and the Federal Highway Administration (FHWA) regulations require that potential indirect effects be considered during the National Environmental Policy Act (NEPA) process. Indirect effects are defined as impacts that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” according to the CEQ (40 Code of Federal

Regulations (C.F.R.) 1508.8) and may "include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

Indirect effects would occur outside of the existing or proposed right of way (ROW). As to the cause and effect relationship between the proposed improvements and the indirect effect, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 C.F.R. § 1508.8). According to the *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects*, indirect effects can be linked to direct effects in a causal chain [National Cooperative Highway Research Program Report (NCHRP) 466]. The chain can be extended as indirect effects produce further consequences. Probability also helps distinguish indirect effects from direct effects; direct effects are often inevitable, while indirect effects are merely probable. Examples of direct and induced growth effects of several types of transportation projects are summarized in **Table 1**.

Table 1: Examples of Indirect Effects

Project Action	Direct Effect	Indirect Effect
Bypass Highway	Improved Access	Farmland converted to residential use. New residences produce new labor force attracting new businesses.
New Light Rail	Improved Access	New businesses open producing jobs/taxes. Traditional businesses/residents priced out.
New Highway	Improved Access	Development alters character of historic area. Visitors increase to historic area.

Source: NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (2002).

The time frame of the indirect effects analysis extends to 2041, the design year of the proposed project. A study area, or Area of Influence (AOI), was determined and used for the indirect effects analysis. The AOI was determined using planner and collaborative judgment, major roadways, existing development areas, and natural features. Interviews with City of Little Rock and North Little Rock city planners allowed planners to provide input on the resulting AOI boundary. Major roadways, existing development areas and natural features helped to determine the boundary of the AOI to ensure that potential developments and areas with a potential for indirect effects were encompassed within the AOI. The indirect effects AOI is included in **Attachment A: Area of Influence Map.**

There are two primary types of indirect effects: encroachment-alteration and induced growth. Each type is discussed in the following sections.

3.0 ENCROACHMENT-ALTERATION EFFECTS

Encroachment-alteration effects are physical, chemical, or biological changes in the environment that occur as a result of the project but are removed in time or distance from the direct effects.

3.1 Ecological Encroachment Effects

Ecological encroachment effects are changes to ecological resources as a result of the project that would occur later in time or distance. Examples of ecological encroachment effects are clearing of vegetation and dredge and fill activities.

The proposed project would be constructed primarily within existing ROW and the surrounding landscape is highly urbanized. The activities associated with urbanization have permanently changed vegetation and wildlife habitat within the AOI. Given that the proposed improvements would occur along an existing, highly urbanized transportation corridor, additional habitat fragmentation as a result of the proposed project is not anticipated. Likewise, of the three threatened and endangered species identified as having the potential to occur within the project limits, the interior least tern has not been recorded within the limits of the AOI and the disturbed nature of the AOI is not ideal for the piping plover and running buffalo clover, which have had no recorded locations near the project area. Accordingly, indirect effects to threatened and endangered species are not anticipated.

Impacts to water resources are not expected to result in substantial effects that would reach beyond the project footprint. Fill impacts to waters of the U.S., including wetlands, would be limited to the project footprint, as would floodplain encroachments. Some temporary floodplain encroachment impacts would result from the proposed improvements; however, mitigation measures will be used to cause no change to the base flood elevations within or outside of the project footprint. Although the amount of eroded soil that could be transported offsite would be expected to increase during project construction, Arkansas Department of Environmental Quality requires erosion and sediment control measures to minimize potential impacts as part of the National Pollutant Discharge Elimination System requirements for the project's Stormwater Pollution Prevention Plan.

3.2 Socio-economic Encroachment Effects

There are two major types of encroachment effects that transportation projects may have on a neighborhood: access modifications and relocations.

3.2.1 Access Modifications

Access modifications may result in changes to accessibility and travel patterns throughout an area. To understand the potential for indirect effects resulting from changes in access, it is first necessary to understand what potential access modifications would result from the proposed project. The access modifications include the following:

Additional Lanes: All of the Action Alternatives would provide additional capacity to I-30 by adding either C/D lanes or GP lanes. Discontinuous frontage roads on both west and east sides of I-30 would be converted to one-way, continuous frontage roads. The additional lanes provided by the Action Alternatives, as well as continuous frontage roads, would result in improved mobility that, in turn, would provide increased accessibility for the corridor.

Bicycle and Pedestrian Accommodations: Proposed bicycle and pedestrian facilities would be included in the proposed project for all Action Alternatives. These accommodations would include wider sidewalks for pedestrians and wider lanes to accommodate a four-foot wide bike lane in each direction for cyclists at the 6th St. and 9th St. bridges over I-30. In addition, underpass bridge improvements could include sidewalk improvements and lighting for travelers at most of the cross streets which have bridge openings that meet or exceed the master street plan width. Renderings[1] of cross street underpass improvements are included in the **Community Impacts Technical Report**. The striping for a designated bike lane would be determined by the cities; however, the proposed project would provide the lane widths to accommodate a four-foot wide bike lane in each direction. These cross-street improvements are a result of community input and provided in an effort to improve east to west connectivity for neighborhoods adjacent to the proposed project limits.

Additional sidewalks would also be included for the reconstruction of 2nd St. under the SDI Action Alternatives. Unlike the SPUI Alternatives, the SDI Action Alternatives would include the reconstruction of 2nd St. to include sidewalks along both sides of 2nd St., two westbound lanes, and two eastbound lanes from Cumberland St. to Mahlon Martin St. The sidewalks would provide additional east to west connectivity.

Highway 10 (Cantrell Road) Interchange Changes: The Action Alternatives would result in varied access changes. For detailed information on the Action Alternatives, see the **Alternatives Technical Report**. For all Action Alternatives, the existing public parking lots within ArDOT ROW would be removed 1) under the I-30 facility south of President Clinton Ave. 2) within the circular ramp to 2nd St./Ferry St. and 3) under the Markham St./Hwy. 10 (Cantrell Rd.) ramp to Cumberland Ave. Removal of these parking lots are not required for the proposed improvements; however, the City of Little Rock has not requested to renew the air space agreement with ArDOT to retain these parking facilities. These areas could potentially be replaced by the proposed roadway improvements, additional green space or park facilities[2] to be determined at a later date as a separate project by the City of Little Rock. On-street parking options are available and business owners would need to consider the parking options for their customers and employees. The green space could also include bike and pedestrian walkways to provide additional east-west connectivity. The green space is further discussed in the **Community Impacts Technical Report**.

For the 1B and 2B Alternatives, modifications to 2nd St. and 4th St. would result in additional parking removals. On-street parking removals are anticipated along 2nd St., 4th St., and Ferry St. On-street parking removal would be required along these streets to accommodate additional lanes for 2nd St. and 4th St. Removal of these parking options could influence future development along these streets and require future consideration

[1] The cross-street renderings are potential views of overpasses and underpasses. Improvements shown such as lighting, decorative fencing and designated bike lanes would be at the discretion of the cities who holds jurisdiction over the cross-street location and may not be included in the proposed project.

[2] The green space and park facilities are to be determined at a later date. ArDOT will coordinate with the City of Little Rock for potential park facilities; however, the park facilities and green space would be at the discretion of, funded, and determined by the City of Little Rock and are not included in this proposed project.

of parking options for future developments.

The 1A and 2A Action Alternatives would be similar to the existing configuration of the Hwy. 10 (Cantrell Rd.) Interchange which would not alter current travel routes. Altered routes would result from the removal of the Hwy. 10 interchange with the 1B and 2B Alternatives and could impact travel to surrounding areas such as the Dillard's headquarters or other businesses near the downtown Little Rock area.

Ramp Modifications: Ramp modifications would occur throughout the project corridor, as presented in **Table 2**. Most of the modifications are applicable to all Action Alternatives; however, some modifications are identified and described in **Table 2** as applicable to only one alternative.

Table 2: Ramp Modifications [1,2]

Existing	Ramp Modification	Access Change	Description
NB I-30 exit to Roosevelt Rd.	Ramp improvement	No change in access	The ramp improvement would be lengthened, prohibiting drivers from directly accessing eastbound 28th St. Drivers must turn east on Roosevelt Rd. and south on Vance St. to reach 28th St.
SB entrance from Roosevelt Rd.	Ramp improvement	No change in access	-
NB entrance from Roosevelt Rd.	Ramp improvement	No change in access	-
SB exit to Roosevelt Rd.	Ramp improvement	No change in access	-
SB entrance from EB I-630	Ramp improvement	No change in access	The ramp improvement consists of widening the ramp from 1 to 2 lanes.
NB entrance from EB I-630	Ramp improvement	Additional access	For 1B and 2B Alternatives: Ramp from EB I-630 splits to access 9th St. and to access NB I-30 main lanes.
		No change in access	1A and 2A Alternatives
	NEW RAMP	Additional access	For 1B and 2B alternatives only: Entrance ramp from SB frontage road from 9th St. connects to the WB I-630 exit from SB I-30.
SB entrance from 9th St.	Ramp improvement	No change in access	-
SB exit to 9th St.	Ramp replacement	Shift in access	SB access to 9th St. must take proposed 6th /9th St. exit in 1A and 2A Alternatives. SB access to 9th St. must take proposed 4th St. exit in 1B and 2B Alternatives.
SB exit to 6th St.	Ramp replacement	Shift in access	SB access to 6th St. must take proposed 6th/9th St. exit in 1A and 2A Alternatives. SB access to 6th St. must take proposed 4th St. exit in 1B and 2B Alternatives.
NB entrance from 6th St.	Ramp improvement	No change in access	1A and 2A Alternatives
	Ramp removal	Shifted access	1B and 2B Alternatives: NB I-30 access by proposed entrance from 4th St.
<u>Hwy 10. (Cantrell Road) Interchange</u> • SB exit to Cantrell Rd./Clinton Ave. • SB exit to 2nd St./Ferry St.	Ramp replacements	Shifts in access	1A and 2A Alternatives: • Interchange located at Hwy. 10 (Cantrell Rd.) • SB exit ramp to 6th St. and 9th St.
	Ramp replacement	Shifts in access	1B and 2B Alternatives: • Interchange shifted and located at 4th St.

Existing	Ramp Modification	Access Change	Description
• SB entrance from Cumberland/2nd and 3rd Streets • NB entrance from Cumberland/2nd/3rd St. • NB entrance from 3rd St. • NB exit to Cantrell Rd./Markham St. and Clinton Ave./2nd St./Ferry St.	and removal		• SB exit to 4th St. with a designated U-turn for 3rd St. • NB entrance from 4th St. • 2nd St./ Cantrell Ave./ 4th St. would be accessed from NB I-30 by the proposed 6th/9th St. exit. • 2nd St. would be reconstructed to include two WB lanes and two EB lane from Cumberland St. to Mahlon Martin St. • 4th St. would be a two-way arterial with one WB lane and two EB lanes from Cumberland St. to SB I-30 frontage road. From the SB I-30 frontage road to Collins St., 4th St. would be two lanes in each direction • Mahlon Martin St. would be widened to be two lanes in each direction from 3rd St. to 2nd St., and one SB lane and two NB lanes from 2nd St. to President Clinton Ave. • Between 3rd and 4th St., a new two-way road (with two lanes in each direction) would be constructed that connects to Mahlon Martin St. and Collin St. • Cumberland St. is restriped to include two NB lanes and two SB lanes from 2nd St. to 3rd St.
NB exit to Broadway St.	Ramp improvement	No change in access	-
SB entrance from Broadway St.	Ramp improvement	No change in access	-
NB entrance from Bishop Lindsey Ave.	Ramp replacement	Shift in access	Ramp is replaced with a NB entrance ramp from Broadway St.
SB exit to Bishop Lindsey Ave.	Ramp improvement	No change in access	-
NB exit to Curtis Sykes Dr.	Ramp improvement	No change in access	-
SB entrance from Curtis Sykes Dr.	Ramp replacement.	Shift in access	Ramp is removed and replaced with a SB entrance from 18th/19th St.
NB entrance from Curtis Sykes Dr.	Ramp removal	Shift in access	EB I-40 can be accessed by proposed entrance ramp from frontage road north of 19th St. WB I-40 can be accessed by going north on Main St. to the JFK Blvd. entrance ramp to WB I-40 or by going north on N. Hills Blvd. to the N. Hills Blvd. entrance ramp to WB I-40.
SB exit to Curtis Sykes Dr.	Ramp replacement	Shift in access	Ramp is replaced with a proposed 18th St./ 19th St./ Curtis Sykes Dr. exit.
WB I-40 entrance from SB N. Hills Blvd.	Ramp improvement	No change in access	-
WB I-40 entrance from NB N. Hills Blvd.	Ramp replacement	Shift in access	Drivers on NB N. Hills Blvd. would turn west to access WB I-40 entrance ramp (replaces existing loop).
EB I-40 to NB US 67	Ramp improvement	No change in access	-

Source: January 2018 Schematic.
Notes:
[1] NB = northbound, SB = southbound, EB = eastbound, WB = westbound
[2] The proposed access modifications are subject to change as the project undergoes further refinement.

Overall, it is anticipated the proposed improvements would have a positive effect on accessibility within the project limits. In terms of traffic operations, the improvements associated with the proposed project are expected to manage congestion along the

improved I-30/I-40 facility and adjacent cross streets. The improvements are also anticipated to improve access on either side of the Arkansas River Bridge for multiple modes of transportation (bike, pedestrian and motorist). This is in line with the City of Little Rock's and City of North Little Rock's planning goals of redeveloping the area into a higher density and intensity, mixed-use, and pedestrian-friendly environment.

Both improved accessibility and mobility along the proposed facility would positively affect local transit, emergency response, and other public services, as time spent in congestion is anticipated to decrease with the proposed improvements. Improved access to these services is a benefit to all populations, including the elderly, children, and persons with disabilities. In addition, improved vehicular access to employment opportunities, markets, goods or services, residential uses, public facilities and transportation-related industries and services are anticipated to have positive indirect effects resulting from the increased accessibility and mobility provided by the proposed project.

For all Action Alternatives, a majority of the ramps (12 ramps) would maintain the existing location/configuration, but improve access and safety. Ramp modifications include addition of ramp lanes, increasing the ramp length and/or widening. Two ramp removals would result in a shift in access, but would not eliminate access. Eight ramp replacements would also result in a shift, but not elimination of access. Ramp replacements include two new interchange alternatives for downtown access: a SPUI alternative with similar access to existing conditions (at Cantrell Rd. and at 6th St); and a split diamond alternative with access at 4th St.

Travel Patterns: Given the similar accessibility to existing conditions, travel patterns along the majority of the proposed project corridor are not anticipated to be substantially altered, with the exception of the SDI Action Alternatives shifting access to downtown Little Rock. The removal of the existing Hwy. 10 (Cantrell Rd.) Interchange and ramp replacement at 4th St. would not only alter the distribution of traffic, but also the traffic patterns for the downtown Little Rock area.

To better assess motorist travel patterns, **Attachment B: Downtown Little Rock Access and Travel Patterns** compares motorist access to (ingress) and from (egress) downtown Little Rock destinations in the AM and PM peak travel hours, respectively, for the following:

A. Existing/Future No-Action;
B. 8-Lane GP Alternatives (1A: 8-Lane GP with SPUI and 1B: 8-Lane GP with SDI);
C. 6-Lane with C/D Alternatives (2A: 6-Lane with C/D with SPUI and 2B: 6-Lane with C/D with SDI).

Two popular downtown Little Rock destinations evaluated include:

1. The River Market area and access to Hwy. 10, which provides access to major employers such as Dillard's, and;
2. The Clinton Presidential Center/Heifer International.

These locations were selected because they are large employment and entertainment districts that attract a large number of vehicles.

In addition to the differences in travel patterns, differences in travel times for the alternatives to and from the River Market and Clinton Presidential/Heifer International sites are assessed in **Table 3**.

Table 3: Peak Hour Travel Times to Downtown Little Rock Destinations [1]

Destination	Existing	No-Action	8-Lane GP		6-Lane with C/D	
			SPUI (ALT 1A)	SDI (ALT 1B)	SPUI (ALT 2A)	SDI (ALT 2B)
To River Market (AM)						
A. From Wildwood Ave on Hwy 67	18:07	30:09	20:55	37:31	13:39	14:20
B. From I-40 and I-440 Interchange	16:09	31:46	26:55	44:30	15:53	16:49
C. From the McArthur Bridge on I-40	10:42	23:07	05:09	12:11	08:54	8:47
D. From Dr. MLK Jr. Drive on I-630	05:17	08:16	04:55	07:09	04:43	7:00
E. From the Dixon Road Bridge on I-530	08:25	17:24	12:11	13:17	08:20	11:54
F. From 65th St on I-30	08:15	12:39	10:35	11:45	08:06	10:40
G. From the Bankhead Drive on I-440	07:28	05:59	10:17	12:10	08:37	13:02
To Clinton Presidential Center / Heifer International (AM)						
A. From Wildwood Ave on Hwy 67	17:46	29:07	20:30	36:00	13:39	12:28
B. From I-40 and I-440 Interchange	15:47	30:44	26:31	43:00	15:53	14:57
C. From the McArthur Bridge on I-40	10:21	22:06	04:45	10:41	08:54	6:55
D. From Dr. MLK Jr. Drive on I-630	04:19	07:11	04:14	04:54	04:01	4:48
E. From the Dixon Road Bridge on I-530	07:27	16:19	11:30	11:01	07:38	9:42
F. From 65th St on I-30	07:16	11:34	09:54	09:30	07:25	8:28
G. From the Bankhead Drive on I-440	06:29	07:38	09:37	09:55	07:55	10:50
From River Market (PM)						
A. To Wildwood Ave on Hwy 67	11:05	55:15	08:36	11:04	09:02	10:46
B. To I-40 and I-440 Interchange	11:28	56:16	09:25	11:53	09:50	11:32
C. To the McArthur Bridge on I-40	06:54	52:19	05:24	07:52	05:54	07:47
D. To Dr. MLK Jr. Drive on I-630	03:57	16:27	03:47	07:27	04:00	10:01
E. To the Dixon Road Bridge on I-530	07:18	21:54	08:20	10:13	10:39	15:01
F. To 65th St on I-30	07:24	23:19	15:11	15:43	17:18	21:52
G. To the Bankhead Drive on I-440	07:41	21:04	08:35	05:15	10:41	15:40
From Clinton Presidential Center / Heifer International (PM)						
A. To Wildwood Ave on Hwy 67	12:00	29:52	09:18	09:16	08:44	07:57
B. To I-40 and I-440 Interchange	12:23	30:53	10:07	10:06	09:29	08:44
C. To the McArthur Bridge on I-40	07:49	26:55	06:06	06:04	05:36	04:59
D. To Dr. MLK Jr. Drive on I-630	04:44	07:37	04:22	05:27	04:46	06:49
E. To the Dixon Road Bridge on I-530	08:06	13:04	08:55	08:13	11:34	11:49
F. To 65th St on I-30	08:11	14:29	15:46	13:42	18:09	18:40
G. To the Bankhead Drive on I-440	08:28	12:13	09:10	10:27	12:14	12:27
Total Travel Time	4:21:16	10:35:36	5:01:00	6:36:16	4:31:33	5:14:44

Source: Interchange Justification Report (IJR) Appendix B, January 2018.

Notes: [1] AM Peak = 7:15 AM to 8:15 AM; PM Peak = 4:30 PM to 5:30 PM

Speeds are inbound to downtown Little Rock in the AM and outbound in the PM.

Travel times between 10:00 minutes and 25:00 minutes are highlighted in light red.

Travel times greater than 25:00 minutes are highlighted in dark red.

Travel times that are unusually low due to a bottleneck upstream are highlighted in blue.

A combined total travel time for each scenario, also included in **Table 3**, shows that the 6-Lane with C/D with SPUI Alternative (2A) has the lowest total travel time of approximately 4:32 hours:minutes (h:m) among the Action Alternatives, whereas the 8-Lane with SDI Alternative (1B) has the highest travel total time of approximately 6:37 h:m among the Action Alternatives; however, the No-Action Alternative has a higher total travel time of approximately 10:36 h:m than all the Action Alternatives. The 2A Alternative would save the most time for drivers traveling to and from the downtown Little Rock destinations, followed by 1A (+30 minutes), 2B (+43 minutes) and 1B (+2 hours, 5 minutes). The value of time saved from travel depends on factors such as the traveler, the circumstances of the trip, and the available transportation options. Generally, travel time savings can be correlated to less time spent; therefore, the 1B Alternative, having the highest overall travel time, would provide the least travel time savings out of all the Action Alternatives.

Although the total travel times show moderate differences between Action Alternatives, specific travel times between certain locations do not substantially differ among the Action Alternatives. Generally, the highest and lowest travel times among the Action Alternatives differ approximately 5 minutes which is not a substantial travel time savings for any given scenario presented in **Table 3**. However, there are four exceptions which have a substantial difference of approximately 25 minutes between the highest travel time to the lowest travel time. These are for the AM peak hour trips from Wildwood Ave. on Hwy. 67 and I-40/I-440 Interchange to the River Market and Clinton Presidential Center/Heifer International. **Table 4** summarizes the lowest and highest travel times of all the scenarios for the existing peak hours to and from the River Market area and Clinton Presidential Center/Heifer International.

Table 4: Travel Time Range for each Scenario

Scenario	Shortest Travel Time	Longest Travel Time
Existing	3:57 minutes	18:07 minutes
No-Action Alternative	5:59 minutes	56:16 minutes
1A Action Alternative	3:47 minutes	26:55 minutes
1B Action Alternative	4:54 minutes	44:30 minutes
2A Action Alternative	4:00 minutes	18:09 minutes
2B Action Alternative	4:48 minutes	21:52 minutes

Source: Table 3, January 2018.

As shown in **Table 4**, of the Action Alternatives, the 1B Alternative has the longest travel time of 44:30 minutes which corresponds to the AM peak hour trip from the I-40/I-440 interchange to the River Market area. The No-Build Alternative has two scenarios that show unusually low travel times due to a bottleneck upstream (from Bankhead Dr. on I-440 in the AM peak hour to the River Market area and to the Clinton Presidential Center/Heifer International). This accounts for the only two scenarios in which all Action Alternatives showed travel times greater than the No-Action Alternative. Overall, the travel times show that Action Alternatives provide better travel times than the No-Action Alternative to and from these two destinations.

Bus travel patterns into and out of the Rock Region Metro River Cities Travel Center (RCTC) would also be affected under the proposed 1B and 2B Alternatives. The travel center is bounded by four streets on the east side of I-30: 4th St. to the north, Rock St. to the east, Capitol Ave. to the south and Cumberland St. to the west. 4th St. currently operates as an eastbound one-way street to Cumberland St., where it transitions to a two-way street from Cumberland St. east to I-30. Under the 6-Lane with C/D with SDI and 8-Lane GP with SDI alternatives, 4th St. would remain a two-way street and restriped to include two eastbound lanes and one westbound lane all the way to I-30. It is anticipated that the 6-Lane with C/D with SDI and 8-Lane GP with SDI alternatives would allow for improved bus access to I-30. Currently, a left-hand turn restriction on the 2nd St. access ramp prevents highway access at a point within a couple of blocks of the RCTC; however, the 4th St. access point in the 6-Lane with C/D with SDI and 8-Lane GP with SDI alternatives would allow buses to access the highway more directly, which would contribute to overall system efficiencies. No modification to bus travel patterns into and out of the travel center is anticipated under the 6-Lane with C/D with SPUI and 8-Lane GP with SPUI alternatives.

As previously discussed, the proposed project is generally anticipated to improve mobility and accessibility within the project limits, which could indirectly affect traffic operations outside of the project limits. To understand the nature of these potential impacts to traffic operations, using data obtained from the I-30 VISSIM traffic modeling, **Table 5** and **6** compares the average speeds observed at seven different roadway segments located immediately outside the project limits for the Action and No-Action Alternatives.

Table 5: Peak Hour Average Speeds of Segments outside the Project Limits (8-Lane GP Alternatives) [1, 2]

Segment Descriptions	No-Action		Alt. 1A: 8-Lane GP with SPUI [3, 4]		Alt. 1B: 8-Lane GP with SDI [3, 4]	
	AM (mph)	PM (mph)	AM (mph)	PM (mph)	AM (mph)	PM (mph)
I-30 southwest of South Terminal	40	55	55	35[5]	55	35[5]
I-630 west of I-30	40	60	60	60	60	60
Hwy. 67 north of I-40	20	60+	25	60+	10	60+
I-440 east of South Terminal	60	60+	55	60+	60	60
I-530 south of South Terminal	40	60+	55	60	55	60
I-40 west of North Terminal	35	60+	60+	60+	50	60+
I-40 east of Hwy. 67	20	60+	30	60+	20	60+

Source: IJR Appendix B, January 2018. Notes: See notes for Table 6.

Table 6: Peak Hour Average Speeds of Segments outside the Project Limits (6-Lane with C/D Alternatives) [1, 2]

Segment Descriptions	No-Action		Alt. 2A: 6-Lane with C/D Lane with SPUI [3,4]		Alt. 2B: 6-Lane with C/D Lane with SDI [3,4]	
	AM (mph)	PM (mph)	AM (mph)	PM (mph)	AM (mph)	PM (mph)
I-30 southwest of South Terminal	40	55	60	35[5]	60	35[5]
I-630 west of I-30	40	60	55	60	55	60
Hwy. 67 north of I-40	20	60+	60	60	60	60
I-440 east of South Terminal	60	60+	55	60	50	60
I-530 south of South Terminal	40	60+	60	60	60	60
I-40 west of North Terminal	35	60+	60	60+	60	60+
I-40 east of Hwy. 67	20	60+	55	60+	55	60+

Source: IJR Appendix B, January 2018.
Notes: [1] AM Peak = 7:15 AM to 8:15 AM; PM Peak = 4:30 PM to 5:30 PM
[2] Speeds are inbound to downtown Little Rock in the AM and outbound in the PM.
[3] Assumption of an additional lane on I-30 in each direction from the South Terminal to 65th Street.
[4] Speeds assessed for alternatives with SPUI interchange option at Hwy. 10 (Cantrell Rd.).
[5] The first 15 minutes has a speed of 65 mph. Subsequently, the speed immediately drops to 35 mph and does not rise above 35 mph during the remainder of the peak period.

*Colors represent the lowest end of four speed ranges (red category = worst speed range, green category = best speed range): **Red Category (10 – 15 mph); Orange Category (20 – 25 mph); Black Category (30 – 45 mph); Green Category (50+ mph).***

- **No-Action Alternative –** The No-Action Alternative has the lowest travel speeds for sections outside of the study area. Travel speeds are lowest in the AM peak hour where speeds range from 20 – 60+ mph. In comparison, in the PM peak hour, travel speeds all range greater than 50 mph. During the AM peak hour there are six segments that are below 50 mph and zero segments in the PM peak.

- **Alternative 1A and 1B: 8-Lane GP with SPUI and SDI Alternatives –** These alternatives have the second lowest travel speeds for sections outside of the study area. Travel speeds are lowest in the AM peak hour where both 8-Lane GP SPUI and SDI Alternatives range from 25 – 60+ mph and 10 – 60 mph respectively. During the AM peak hour there are two segments that are below 50 mph for both alternatives. In the PM peak hour, there is only one segment that is below 50 mph for both alternatives. This is due to slow I-30 merging traffic causing a back-up on the ramps to I-440.

- **Alternative 2A and 2B: 6-Lane with C/D with SPUI and SDI Alternatives –** These alternatives have the highest travel speeds for sections outside of the study area. Travel speeds are highest in the AM peak hour where the speeds range from 50 to 60 mph for both alternatives. Speeds range from 35 to 60+ mph in the PM peak hour for both alternatives. During the AM peak hour there are zero segments that are below 50 mph for both alternatives. In the PM peak hour, there is only one segment that is below 50 mph for both alternatives.

3.2.2 Displacements and Relocations

The direct displacement and relocation or alteration of homes, businesses or public facilities may lead to indirect effects such as changes to neighborhood cohesion, neighborhood stability, the local economy, access to specific services or products, recreation patterns at public facilities and cultural values.

As previously described, the majority of the proposed improvements will take place within existing ROW. The proposed project would potentially result in six residential displacements for all Action Alternatives. All Action Alternatives would potentially result in five commercial displacements except for the 8-lane GP with SDI Alternative, which would result in four commercial displacements.

In terms of indirect residential impacts, the proposed project's impact on housing along the proposed facility may slightly decrease the stock of housing supply in the immediate area. However, current realtor data (www.realtor.com) indicates comparable housing supply is available within one to five miles of the potentially displaced residences. For additional information, see the **Community Impacts Technical Report.** In addition, planning efforts by the cities within the AOI are focused on increasing housing choices for residents of all income levels. Residential properties located near the proposed facility which are not physically impacted by the proposed improvements may experience a change in market value, either positive or negative.

Of the five potentially displaced commercial properties, four are warehouse type facilities that may include office space and one is a fuel station. Two of these warehouse type facilities may have a portion of the facility currently vacant. The potential commercial displacements are scattered at various locations along the project corridor, including three in Little Rock and two in North Little Rock. The locations of these potential commercial displacements are shown on aerial imagery as part of the **Community Impacts Technical Report**.

None of these potential displacements are community facilities or other community gathering locations that upon their displacement could affect neighborhood cohesion, stability, recreation patterns or result in a shift of cultural values. Additionally, the nature of these businesses is such that their displacement would not affect access to specific services or products. While the employees of the active commercial businesses to be displaced could be impacted by increased commuting time to a different location, the majority of the commercial workforce, as well as residential populations, would indirectly benefit from the proposed improvements due to improved access and mobility throughout the I-30 corridor.

3.2.3 Other Issues

For air quality and traffic noise, the direct impacts analysis extends beyond the project construction footprint. Accordingly, indirect effects are necessarily addressed as an extension of the direct impacts analyses of these resources and can be found within the **Air Quality and Traffic Noise Technical Reports**. Encroachment effects to hazardous

materials are not anticipated, as any hazardous material potentially encountered would occur within the direct project footprint and not extend outside of that footprint.

4.0 INDUCED GROWTH EFFECTS

The primary goal of the induced growth effects analysis will be to understand the relationship between the 30 Crossing project, the growth induced by the proposed project and the potential changes in land use and other resources.

This induced growth effects analysis was conducted in accordance with the *Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts under NEPA by the American Association of State Highway and Transportation Officials (AASHTO) (August 2016)*. The handbook describes a four-step process for determining indirect effects and was used for the induced growth effects analysis. This four-step process is described in **Table 7**.

Table 7: Four Step Approach to Estimate Induced Growth Effects

Step 1 – Assess the potential for increased accessibility: Information is gathered and analyzed to determine potential access changes and increases in accessibility.
Step 2 – Assess the potential for induced growth: Using information gathered on access changes, identify the potential for the changes to induce growth and analyze the magnitude, rate, type and location of these effects.
Step 3 – Assess the potential for impacts on sensitive resources: Identify potential resources with impacts that are likely and probable from the induced growth effects.
Step 4 – Assess potential minimization and mitigation measures: Identify reasonable minimization and mitigation measures for indirect effects.

Source: AASHTO, 2016.

Each step of the four-step process has been applied to the proposed project alternatives and the findings are documented in this technical report. The proposed project includes the improvements related to each of the alternatives described in **Section 1.2**.

A meeting with Planning and Development, Public Works and other departmental staff representing the City of Little Rock and City of North Little Rock were held to supplement the four-step process for evaluating induced growth effects. A meeting with the City of Little Rock occurred on March 21, 2016 and a follow-up meeting was held on April 12, 2016. The meeting with the City of North Little Rock occurred on March 22, 2016. Questions were provided to the attendees in advance to allow the meeting representatives to prepare for a discussion involving indirect effects. A map illustrating a draft AOI was presented to the meeting attendees. The resulting AOI used for the induced growth analysis incorporates the feedback received by the planners and was supported by the meeting participants as an acceptable study area for the indirect effects analysis. The following analysis presented in Steps 1 through 4 contains feedback, suggestions, and professional opinions provided during these meetings.

4.1 Step 1: Potential for Increased Accessibility

In addition to reviewing ramp modifications (see **Section 3.2.1**), traffic volumes were reviewed to help determine potential for increasing accessibility of the proposed project alternatives. The average daily traffic (ADT) for the 2016 existing year (at the time of

modeling) and the 2041 design year for the No-Action Alternative and each proposed Action Alternative is included in **Table 8**. Three locations were used as representative locations of the corridor. A1 is located on I-40, east of the North Hills Blvd. interchange; A2 is located at the Arkansas River Bridge; and A3 is located on I-30, south of Roosevelt Blvd.

Table 8: Average Daily Traffic (ADT)

	A1 I-40 east of North Hills Blvd. Interchange	A2 Arkansas River Bridge	A3 I-30 south of Roosevelt Interchange
Existing (2016)	124,000	123,000	100,000
No-Action	153,000	153,000	119,000
8-Lane GP SPUI	155,000	166,000	128,000
8-Lane GP SDI	157,000	168,000	129,000
6-Lane with C/D SPUI	159,000	182,000	131,000
6-Lane with C/D SDI	159,000	182,000	133,000

Source: IJR Appendix B, January 2018. Note: All values are in vehicles per day. Future ADT's are estimated based on peak hour traffic volumes in the 30 Crossing IJR, Appendix B, Traffic Results, Traffic Volume Attachment 1.

At the three locations, the No-Action 2041 year ADTs are greater than the 2016 existing ADT. Furthermore, the two Action Alternatives 2041 ADTs are greater than the No-Action 2041 ADTs. The ADTs for the 6-Lane with C/D Alternatives are greater than the 8-Lane GP Alternatives at all three locations. Although not substantially greater, the larger numbers would represent a greater potential of the 6-Lane with C/D Alternatives to increase accessibility compared to the 8-Lane GP Alternatives.

4.2 Step 2: Potential for Induced Growth

The purpose of Step 2 is to determine the potential for induced growth. Induced growth effects are defined by AASHTO as, "changes in the location, magnitude, or pace of future development that result from changes in accessibility caused by the project." An example of an induced-growth effect is commercial development occurring around a new interchange and the environmental impacts associated with this development (AASHTO, 2011).

Both Little Rock and North Little Rock are experiencing a slow but steady growth trend. According to U.S. Census Bureau population data, both cities' population numbers from 2010 to 2014 increased, from 193,524 to 197,706 for Little Rock and 62,304 to 66,810 for North Little Rock. Most of the existing areas within or adjacent to the proposed project limits are urbanized and developed with some intermittent pockets of undeveloped areas. Undeveloped areas represent approximately 21 percent of the entire AOI. Furthermore, these areas are undeveloped primarily due to natural features such as parks, streams, wetlands, and floodplains. These areas are not likely to be developed due to these regulated features.

City comprehensive plans, future land use plans and zoning maps were reviewed for potential areas of development within the proposed project limits. Some of the goals

outlined in the plans include providing cross city connections, safe transportation options, a transportation network, and maintaining a sense of community. The proposed project would not adversely affect the goals outlined in these plans. In fact, many of the plans included transportation infrastructure improvements like the proposed project as a continuing need to support development and growth. The proposed improvements such as the bicycle and pedestrian accommodations would be aligned to the goals for providing cross city connections and safe transportation options.

As mentioned in **Section 4.0**, feedback was received from a panel of local planners on planned developments within the AOI. A questionnaire, presented in **Attachment C: Indirect Effects Questionnaire**, was distributed and planner interviews were held with both the Cities of Little Rock and North Little Rock to gather information on potential development and redevelopment plans near the proposed project. Staff from both cities provided input and information for their respective jurisdictions. Although several areas were identified for planned developments, overall feedback showed little dependence of potential development on the proposed project. Feedback also indicates little development or redevelopment effects overall; however, a staff member from the City of North Little Rock did rate the proposed project to have a strong influence on the rate of development/redevelopment.

After review of the various comprehensive plans, future zoning maps and feedback received from planners, it was determined that several areas near or adjacent to the proposed project are anticipated to be developed or redeveloped. **Table 9** details areas of development and redevelopment that have the potential to be affected by and have induced growth effects as a result of the proposed project. Most of the proposed development plans are underway and are not dependent upon the construction of the proposed project, nor would be limited should the proposed project not be built; however, there is potential for the proposed project to affect the rate of the development/redevelopment projects. The areas included in **Table 9** are planned development/redevelopment projects that were identified in the feedback gathered from the indirect effects questionnaire and planner interviews. These areas, also shown in **Attachment D: Areas of Development/Redevelopment Map** were identified by city planners as areas that would potentially have induced growth effects from the proposed project. Other factors, such as economic incentives for commercial development, could potentially impact these development projects as well, but such factors would not be dependent on or affected by the proposed project. The economic incentives could include economic development grants or various tax incentives to attract businesses for development by local municipalities. Although these areas follow local comprehensive plans and initiatives for future growth, the increased capacity of the future facility would positively benefit the development and mobility to the areas within the proposed project limits.

Table 9: Potential Induced Growth Effects

Location	Type	Magnitude, Rate or Type of Effects
Rockwater Area	Mixed Use Development	Increase rate of development
Downtown North Little Rock	Commercial Development	Increase rate of development
Downtown Little Rock	Mixed Use Development	Increase rate of development
Marina Area	Mixed Use Development	Increase rate of development
East Little Rock	Mixed Use Development	Increase rate of development

*Source: Project Team (April 2016). Locations shown in **Attachment D**.*

4.3 Step 3: Potential for Impacts on Sensitive Resources

As previously described in **Section 4.2**, it is not anticipated that implementation of the proposed project would result in the change of one land use type to a different land use type (i.e., project-induced land use change). It is more likely, however, that the proposed project could result in induced growth effects by increasing the rate of development on already planned projects. Sensitive resources within the AOI that could be affected by induced growth include biological and socio-economic resources.

4.3.1 Biological Resources

Vegetation: It is anticipated that induced growth effects would primarily occur in areas currently in urban use or in areas with vegetation characteristic of urbanized landscapes. Any small areas of undeveloped land are generally islands of maintained grass-dominated areas with little value for wildlife habitat and natural areas unsuitable for development such as those along Fourche Creek and within other floodplain areas. Two of the five areas of potential induced growth are located along the Arkansas River: the Rockwater Area in North Little Rock and the Marina Area in Little Rock. Both areas include tree-lined areas adjacent to the river which could serve as potential habitat for wildlife. However, the majority of these properties have already been cleared for urban use. Ultimately, it is expected that city landscaping requirements for site development would mitigate the loss of limited habitat and could benefit wildlife with the addition of landscaping trees.

Water Resources: The Arkansas River is a major surface water body in the AOI. It could be slightly affected by increased sedimentation from the Rockwater Area and Marina Area future developments along the river; however, it is anticipated that the National Pollution Discharge Elimination System storm water pollution prevention program supervised by the cities would serve to control and minimize sedimentation impacts. The regulatory programs supervised by the United States Corps of Engineers (USACE) are also designed to protect and preserve these features. In relation to floodplains, urban development within floodplain areas would be constrained by local government ordinances. Negative impacts to water quality may be expected during construction, but these impacts should be temporary and mitigated by construction best management practices.

Based on the above, minimal induced growth impacts are anticipated to biological resources in the AOI.

4.3.2 Socio-economic Resources

It is anticipated that any of the future developments associated with the areas of potential induced growth would be done in accordance with local zoning regulations. Furthermore, none of these areas of future development are incongruous with future land use planning and goals for the cities.

All three areas for potential induced development in Little Rock are identified in the future land use plan as mixed urban use. The two areas of potential induced development in North Little Rock are primarily identified in the future land use plan as Central Business District and zoned as downtown commercial. In general, the purpose of mixed-urban use and central business district land use types is to provide a mix of residential, office and commercial uses which support each other to create a vital area. This includes medium density residential housing, hotels, and dwellings combined in buildings with commercial activity. A portion of the Rockwater Area is identified as multi-family in the future land use plan. Per input received from the city planners of both cities, it is unlikely that future developments within these five areas of induced growth would fall outside of the stated future land use types.

In North Little Rock, there are pockets of existing neighborhoods within or adjacent to the Downtown North Little Rock and Rockwater areas. It is anticipated that community cohesion for these neighborhoods would not be adversely affected from induced growth. Future development near these existing neighborhoods could provide connections to retail and commercial developments and provide positive benefits to community cohesion between future and existing developments. The degree to which positive community impacts could be achieved is dependent upon the city's commitment to provide access on local streets and walkability between the future developments and existing neighborhoods. Positive integration of new developments with existing neighborhoods could occur through planning by the developer with city coordination to avoid isolating existing residents and provide social connections to unite both new and established residents.

Similarly, both the East Little Rock area and the Downtown Little Rock area also have pockets of single family and multi-family residences such as condominiums, townhomes and apartments. The SDI Alternatives could affect the community cohesion of the Downtown Little Rock area from potential increases in traffic through 2nd through 4th Streets; however, it is unlikely that adverse community cohesion impacts would result because of the predominantly commercial land use along the 2nd through 4th Streets. Most of the residences are located south and along 6th St. which is not expected to have increased traffic volumes compared to the No-Action Alternative. In addition, the MacArthur Park District would not likely be adversely affected and would not be eliminated or encroached by future development because of the continued conservation and protections of these historic properties. The Little Rock Historic District Commission, by Arkansas Code Annotated 14-172-206 – Little Rock City Code, Section 23-96, and 97, established the *MacArthur Park Historic District Guidelines for Rehabilitation and New Construction* as authority over any architectural changes within the district. Certificates of Appropriateness are required for any alterations in view from a public street, as stated in Little Rock City Code Section 23-115: "No building or structure, including stone walls,

fences, light fixtures, steps and paving or other appurtenant fixtures shall be erected, altered, restored, moved, or demolished within the historic district created by this division until after an application for a certificate of appropriateness as to the exterior architectural changes has been submitted to and approved by the historic district commission."

For East Little Rock (east of I-30), potential growth in this area could result in positive effects to community cohesion with future and existing neighborhoods adjacent to potential development areas. As mentioned above, the city's commitment to providing access and walkability features to provide connectivity between future and existing development would impact the level of effects and community benefits.

As previously discussed, city planners acknowledged that the proposed improvements would not be the driving factor affecting growth. Instead, market forces would likely have the most influence on growth.

Given the above, it is not anticipated that the identified areas of induced growth would result in negative socio-economic effects, but could instead positively influence the local economy as businesses benefit from the close living proximity of their customers. Moreover, property and sales tax revenues could potentially increase as denser, more modernized and tax-generating commercial and residential developments are constructed, which in turn could expand the AOI's population base to support existing and forthcoming commercial development. Market forces and cooperation with future land use regulations are more likely to influence growth, not the proposed project, according to city planners.

4.4 Step 4: Minimization and Mitigation Measures

As the rate of planned development increases, minimization and mitigation measures could be implemented to minimize and mitigate potential effects to biological and socio-economic resources.

4.4.1 Biological Resources

Minimal induced growth effects are anticipated for biological resources. The minor impacts could be further minimized by avoiding protected species and habitat. For potential loss of habitat and species potentially affected from increased magnitude of growth, best management practices (BMPs) should be implemented to minimize impacts to these resources. Local entities and developers would be responsible for incorporating BMPs for potential development activities. Examples of BMPs would be requirements for contractors to avoid harming species if encountered, seeding, replanting and landscaping with specifications that would minimize soil disturbance where possible.

4.4.2 Socio-economic Resources

Land use planning and regulatory guidelines would help manage any indirect impacts within the AOI, including impacts related to an accelerated rate of development/redevelopment. Examples of regulatory guidelines and planning techniques include subdivision regulations, zoning ordinances, land development regulations, and ordinances. The responsibility of transportation providers, such as ArDOT, local and regional transit agencies, and local

municipalities, would be to implement a transportation system to complement land use or development management techniques currently in place.

ArDOT began a study, the *Arkansas Long Range Intermodal Transportation Plan*, in 2015, and a draft completed in February 2017. This plan's purpose is to address transportation issues in Arkansas and to set strategic goals on the future transportation systems for the next 25 years. The study includes public and stakeholder input to help develop key issues and concerns of the community and local municipalities.

Policy guides and implementation tools are already in place within the Cities of Little Rock and North Little Rock to ensure certain types of development or redevelopment occur within the AOI. Any additional impacts to residential and commercial properties must be coordinated with property owners to ensure equitable and fair compensation for any damages.

5.0 CONCLUSION

The purpose of this technical report was to evaluate the potential of the proposed 30 Crossing project to result in the two types of indirect effects: encroachment alteration effects (ecological and socio-economic) and induced growth effects.

The proposed project is not anticipated to result in substantial ecological encroachment alteration effects to vegetation and habitat, threatened and endangered species, water resources or floodplains. Increased eroded soil from construction impacts would be temporary and local regulations and construction BMPs would be implemented for erosion and sediment control measures.

From a socio-economic standpoint, the proposed project would provide additional lanes and improved frontage road systems that improve mobility and reduce congestion, resulting in improved access. Bicycle and pedestrian accommodations such as shared-use lanes and sidewalks would also have the potential to improve east-west connectivity and accessibility for pedestrians and cyclists to reach public transportation and their desired destinations. In addition, ramp modifications designed to improve safety (e.g., reduce motorist weaving) would improve and/or shift access, but not eliminate existing accessibility to locations along the project corridor. Of the Action Alternatives, the SPUI alternatives would maintain similar access to existing conditions, while the SDI alternatives would shift downtown access to 4th St. and 9th St. The shift in downtown access would lead to changes in travel patterns, potentially resulting in increased traffic on 2nd St., 3rd St. and 4th St. and longer travel times to two important Little Rock destinations. Total approximate travel times for the SDI Alternatives are 6 hours and 36 minutes (8-Lane GP with SDI) and 5 hours and 14 minutes (6-Lane with C/D with SDI) which are slightly higher than the total approximate travel times for the SPUI Action Alternatives (5 hours and 1 minute for 8-Lane GP with SPUI and 4 hours and 31 minutes for the 6-Lane with C/D with SPUI).

On the other hand, the SDI Action Alternatives would provide better accessibility than the SPUI Action Alternatives with a connected frontage road system from I-630 to the Arkansas River. The SPUI Action Alternatives would not have frontage roads from 3rd St.

to 6th St. in Little Rock whereas the SDI Action Alternatives would have continuous frontage roads from I-630 to 4th St. and provides direct access from the frontage road to 3rd St., 2nd St., and President Clinton Ave. Furthermore, better accessibility for pedestrians would result from the SDI Action Alternatives. A sidewalk along both sides of 2nd St. from Cumberland St. to Mahlon Martin St. would be included as part of the reconstruction of 2nd St. for the SDI Action Alternatives. These proposed improvements would result in better east to west and north to south connectivity from the SDI Action Alternatives.

The improved mobility and accessibility within the project limits could potentially indirectly affect traffic operations outside of the project limits, as shown in **Tables 5** and **6**. Low speeds were observed along some of the outside roadway segments leading into and out of the project corridor under all Action Alternatives, with the 6-Lane with C/D Alternatives having higher speed ranges on the outside segments compared to the 8-Lane GP Alternatives. All Action Alternatives, however, generally demonstrated higher speed ranges on outside roadway segments compared to the No-Action Alternative, of which the lowest speeds were observed along I-530 south of the South Terminal, Hwy. 67 north of I-40 and I-40 east of Hwy. 67.

The increase in accessibility described above is anticipated to increase the rate of future development within the AOI. These anticipated induced growth effects are expected to occur at five locations: the Marina, East Little Rock, downtown Little Rock, downtown North Little Rock, and Rockwater areas as shown in **Attachment D: Areas of Development/Redevelopment Map**.

Increased rate of development for residential, commercial and mixed-use purposes could potentially impact sensitive biological resources in the AOI; however, measures such as BMPs, permitting guidelines, agency coordination and regulatory requirements in cooperation with appropriate stakeholders and entities would mitigate or minimize potential adverse induced growth impacts for these sensitive resources. The increased rate of development resulting from the proposed project could result in positive economic impacts due to increased property taxes and sales tax revenues as denser, more modernized tax-generating commercial and residential developments are constructed.

6.0 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). August 2016. Practitioner's Handbook Number 12. *Assessing Indirect Effects and Cumulative Impacts Under NEPA*.

National Cooperative Highway Research Program (NCHRP). 2002. Report 466: *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects.*

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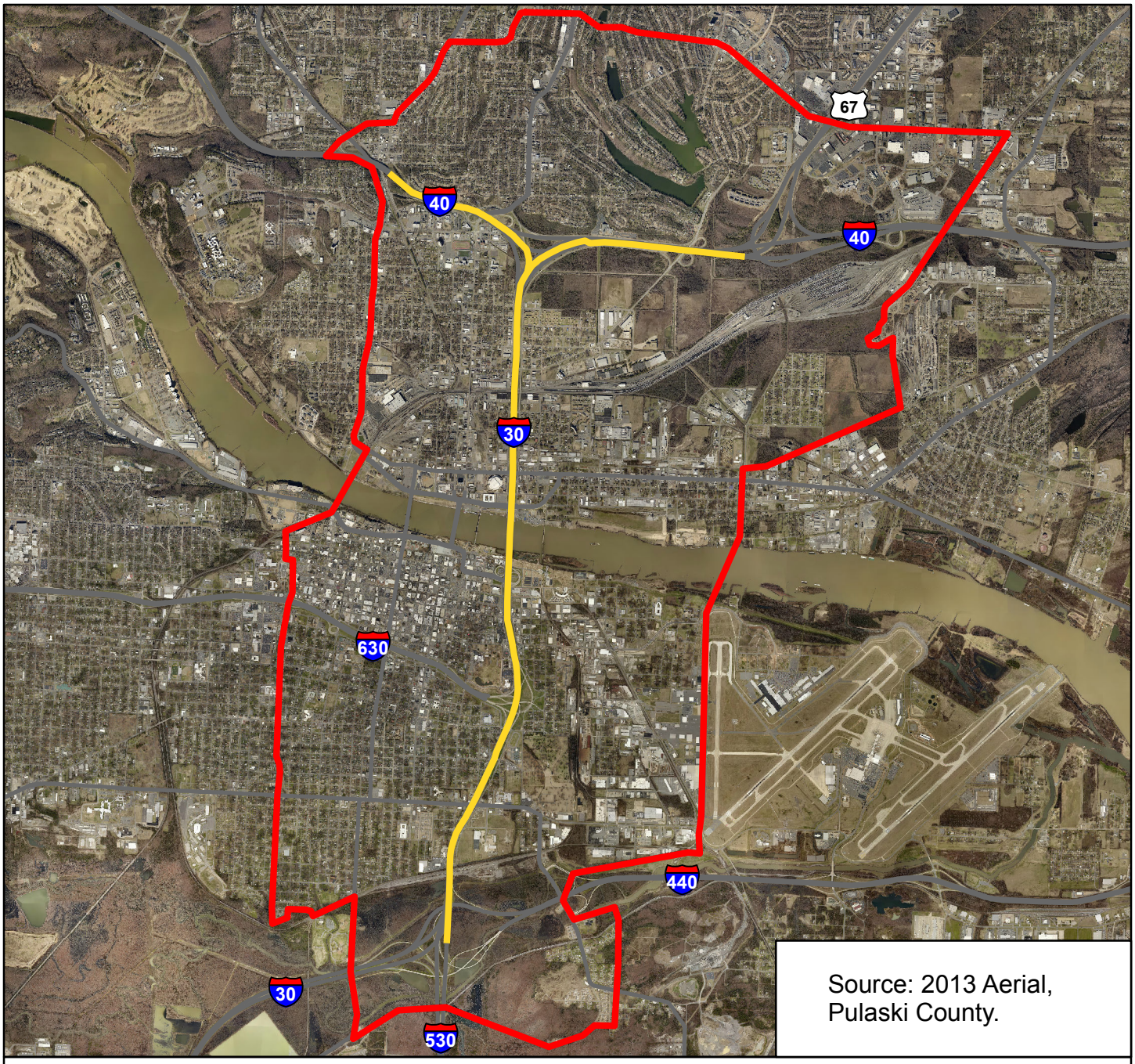
Attachment A: Area of Influence Map



Source: 2013 Aerial, Pulaski County.

N

ARDOT ARKANSAS DEPARTMENT OF TRANSPORTATION

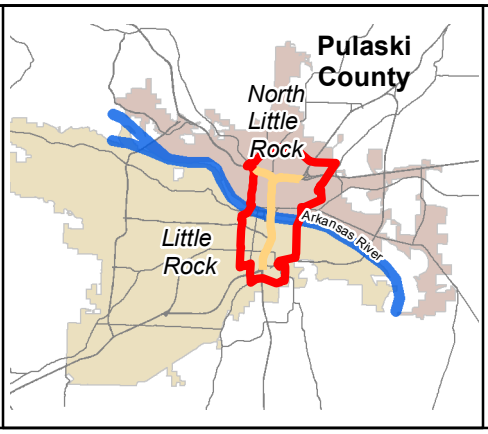
0 1 2

Miles

30 CROSSING

Legend

- Project Limits
- Study Area



AREA OF INFLUENCE MAP

I-30 from I-530 to Hwy. 67

30 Crossing Project
CA0602

Indirect Effects
Technical Report

Pulaski County, Arkansas

Attachment B: Downtown Little Rock Access and Travel Patterns

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Attachment B
Access and Travel Patterns to Downtown Little Rock Destinations (Ingress) in the AM Peak Hour (6:30 AM – 8:30 AM)

Figure A:
Existing/Future 2041 No Action

Figure B:
Future 2041 SPUI Interchange (Alt. 1A & 2A)

Figure C:
Future 2041 Split Diamond Interchange (Alt. 1B & 2B)

Note: The text below depicts travel patterns between the green origin numbers (1 – I-40/I-30 north terminal, 2 – I-630/Cumberland Street, and 3 – I-30/I-530/I-440 south terminal) and the blue destination circles (River Market area and the Clinton Presidential Center/Heifer International sites) in the above figures. There is more than one route between each origin and destination. For the purposes of this analysis, we have identified one logical route for analysis.

A. **Existing/Future 2041 No Action:** Today and in the future, with no changes in access configuration, motorists would use the existing Cantrell interchange to access both the River Market and Clinton Presidential Center/Heifer International sites in the AM Peak Hour from the north and south (**Figure A**). The Cantrell interchange is made up of several loop ramps, with multiple entrance and exit locations to these loops, creating safety hazards for motorists and pedestrians/bicyclists converging at Cantrell Rd. Along with access at Cantrell Rd., existing access to downtown Little Rock is provided at Sixth St. and Ninth St. **Figure A** shows that motorists from the north going to the River Market would exit I-30 and head west to Cumberland St. Motorists from the north going to the Clinton Presidential Center/Heifer International would exit I-30 and use the west loop ramp to Third St. and then go east on Third St. Motorists from the south going to the River Market would use the east loop to Cantrell Rd. and then west to Cumberland St. Motorists from the south going to the Clinton Presidential Center/Heifer International sites would exit I-30 and use the loop ramp to Second St., then travelling east to Collins St. and then east on Third St.

B. **Future 2041 SPUI Interchange (Alt. 1A & 2A):** The SPUI interchange option (**Figure B**) would be located at the same location as the existing Cantrell interchange, but instead of a loop ramps, would be configured so that the turning movements of the I-30 entrance/exit ramps on to and off of Cantrell Rd. and the frontage roads are executed in one central area that is located as an underpass to the I-30 main lanes. The SPUI option maintains two access points into and out of downtown Little Rock at Cantrell Rd. and Sixth St./Ninth St. Access from the north traveling to the River Market would be an exit ramp with a right turn onto Cantrell Rd. and then a right turn onto Cumberland St.; and access traveling south to the same location would be an exit ramp with a left turn at the SPUI onto Cantrell Rd. and then a right onto Cumberland St. Similarly, access traveling from the north to the Clinton Presidential Center/Heifer International sites would be an exit ramp with a left turn at the SPUI, a right turn onto Collins St., and then a left turn onto Third St. Access traveling from the south to the same locations would be an exit ramp with a right turn at Collins St. and then a left turn onto Third St. In general, access to the River Market and Clinton Presidential Center/Heifer International sites would include simplified exit and turning movements with the SPUI compared to the No-Build loop ramps. SPUIs are not uncommon around the country, but there are no known examples of SPUIs in Arkansas. This would be a new interchange type for Arkansas motorists.

C. **Future 2041 Split Diamond Interchange (Alt. 1B & 2B):** The split diamond interchange option (**Figure C**) includes only one access point along I-30 into and out of downtown Little Rock made of up two half diamond interchanges at Fourth St. and Ninth St. This configuration would spread traffic coming from the north and south out onto different downtown roads, including Fourth St., Capitol Ave. and Sixth St. Motorists traveling from the south destined for the River Market or Clinton Presidential Center/Heifer International would exit I-30 at Ninth St. and make their way north using the street grid. Motorists traveling from the north destined for these same locations would exit the interstate at Fourth St. and make their way north using the street grid; or utilize a U-turn under I-30 at Fourth St. taking the motorist to Third St. There are many examples of split diamonds in the Little Rock area, including on I-630 between Cumberland St. and Broadway St.

Attachment B
Access and Travel Patterns from Downtown Little Rock Destinations (Egress) in the PM Peak Hour (4:00 PM – 6:00 PM)

Figure D:
Existing/Future 2041 No Action

Figure E:
Future 2041 SPUI Interchange (Alt. 1A & 2A)

Figure F:
Future 2041 Split Diamond Interchange (Alt. 1B & 2B)

Note: The text below depicts travel patterns between the blue origin circles (River Market area and the Clinton Presidential Center/Heifer International sites) and the green destination numbers (1 – I-40/I-30 north terminal, 2 – I-630/Cumberland Street, and 3 – I-30/I-530/I-440 south terminal) in the above figures. There is more than one route between each origin and destination. For the purposes of this analysis, we have identified one logical route for analysis.

D. **Existing/Future 2041 No Action:** Today and in the future, with no changes in access configuration, motorists would use the existing Cantrell Interchange to access I-30 from both the River Market and Clinton Presidential Center/Heifer International sites in the PM Peak Hour to the north and south (**Figure D**). The Cantrell interchange is made up of several loop ramps, with multiple entrance and exit locations to these loops, creating safety hazards for motorists and pedestrians/bicyclists converging at Cantrell Rd. Along with access at Cantrell Rd., existing access to downtown Little Rock is provided at Sixth St. and Ninth St. **Figure D** shows that motorists from the River Market would travel south on Cumberland St. to access the I-30 northbound and southbound entrance ramps. Motorists from Clinton Presidential Center/Heifer International would travel west on Third St. to Cumberland St. to access the I-30 northbound and southbound entrance ramps. Motorists could also access southbound I-30 from the Clinton Presidential Center/Heifer International sites by travelling west on Third St. to the I-30 southbound frontage road, entering I-30 south of 11th St. in Little Rock. Likewise, motorists could access I-30 northbound by travelling west on Third St. to Collins St. to access the I-30 northbound entrance ramp.

E. **Future 2041 SPUI Interchange (Alt. 1A & 2A):** The SPUI interchange option (**Figure E**) would be located at the same location as the existing Cantrell interchange, but instead of a loop ramps, would be configured so that the turning movements from Cantrell Rd. to the I-30 entrance ramps and frontage roads are executed in one central area that is located as an underpass to the I-30 main lanes. The SPUI option maintains two access points into and out of downtown Little Rock at Cantrell Rd. and Sixth St./Ninth St. Access to the north from the River Market would be via an entrance ramp off Cantrell Rd. through the SPUI and access south from the River Market would be via an entrance ramp off Cantrell Rd. through the SPUI. Similarly, access to the north from the Clinton Presidential Center/Heifer International sites would be via along Third St., Collins St. and to the SPUI northbound entrance ramp and access to the south from the Clinton Presidential Center/Heifer International sites would be along Third St., Collins St. and the SPUI southbound entrance ramp. In general, access from the River Market and Clinton Presidential Center/Heifer International sites to I-30 would include simplified entrance and turning movements with the SPUI compared to the No-Build loop ramps. SPUIs are not uncommon around the country, but there are no known examples of SPUIs in Arkansas. This would be a new interchange type for Arkansas motorists.

F. **Future 2041 Split Diamond Interchange (Alt. 1B & 2B):** The split diamond interchange option (**Figure F**) includes only one access point along I-30 into and out of downtown Little Rock made of up two half diamond interchanges at Fourth St. and Ninth St. This configuration would funnel traffic coming from downtown roads, including Fourth St., Capitol Ave. and Sixth St. on to I-30 at Fourth St. or Capitol Ave. Access to the north from the River Market would be via Cumberland St. and Fourth St. to the northbound entrance ramp and access to the south from the River Market would be via Cumberland St. and Capitol Ave. to the frontage road and Ninth St. southbound entrance ramp. Similarly, access to the north from the Clinton Presidential Center/Heifer International sites would be via the Fourth St. northbound entrance and access to the south from the Clinton Presidential Center/Heifer International sites would be to cross I-30 along Fourth St. and travel south on the frontage road to the Ninth St. southbound entrance ramp. In general, access from the Clinton Presidential Center/Heifer International sites to I-30 would include simplified entrance and turning movements with the split diamond compared to the No-Build loop ramps, but there is not the direct access to I-30 that the SPUI provides. Travel along more downtown streets is necessary to access I-30 with the split diamond configuration. There are many examples of split diamonds in the Little Rock are, such as I-630 between Cumberland St. and Broadway St.

Attachment C: Indirect Effects Questionnaire

Indirect Effects Questionnaire

CA0602 Interstate 530 (I-530) – Highway (Hwy.) 67 Widening & Reconstruction
I-30 from Interstate 530 to US Highway 67
Pulaski County, Arkansas

Respondent Information

Date:_____

Name:_____

Organization/Title:_____

Address:_____

Phone:_____

Email:_____

Questions & Discussion Topics

1.) Please summarize the trend of development and changes in land use within your jurisdiction during the past 5-10 years. If possible, please provide examples.

2.) In your opinion, would the proposed project induce development in your jurisdiction or planning area and why? If so, would this development occur alone or in conjunction with other factors?

3) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and why?

4.) In your opinion, would any redevelopment occur as a result of the proposed project? If so, what potential areas would redevelopment occur?

5.) What future development would you not expect to be dependent on the proposed project?

6.) Using a scale of 1 to 5, please indicate if you think the proposed project would affect the *rate* and *intensity* of development within your jurisdiction?

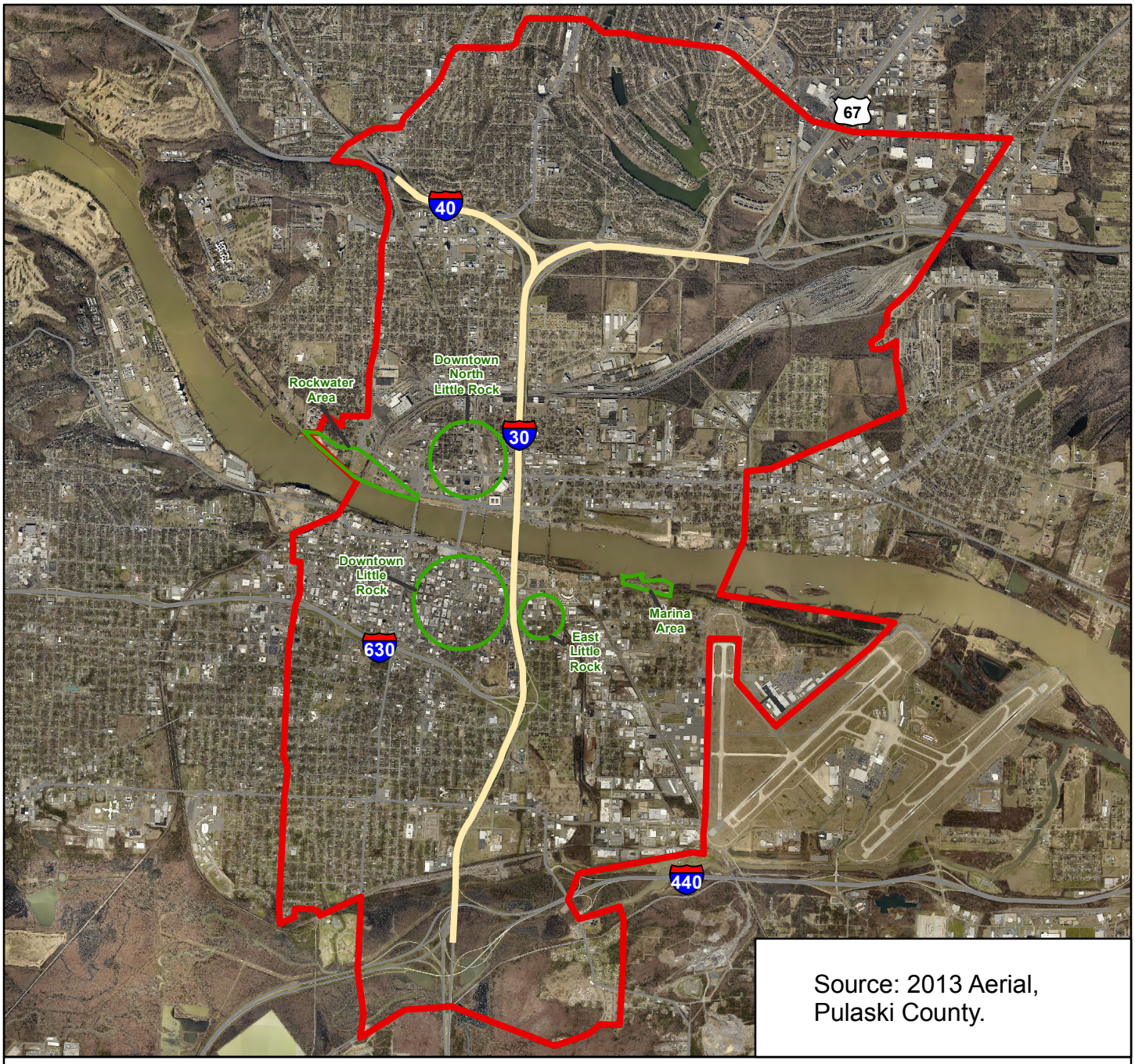
Scale based on: 1 = No Influence
5 = Strong Influence

RATE _____

MAGNITUDE _____

6.) In your opinion, would the proposed project affect or change the type of development within your jurisdiction?

Attachment D: Areas of Development/Redevelopment Map



Source: 2013 Aerial, Pulaski County.

N

ARDOT ARKANSAS DEPARTMENT OF TRANSPORTATION

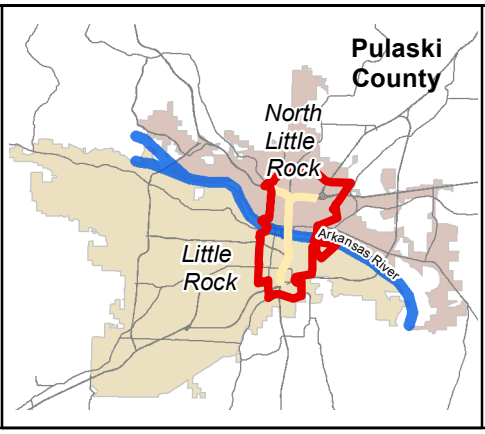
0 1 2

Miles

30 CROSSING

Legend

- Project Limits
- Areas of Development/ Redevelopment
- Area of Influence



AREAS OF DEVELOPMENT / REDEVELOPMENT MAP

I-30 from I-530 to Hwy. 67

30 Crossing Project
CA0602

Indirect Effects
Technical Report

Pulaski County, Arkansas