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MEMORANDUM

TO: Nicholas Olivier, P.E.
Project Management

FROM: Joy Johnson, E.I. *JJ*
Traffic Engineering

DATE: September 17, 2012

SUBJECT: TRAFFIC STUDY
LA 531
I-20 SERVICE RD TO JIMMY BATTON RD
WEBSTER PARISH

The following is a traffic study for roadway improvements on LA 531 in Minden, LA. Attachments include conceptual drawings and SIDRA data. Additional SIDRA files, Synchro files, traffic counts, and volume balancing data are available upon request.

If you have any questions or comments please contact me at 225-242-4636.

RECOMMENDED FOR APPROVAL _____ DATE _____

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APPROVED _____ DATE _____

Louisiana Department of Transportation and Development

Traffic Engineering Management

Traffic Study for the Environmental Assessment

LA 531 Improvements

Minden, LA



September 17, 2012

Traffic Study for the Environmental Assessment

LA 531 Improvements

Minden, LA

District 04

This traffic study was performed to determine the best alternative for widening portions of the existing two-lane two-way roadway while increasing capacity near the interchange ramps.

Project Background

The project area is along the LA 531 corridor in Minden, LA from Industrial Drive/I-20 Service Road to Jimmy Batton Road/Taylor Road in Webster Parish. The proposed roadway is comprised of 4 lanes divided with a median from Industrial Drive/I-20 Service Road to the I-20 eastbound ramps.

Design Alternatives

I. Scenario One

Scenario 1 proposes installing a multi-lane roundabout at the intersection of LA 531 and Industrial Drive/I-20 Service Road, a second multi-lane roundabout at the intersection of LA 531 and the I-20 westbound ramp, and a third multi-lane roundabout at the intersection of LA 531 and the I-20 eastbound ramp. The existing stop control at Jimmy Batton Road/Taylor Road would remain. The portion from the I-20 eastbound ramps to Jimmy Batton Road/Taylor Road would widen at the northbound approach to the interchange. The bridge on LA 531 would also be widened to 4 lanes.

II. Scenario Two

Scenario 2 proposes widening the LA 531 Bridge to five lanes, striping the outer lanes until traffic volumes warrant the additional lane. The existing stop control at the I-20 ramps would remain. The signal at Industrial Drive/I-20 Service Road would also remain as existing.

III. No-Build Scenario

For the No-Build Scenario the existing two-lane two-way bridge on LA 531 would be replaced with a two-lane bridge, but the existing signal at Industrial Drive/I-20 Service Road and the existing stop control at the ramps would remain with no improvements.

Benefits and Issues

The No-Build option will work if there is no growth along the LA 531 corridor; however, SIDRA output for existing traffic volumes shows the eastbound off-ramp will reach capacity within 17 years. Also, the bridge and roadway may eventually need to be widened for growth and to accommodate use of LA 531 as a bypass.

Scenario One provides roundabouts which are proven to enhance traffic flow and provide better mobility. With this scenario, the Level of Service (LOS) at Industrial Drive/I-20 Service Road would improve from LOS B to LOS A and the LOS at both ramps would also improve. This scenario also reduces the number of conflict points for potential crashes from 32 to 8, making this a safer alternative.

Scenario Two provides a wider bridge with the prospect of meeting higher traffic demands if an additional lane is needed in the future; however, this scenario does not widen the roadway from the westbound ramp to Industrial Drive/I-20 Service Road to accommodate for future growth. As a safety benefit, traffic may temporarily be diverted onto the additional lane during future bridge maintenance work.

Analysis

To analyze each scenario, each intersection was analyzed as a signal and then converted to the proposed alternative. The network cycle lengths were optimized in Synchro for the entire network for each scenario based on existing peak hour traffic volumes for AM and PM. The second signal phase was eliminated to further decrease delay at the interchange ramps and the optimum signal phase parameters were determined. These parameters were entered into SIDRA and processed for output. Traffic was balanced for Scenario Two to generate volumes for U-turning traffic at Industrial Drive/I-20 Service Road and at Jimmy Batton Road.

To place a signal at either of the ramps for Scenario Two, the distance from the nearest signal would need to be at least 1/2 mile as required by EDSM VI.3.1.6. The distance from the existing signal at Industrial Drive/I-20 Service Road to the I-20 westbound ramp is only 576 feet, and is less than 1000 feet from the I-20 eastbound ramp. Also, the traffic counts reveal low volumes that do not meet the conditions of EDSM VI.3.1.6 for placing new signals. Therefore, signals were not considered as a proposed alternative.

Each scenario was analyzed at a 20-year design life and a growth rate of 2 percent. The roundabouts were also analyzed with an environmental factor of 1.1.

Conclusion

Based on the data and anticipated growth along LA 531 near the I-20 interchange, Scenario One is the preferred option.

Attachments include conceptual drawings of each scenario, the SIDRA Level of Service Summary for each alternative, and the distances between each intersection. Additional data includes the SIDRA files, Synchro files, traffic counts, and volume balancing. These are available upon request.

Figure 1: SIDRA Output showing Average Delay for overall intersection in seconds PM Peak Hour at 20 years (2% compound growth)

Average PM Delay (Seconds)			Intersecting LA 531
No Build	Scenario 1	Scenario 2	
22.3	5.6	22.3	I-20 EB Ramps
2.7	8.0	2.4	I-20 WB Ramps
13.7	2.3	13.7	Industrial Drive/I-20 Service Road

Figure 2: SIDRA Output showing Average Delay for overall intersection in seconds AM Peak Hour at 20 years (2% compound growth)

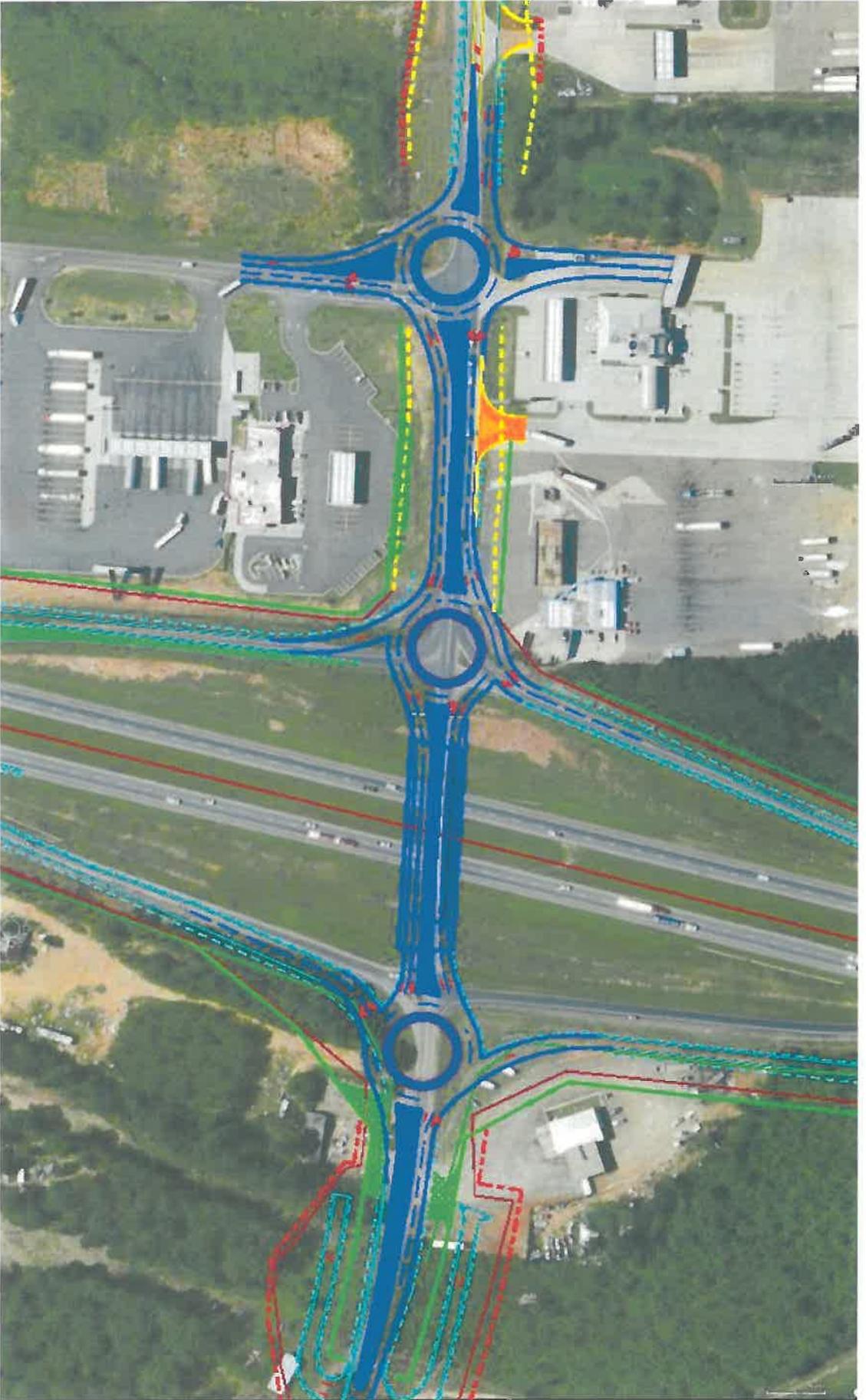
Average AM Delay (Seconds)			Intersecting LA 531
No Build	Scenario 1	Scenario 2	
9.0	11.5	9.0	I-20 EB Ramps
2.9	7.9	3.4	I-20 WB Ramps
9.3	1.8	9.3	Industrial Drive/I-20 Service Road

Figure 1: SIDRA Output showing Average Delay for overall intersection in seconds PM Peak Hour at 20 years (2% compound growth)

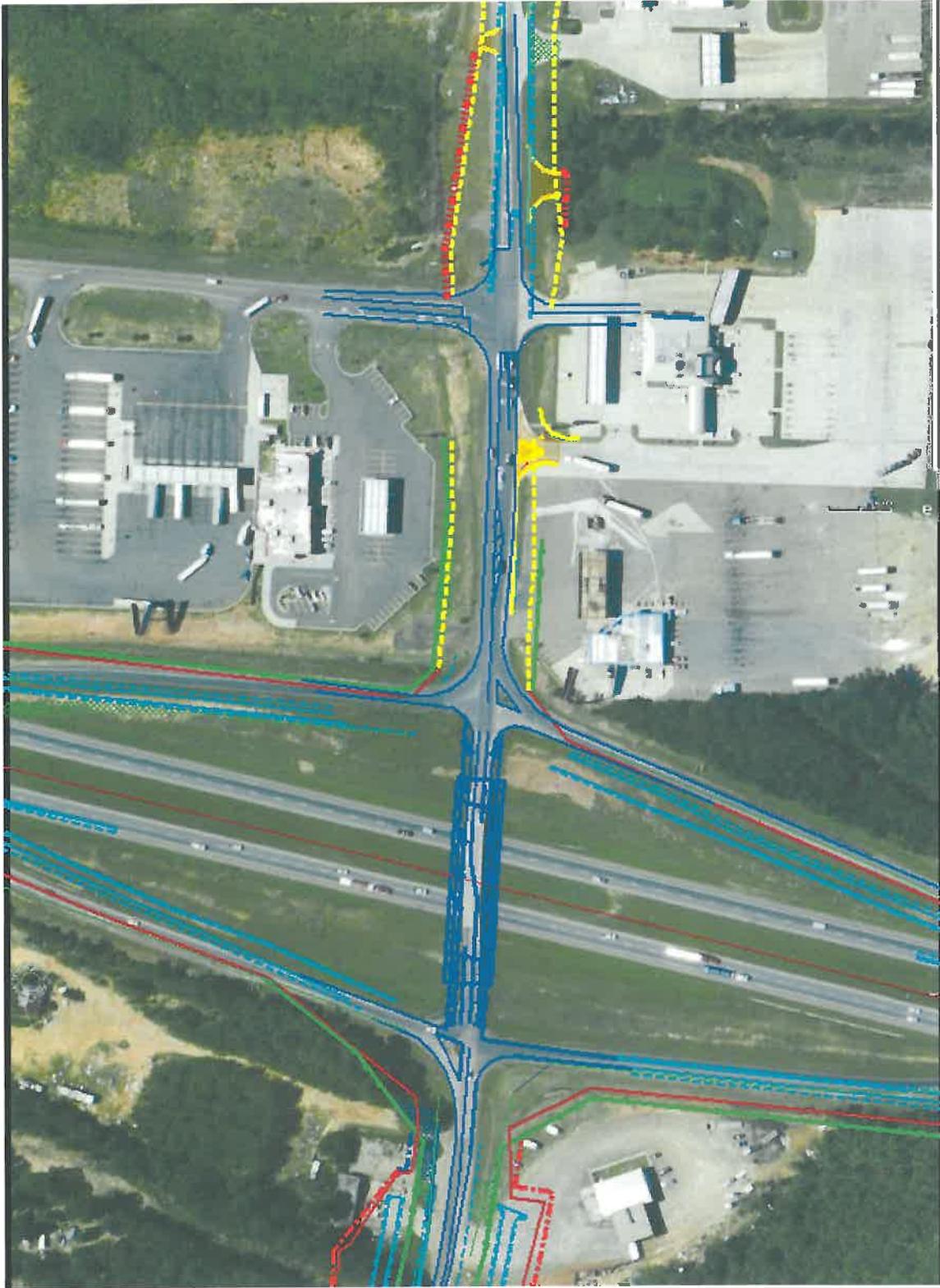
Average PM Delay (Seconds)			Intersecting LA 531
No Build	Scenario 1	Scenario 2	
22.3	5.6	22.3	I-20 EB Ramps
2.7	8.0	2.4	I-20 WB Ramps
13.7	2.3	13.7	Industrial Drive/I-20 Service Road

Figure 2: SIDRA Output showing Average Delay for overall intersection in seconds AM Peak Hour at 20 years (2% compound growth)

Average AM Delay (Seconds)			Intersecting LA 531
No Build	Scenario 1	Scenario 2	
9.0	11.5	9.0	I-20 EB Ramps
2.9	7.9	3.4	I-20 WB Ramps
9.3	1.8	9.3	Industrial Drive/I-20 Service Road



LA 531 Scenario One

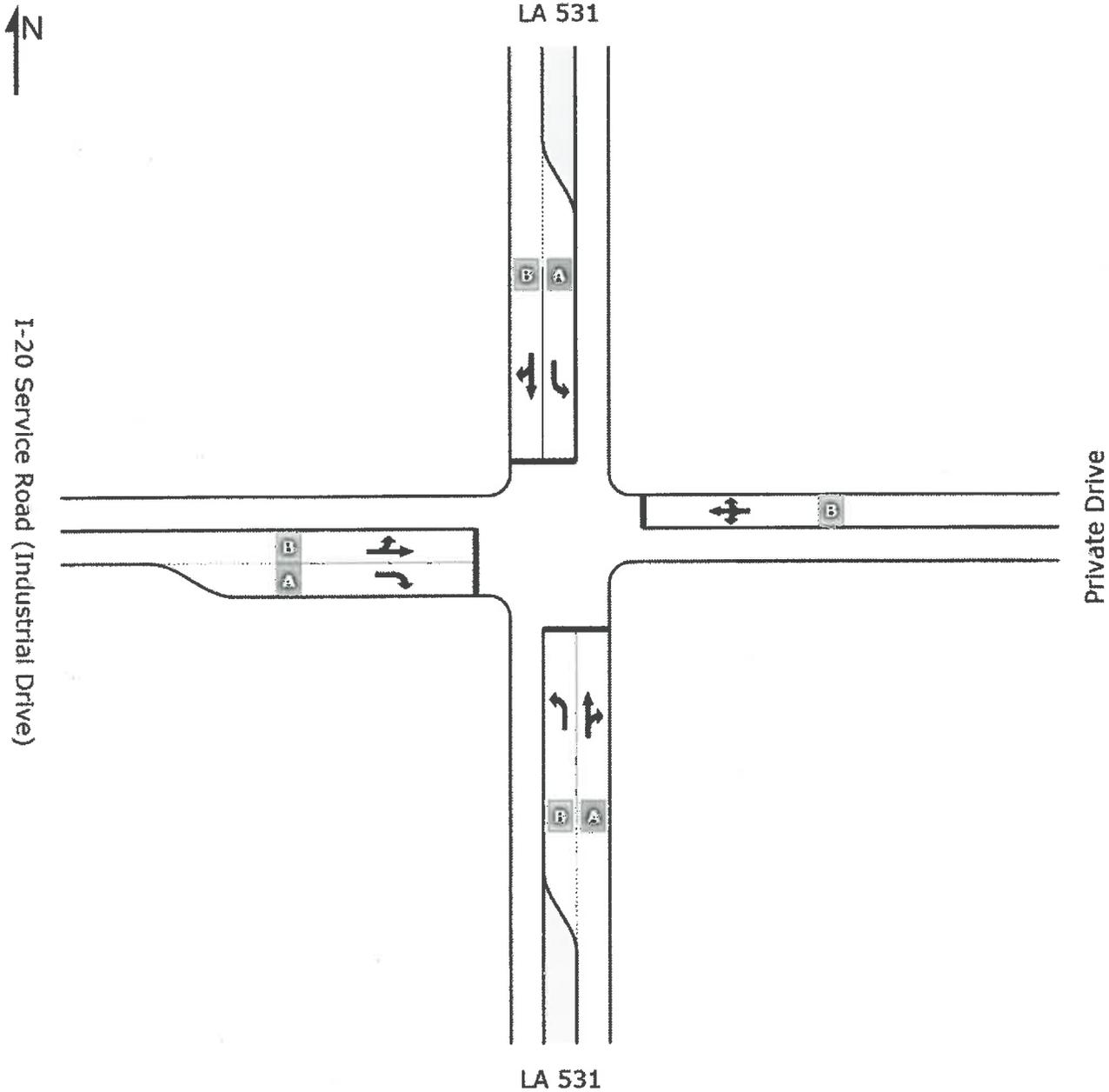


LA 531 Scenario Two

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 Service Road
(Signal) (AM)

LA 531 @ I-20 Service Road (AM) - Signal
(No-Build)
Signals - Pretimed Cycle Time = 30 seconds (Practical Cycle Time)
Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	A	B	B	A	A

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1.0 irrespective of lane delay value (does not apply for approaches and intersection).

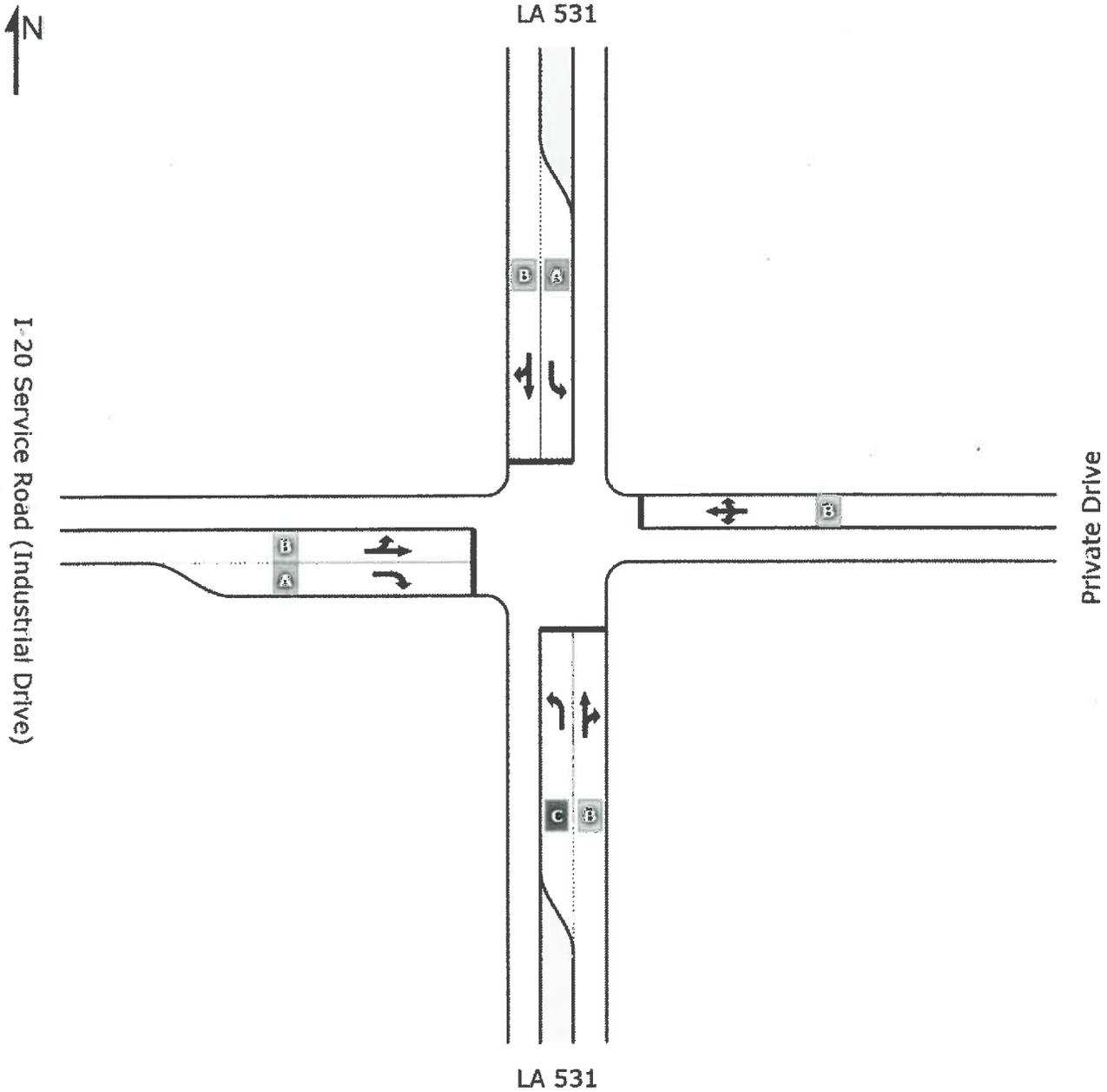
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 Service Road
(Signal) (PM)

LA 531 @ I-20 Service Road (PM) - Signal
(No-Build)
Signals - Pretimed Cycle Time = 30 seconds (Practical Cycle Time)
Design Life Analysis (Practical Capacity): Results for 20 years



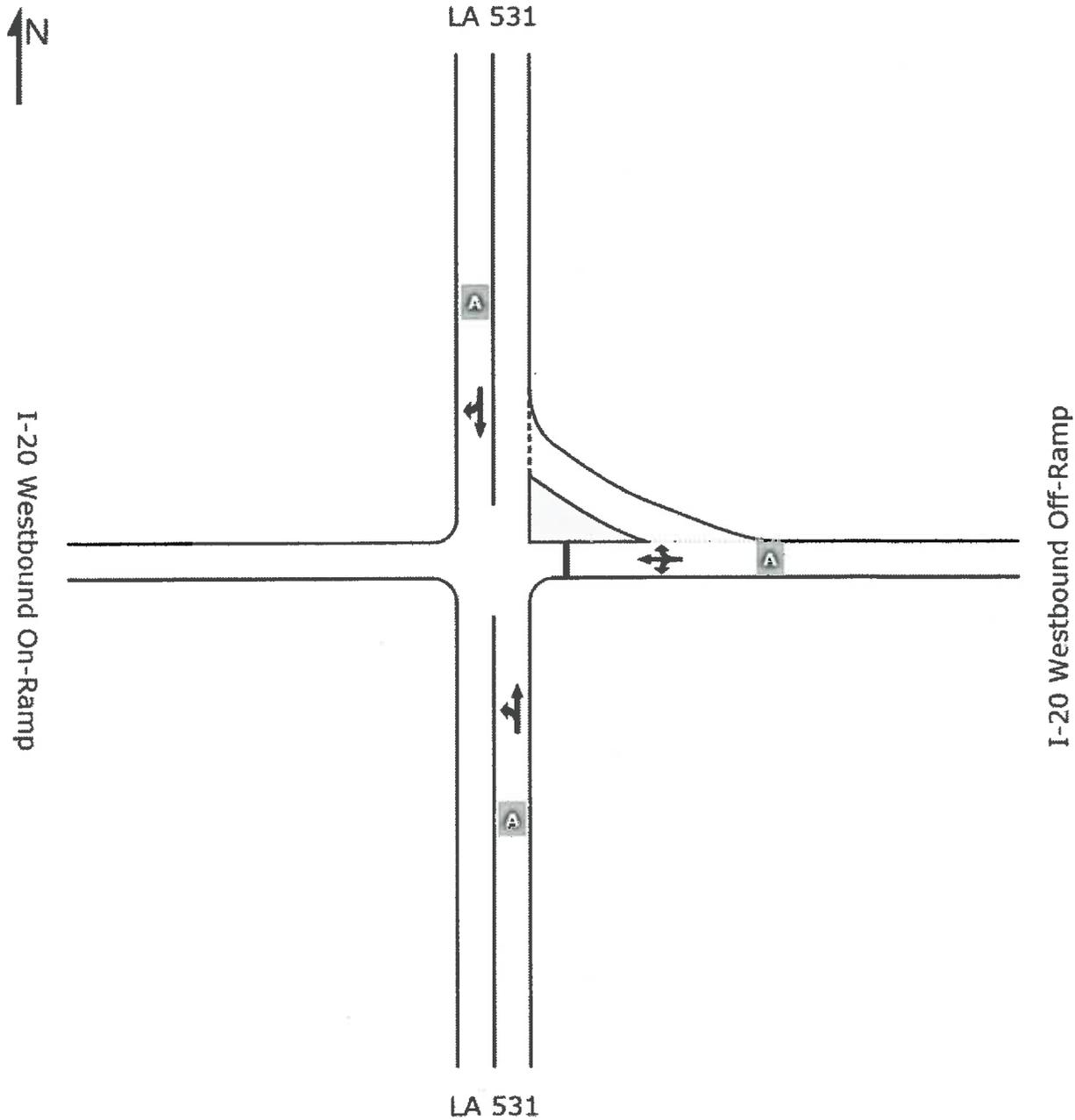
	South	East	North	West	Intersection
LOS	B	B	B	A	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1.0 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp (2-way Stop) (AM)

LA 531 @ I-20 WB Ramp (AM) - 2-way Stop
 (No-Build)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	A	NA	NA	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

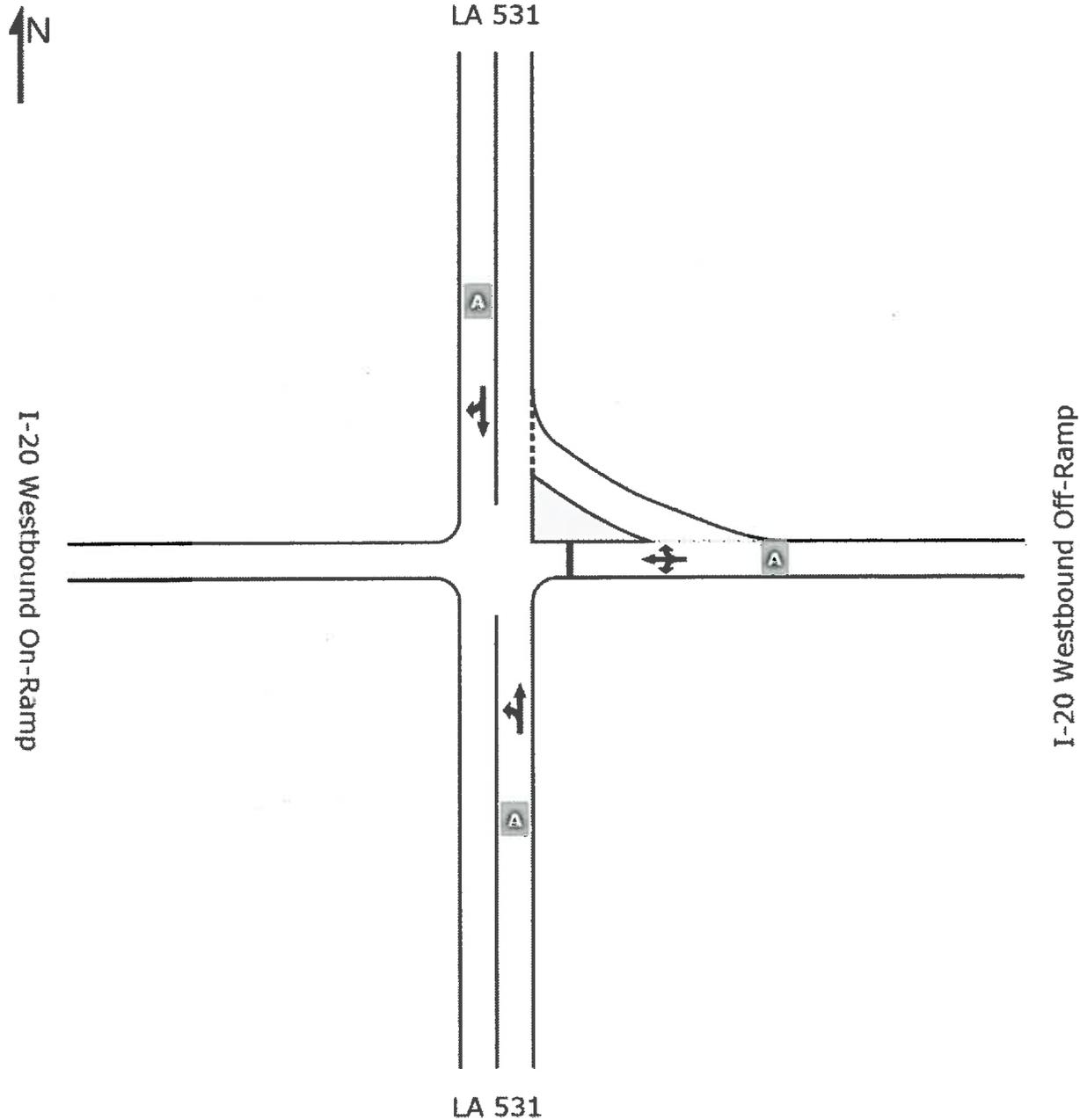
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp (2-way Stop) (PM)

LA 531 @ I-20 WB Ramp (PM) - 2-way Stop
 (No-Build)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	A	NA	NA	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

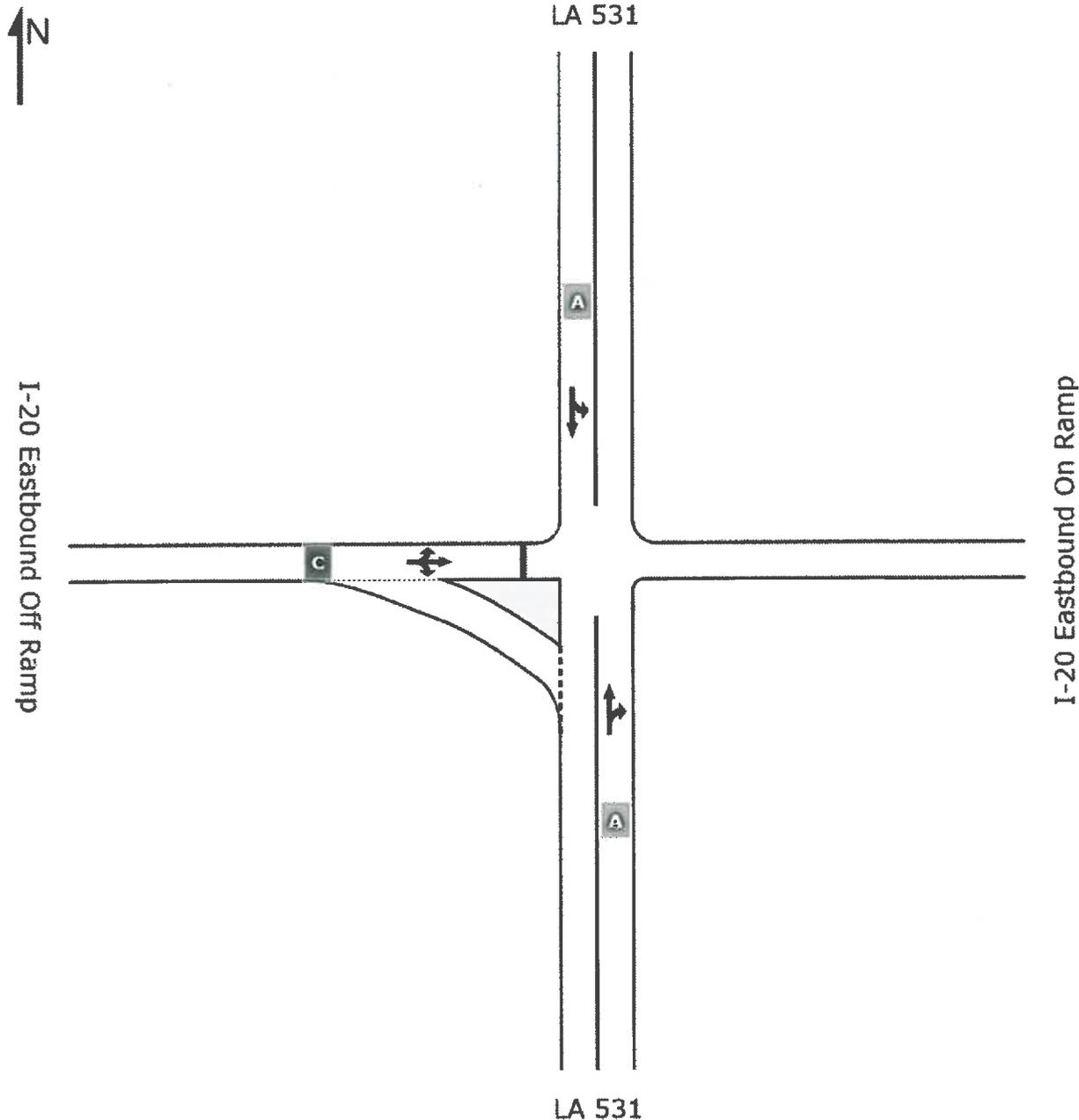
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB Ramp (Stop Sign) (AM)

LA 531 @ I-20 EB Ramp (AM) (Stop Sign)
 (No-Build)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	NA	NA	C	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

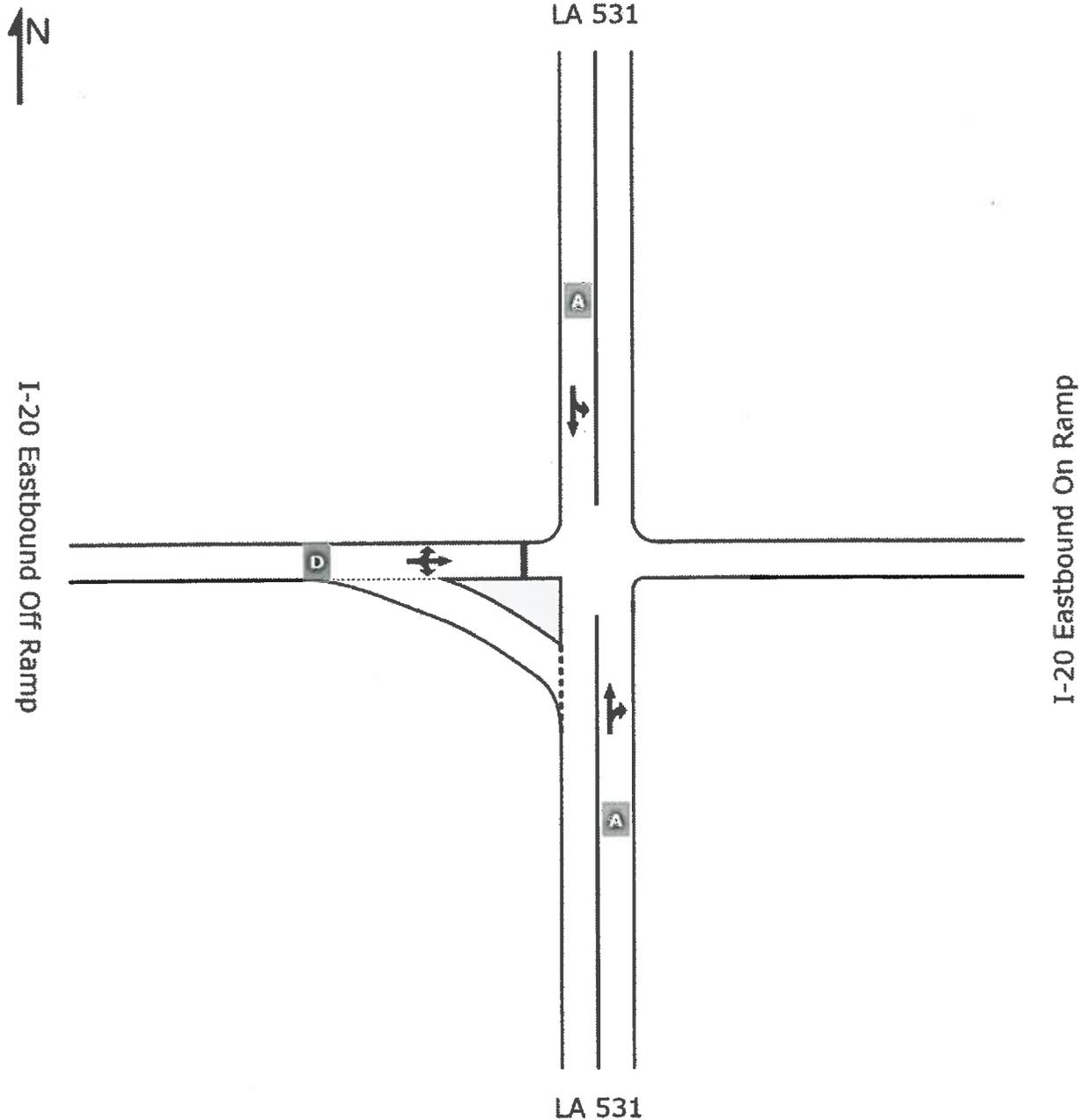
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB Ramp (Stop Sign) (PM)

LA 531 @ I-20 EB Ramp (PM) - Stop Sign
 (No-Build)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 17 years



	South	East	North	West	Intersection
LOS	NA	NA	NA	D	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

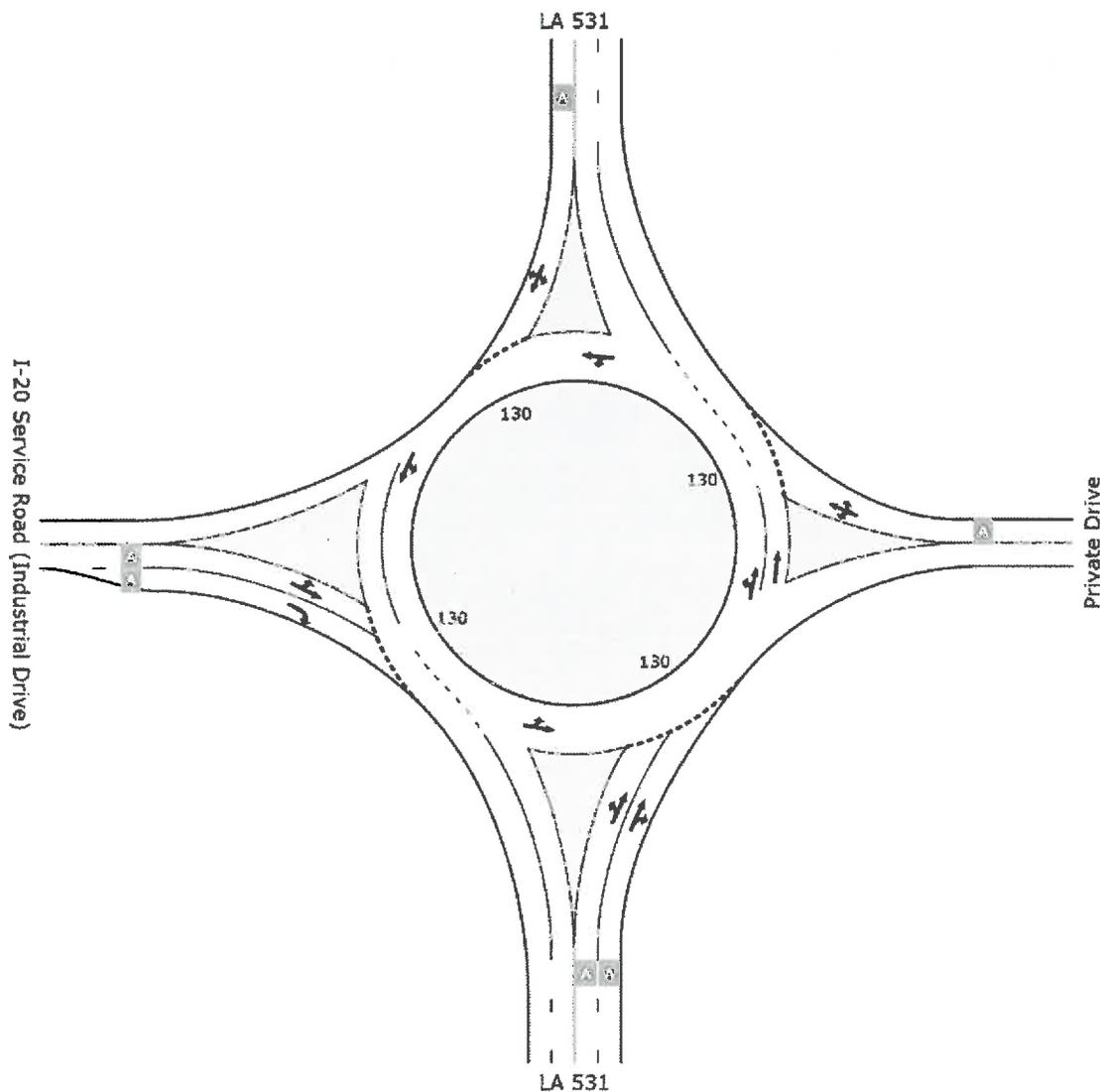
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 Service Road
(Roundabout) (AM)

LA 531 @ I-20 Service Road (AM) - Roundabout
{Scenario One}
Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



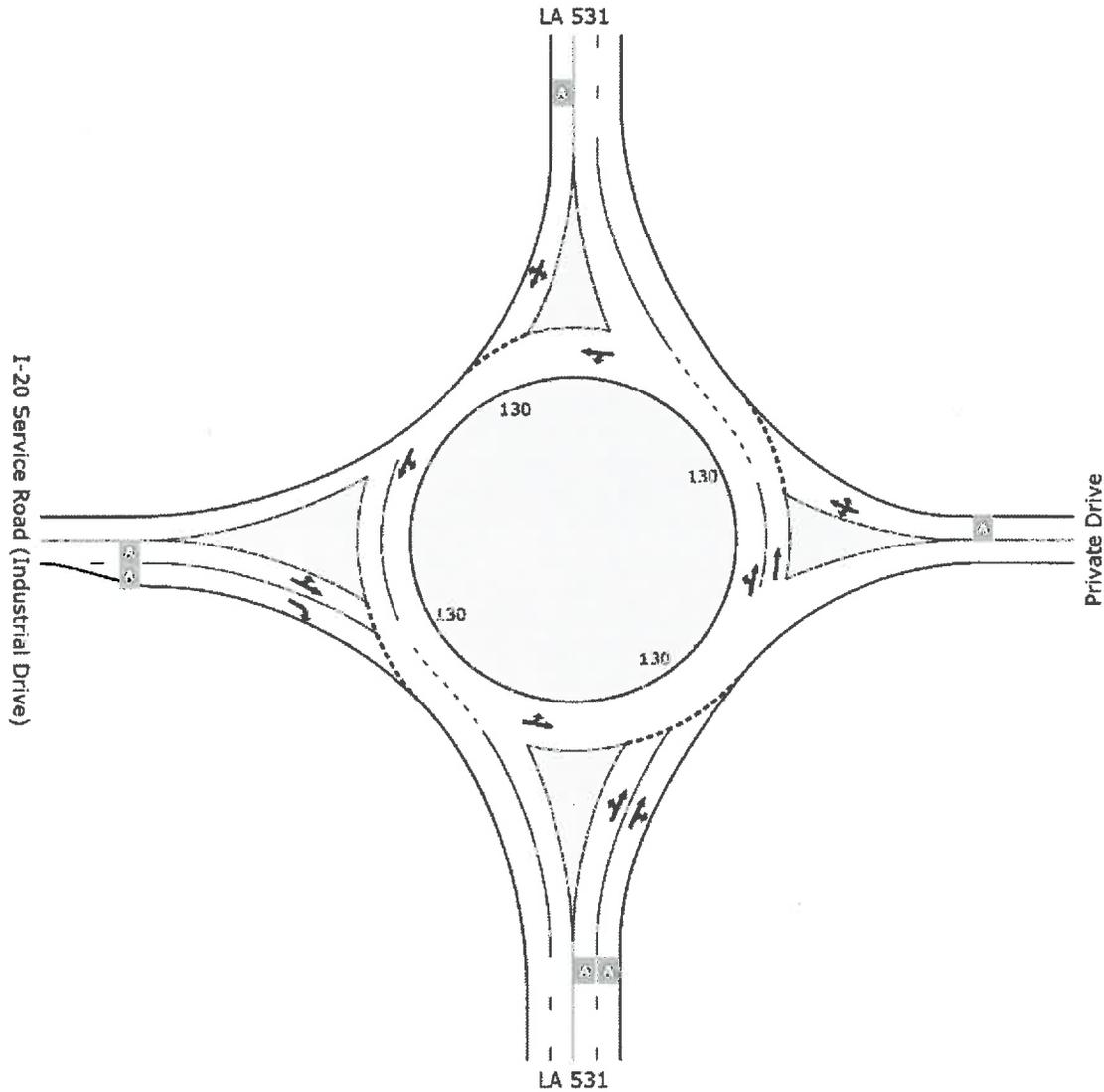
	South	East	North	West	Intersection
LOS	A	A	A	A	A

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 Service Road
(Roundabout) (PM)

LA 531 @ I-20 Service Road (PM) - Roundabout
{Scenario One}
Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



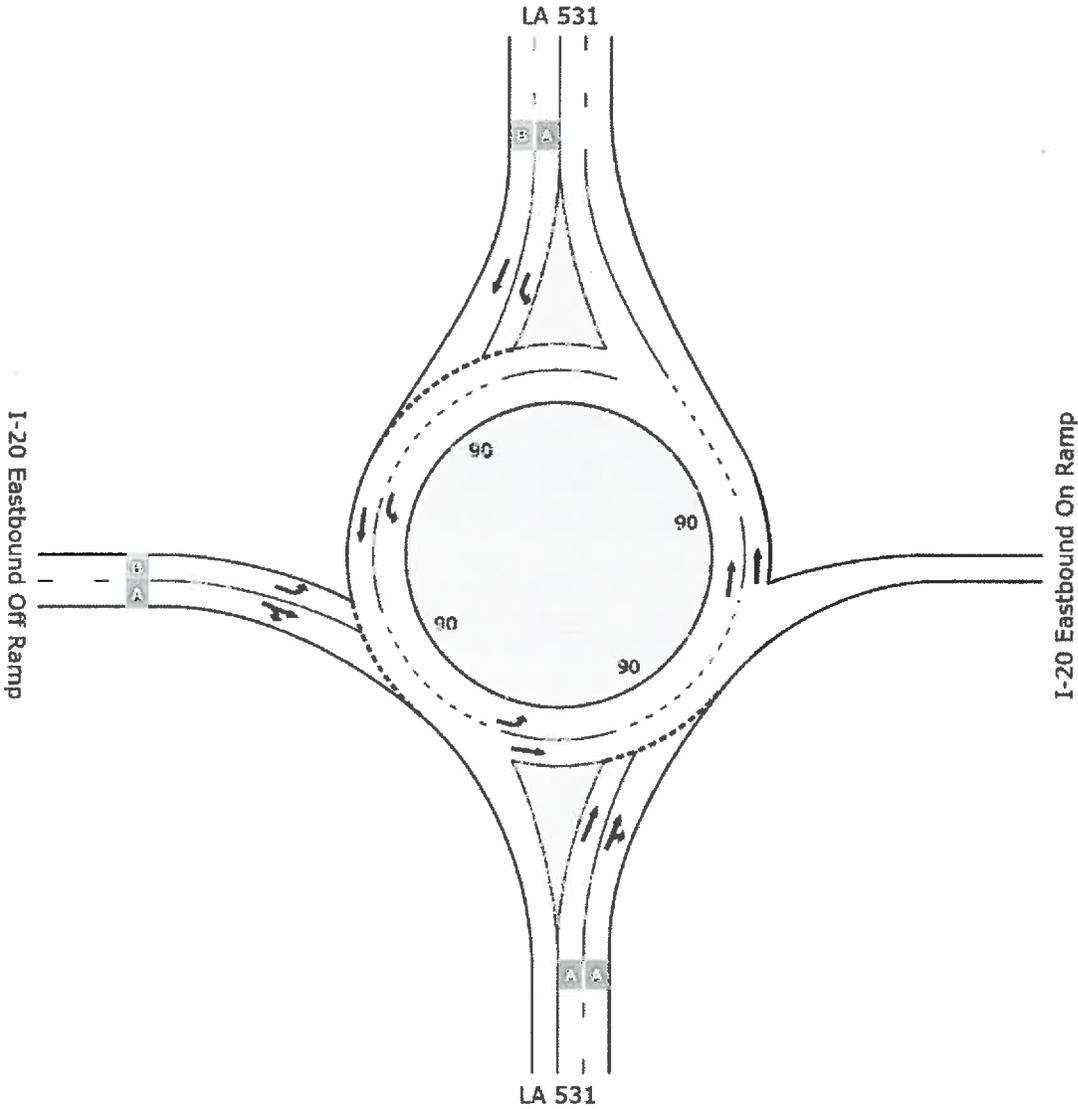
	South	East	North	West	Intersection
LOS	A	A	A	A	A

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 Lane LOS values are based on average delay per lane.
 Intersection and Approach LOS values are based on average delay for all lanes.
 SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB Ramp
(Roundabout) (AM)

LA 531 @ I-20 EB Ramp (AM) - Roundabout
{Scenario One}
Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



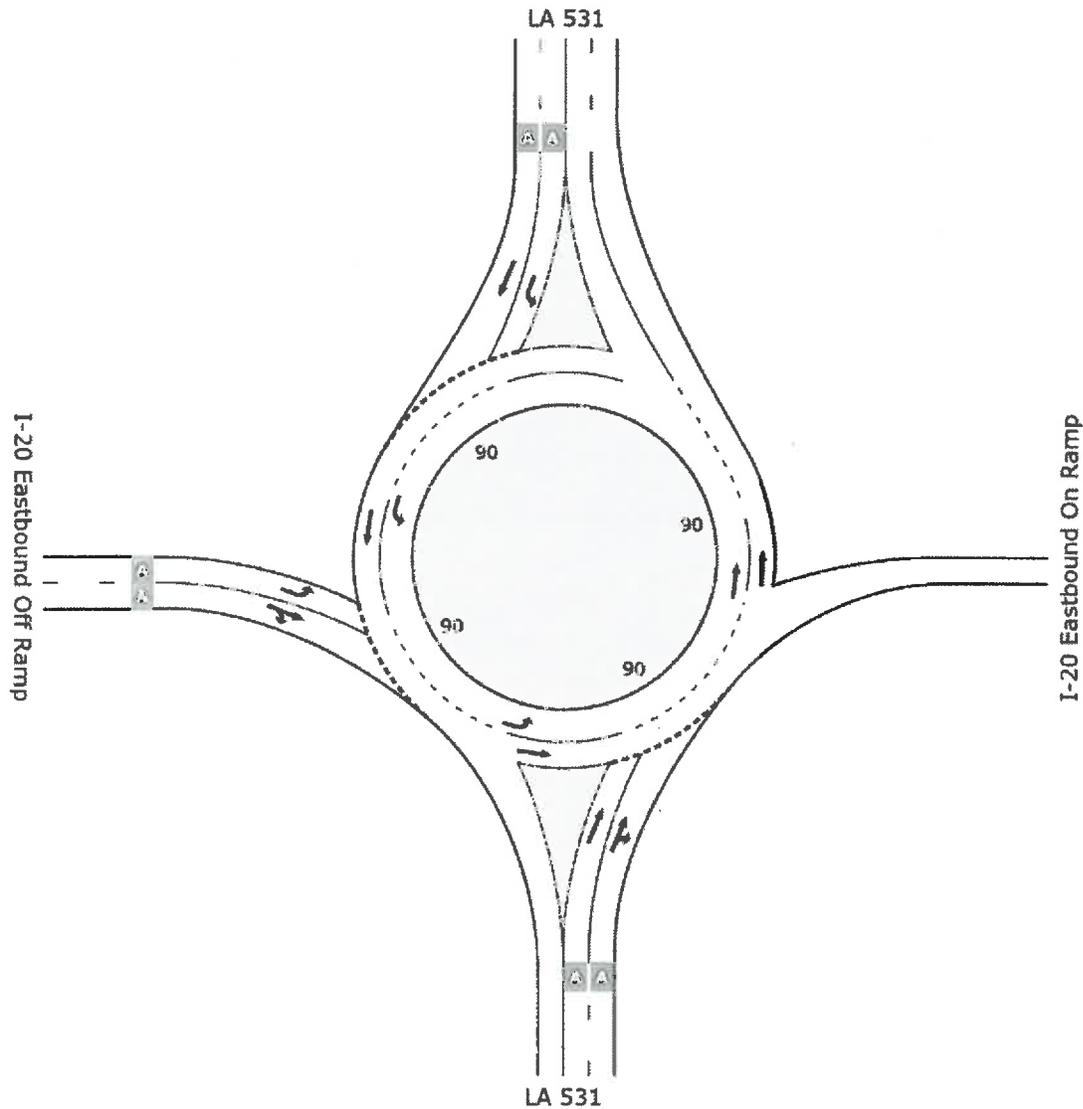
	South	East	North	West	Intersection
LOS	A	NA	B	B	B

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB Ramp
(Roundabout) (PM)

LA 531 @ I-20 EB Ramp (PM) - Roundabout
{Scenario One}
Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



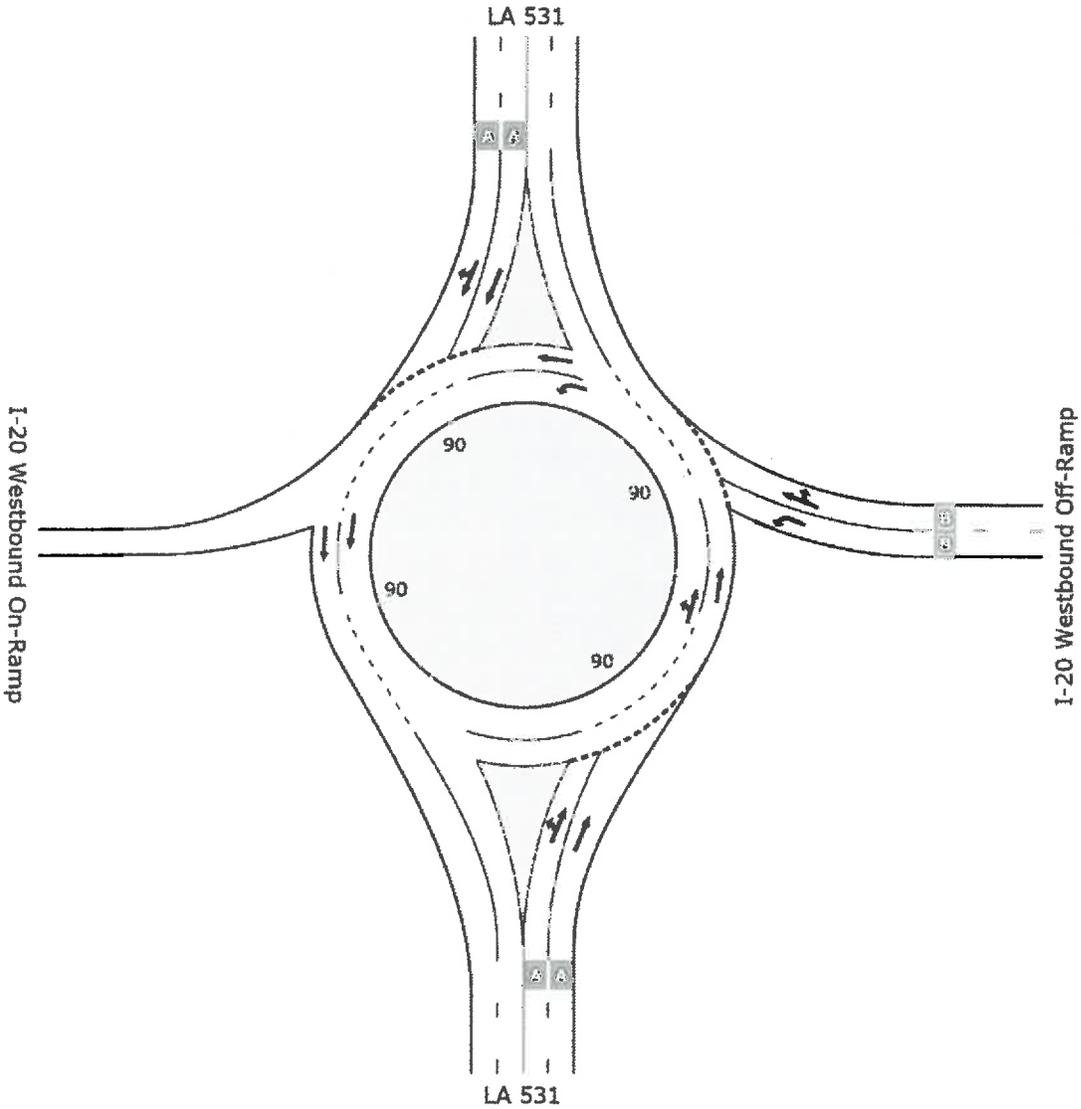
	South	East	North	West	Intersection
LOS	A	NA	A	A	A

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp
(Roundabout) (AM)

LA 531 @ I-20 WB Ramp (AM) - Roundabout
{Scenario One}
Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



	South	East	North	West	Intersection
LOS	A	B	A	NA	A

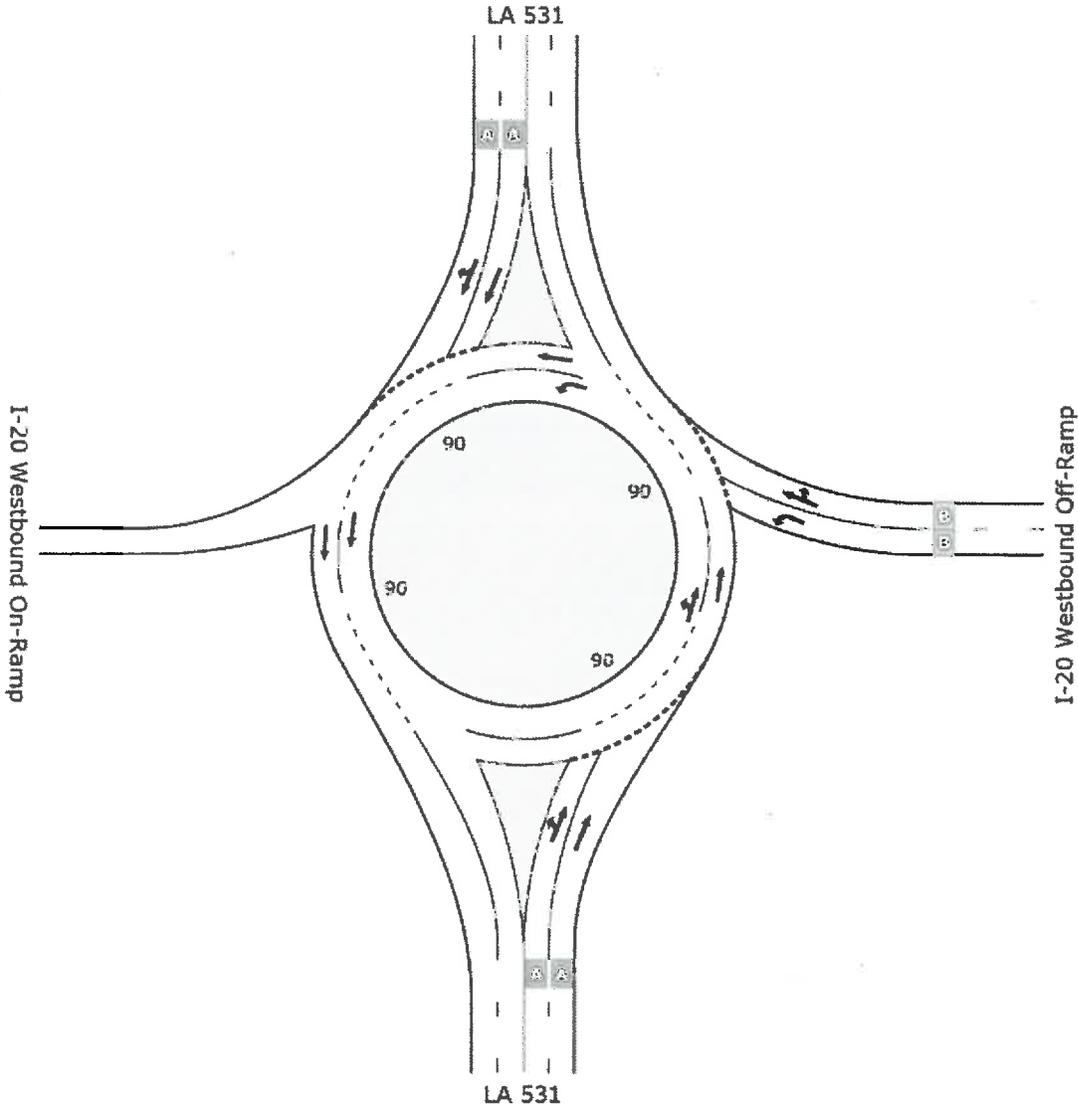
Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp
(Roundabout) (PM)

LA 531 @ I-20 WB Ramp (PM) - Roundabout
{Scenario One}

Roundabout
Design Life Analysis (Practical Capacity): Results for 15 years



	South	East	North	West	Intersection
LOS	A	B	A	NA	A

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Lane LOS values are based on average delay per lane.

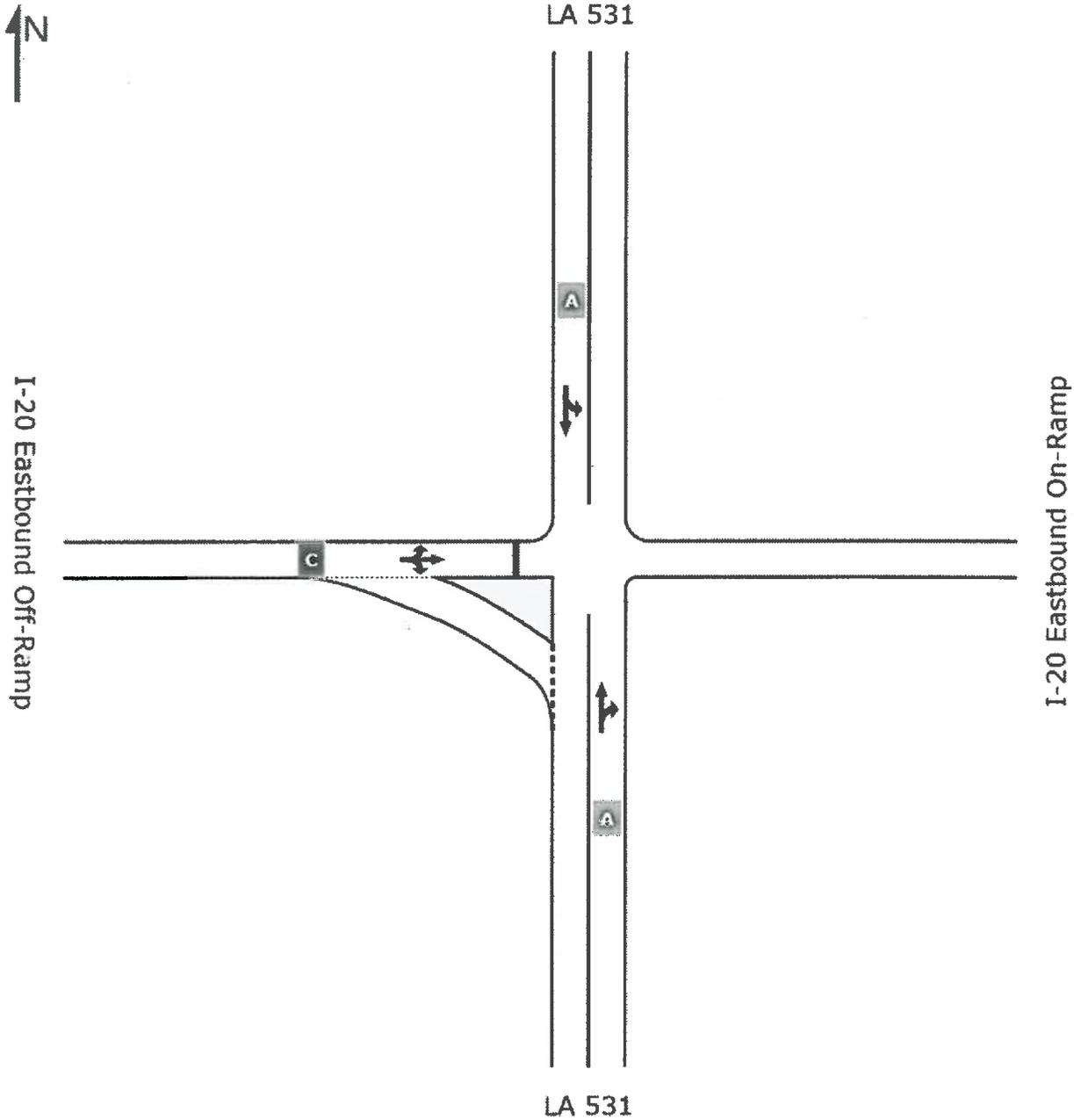
Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model used.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB (AM) - Two-way Stop

LA 531 @ I-20 EB Ramp (AM) 2-way Stop
 (Scenario Two)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	NA	NA	C	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

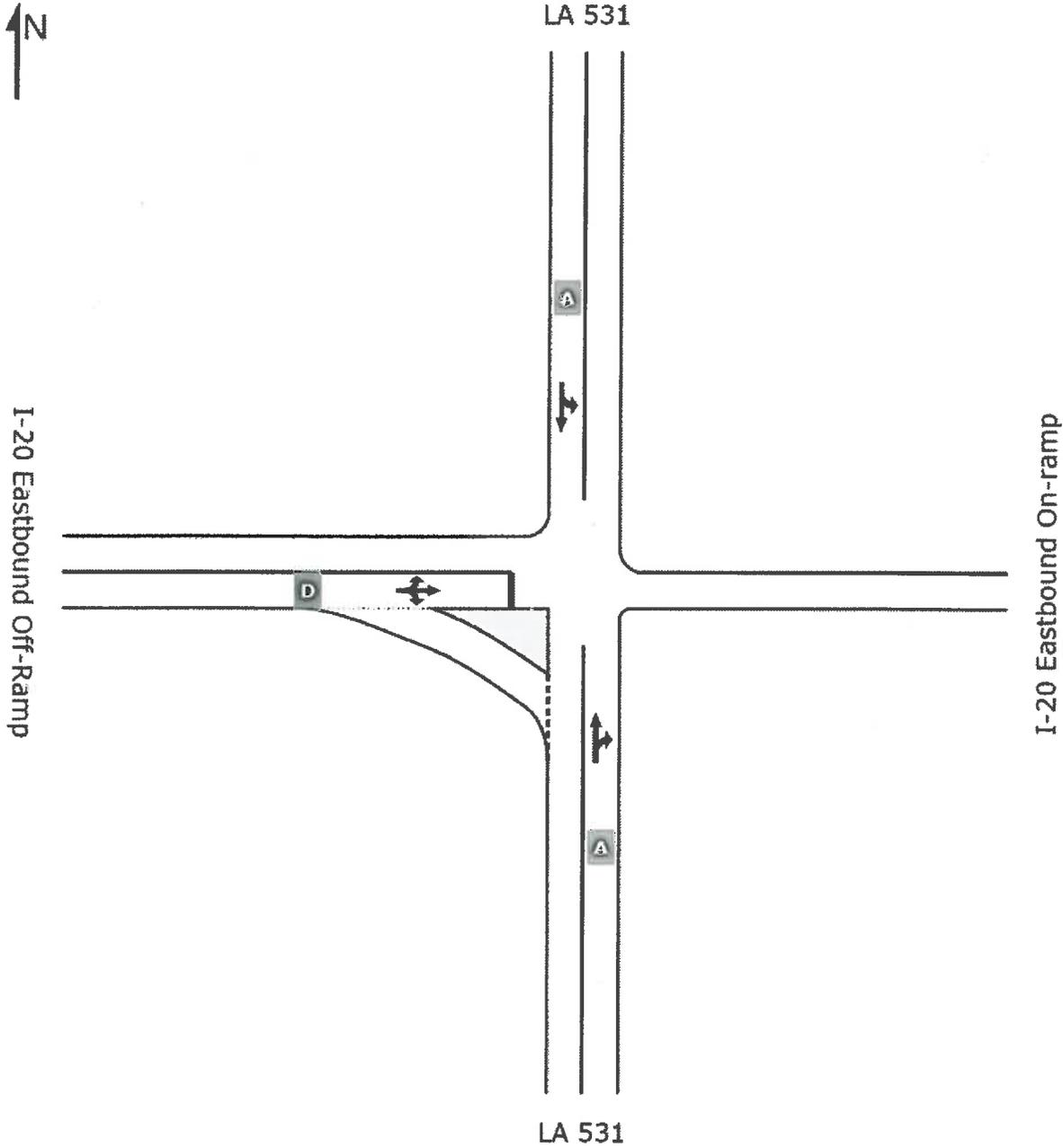
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 EB (PM) -Two-way Stop

LA 531 @ I-20 EB Ramp (PM) Two-way Stop
 (Scenario Two)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 17 years



	South	East	North	West	Intersection
LOS	NA	NA	NA	D	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

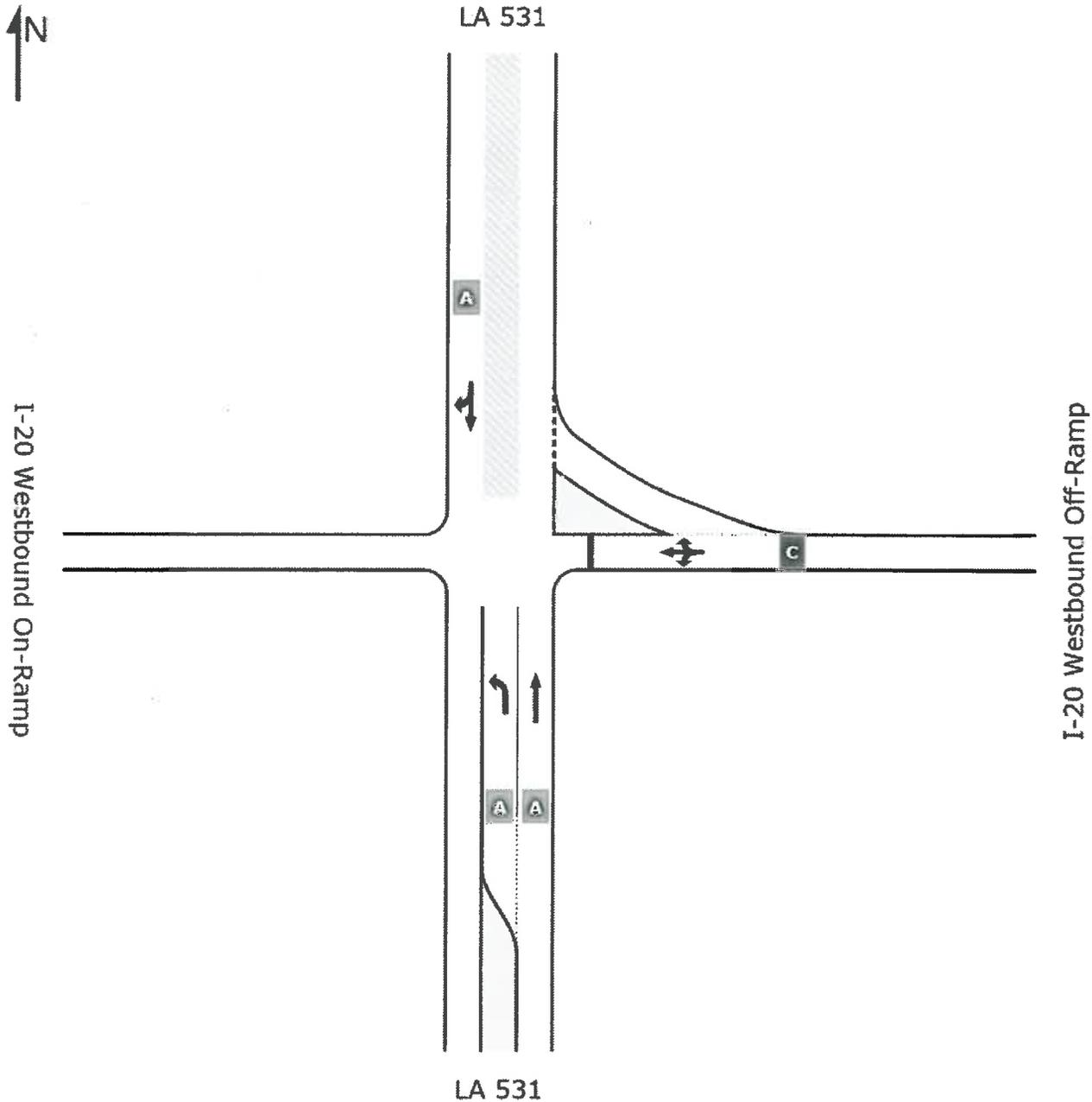
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp (2-way Stop) (AM)

LA 531 @ I-20 WB Ramp (AM) - 2-way Stop
 (Scenario Two)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	C	NA	NA	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

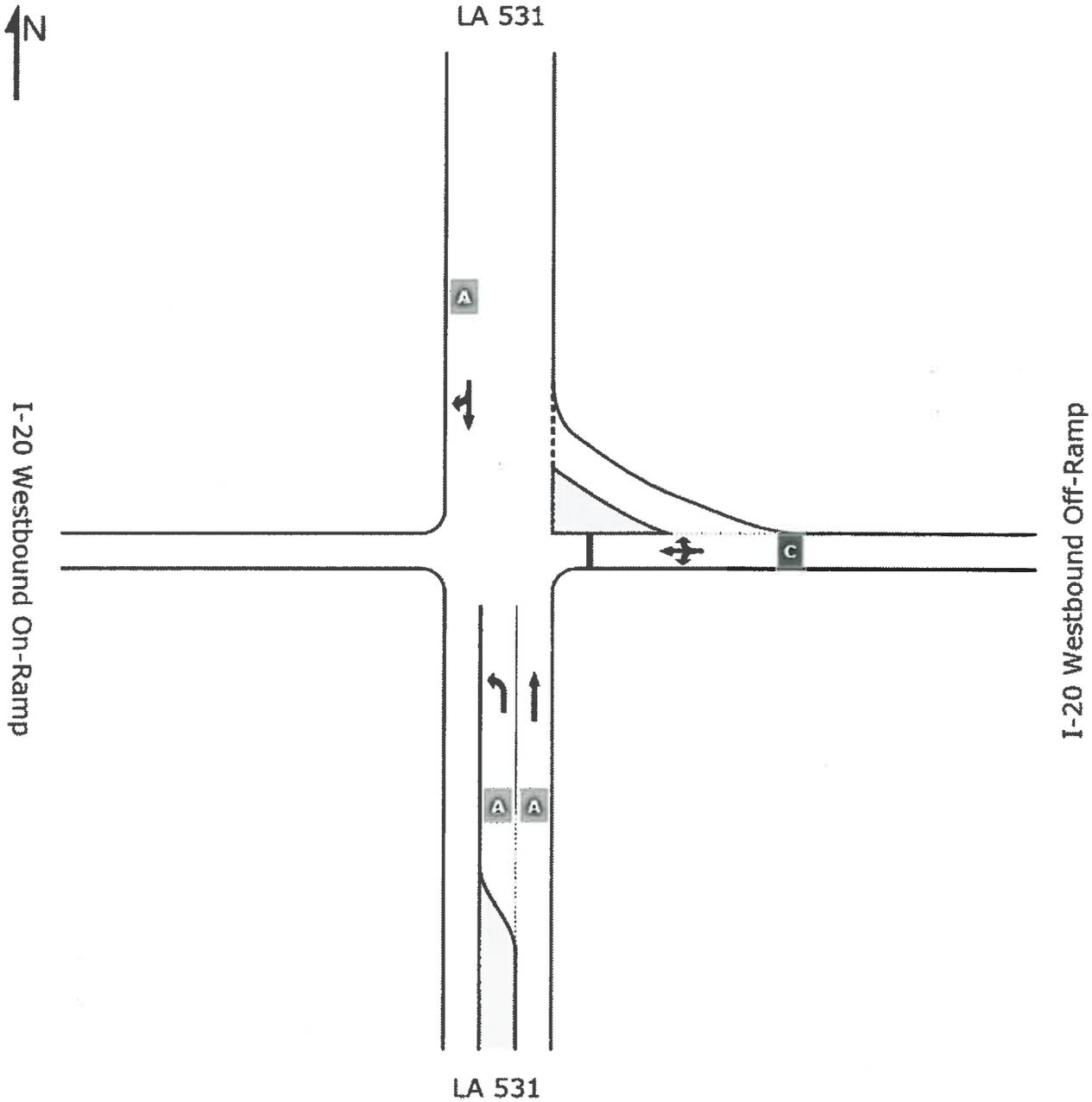
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: LA 531 @ I-20 WB Ramp (2-way Stop) (PM)

LA 531 @ I-20 WB Ramp (PM) - 2-way Stop
 (Scenario Two)
 Stop (Two-Way)
 Design Life Analysis (Practical Capacity): Results for 20 years



	South	East	North	West	Intersection
LOS	NA	C	NA	NA	NA

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

HCM Delay Model used. Geometric Delay not included.



Scenario One (AM Peak)

Synchro file - Counts taken 3/28/2012



Scenario One (PM Peak)

Synchro file - Counts taken 3/28/2012



Scenario Two (AM Peak)

Synchro file - Counts taken 3/28/2012

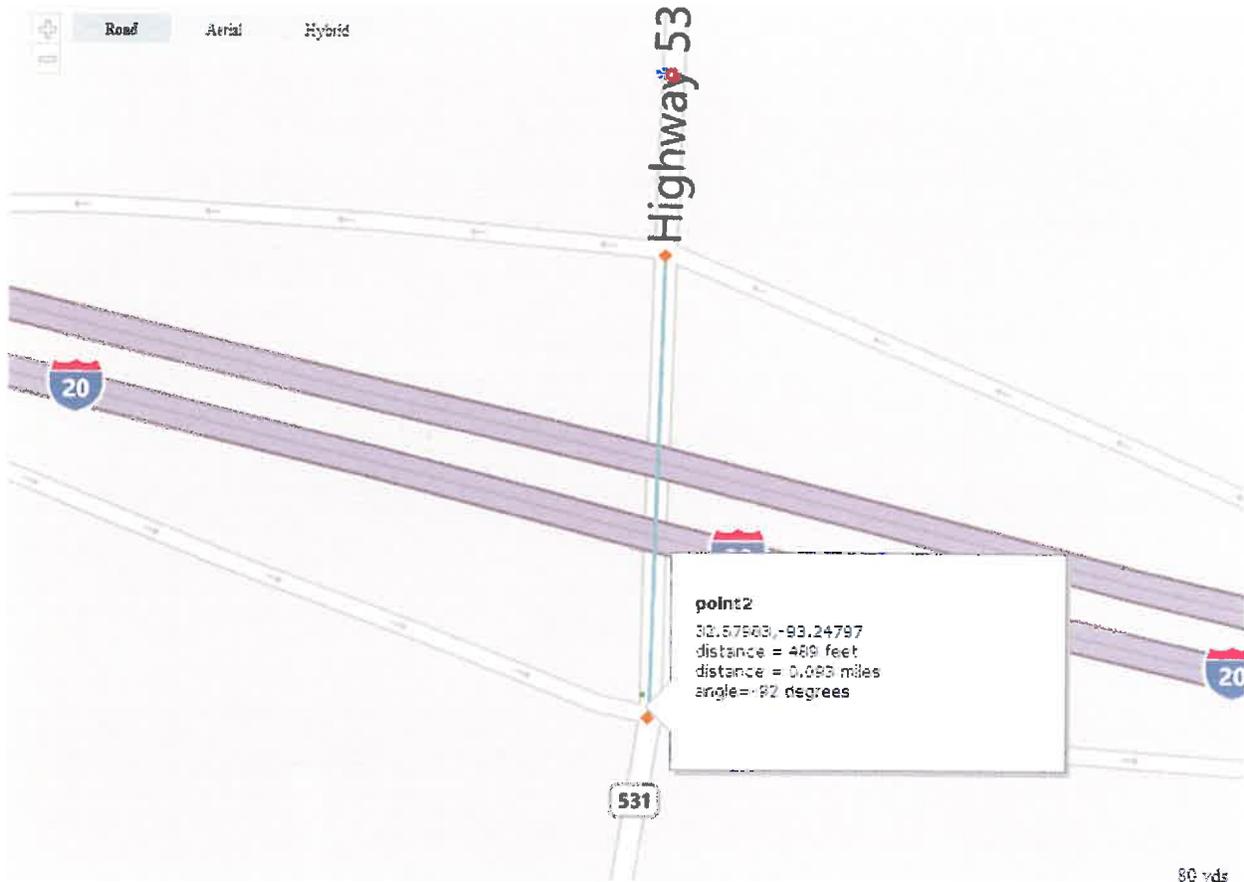


Scenario Two (PM Peak)

Synchro file - Counts taken 3/28/2012



Distance from I-20 Service Road (Industrial Drive) to the I-20 Westbound Ramp



Distance from the I-20 Westbound Ramp to the I-20 Eastbound Ramp



Distance from the I-20 Eastbound Ramp to Jimmy Batton Road



Distance from US 80 to I-20 Service Road (Industrial Drive)