

RESOLUTION 20-54

**A RESOLUTION TO APPROVE AMENDMENT NO. 01 FOR
KIMLEY HORN PROFESSIONAL SERVICES AGREEMENT FOR
DESIGN SERVICES FOR BUCKNER LANE WIDENING PROJECT**

WHEREAS, on October 21, 2019, the City of Spring Hill Board of Mayor and Aldermen approved the professional services agreement with Kimley Horn for design services for the Buckner Lane Widening Project with Resolution 19-191; and

WHEREAS, the original agreement for design services included, but was not limited to, four (4) traffic signals, with the potential for additional signalization if warranted upon completion of the traffic analysis of the corridor; and

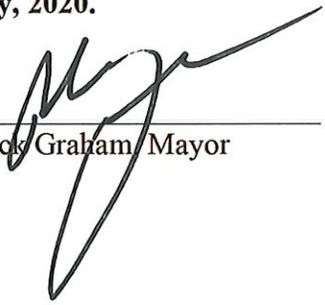
WHEREAS, the traffic analysis has been completed and the results support an additional traffic signal be added at the intersection of Buckner Lane and Twin Lakes Drive to assist with the management of peak traffic associated with the schools on this road; and

WHEREAS, Amendment No. 01 represents fees for the scope of preliminary traffic signal design and final traffic signal design for the traffic signal at Twin Lakes Drive in the total amount of \$9,000.00, as shown in Exhibit A; and

WHEREAS, the original budgeted amount for this project included a design contingency of \$226,600.00, to be paid from Adequate Facilities Tax fund.

NOW, THEREFORE BE IT RESOLVED, that the City of Spring Hill, Board of Mayor and Aldermen approves Amendment No. 01 attached hereto for Kimley Horn Professional Services Agreement for design services for Buckner Lane widening project in the total amount of \$9,000.00.

Passed and adopted by the Board of Mayor and Aldermen of the City of Spring Hill, Tennessee on the 18th day of May, 2020.



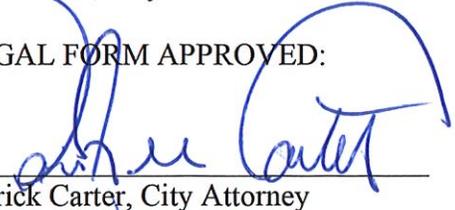
Rick Graham, Mayor

ATTEST:



April Goad, City Recorder

LEGAL FORM APPROVED:



Patrick Carter, City Attorney

SUBJECT: Resolution 20-54 to approve Amendment No. 01 to Professional Services Agreement with Kimley Horn for Buckner Lane widening project

DATE: May 4, 2020

ATTENTION: Board of Mayor and Aldermen

STAFF: Chuck Downham, Assistant City Administrator and Missy Stahl, Senior Project Manager



STAFF MEMORANDUM

The City Board of Mayor and Aldermen on October 21, 2019 approved the Professional Services Agreement with Kimley Horn for design services for the Buckner Lane widening project by Resolution 19-191 in the amount of \$937,000, paid from Adequate Facilities Tax Fund. This amount included \$710,400 for designated tasks in Preliminary and Project Support Tasks and Design Package #1, as well as a design contingency of \$226,600.

The original agreement included, as part of the design services, four traffic signals with the potential to add more traffic signals if the traffic analysis supported the need. The traffic analysis has been completed (see attached report and exhibits) and the results support an additional traffic signal be added at Buckner Lane and Twin Lakes Drive intersection. Twin Lakes Drive leads to the middle school and high school located on this road and the added signal would help manage the peak traffic volume during school hours, specifically in AM and PM peak time periods.

Amendment No. 01 is in the amount of \$9,000 and would encompass both preliminary and final design of the additional traffic signal at the Twin Lakes Drive intersection and would be paid from the budgeted design contingency.

The Amendment No. 01 is attached as part of the resolution.

Staff recommends approval of this resolution.

**AMENDMENT NUMBER 01 TO THE AGREEMENT BETWEEN CLIENT AND KIMLEY-HORN
AND ASSOCIATES, INC.**

This is Amendment number 01 dated April 29, 2020 to the agreement between City of Spring Hill ("Client") and Kimley-Horn and Associates, Inc. ("Consultant") dated October 21, 2019 ("the Agreement") concerning Buckner Lane Widening Project (the "Project").

The Consultant has entered into the Agreement with Client for the furnishing of professional services, and the parties now desire to amend the Agreement.

The Agreement is amended to include services to be performed by Consultant for compensation as set forth below in accordance with the terms of the Agreement, which are incorporated by reference.

Based on the traffic analysis performed in Task 5.2 – Traffic Analysis, it has been determined an additional signal outside of the originally scoped traffic signal locations (Buckner Lane/Spring Station Drive and Buckner Lane/Stewart Campbell Pointe) is needed.

Consultant will perform the following services:

Task 6.3 – Preliminary Traffic Signal Design

A preliminary traffic signal design will be prepared for the intersection of Buckner Lane and Twin Lakes Drive. Components of the preliminary design will consist of the following:

- Placement of steel mast arms or steel strain poles and pedestal poles (if needed)
- Signal head placement
- Conduit / pull box / cabinet placement
- Accessible Pedestrian Signal (APS) infrastructure placement (countdown pedestrian signal heads, push buttons)
- Vehicle detection system (radar or fisheye video)
- Signing / pavement markings
- Signal phasing selection

The preliminary design will be incorporated into the overall preliminary plans package, consistent with applicable TDOT and / or City of Spring Hill standards.

Task 8.2 – Final Traffic Signal Design

Building upon the preliminary signal design and based upon comments received by City staff, Kimley-Horn will prepare a final signal design for the intersection of Buckner Lane and Twin Lakes Drive. The final design will add in conduit sizing, wiring design, electrical services design, construction notes, and other items deemed necessary by Kimley-Horn staff to prepare a final signal design.

For the services set forth above, Client shall pay Consultant the following compensation:

Task 6.3 - \$3,500

Task 8.2 - \$5,500

Total Fee - \$9,000

CLIENT:

CITY OF SPRING HILL

By:  _____

Title: Mayor _____

Date: May 18, 2020 _____

CONSULTANT:

KIMLEY-HORN AND ASSOCIATES, INC.

By:  _____

Title: Vice President _____

Date: April 29, 2020 _____



MEMORANDUM

To: **City of Spring Hill, Tennessee**
Chuck Downham

From: **Kimley-Horn and Associates, Inc.**
Brad Waldschmidt, P.E., PTOE
Lee Schumann, P.E.

Date: January 30, 2020

Subject: Buckner Lane Traffic Analysis
Kimley-Horn Project Number: 118070008

Introduction

The City of Spring Hill desires to widen Buckner Lane from two (2) lanes to either four (4) lanes with a raised median or five (5) lanes with a center two-way left-turn lane. This Buckner Lane widening project begins at Duplex Road (SR-247) and ends at Buckner Road, a length of approximately 1.9 miles. The traffic analysis assumes a Design Year 2040 for the purposes of forecasting traffic volumes and future needs for components such as turn lanes and traffic signals.

Six (6) intersections have been analyzed:

- Buckner Lane at Buckner Road
- Buckner Lane at Twin Lakes Drive
- Buckner Lane at Stewart Campbell Pointe
- Buckner Lane at Spring Station Drive
- Buckner Lane at Wades Crossing
- Buckner Lane at Duplex Road (SR-247)

This memorandum summarizes the following information:

- Study Area
- Pertinent Projects in Proximity
- Traffic Volume Forecasting
- Intersection Capacity Analysis
- Intersection Queue Length Evaluation
- Conclusion

Study Area

Buckner Lane is currently a two-lane roadway (one lane in each direction) between Duplex Road and Buckner Road with a posted speed limit of 40 MPH. The Tennessee Department of Transportation classifies Buckner Lane as major collector, and the City of Spring Hill's Major Thoroughfare Plan (dated February 2019) classifies Buckner Lane as arterial.

The posted speed limits for the intersecting roadways being evaluated are as follows:

- Buckner Road – 35 MPH
- Twin Lakes Drive – 20 MPH
- Stewart Campbell Pointe – 20 MPH
- Spring Station Drive – 20 MPH
- Wades Crossing – 20 MPH
- Duplex Road – 35 MPH

Pertinent Projects in Proximity

Duplex Road is currently under construction between US-31 and just west of the Interstate 65 bridge overpass, a length of approximately 3.2 miles. Once complete, Duplex Road will be widened to three (3) lanes with a center two-way left-turn lane. ***This traffic analysis assumes that improvements to the intersection of Buckner Lane at Duplex Road will be completed by Design Year 2040, and was incorporated into the traffic analysis.***

A future interchange with Interstate 65 is underway and has successfully received a \$25,000,000 Better Utilizing Investments to Leverage Development (BUILD) grant from the U.S. Department of Transportation. This project will extend Buckner Road eastward to create a 4-leg intersection with Buckner Lane, provide a new interchange with Interstate 65, and continue eastward to intersect with Lewisburg Pike (US-431). The new interchange with Interstate 65 will be constructed as a diverging diamond interchange (a.k.a. double crossover diamond interchange). The *Interstate Access Request for Interstate 65 at Buckner Road Extension in Williamson County (Revision #2)*, dated 01/31/2018, was reviewed. ***This traffic analysis assumes this new interchange and corresponding new road alignments will be completed by Design Year 2040, and was incorporated into the traffic analysis.***

Future development is planned on approximately 775 acres of land, known as the Alexander Farm. The development location is bounded by Buckner Lane to the west, Thompson's Station Road East to the north, Interstate 65 to the east, and extending southward between the schools (Summit High School and Spring Station Middle School) and Interstate 65. Based upon review of the traffic impact study prepared for the 2660 Buckner Lane (or Alexander Farm) development, the full build-out is anticipated to include 2,926 residential dwelling units, 1,281,862 square feet of retail/restaurant, 3,902,250 square feet of office space, and 400 hotel rooms. Full build-out of the development is anticipated by year 2037. ***This traffic analysis assumes the Alexander Farm development will be completed by Design Year 2040, and was incorporated into the traffic analysis.***

Buckner Road is planned to be widened between US-31 and Buckner Lane, a length of approximately 1.9 miles. Based upon review of the *Buckner Road Transportation Study* dated March 2016, Buckner Road will be widened to either three (3) lanes or five (5) lanes, either with a center two-way left-turn lane. ***This traffic analysis assumes the Buckner Road widening will be completed by Design Year 2040, and was incorporated into the traffic analysis.***

Traffic Volume Forecasting

The Design Year 2040 traffic volumes were developed for the weekday AM and weekday PM peak hours by using a combination of new traffic counts, review of previous traffic forecasting efforts during other projects, and engineering judgment using knowledge of the Buckner Lane corridor and the City of Spring Hill. The methodology for developing the Design Year 2040 traffic volumes are below:

- The *Interstate Access Request for Interstate 65 at Buckner Road Extension in Williamson County (Revision #2)*, dated 01/31/2018, provides forecasted traffic volumes for the weekday AM and weekday PM peak hours. Specifically, Figure C14(b) titled "Year 2041 Turning Movement Volumes with New Interchange (Alexander Property Scenario 3)" in the appendix was referenced.
 - This traffic analysis for Buckner Lane considered the same intersection turning movement traffic volumes, without revisions, at the intersections of Buckner Lane at Buckner Road, and Buckner Lane at Duplex Road.
- The traffic impact study for the Wilkerson Place Residential Project, dated April 2018, provides traffic volumes for the intersection of Buckner Lane at Wades Crossing during the weekday AM and weekday PM peak hours. Specifically, Figure 4 titled "Background Peak Hour Traffic Volumes (from the December 2016 Traffic Impact Study for Phases 1 and 2 of the Alexander Property)" within the traffic impact study was referenced.
 - This traffic analysis for Buckner Lane considered the intersection turning movement traffic volumes for the left-turn and right-turn movements at the intersection with Wades Crossing, but disregarded the through movements along Buckner Lane.
- Intersection turning movement traffic counts were collected on Thursday, December 12, 2019 at three (3) intersections along Buckner Lane: at Spring Station Drive, at Stewart Campbell Pointe, and at Twin Lakes Drive. Traffic data was obtained to determine the weekday AM and weekday PM peak hour traffic volumes. In the morning, traffic counts were performed during the 6:30 AM – 8:30 AM timeframe; in the afternoon, the 2:00 PM – 4:00 PM timeframe at Spring Station Drive and at Twin Lakes Drive, and the 4:00 PM – 6:00 PM timeframe at Stewart Campbell Pointe.
 - This traffic analysis for Buckner Lane considered the intersection turning movement traffic volumes for the left-turn and right-turn movements at the intersections with Spring Station Drive, Stewart Campbell Pointe, and Twin Lakes Drive along Buckner Lane, but disregarded the through movements along Buckner Lane.
- For the intersections of Buckner Lane at Wades Crossing, Spring Station Drive, Stewart Campbell Pointe, and Twin Lakes Drive, a 1% annual growth rate was applied (from year 2019 to year 2040) to the left-turn and right-turn movements at these four (4) intersections.

- Traffic volumes were balanced between the six (6) study intersections, and the resulting calculations yielded the through movements along Buckner Lane in both the northbound and southbound directions. For the intersections of Buckner Lane at Wades Crossing, Spring Station Drive, Stewart Campbell Pointe, and Twin Lakes Drive, the left-turn and right-turn movements were adjusted (some increased, some decreased) to apply the volume balancing between intersections.
 - Between Spring Station Drive and Stewart Campbell Pointe, and between Stewart Campbell Pointe and Twin Lakes Drive, a 'zero' volume balance was achieved since there are no trip generators along these segments between the study intersections.
 - Between Duplex Road and Wades Crossing, between Wades Crossing and Spring Station Drive, and between Twin Lakes Drive and Buckner Road, unbalanced volumes were deemed reasonable since there are existing and/or anticipated trip generators along these segments between the study intersections.

Intersection Capacity Analysis

The *Highway Capacity Manual (HCM) 6th Edition* provides insight and guidance on control delay, level of service (LOS), signalized intersection LOS, and unsignalized intersection LOS. The LOS criteria for unsignalized intersections differ somewhat from the criteria for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals.

The intersection capacity analyses were performed using the Synchro 10 software using methodologies provided within the *Highway Capacity Manual (HCM), 6th Edition (HCM 6th Edition)* published by the Transportation Research Board (TRB). Design Year 2040 traffic volumes were analyzed for the weekday AM and weekday PM peak hours.

Table 1 summarizes the intersection capacity analysis results.

Table 1: Design Year 2040 Capacity Analysis Results

| Intersection | Approach | AM Peak Hour | PM Peak Hour |
|------------------------------|------------|--------------|--------------|
| Buckner Lane at Buckner Road | Eastbound | F (233.2) | F (140.9) |
| | Westbound | F (102.0) | F (279.5) |
| | Northbound | F (139.1) | F (80.9) |
| | Southbound | F (90.5) | F (255.3) |
| | Overall | F (154.6) | F (225.5) |

| Intersection | Approach | AM Peak Hour | PM Peak Hour |
|---|------------|--------------|--------------|
| Buckner Lane at Twin Lakes Drive | Westbound | F (91.5) | E (59.9) |
| | Northbound | A (3.1) | A (1.0) |
| | Southbound | A (8.2) | A (1.4) |
| | Overall | B (13.9) | A (7.6) |
| Buckner Lane at Stewart Campbell Pointe | Eastbound | E (56.2) | D (50.1) |
| | Northbound | B (15.9) | A (2.8) |
| | Southbound | A (0.7) | A (1.6) |
| | Overall | B (18.0) | A (4.4) |
| Buckner Lane at Spring Station Drive | Westbound | E (70.6) | D (54.4) |
| | Northbound | C (27.2) | B (13.2) |
| | Southbound | C (21.9) | A (2.2) |
| | Overall | C (30.1) | B (10.1) |
| Buckner Lane at Wades Crossing | Westbound | F (214.0) | D (53.6) |
| | Northbound | A (0.5) | B (19.4) |
| | Southbound | A (3.6) | A (8.7) |
| | Overall | C (29.4) | B (15.2) |
| Buckner Lane at Duplex Road (SR-247) | Eastbound | E (66.0) | F (80.1) |
| | Westbound | F (135.6) | E (79.3) |
| | Northbound | F (94.3) | F (88.1) |
| | Southbound | C (33.1) | D (49.6) |
| | Overall | E (78.3) | E (69.7) |

Intersection Queue Length Evaluation

A queuing analysis was performed using the Synchro 10 software to evaluate and determine the forecasted 50th percentile queue lengths and 95th percentile queue lengths.

Table 2 summarizes the intersection queue length evaluation results.

Table 2: Design Year 2040 Queue Length Results

| Intersection | Approach | AM Peak Hour | | PM Peak Hour | |
|---|------------------|--------------------|--------------------|--------------------|--------------------|
| | | 50 th % | 95 th % | 50 th % | 95 th % |
| Buckner Lane at Buckner Road | Eastbound Left | 147 | 199 | 61 | 97 |
| | Eastbound Thru | ~1073 | #1212 | ~411 | #537 |
| | Eastbound Right | 12 | 34 | 42 | 110 |
| | Westbound Left | ~322 | #438 | ~830 | #967 |
| | Westbound Thru | 295 | 377 | ~1262 | #1398 |
| | Westbound Right | 20 | 45 | 102 | 170 |
| | Northbound Left | ~165 | m#188 | ~163 | #261 |
| | Northbound Thru | ~474 | m#512 | 119 | 214 |
| | Northbound Right | ~278 | m#323 | 56 | 93 |
| | Southbound Left | ~178 | #323 | 117 | #228 |
| | Southbound Thru | 280 | #398 | ~673 | #810 |
| | Southbound Right | 7 | 23 | ~655 | #807 |
| Buckner Lane at Twin Lakes Drive | Westbound Left | 84 | #195 | 192 | #336 |
| | Westbound Right | 216 | 323 | 96 | 147 |
| | Northbound Thru | 658 | #968 | 145 | 276 |
| | Northbound Right | 25 | m36 | 1 | 8 |
| | Southbound Left | ~218 | m181 | 82 | m27 |
| | Southbound Thru | 6 | m5 | 124 | m23 |
| Buckner Lane at Stewart Campbell Pointe | Eastbound Left | 243 | #386 | 38 | 78 |

| Intersection | Approach | AM Peak Hour | | PM Peak Hour | |
|--------------------------------------|------------------|--------------------|--------------------|--------------------|--------------------|
| | | 50 th % | 95 th % | 50 th % | 95 th % |
| | Eastbound Right | 112 | 185 | 103 | 168 |
| | Northbound Left | 14 | m15 | 89 | #214 |
| | Northbound Thru | 113 | m120 | 33 | 81 |
| | Southbound Thru | 227 | m274 | 243 | 539 |
| | Southbound Right | 13 | m38 | 29 | m45 |
| Buckner Lane at Spring Station Drive | Westbound Left | 101 | #228 | 131 | 204 |
| | Westbound Right | 175 | 267 | 70 | 110 |
| | Northbound Thru | 477 | #898 | 33 | 42 |
| | Northbound Right | 9 | m18 | 1 | m0 |
| | Southbound Left | ~269 | #456 | 57 | m97 |
| | Southbound Thru | 64 | 77 | 57 | 62 |
| Buckner Lane at Wades Crossing | Westbound Left | 73 | #149 | 83 | 141 |
| | Westbound Right | 205 | 308 | 34 | 63 |
| | Northbound Thru | 314 | m380 | 142 | m202 |
| | Northbound Right | 6 | m7 | 8 | m21 |
| | Southbound Left | 99 | m163 | 101 | m198 |
| | Southbound Thru | 101 | m118 | 54 | 60 |
| Buckner Lane at Duplex Road (SR-247) | Eastbound Left | 320 | #432 | ~244 | #355 |
| | Eastbound Thru | ~634 | #879 | 228 | 338 |
| | Eastbound Right | 0 | 0 | 0 | 5 |
| | Westbound Left | 20 | 51 | 95 | 159 |
| | Westbound Thru | 178 | #296 | ~510 | #731 |
| | Westbound Right | 235 | #410 | 75 | 141 |
| | Northbound Left | 14 | 34 | 21 | 46 |

| Intersection | Approach | AM Peak Hour | | PM Peak Hour | |
|--------------|------------------|--------------------|--------------------|--------------------|--------------------|
| | | 50 th % | 95 th % | 50 th % | 95 th % |
| | Northbound Thru | ~434 | #651 | ~394 | #607 |
| | Northbound Right | 0 | 0 | 0 | 0 |
| | Southbound Left | 89 | #201 | 89 | #235 |
| | Southbound Thru | 88 | 131 | ~500 | #721 |
| | Southbound Right | 5 | 24 | 114 | 140 |

~ - Volume exceeds capacity, queue is theoretically infinite
 # - 95th percentile volume exceeds capacity, queue may be longer
 m - volume for 95th percentile queue is metered by upstream signal

Conclusion

The following conclusions and recommended improvements are based on the Design Year 2040 traffic volumes, the intersection capacity analyses, and the intersection queue length evaluations.

Buckner Lane Corridor

The following improvements are recommended:

- Widen Buckner Lane to provide four (4) travel lanes: two (2) northbound, and two (2) southbound.

Buckner Lane at Buckner Road

The following improvements are recommended:

- Eastbound Approach:
 - Two (2) left-turn lanes
 - Two (2) through lanes
 - One (1) right-turn lane
- Westbound Approach:
 - Two (2) left-turn lanes
 - Two (2) through lanes
 - One (1) right-turn lane
- Northbound Approach:
 - Two (2) left-turn lanes
 - Two (2) through lanes
 - Two (2) right-turn lanes

- Southbound Approach:
 - Two (2) left-turn lanes
 - Two (2) through lanes
 - One (1) right-turn lane

Buckner Lane at Twin Lakes Drive

The following improvements are recommended:

- Two (2) westbound approach lanes along Spring Station Drive: one (1) left-turn and one (1) right-turn
 - NOTE: There are two (2) existing westbound approach lanes
- Northbound right-turn lane along Buckner Lane
 - NOTE: There is an existing northbound right-turn lane
- Southbound left-turn lane along Buckner Lane
 - NOTE: There is an existing southbound left-turn lane

Buckner Lane at Stewart Campbell Pointe

The following improvements are recommended:

- Two (2) eastbound approach lanes along Stewart Campbell Pointe: one (1) left-turn and one (1) right-turn
 - NOTE: There is one (1) existing eastbound approach lane
- Northbound left-turn lane along Buckner Lane
 - **NOTE: The available storage length for vehicle queuing between Stewart Campbell Pointe and Spring Station Drive is approximately 425 feet. However, this distance is forecasted to be insufficient for one (1) center two-way left-turn lane to accommodate the northbound left-turn queuing at Stewart Campbell Pointe and the southbound left-turn queuing at Spring Station Drive. Separate (i.e. side-by-side) left-turn lanes should be considered along Buckner Lane, to provide each left-turn movement with up to 425 feet of storage.**
- Southbound right-turn lane along Buckner Lane

Buckner Lane at Spring Station Drive

The following improvements are recommended:

- Two (2) westbound approach lanes along Spring Station Drive: one (1) left-turn and one (1) right-turn
 - NOTE: There are two (2) existing westbound approach lanes
- Northbound right-turn lane along Buckner Lane
 - NOTE: There is an existing northbound right-turn lane
- Southbound left-turn lane along Buckner Lane
 - NOTE: There is an existing southbound left-turn lane
 - **NOTE: The available storage length for vehicle queuing between Stewart Campbell Pointe and Spring Station Drive is approximately 425 feet. However, this distance is forecasted to be insufficient for one (1) center two-way left-turn lane to accommodate the northbound left-turn queuing at Stewart Campbell Pointe and the southbound left-turn queuing at Spring Station Drive. Separate (i.e. side-by-side) left-turn lanes should be considered along Buckner Lane, to provide each left-turn movement with up to 425 feet of storage.**

Buckner Lane at Wades Crossing

The following improvements are recommended:

- Two (2) westbound approach lanes along Wades Crossing: one (1) left-turn and one (1) right-turn
 - NOTE: There is one (1) existing westbound approach lane
- Northbound right-turn lane along Buckner Lane
 - NOTE: There is an existing northbound right-turn lane
- Southbound left-turn lane along Buckner Lane

Buckner Lane at Duplex Road (SR-247)

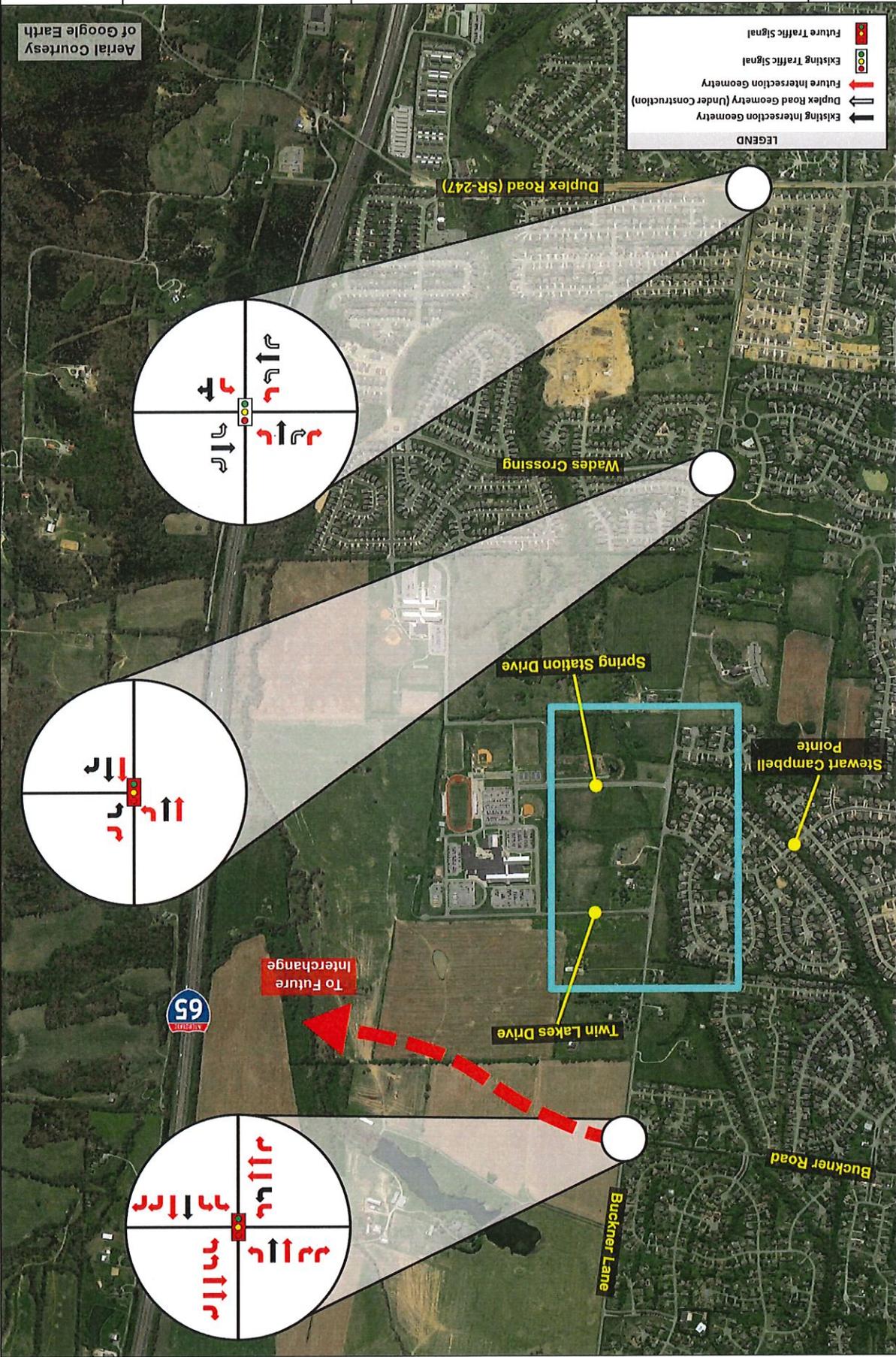
The Duplex Road widening project that is currently under construction will provide the following improvements:

- Eastbound left-turn lane along Duplex Road
- Eastbound right-turn lane along Duplex Road
- Westbound left-turn lane along Duplex Road
- Westbound right-turn lane along Duplex Road
- Southbound right-turn lane along Buckner Lane (existing approach lane will function as a shared left-turn / through lane)

In addition to the above improvements that are currently under construction, the following improvements are recommended:

- Additional eastbound left-turn lane along Duplex Road, to provide two (2) eastbound left-turn lanes
 - NOTE: This would require widening the west leg of Duplex Road.
- Northbound left-turn lane along Buckner Lane (existing approach lane would function as a shared through / right-turn lane)
 - NOTE: This would require widening the south leg of Buckner Lane
- Southbound left-turn lane along Buckner Lane
- Additional southbound right-turn lane along Buckner Lane, to provide two (2) southbound right-turn lanes
 - NOTE: This will require widening the west leg of Duplex Road to provide two (2) westbound receiving lanes.
 - ALTERNATIVE: Instead of providing two (2) southbound right-turn lanes, one (1) southbound right-turn lane operating under 'free flow' conditions could be considered as an alternative. However, this would still require another westbound receiving lane along Duplex Road.

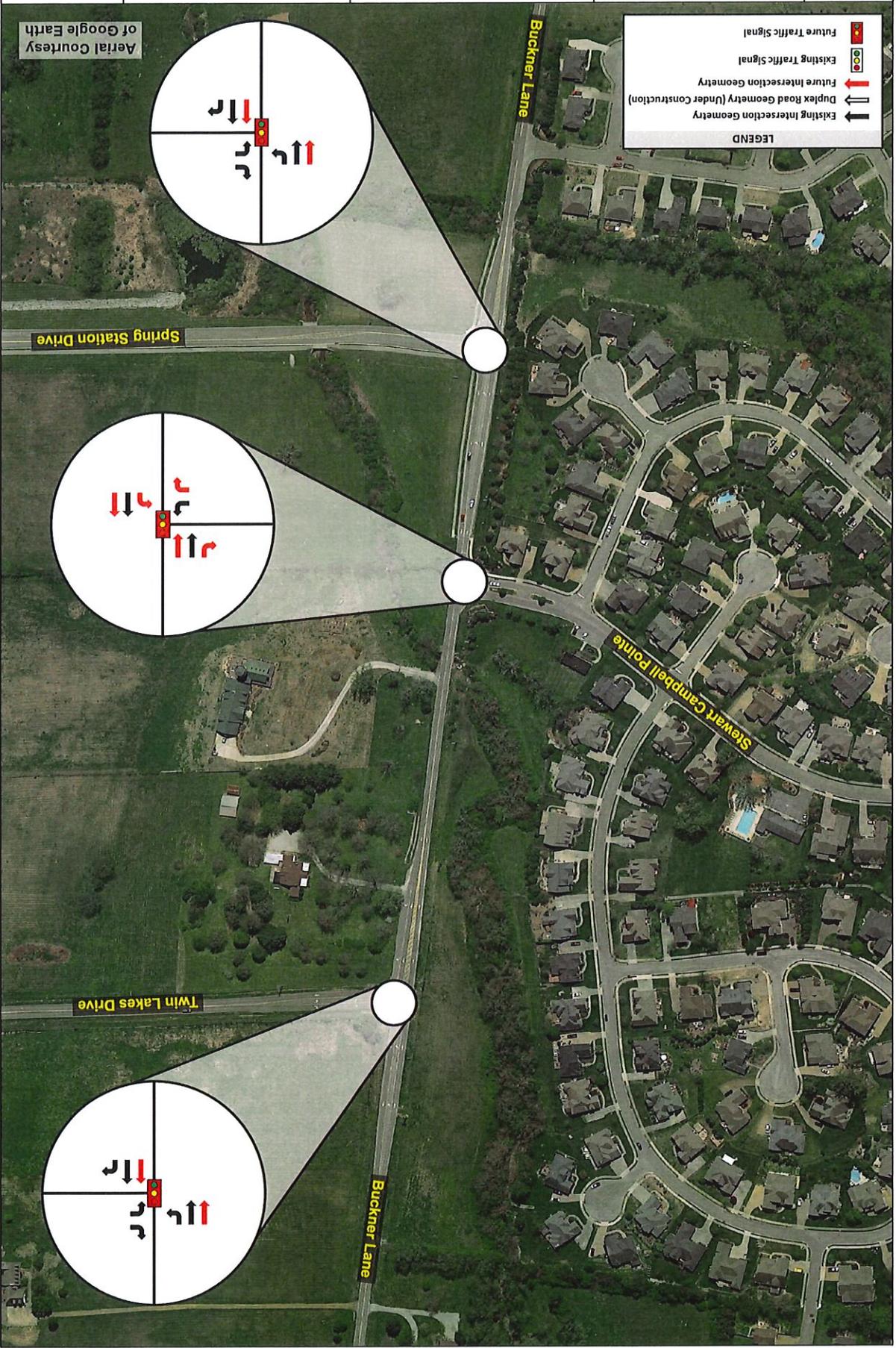
Attachments: Figure 1A and Figure 1B – Design Year 2040 Intersection Geometry
Figure 2A and Figure 2B – Design Year 2040 Intersection Traffic Volumes
Traffic Volume Forecast Calculations
HCM6 Reports and Queue Reports



Aerial Courtesy
of Google Earth

LEGEND

- Future Traffic Signal
- Existing Traffic Signal
- Future Intersection Geometry
- Existing Intersection Geometry
- Duplex Road Geometry (Under Construction)



Aerial Courtesy
of Google Earth

