ALLEN FOSSIL PLANT ASH IMPOUNDMENT CLOSURE

TRAFFIC MANAGEMENT PLAN

Shelby County, Tennessee

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Tennessee Valley Authority (TVA)

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ACRONYMS AND ABBREVIATIONS

ALF	Allen Fossil Plant
CCR	Coal combustion residuals
COVID-19	Coronavirus Disease of 2019
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
HCM	Transportation Research Board Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MDOT	Mississippi Department of Transportation
NEPA	National Environmental Policy Act
STIP	State Transportation Improvement Plan
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Plan
TVA	Tennessee Valley Authority
USACE	United States Army Corps of Engineers

Executive Summary

The Tennessee Valley Authority (TVA) has developed a traffic management plan for the Allen Fossil Plant (ALF) Ash Impoundment Closure project. The purpose of the traffic management plan is to assess and quantify in detail the effects of traffic generated by the proposed ALF impoundment closure project and provide mitigation recommendations for specific locations that would experience a moderate to large impact.

As identified in the ALF Ash Impoundment Closure Final Environmental Impact Statement (FEIS) (TVA 2020), traffic generated from impoundment closure activities at ALF include workforce traffic, truck traffic associated with hauling coal combustion residuals (CCR) to offsite existing landfills, and the transport of borrow materials from existing, permitted borrow sites within a 30-mile radius of ALF. The exact origin of workforce traffic is unknown and is assumed to be distributed throughout the greater Memphis area.

The roadway network in this study includes suburban and rural settings. As such, the baseline condition of the network was determined by the capacity of the potentially affected intersections. The study area includes 46 intersections identified as key locations along the haul routes to and from ALF to the potential landfill and borrow sites. Individual turning movements at each intersection were analyzed to provide a complete assessment of the conditions.

In general, the traffic network operates adequately under existing conditions. However, four locations within the study area currently experience capacity issues. Traffic scenarios proposed in the 2020 FEIS and associated with the ash impoundment closure project would result in moderate impacts to two of the intersections that currently experience capacity issues. One of these intersections is Paul R. Lowry Road at Plant Road, which provides primary access to ALF, and the other is Malone Road at East Holmes Road near an off-site landfill location. In the future, once the ALF Decontamination and Deconstruction Project (ALF D4) begins, the associated additional traffic would result in moderate to large impacts to two intersections within the study area. These intersections include Paul R. Lowry Road at Plant Road, which provides primary access to ALF, and Paul R. Lowry Road at Hyosung Entrance Drive east of ALF. These additional impacts would occur during the 18-month period when traffic associated with ash impoundment closure and ALF D4 activities overlap.

Mitigative measures identified in the traffic management plan include development of alternate access routes to ALF to improve traffic conditions and promote increased efficiency and the use of existing alternate routes that avoid impacted intersections to access the South Shelby Landfill. Transport of CCR to the Tunica Landfill would result in minor impacts to local roadways, and therefore, no mitigative measures were identified. Given current pavement conditions, an alternate route was also identified for access to the Shelby/Sewanee borrow site that would result in a minor change in the traffic pattern, and the traffic impact would remain minor.

Based on actual traffic data counts, traffic impacts to the southbound left turn movement at Paul R. Lowry Road and the Hyosung Entrance Drive are estimated to be minor. However, impacts to this intersection associated with ALF impoundment closure traffic combined with ALF D4 activities would be moderate for an estimated 18-month period. Since this is a privately owned driveway, any mitigation steps would involve coordination with Hyosung.

There would be construction costs for intersection improvements for the proposed alternate access routes to ALF. No other substantial mitigation costs are anticipated at this time.

1.0 INTRODUCTION

As identified in the Allen Fossil Plant (ALF) Ash Impoundment Closure Final Environmental Impact Statement (FEIS) (TVA 2020), the Tennessee Valley Authority (TVA) committed to developing a traffic management plan. Wood was contracted by TVA to develop this plan.

Specific objectives to be accomplished by this analysis include the following:

- Obtain detailed traffic data within the potentially affected roadway network to establish baseline conditions.
- Assess traffic impacts associated with the proposed transport of coal combustion residuals (CCR) and borrow materials on established haul routes.
- Identify and prioritize key roadway network locations and key intersections exhibiting adverse project-induced conditions.
- Identify potential traffic mitigation measures such as intersection improvements, traffic signal timing changes, temporary traffic signals, signing, striping, and lane configuration changes.
- If required, identify secondary access routes and locations.

1.1 Purpose

The purpose of the traffic management plan is to assess and quantify in detail the effects of traffic generated by the proposed ALF impoundment closure project. This study builds on the findings of the 2020 FEIS by developing a more detailed analysis of traffic data to identify impacted areas and develop mitigation recommendations. Traffic generated from impoundment closure activities at ALF include workforce traffic, truck traffic associated with hauling CCR to offsite existing landfills, and the transport of borrow materials from existing, permitted borrow sites. Borrow sites and landfills evaluated in this study are identified in Table 1-1 and shown on Figure 1-1. The exact origin of workforce traffic is unknown and is assumed to be distributed throughout the greater Memphis area.

Table 1-1. Landfills and Borrow Sites Evaluated

Facility	Distance to ALF
South Shelby Landfill	14 miles
Tunica Landfill	20 Miles
Weaver Road Borrow Site	9.6 miles
Shelby/ Sewanee Borrow Site	12.2 miles
Highway 301 Borrow Site	12.4 miles
OB Borrow Site	22.0 miles

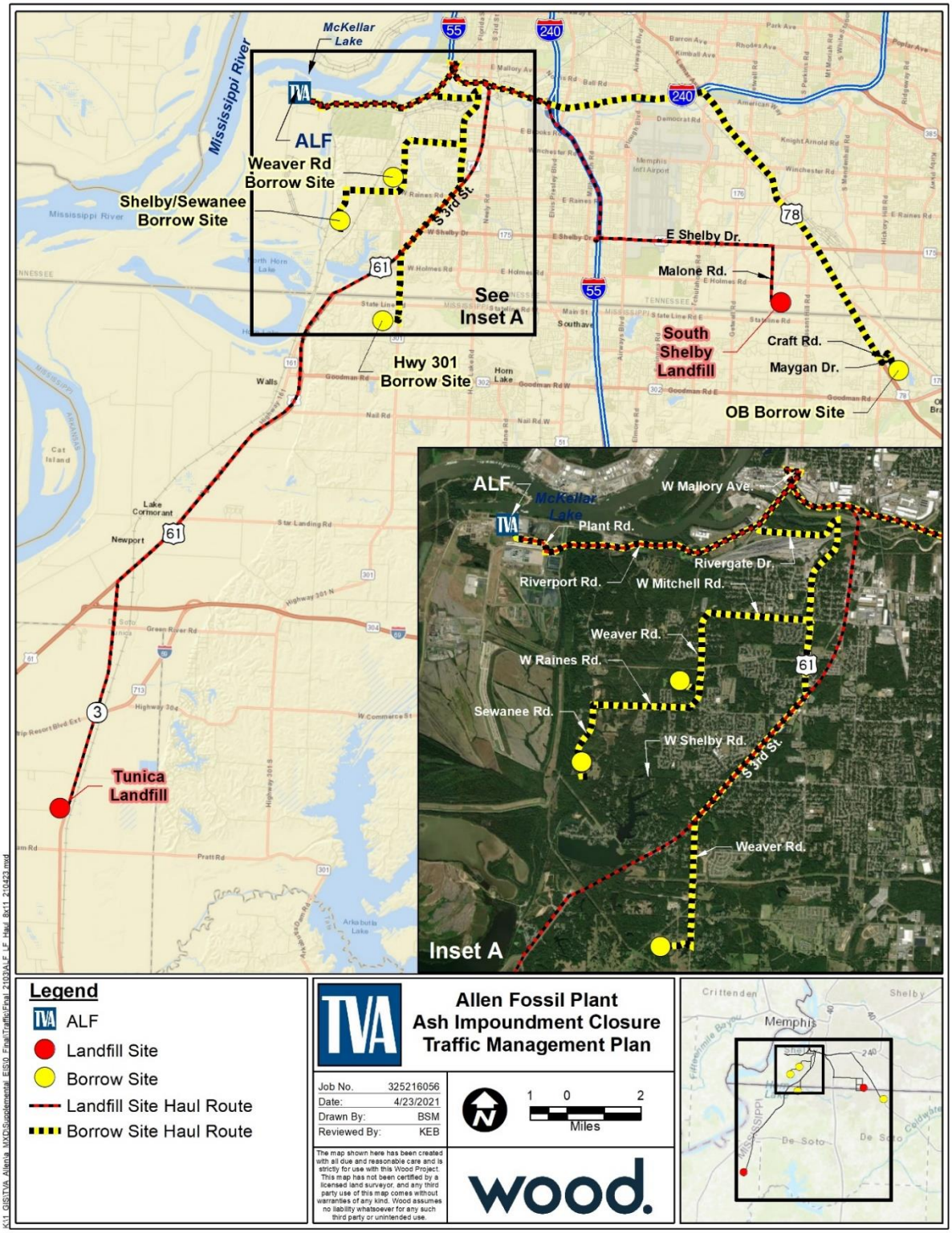

Figure 1-1. Landfill and Borrow Site Locations

1.2 Description of the Study Area

ALF is located in Shelby County, southwest of Memphis, Tennessee. The plant was constructed in the 1950s by the Memphis, Light, Gas, and Water Division and is located on the south bank of McKellar Lake and east of the Mississippi River, on land protected from flooding by an existing United States Army Corps of Engineers (USACE) levee system. TVA purchased the plant and the underlying property in 1984. ALF's three coal-fired units were retired on March 31, 2018.

The study area for this analysis encompasses the roadway network within the vicinity of ALF that would be used to access the borrow sites and landfills identified in Table 1-1 and Figure 1-1. It is assumed that once traffic has reached a high-capacity roadway such as Interstate 55 or US 61, the capacity of such roadways is sufficient such that any impact from the ALF traffic would be insignificant. However, selected intersections on the high-capacity roadways within the study area were analyzed to assess potential impacts based on input from local TVA staff and other sources.

The roadway network in this study includes a number of intersections in a suburban setting and two intersections in a rural setting on the route to the Tunica landfill. As such, the baseline condition of the network was determined by the capacity of the potentially affected intersections. The study area includes 46 intersections identified as key locations along the haul routes to the landfill and borrow sites. Individual turning movements at each intersection were analyzed to provide a complete assessment of the conditions at each of these intersections. A description of the intersections analyzed is shown in Table 1-2.

Table 1-2. Study Area Intersections

Intersection	Description
Paul R. Lowry Road at West Mallory Avenue	Signalized 4-Leg Intersection
West Mallory Avenue at Interstate 55 Ramps	Signalized Single Point Urban Interchange
New Horn Lake Road at West Peebles Road	Signalized 4-Leg Intersection
New Horn Lake Road at West Brooks Road	Signalized 4-Leg Intersection
New Horn Lake Road at West Mitchell Road	Signalized 4-Leg Intersection
New Horn Lake Road at West Levi Road	Signalized 4-Leg Intersection
New Horn Lake Road at US61/South 3rd Street	Signalized 4-Leg Intersection
Weaver Road at US61/South 3rd Street	Signalized 4-Leg Intersection
West Raines Road at Weaver Road	Unsignalized 4-Leg Intersection (Four Way Stop)
West Mitchell Road at Weaver Road	Unsignalized 4-Leg Intersection (Four Way Stop)
West Mitchell Road at Rochester Road	Unsignalized 4-Leg Intersection (Four Way Stop)
Weaver Road at West Shelby Drive	Unsignalized 4-Leg Intersection (Four Way Stop)
Weaver Road at West Holmes Road	Unsignalized 4-Leg Intersection (Four Way Stop)
Weaver Road at Stateline Road	Unsignalized 4-Leg Intersection (Four Way Stop)
Paul R. Lowry Road at Valero Entrance Drive	Unsignalized T Intersection (One Way Stop)
Paul R. Lowry Road at North Rivergate Road	Unsignalized T Intersection (One Way Stop)
Paul R. Lowry Road at Hyosung (formerly	Unsignalized T Intersection (One Way Stop)

Intersection	Description
Mitsubishi) Entrance Drive	
Paul R. Lowry Road at Rivergate Road	Unsignalized T Intersection (One Way Stop)
New Horn Lake Road at Rivergate Road	Unsignalized T Intersection (One Way Stop)
Paul R. Lowry Road at USACE Ensley Engineer Yard Entrance Drive	Unsignalized T Intersection (One Way Stop)
West Mitchell Road at Ford Road	Unsignalized T Intersection (One Way Stop)
West Mitchell Road at Daggett Road	Unsignalized T Intersection (One Way Stop)
Weaver Road at Fields Road	Unsignalized Four Leg Intersection (Two Way Stop)
Weaver Road at Canary Lane	Unsignalized T Intersection (One Way Stop)
Weaver Road at West Levi Road	Unsignalized T Intersection (One Way Stop)
Weaver Road at Norfleet Avenue	Unsignalized T Intersection (One Way Stop)
Weaver Road at Western Park Drive	Unsignalized Four Leg Intersection (Two Way Stop)
Weaver Road at Parkrose Road	Unsignalized Four Leg Intersection (Two Way Stop)
Paul R. Lowry Road at Plant Road/Buoy Street	Unsignalized Four Leg Intersection (Two Way Stop)
West Raines Road at Sewanee Road	Unsignalized T Intersection (One Way Stop)
West Raines Road at Double Tree Road	Unsignalized Four Leg Intersection (Two Way Stop)
West Horn Lake Road at West Mitchell Road	Unsignalized Four Leg Intersection (Two Way Stop)
Paul R. Lowry Road at Plant Road (South)	Unsignalized T Intersection (One Way Stop)
Plant Road at ALF Entrance Drive	Unsignalized T Intersection (One Way Stop)
East Shelby Drive at I-55 Southbound Off Ramp	Ramp Merge
East Shelby Drive at I-55 Northbound On Ramp	Ramp Diverge
East Shelby Drive at I-55 Northbound Off Ramp	Signalized T Intersection
East Shelby Drive at Getwell Road	Signalized 4-Leg Intersection
East Shelby Drive at Malone Road	Signalized 4-Leg Intersection
Malone Road at East Holmes Road	Unsignalized 4-Leg Intersection (Four Way Stop)
East Holmes Road at Getwell Road	Signalized 4-Leg Intersection
Stateline Road at Tchulahoma Road	Signalized Offset T Intersection
Stateline Road at Getwell Road	Signalized 4-Leg Intersection
Stateline Road at Malone Road	Unsignalized 4-Leg Intersection (Four Way Stop)
US 61 at Mississippi 3	Unsignalized Four Leg Intersection (Two Way Stop)
Mississippi 3 at Hambrick Road	Unsignalized Four Leg Intersection (Two Way Stop)

2.0 DATA COLLECTION

2.1 Traffic Count Data

Current intersection count data and point counts were collected at key intersections within the study area in September 2020 and supplemental counts were collected in February 2021. Traffic counts were collected on an average weekday (Tuesday, Wednesday, or Thursday) over a 12- to 24-hour period at the intersections listed in Table 2-1.

Other data collection consisted of documentation of roadway classifications, incorporation of prior TVA traffic analysis (TVA 2016), the 2020 FEIS (TVA 2020), and relevant data from the Tennessee Department of Transportation (TDOT) Traffic Data Management System and the Mississippi Department of Transportation (MDOT) Traffic Count Application. Intersection configurations were collected from aerial imagery and verified in a field review. In addition, the City of Memphis provided data regarding timing of traffic signals in the network, and historic traffic counts at some intersections.

Table 2-1. Traffic Count Data Collection

Intersection/Location	Type of Count Performed	Count Date
Primary Route - ALF Plant to Rivergate		
Paul R. Lowry TDOT Count Location (near Hyosung Entrance Drive)	Point Count for COVID-19 Calibration	September 23, 2020
Paul R. Lowry Road at Plant Road/Buoy Street	Intersection Count	February 4, 2021
Paul R. Lowry Road at Hyosung (formerly Mitsubishi) Entrance Drive	Intersection Count	February 4, 2021
Borrow Site and Landfill Routes		
Rivergate Road at New Horn Lake Road	Intersection Count	September 23, 2020
New Horn Lake Road at West Peebles Road	Intersection Count	September 23, 2020
New Horn Lake Road at West Brooks Road	Intersection Count	September 24, 2020
New Horn Lake Road at West Mitchell Road	Intersection Count	September 23, 2020
West Mitchell Road at West Horn Lake Road	Intersection Count	September 23, 2020
West Mitchell Road at Rochester Road	Intersection Count	September 23, 2020
West Mitchell Road at Ford Road	Intersection Count	September 23, 2020
West Mitchell TDOT Count Site (east of Weaver Road)	Point Count for COVID-19 Calibration	September 23, 2020
West Mitchell Road at Weaver Road	Intersection Count	
Weaver TDOT Count Site (near Fields Road)	Point Count for COVID-19 Calibration	September 23, 2020
Weaver at West Raines Road	Intersection Count	

Intersection/Location	Type of Count Performed	Count Date
West Raines TDOT Count Site (west of Weaver Road)	Point Count for COVID-19 Calibration	September 23, 2020
West Raines Road at Sewanee Road	Intersection Count	September 23, 2020
Weaver Road at West Shelby Drive	Intersection Count	September 23, 2020
Weaver Road at US 61/S 3rd Street	Intersection Count	September 23, 2020
Weaver Road at West Holmes Road	Intersection Count	September 23, 2020
Weaver Road at Stateline Road	Intersection Count	September 23, 2020
Malone Road at East Holmes Rd	Intersection Count	September 23, 2020
New Horn Lake Road at West Levi Road	Intersection Count	September 23, 2020
New Horn Lake Road at US61/S 3rd Street	Intersection Count	September 23, 2020
East Holmes Road at Getwell Road	Intersection Count	February 4, 2021
Stateline Road at Tchulahoma Road	Intersection Count	February 4, 2021
Stateline Road at Getwell Road	Intersection Count	February 4, 2021
Stateline Road at Malone Road	Intersection Count	February 4, 2021

The Coronavirus Disease of 2019 (COVID-19) pandemic has created a significant reduction in traffic volumes in most areas. Therefore, traffic counts obtained in September 2020 and February 2021 were calibrated to represent pre-COVID-19 data or equivalency. The study used the following measures to address this issue and develop a representation of "normal" conditions based on methods that are standard practice in traffic engineering studies:

- Use of historic pre-COVID-19 actual traffic counts where available. Traffic counts that were more than approximately one year old were factored based on regional and local growth factors.
- Use of Institution of Transportation Engineers (ITE) Trip Generation traffic estimates for driveways and roads that service a confined and defined area (e.g., commercial facility driveways, subdivision streets) where current field collected traffic counts are not available. ITE Trip Generation data is representative of pre-COVID-19 conditions.
- Use of field collected current traffic counts with COVID-19 scaling factors. Traffic count data collected at TDOT Count Site locations shown in Table 2-1 were compared to the most recent pre-COVID-19 count data obtained from TDOT to develop scaling factors for the collected count.

Existing traffic data were estimated for those areas where other data was not available. The following assumptions were used to estimate traffic data for these areas:

- Growth factors were derived from historic count data in the TDOT Traffic Data Management System. Note that some areas experienced a reduction in traffic.
- Where available, actual peak hour factors and heavy vehicle percentages were used. These

percentages are as follows:

- A Peak Hour Factor of 0.92
- A heavy vehicle factor of 2 percent

2.2 Field Review

A field review of the study area was performed from February 8 – 12, 2021. The purpose of the review was to validate initial modeled conditions and determine if additional information was needed to thoroughly assess traffic impacts associated with ash pond closure at ALF. Observations and conclusions from the review include:

- During peak and off-peak times, traffic was found to be generally consistent with the initial analysis.
- Visual observations were conducted at intersections where initial traffic count data were estimated to determine if actual count data were needed to more accurately identify traffic counts in those areas.
- Six locations were identified where additional actual traffic count data would be obtained. All traffic count locations including the initial locations (September 2020) and these supplemental locations (February 2021) are shown in Table 2-1.
- Additional routing options were identified that are described later in this report.

2.3 Road Construction

In order to determine if future road improvement project would affect findings of this study, State Transportation Improvement Plans (STIP) developed for both Tennessee and Mississippi (TDOT 2019; MDOT 2020), as well as the Transportation Improvement Plan (TIP) for the Memphis Urban Area (Memphis MPO 2021), were reviewed. These plans are developed by the state and/or regional planning organization and identify projected transportation improvement projects over a three-year period.

No planned improvement projects were identified for any of the proposed routes. One construction project was identified in the Tennessee STIP in the area around the South Shelby Landfill. The purpose of the project is to improve US 78 (Lamar Avenue) from the Mississippi state line to Getwell Road. This project is currently ongoing and the construction of the last phase of the Lamar Road project is forecasted to begin in Fall 2023; no completion date is forecasted at this time (TDOT 2021). This project will not affect the proposed haul route to the South Shelby Landfill, but once complete, the improved US 78 may offer an additional route option for the trucking to the South Shelby Landfill.

3.0 TRAFFIC MODELING AND ANALYSIS

3.1 Description

Traffic analysis modeling was completed using Synchro 10 software, which follows Transportation Research Board Highway Capacity Manual (HCM) practices that are considered the national standard. For the analysis, Synchro traffic models were created to represent three scenarios: 1) existing conditions, 2) traffic conditions identified in the 2020 FEIS (TVA 2020), and 3) ALF Decontamination and Deconstruction Project (ALF D4) traffic identified in an Environmental Assessment (EA) published in October 2019 (TVA 2019). This project was included in the analysis as traffic generated by demolition and deconstruction of the ALF fossil plant may overlap with ash closure activities which could contribute to cumulative impacts to the local transportation network. The following assumptions were factored into the development of the Synchro traffic models:

- Typically, only the AM and PM peak periods were analyzed for the capacity analysis. Peak periods are defined as 7AM to 8AM and 4PM to 5PM. Peak periods were defined based upon traffic count data. At some locations the off-peak period was analyzed which is defined as the lunch hour of 12PM to 1PM.
- The study area road network includes numerous driveways and subdivision streets. Any roadways or driveways that serviced less than 50 homes, and a small number of minor traffic generators (e.g., small offices), were not included in the analysis.

Two measures of performance were used for this study: Average vehicle delay (measured in seconds of delay) for each traffic movement and Level of Service (LOS). Average delay provides a measurement of what drivers experience at intersections. For this analysis, the assessment of impacts associated with the proposed transport of CCR and borrow material is based on the criteria shown in Table 3-1.

Table 3-1. Criteria for Impact Assessment

Impact Category	Criteria
Minor impact	Any increase in delay of ten seconds or less
Moderate impact	An increase in delay between 10 and 20 seconds, or an increase in delay greater than 20 seconds at intersections that are currently over capacity
Large impact	Increased delays of greater than 20 seconds or increases in delay of greater than 60 seconds at intersections that are currently over capacity

A delay increase of approximately 10 seconds or less in urban or suburban settings is generally not noticed by most drivers. Additionally, while large impacts would typically be considered increased delays of 20 seconds or greater, the intersections in the study area where delays of this duration are predicted are currently over capacity, resulting in a highly congested situation. Therefore, impacts for such intersections are considered moderate even though the increase in delay is greater than 20 seconds. Increases in delay that exceed 20 seconds at interchanges that

are not over capacity would be considered a large impact. In addition, increases in delay of greater than 60 seconds at interchanges that are currently over capacity is also considered a large impact, as these delays would impair traffic movement in these highly congested areas.

LOS estimates the average amount of delay that traffic experiences and can be expressed on a per-movement basis (i.e., northbound left, northbound through, northbound right, etc.) or as a single value for the entire intersection. LOS of "E" or "F" is considered undesirable, indicating operations with excessive delays and at or over capacity. LOS "D" typically represents adequate operation but may need review. In general, LOS of "C" or better represents satisfactory operation.

Intermittent delays that may occur at intersections with at-grade rail crossings were not factored into the model analysis.

3.2 Existing Conditions

The objective of the analysis of existing conditions is to develop a basis for the traffic impact analysis for proposed conditions and identify any existing problem areas.

In general, the study area network operates adequately in the existing condition, with only a few intersections with capacity issues (i.e., operate at a LOS D or below). These intersections are described in Tables 3-2 and 3-3. LOS of intersections modeled within the study area are shown on Figure 3-1.

Table 3-2. Intersections Currently Operating at LOS D or Below – AM Peak

Intersection	Movement	LOS
Paul R. Lowry Road at Valero Entrance Drive	Southbound Left	D
New Horn Lake Road at US61/South 3rd Street	Northbound Right and Westbound Left	D
Malone Street and East Holmes Road	Northbound (all)	E
Malone Street and East Holmes Road	Eastbound (Through/Left) and Westbound (All)	F

Table 3-3. Intersections Currently Operating at LOS D or Below – PM Peak

Intersection	Movement	LOS
Paul R. Lowry Road at Valero Entrance Drive	Southbound Left	D
Paul R. Lowry Road at North Rivergate Road	Southbound Left/Right	D
Paul R. Lowry at USACE Ensley Engineer Yard Entrance Drive	Southbound Left/Right	D
I-55 Northbound Off Ramp at East Shelby Drive	Northbound Right	D
East Shelby Drive at Getwell Road	Eastbound Through/Right, Westbound Through/Right, Northbound Left, Northbound Through/Right, Southbound Left and Southbound Through	D
East Shelby Drive at Malone Street	Northbound Left, Northbound Through, Southbound Left and Southbound Through	D
New Horn Lake Road at West Mitchell Road	Northbound Left	E
New Horn Lake Road at US61/South 3rd Street	Westbound Left	E
Malone Road at East Holmes Road	Southbound (all)	E
Paul R. Lowry Road at Hyosung (formerly Mitsubishi) Entrance Drive	Southbound Left	D
Malone Street and East Holmes Road	Eastbound (Through/Left) and Westbound (All)	F

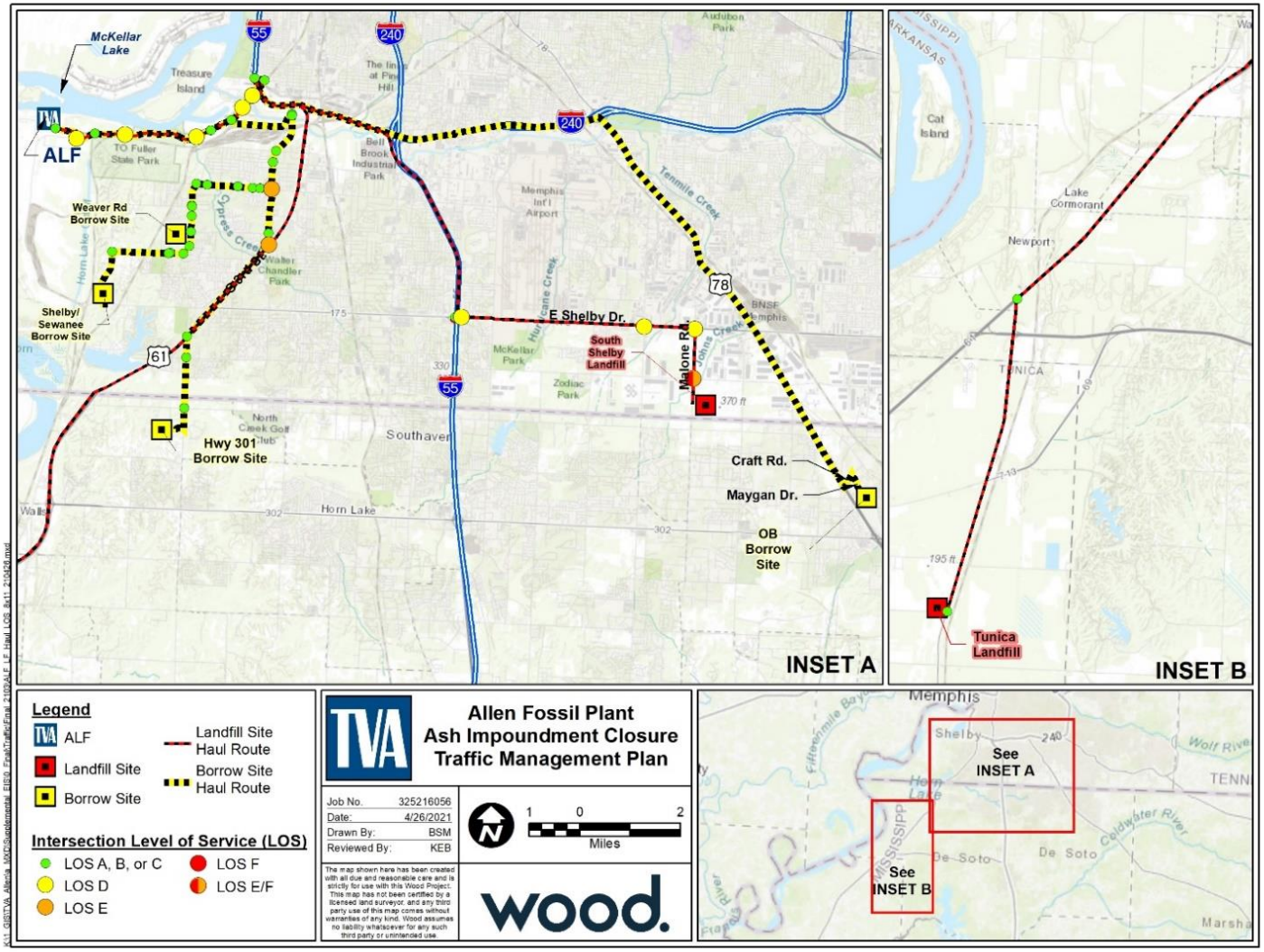

Figure 3-1. LOS of Intersections Modeled in the Study Area

4.0 TRAFFIC IMPACT OF CLOSURE OF THE ASH IMPOUNDMENTS AT ALF

The proposed workforce and trucking traffic associated with closure of the ash impoundments at ALF, as studied in the 2020 FEIS, were added to the existing traffic counts. The following are the workforce and trucking rates evaluated in the FEIS:

- Maximum workforce traffic of 100 employees per day
- Maximum rate of trucking of CCR from ALF to an offsite landfill of 120 truckloads (240 truck trips) per day
- Maximum rate of trucking of borrow material to ALF of 116 truckloads (232 truck trips) per day

The analysis centered on the following geographic areas:

- **Access to ALF.** This area includes Plant Road to Paul R. Lowry Road, Paul R. Lowry Road from ALF to Mallory Street, Rivergate Drive, and Mallory Street at Interstate 55 (I-55).
- **Access to Borrow Sites.** This area includes haul route to the Weaver Road borrow site, the Shelby Sewanee borrow site, and the Highway 301 borrow site. This area was identified for further study as it includes residential areas to the south of ALF. This area is bounded by West Peebles Road in the north, New Horn Lake Road in the east, Sewanee Road in the west, and Stateline Road in the south.
- **Access to the South Shelby Landfill.** This area includes all potential routes to access the South Shelby Landfill from I-55.
- **Access to the Tunica Landfill.** This area includes the route to access the Tunica Landfill. The northern section of this route uses Paul R. Lowry Road to I-55 along with other ALF traffic and is included in that analysis. The route departs from I-55 at US 61 and the trucks travel into Mississippi, turning onto Mississippi Route 3, then to Hambrick Road to access the Tunica Landfill.

The traffic capacity model developed for the 2020 FEIS workforce and trucking traffic was compared to the model of existing conditions for each of the above areas. Both LOS and average delay (in seconds) for each movement were analyzed.

In general, the traffic capacity model for the 2020 FEIS identified minor impacts except for two intersections, Paul R. Lowry Road at Plant Road/Buoy Street and Malone Road at East Holmes Road. Based on these model results, the haul routes identified in the FEIS (See Figure 1-1) were analyzed to determine impacts and the need for mitigation.

4.1 Access to the Allen Fossil Plant

Paul R. Lowry Road (also known as Riverport Road) is the main east-west roadway to ALF and the Frank C. Pidgeon Industrial Park. Access to this roadway from I-55 is provided by two interchanges. One is at West Mallory Avenue (a single-point urban interchange), and the other is a partial (half-diamond) interchange at Kansas Street. The I-55 interchange at Kansas Street was not identified as a haul route to be analyzed in this study. Rivergate Drive provides access between Kansas Street

and Paul R. Lowry Road (also known as Riverport Road). From West Mallory Avenue, Paul R. Lowry Road varies from two to four lanes, whereas Rivergate Drive is a two-lane facility. Direct access to ALF is provided by Plant Road via Paul R. Lowry Road.

4.1.1 Paul R. Lowry Road

As shown in Tables 3-2 and 3-3, the following intersections along Paul R. Lowry Road currently operate at LOS D during peak traffic:

- Paul R. Lowry Road at Valero Entrance Drive
- Paul R. Lowry Road at North Rivergate Road
- Paul R. Lowry at USACE Ensley Engineer Yard Entrance Drive
- Paul R. Lowry Road at Hyosung (formerly Mitsubishi) Entrance Drive

The proposed workforce and trucking traffic associated with closure of the ash impoundments at ALF, as studied in the 2020 FEIS, would have a minor impact associated with delays at these intersections.

4.1.2 Direct Access to ALF

As stated above, the primary direct access to ALF is provided via Plant Road and Paul R. Lowry Road. As shown on Table 4-1, the addition of the ALF truck and workforce traffic from the 2020 FEIS results in a moderate impact for the southbound left turn from Plant Road onto Paul R. Lowry Road.

Additionally, the existing intersection lacks a sufficient right turn radius to accommodate coincident movements of large trucks from both southbound left turn (from Plant Road onto Paul R. Lowry Road) and westbound right turn (from Paul R. Lowry Road onto Plant Road). Under the existing condition, westbound right turning trucks may have to wait for a break in the southbound left turn traffic before they can turn, causing them to slow or stop on Paul R. Lowry Road. This slowed or stopped condition creates some potential exposure of vehicles leaving Plant Road to high-speed through traffic on Paul R. Lowry Road. This condition exists under current operating traffic but is expected to be exacerbated with the addition of increased operational traffic identified in the 2020 FEIS. Importantly, while this issue primarily occurs under some conditions (notably, AM and PM peak conditions), westbound through traffic can pass in the left lane on Paul R. Lowry Road without any delay or reduction in service.

Table 4-1. 2020 FEIS Traffic Scenario Model Results – Access to ALF

		AM Peak			PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Paul R. Lowry Road at Plant Road/Buoy Street	Southbound Left	B	13	1	D	32	12	Moderate
Paul R. Lowry Road at Plant Road/Buoy Street (Without Right Turn Improvements)	Westbound Right	B	14	1	B	12	1	Minor

(S) = seconds

4.1.3 Alternate Access to the Allen Fossil Plant

A mitigative option to address traffic accessing the plant is the development of an alternate routing of ALF-related traffic. This circular route would provide one-way traffic for ALF trucking and workforce traffic. This route has two options (Circle Route Options 1 and 2), as shown in Figure 4-1.

- **Option 1 (Proposed Connector Road Development – Inbound Traffic)** – Circle Route Option 1 includes development of a connector road from Paul R. Lowry Road to an old access road that is currently a dead end to provide inbound access to ALF (Figure 4-2). This option would move all inbound ALF traffic away from the Paul R. Lowry Road at Plant Road/Buoy Street intersection and would both avoid conflicts at this intersection and would minimize access delays.
- **Option 2 (Proposed Right Turn Improvement – Inbound Traffic)** – Circle Route Option 2 uses the Paul R. Lowry Road at Plant Road/Buoy Street intersection for inbound traffic (westbound right turn from Paul R. Lowry Road). This is the same route that is currently used for access to ALF. However, Circle Route Option 2 includes an improvement to the westbound right turn from Paul R. Lowry Road onto Plant Road. The proposed mitigation consists of the construction of an appropriate westbound right turn lane designed for the speeds on Paul R. Lowry Road as defined in applicable city, state and/or national standards. A sketch of this proposed improvement is shown in Figure 4-3.
- **Options 1 and 2 (Proposed West Exit Improvement – Outbound Traffic)** – Under both Options 1 and 2, outbound traffic would use the western section of the loop to return to Paul R. Lowry Road. Improvements to the existing and lightly used intersection of Riverport Road and Paul R. Lowry Road west of ALF would be made to accommodate operational traffic. Use of this intersection for outbound traffic would streamline the circulation of traffic associated with ALF and reduce conflicts at the Plant Road/Buoy Street intersection. A sketch of the required west exit improvement is shown in Figure 4-4.

On an interim basis, to facilitate the timing of implementation of one of the above improvement options, TVA could utilize an existing driveway further to the west of the Riverport Road intersection that connects between Riverport Road and Paul R. Lowry Road (Figure 4-1). Currently, this road has a very low usage. Use of this road would provide for temporary access to ALF to minimize exacerbation of issues at Paul R. Lowry Road and Plant Road/Buoy Street intersection in the near term. In this interim scenario, Riverport Road would be used for inbound traffic and the connector further to the west would be used for outbound traffic. Based on a visual inspection of this connector road, further investigation of the pavement condition will be needed to assess the ability of this road to handle truck traffic over long durations.

Figure 4-1. Allen Fossil Plant Alternate Circle Route Options

Figure 4-2. Alternate Circle Route Option 1 – Proposed Connector Road

Figure 4-3. Proposed Plant Road Right Turn Improvement for Current Access Route to ALF

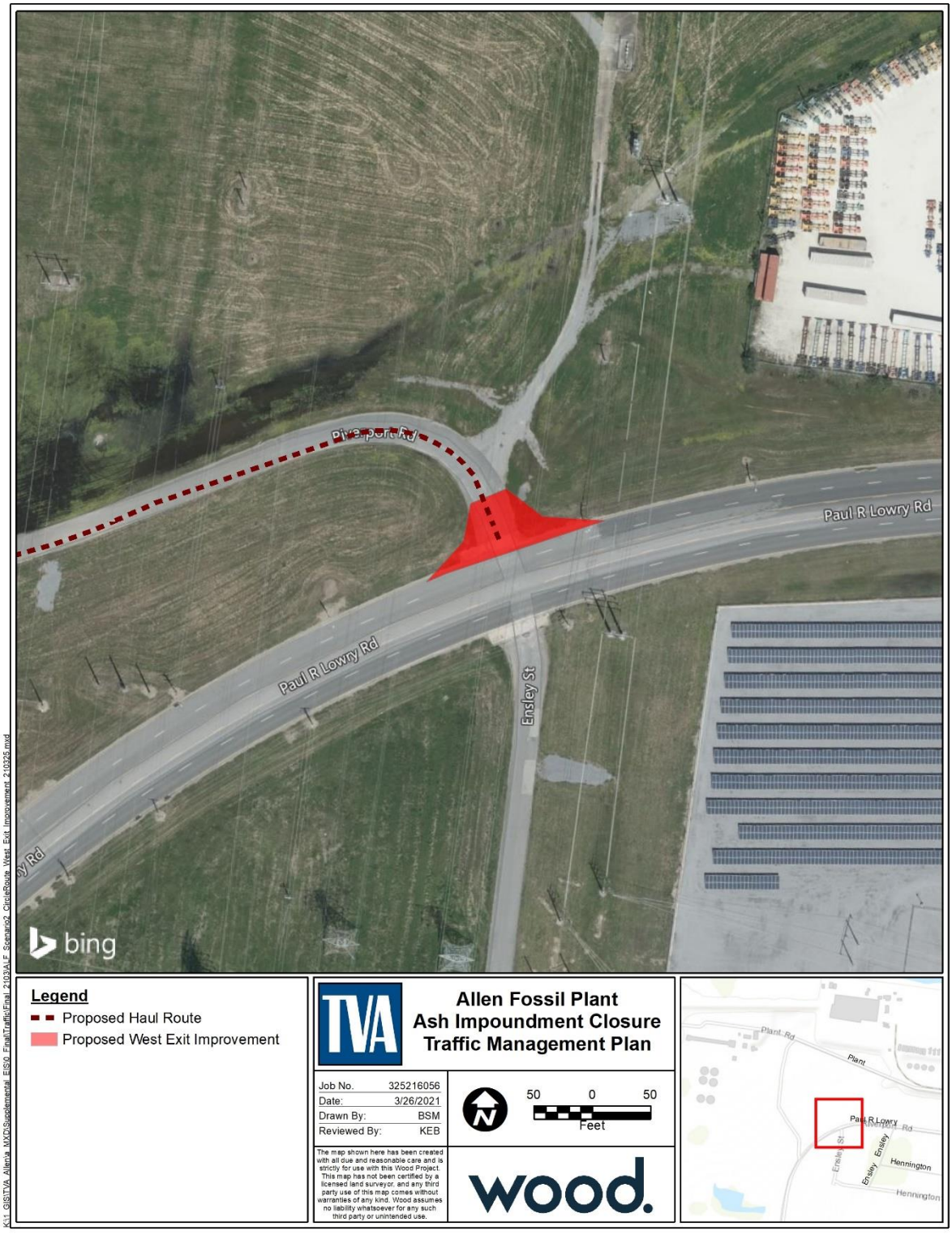

Figure 4-4. Alternate Circle Route Options 1 and 2 – Proposed West Exit Improvement

Traffic impacts associated with the proposed Circle Route options are shown in Table 4-2. There would be either no impact or there would be minor improvement in existing delay at the Paul R. Lowry Road at Plant Road/Buoy Street intersection under both of the Circle Route options. The intersection of Riverport Road and Paul R. Lowry Road for outbound traffic would operate at a LOS B and experience some delay. However, the impact would be minor.

Table 4-2. 2020 FEIS Traffic Scenario Model Results with Mitigation – Access to ALF

		AM Peak			PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Paul R. Lowry Road at Plant Road/Buoy Street Circle Route Options 1 and 2	Southbound Left	No Change			No Change			None[1]
Paul R. Lowry Road at Plant Road/Buoy Street (With Right Turn – Improvements) Circle Route Option 2	Westbound Right	A	0	-13	A	0	-11	Beneficial[2]
Circle Route West Exit at Riverport Road and Paul R. Lowry Road – Circle Route Options 1 and 2	Southbound Left	B	10	Not Applicable[3]	B	13	Not Applicable[3]	Minor

(S) = seconds

[1] Since the proposed Circle Route option does not include this movement, there will be no change in existing conditions and therefore no impact.

[2] This mitigation provides an improvement over existing conditions.

[3] This intersection currently has negligible usage; therefore, LOS and delay figures represent anticipated conditions. Since the new movement LOS is B, the impact is considered minor.

4.2 Access to Borrow Sites

All traffic impacts in the residential area south of ALF were found to be minor since the general traffic levels are low in the area.

During the field review, it was noted that a section of Raines Road on the proposed borrow haul route to the Shelby/Sewanee borrow site has poor pavement condition. An alternate route was identified (Figure 4-5). While this would result in a minor change in the traffic pattern, the traffic impact would remain minor.

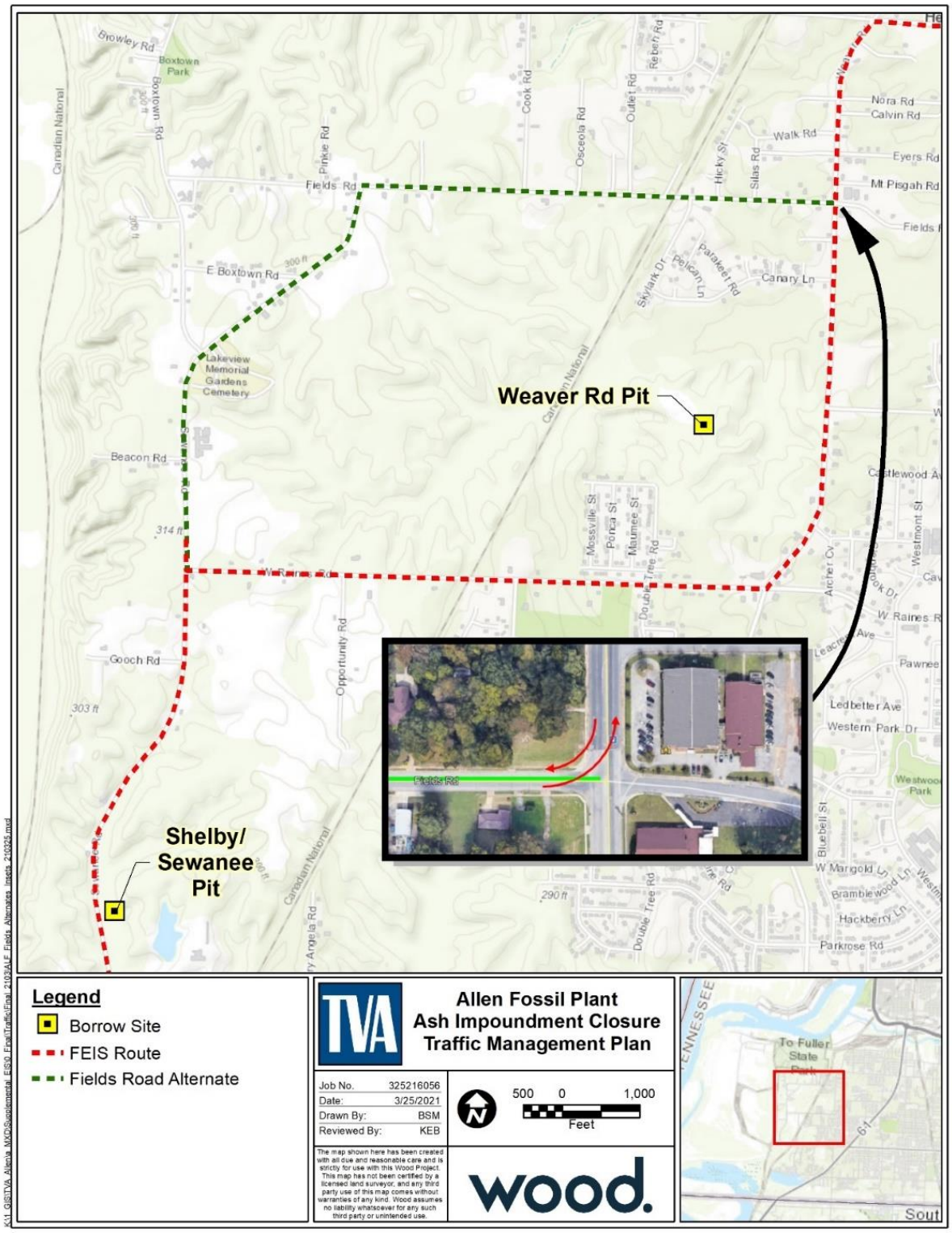

Figure 4-5. Fields Road Alternate Route to Borrow Site

4.3 Access to the South Shelby Landfill

The only intersection along the route to the South Shelby landfill that would be impacted as a result of transport of CCR from ALF to the landfill is the intersection of Malone Road at East Holmes Road. As shown in Table 4-3, there would be moderate impacts to traffic during the peak periods at this intersection. Traffic impacts at this intersection during the off-peak period were also analyzed, as shown in Table 4-4, and the impacts are minor. Therefore, it is recommended that this intersection be avoided during the peak periods by using alternate routes.

During the field review, two alternate routing scenarios (Alternate Scenarios 1 and 2) were identified for access to the South Shelby Landfill from Interstate 55. As shown in Figure 4-6, Alternate Scenario 1 uses the eastbound right turn at Malone and Holmes. This right turn has low traffic volumes and a dedicated lane, a detail shown in the inset of Figure 4-6. Scenario 2 avoids the Malone Road and East Holmes Road intersection. As shown in Table 4-4, there would be no impact to the Malone Road and East Holmes Road intersection under both scenarios during off-peak periods

It should be noted that as part of exploring alternate routing to the South Shelby Landfill, an initial analysis of the intersection of Stateline Road at Tchulahoma Road was made, as well as observation during the field review. This intersection was confirmed to be over capacity, which eliminated the use of either Stateline Road or Tchulahoma Road as alternative routes, so no further analysis was pursued.

Table 4-3. 2020 FEIS Peak Hour Traffic Scenario Model Results Without Mitigation – Access to South Shelby Landfill (FEIS Route)

		AM Peak			PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Malone Road at East Holmes Road	Eastbound (Through-Left)	F	145	22	F	127	17	Moderate
	Eastbound Right	A	5	0	A	5	0	No Change
	Westbound (All)	F	115	15	F	254	25	Moderate
	Northbound (All)	F	60	15	C	22	3	Moderate
	Southbound (All)	C	24	4	E	52	12	Moderate

Table 4-4. 2020 FEIS Off-Peak Traffic Scenario Model Results Without Mitigation – Access to South Shelby Landfill (FEIS Route)

		Off-Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Malone Road at East Holmes Road	Eastbound (Through-Left)	C	24	2	Minor
	Eastbound Right	A	5	0	No Change
	Westbound (All)	E	44	4	Minor
	Northbound (All)	B	14	1	Minor
	Southbound (All)	C	20	2	Minor

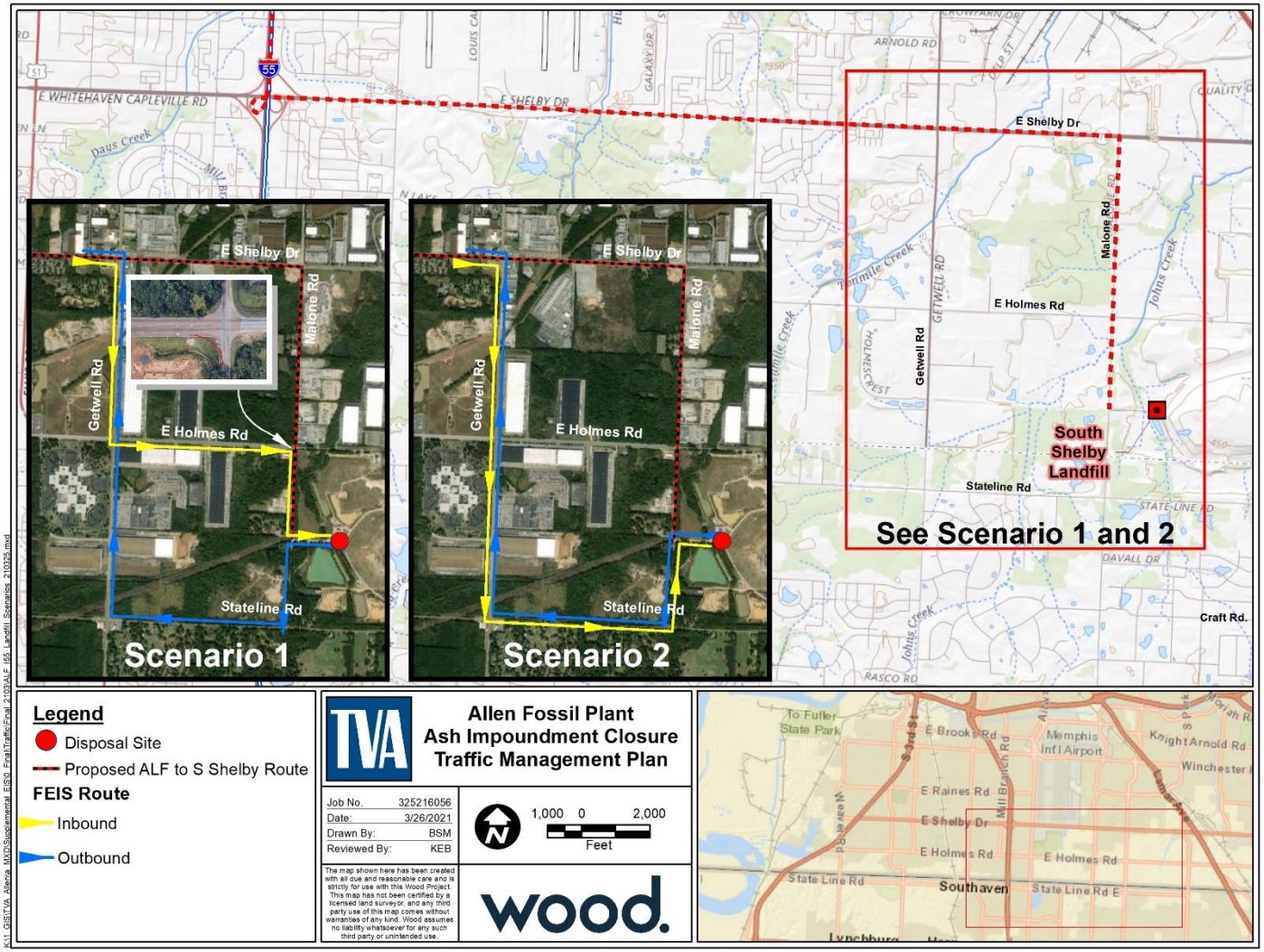

Figure 4-6. Alternate Route Scenarios to South Shelby Landfill from Interstate 55

Table 4-5. 2020 FEIS Traffic Scenario Model Results with Mitigation – Access to South Shelby Landfill (Scenarios 1 and 2)

		Off Peak				PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Malone Road at East Holmes Road	Eastbound (Through-Left)	C	22	0	No Change	F	110	0	No Change
	Eastbound Right	A	5	0	No Change	A	5	0	No Change
	Westbound (All)	E	40	0	No Change	F	230	0	No Change
	Northbound (All)	B	13	0	No Change	C	19	0	No Change
	Southbound (All)	C	18	0	No Change	E	40	0	No Change

4.4 Access to the Tunica Landfill

The northern section of the access route to the Tunica Landfill uses Paul R. Lowry Road to I-55. Discussion of the impacts in this area are discussed in Section 4.1.1.

The southern part of this route uses US 61, Mississippi Route 3, and Hambrick Road. There are only two intersections of concern on this route, US 61 at Mississippi Route 3 near Clack, Mississippi, and Mississippi Route 3 at Hambrick Road south of Banks, Mississippi. Both intersections were analyzed for worst case peak hour traffic. The worst-case impact at US 61 and Mississippi Route 3 is an additional 4 seconds of delay and the worst-case impact at Mississippi Route 3 and Hambrick Road is less than 1 second increase in delay, both minor impacts. Therefore, as impacts would be minor, mitigation measures are not needed.

5.0 TRAFFIC IMPACT OF DECONTAMINATION AND DECONSTRUCTION OF THE ALLEN FOSSIL PLANT

TVA evaluated the ALF D4 Project in an EA published in October 2019 (TVA 2019). The purpose of the project is to appropriately manage the disposition of the buildings and physical structures at ALF that are no longer needed for their original purpose of power generation. ALF D4 activities would occur over an approximate 18-month period that could overlap with ash pond closure activities and could contribute to cumulative impacts on the local transportation network. The following are the workforce and trucking rates evaluated in the 2019 EA:

- Maximum workforce traffic of 200 employees per day
- Maximum rate of trucking of debris offsite to existing landfills of 15 trucks (30 truck trips) per day
- Maximum rate of trucking of borrow material to ALF of up to 180 truckloads (360 truck trips) per day

Receiving landfills and the sources of the borrow material have not been selected at this time. TVA assumed that trucks would utilize local roads and arterial and interstate highways to transport demolition debris to a permitted landfill or borrow site within 30 miles of ALF (reasonable trucking distance from ALF). Therefore, the cumulative impact analysis assumes that trucks would use Paul R. Lowry Road to reach Interstate 55 and would disperse to various destinations on high-capacity routes.

As shown on Table 5-1 and Figure 5-1, the impact of the cumulative truck traffic would result in moderate to large impacts at two intersections during the approximate 18-month period when ALF D4 activities overlap with ash pond closure activities. The impact of the cumulative truck traffic with mitigation options identified in Section 4.1.2 (Circle Route Options 1 and 2) are shown in Table 5-2.

The impact at the Paul R. Lowry Road at Hyosung Entrance Drive would occur only during the 18-month period when ash pond closure activities overlap with ALF D4 activities. Since this is a privately owned driveway, any mitigation steps would involve coordination with Hyosung.

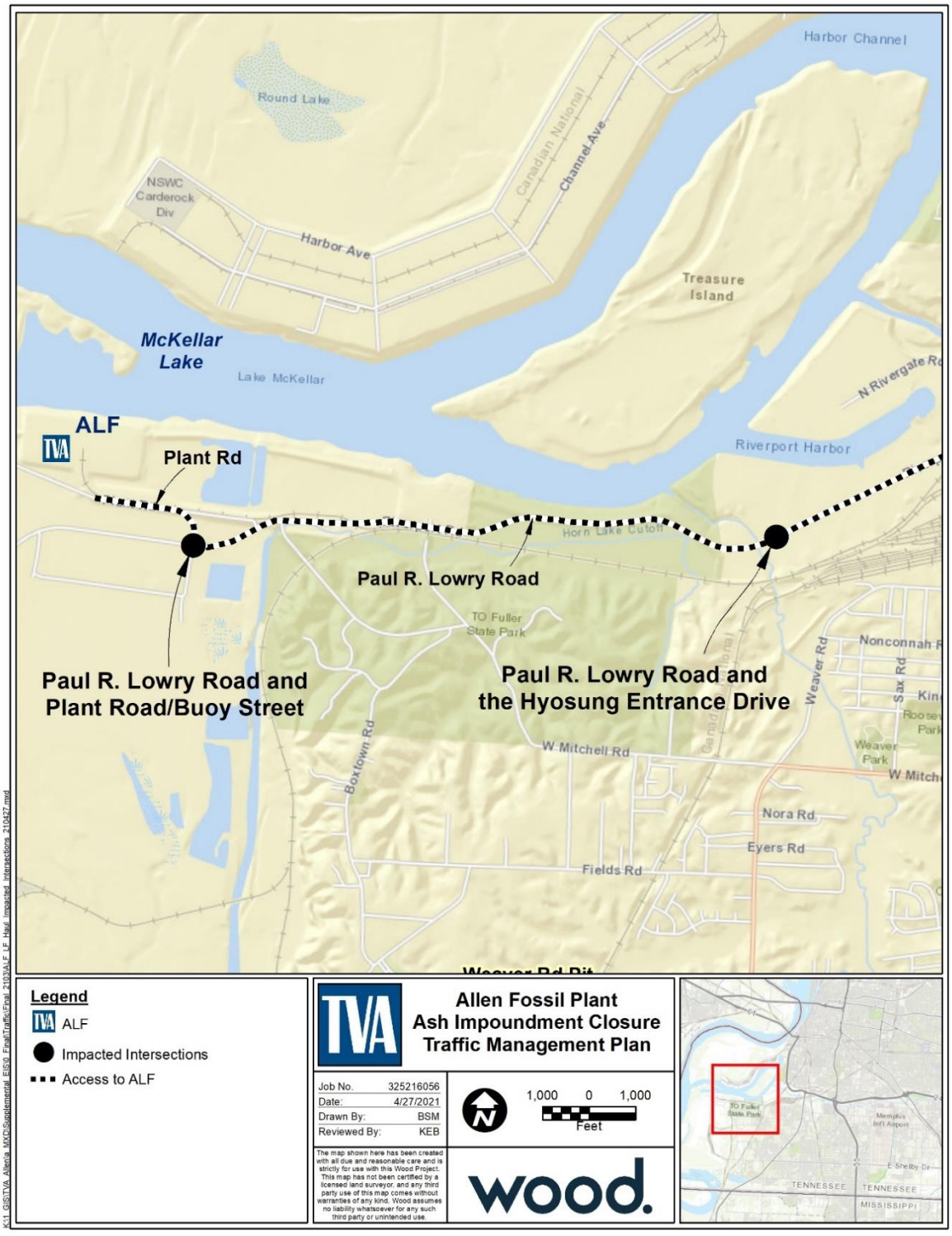

Figure 5-1. Impacted Intersections Associated with Cumulative ALF D4 Activities and Ash Impoundment Closure

Table 5-1. Cumulative Traffic Impacts Associated with ALF D4 Activities and Ash Impoundment Closure – Paul R. Lowry Road Area and Access to ALF

		AM Peak			PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**ALF D4 and Ash Impoundment Closure Impact**
Paul R. Lowry Road at Hyosung Entrance Drive	Southbound Left	B	14	2	E	47	20	Moderate
Paul R. Lowry Road at Plant Road/Buoy St	Southbound Left	C	15	1	F	113	93	Large
Paul R. Lowry Road at Plant Road/Buoy Street (Without Right Turn Improvements)	Westbound Right	C	16	3	B	13	2	Minor

(S) = seconds

Table 5-2. Cumulative Traffic Impacts Associated with ALF D4 Activities and Ash Impoundment Closure with Mitigation – Paul R. Lowry Road Area and Access to ALF

		AM Peak			PM Peak			
Intersection	**Movement**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**LOS**	**Delay (S)**	**Delay Difference from Existing (S)**	**Impact**
Paul R. Lowry Road at Hyosung Entrance Drive	Southbound Left	B	14	2	E	47	20	Moderate
Paul R. Lowry Road at Plant Road/Buoy St	Southbound Left	No Change			No Change			None[1]
Paul R. Lowry Road at Plant Road/Buoy Street (With Right Turn Improvements) Circle Route Option 2	Westbound Right	A	0	-13	A	0	-11	Beneficial[2]
Circle Route West Exit at Paul R. Lowry Road Circle Route Options 1 and 2	Southbound Left	B	10	Not Applicable[3]	B	13	Not Applicable[3]	Minor

(S) = seconds

[1] Since the proposed Circle Route option does not include this movement, there will be no change in existing conditions and therefore no impact.

[2] This mitigation provides an improvement over existing conditions.

[3] This intersection currently has negligible usage; therefore, LOS and delay figures represent anticipated conditions. Since the new movement LOS is B, the impact is considered minor.

6.0 SUMMARY OF MITIGATION RECOMMENDATIONS

6.1 Options to Address Access to ALF, Access to Borrow Sites, and Access to the South Shelby Landfill

A number of alternates designed to mitigate traffic impacts were presented in the analysis above. Note that there is no recommended mitigation for the access to the Tunica Landfill as traffic impacts were not identified. Mitigative measures to address traffic impacts associated with access to ALF, the borrow sites, and the South Shelby Landfill fall into two general categories:

- **Mitigation Requiring Construction.** These improvements are part of the proposed Circle Route for one-way ALF traffic.
    - Right turn lane improvement at the intersection of Paul R. Lowry Road and Plant Road/Buoy Street to accommodate westbound right turn movements
    - Development of a connector road from Paul R. Lowry Road to an existing old access road
    - Improvements to the intersection of Riverport Road and Paul R. Lowry Road to accommodate the west exit of the proposed circle route

  On an interim basis, to facilitate the timing of implementation of the above improvement options and meet project needs, TVA could utilize an existing driveway further to the west of the Riverport Road intersection that connects between Riverport Road and Paul R. Lowry Road (Figure 4-1).

  Costs for these mitigation options will be developed when preliminary plans are complete.
- **Alternate Routes.** These alternate routes would not require any construction and would have no significant costs.
    - Fields Road alternate route to the Shelby/Sewanee borrow site
    - South Shelby Landfill alternate routes

6.2 Paul R. Lowry Road at Hyosung Entrance Drive

Based on actual traffic data accounts, traffic impacts to the southbound left turn movement at Paul R. Lowry Road and the Hyosung Entrance Drive are estimated to be minor. However, impacts associated with the cumulative traffic assessments (i.e., ash impoundment closure traffic combined with ALF D4 activities) would be moderate for an estimated 18-month period. Since this is a privately owned driveway, any mitigation steps would involve coordination with Hyosung, and it is recommended that TVA continue discussion with Hyosung.

Some potential mitigation steps for the Hyosung plant traffic congestion include the following:

- Reducing or eliminating ALF hauling during Hyosung plant AM and PM peak periods.
- Adjustment of shift times by Hyosung.

These mitigation steps would not result in any significant costs.

7.0 CONCLUSIONS

For the traffic analysis, 46 intersections were analyzed for existing conditions and proposed traffic associated with the ALF ash impoundment closure project as described in the 2020 FEIS (TVA 2020).

In general, the network operates adequately in the existing conditions. However, four locations within the study area currently experience capacity issues. Traffic scenarios proposed in the 2020 FEIS would result in moderate impacts to the existing network. Traffic associated with the ash pond closure as identified in the 2020 FEIS and 2019 ALF D4 EA would result in moderate to large impacts to the existing network during the 18-month period when these two projects overlap.

Impacts associated with the traffic scenarios analyzed and suggested mitigation measures are summarized in Table 7-1. These mitigation measures include the development of optional access to/from ALF to improve traffic conditions and promote increased efficiency.

There would be construction costs for the intersection improvements for the proposed Circle Route at ALF. No other substantial mitigation costs are anticipated at this time.

Table 7-1. Summary of Impact Findings and Mitigation Measures

Intersection	ALF Impoundment Closure Traffic Scenario	Cumulative Traffic Scenario[1]	Worst Case LOS Without Mitigation	Proposed Mitigation Measures
Paul R. Lowry Road at Plant Road/Buoy St.	Moderate	Large	F	Use proposed Circle Route with associated intersection improvements.
Paul R. Lowry Road at Plant Road/Buoy St. (Westbound Right Turn)	Minor	Minor	A	
Paul R. Lowry Road[1] at Hyosung Entrance Drive	Minor	Moderate	E	Coordination with Hyosung to develop potential mitigation measures. Consider staggering shifts at the Hyosung plant or delaying hauling of material to and from ALF during AM and PM Peak.
Malone Road at East Holmes Road	Moderate	Not applicable[2]	F	Use proposed alternate routes of Getwell Road, East Holmes Road, and Stateline Road.

[1] This impact would occur as a result of the cumulative traffic generated by the ash impoundment closure project as identified in the 2020 FEIS and the ALF D4 Project (2019 EA). This impact would occur for an estimated 18-month period.

[2] The cumulative impact analysis assumes that trucks would use Paul R. Lowry Road to reach Interstate 55 and would disperse to various destinations on high-capacity routes.

8.0 REFERENCES

Memphis Urban Area Metropolitan Planning Organization (Memphis MPO). 2021. Memphis Urban Area Metropolitan Planning Organization – Fiscal Year (FY) 2020-2023 – Transportation Improvement Program (TIP). Modified April 15, 2021.

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