SH4 at Fox Lane, Grady County JP No. 34262(04)

The intersection of SH-4 and Fox Lane (EW 122) 2.24 miles north of I-44

Alternatives Considered

Preliminary Preferred Alternative :: Alt. 3A2 INTERCHANGE

SH-4 at Fox Lane Flythrough

Click on the image below to interact with the map.

This alternative maintains traffic on the existing SH-4 roadway and reconstructs Fox Lane to go over. The existing SH-4 paving is included as an overlay of the existing paving and full depth widening to increase the shoulder widths from 2 feet wide to 8 feet wide. The interchange ramps have been designed to work with the divided configuration for SH-4 with minor reconstruction if this should be built in the future. The bridge GP&E shows a four-span structure to allow SH-4 with a 6 feet wide shoulder on the south side of the bridge to provide defined pedestrian access at this location.

The proposed roadway for Fox Lane is shown as a three-lane section with 8 feet wide shoulders to provide left turn lanes at the interchange ramps. The proposed profile for Fox Lane to cross over SH-4 requires up to 25 feet of embankment to provide the required bridge clearance over SH-4. Due to the existing grade of Fox Lane, the Fox Lane intersection with Mustang Road to the west of SH-4 will be impacted with approximately 10 feet of embankment to be able to meet a 45 mph design speed on Fox Lane.

The profile of Fox Lane shown in the attached plans does provide the required sight distances for passenger car and truck left turns as show in Tables 9-7 through 9-11 of the current AASHTO Green Book.

Construction sequencing will require temporary pavement widening and detour alignment for the Fox Lane traffic to shift traffic off the existing alignment while the embankment and new paving is placed. Building the temporary paving and detour to the north of the existing alignment appears to be the best option due to a drainage channel to the south of Fox Lane. Additional phasing coordination of the detour and the interchange ramp construction will be needed to maintain traffic throughout the project.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

This alternative adds the northbound lanes on SH-4 to achieve the four-lane divided scenario as an option to prepare this corridor for increases in traffic volumes. Northbound crossovers are included at each end of the project to connect traffic to the existing SH-4 paving.

Alternative 3A2 is recommended as the preferred alternative for the intersection of SH-4 and Fox Lane. This alternative will reduce high-speed collisions with the separation of SH-4 and Fox Lane traffic by carrying Fox Lane over SH-4. It also provides increased capacity on SH-4 by building the four-lane divided highway configuration which can ultimately be connected to the sections of SH-4 to the north and south of this location that have already been widened for increased capacity.

Alt. 1A AT-GRADE

Did not meet purpose and need.

Alt. 1B AT-GRADE

Did not meet purpose and need.

Alt. 1C AT-GRADE

Did not meet purpose and need.

Alt. 1D AT-GRADE

Did not meet purpose and need.

Alt. 1E AT-GRADE

Click on the image below to interact with the map.

A 2019 safety review of the intersection was conducted and as part of that review, signal warrants were run. The intersection did not meet warrants at the time of the review, but signalization of the intersection may be a viable alternate based on future traffic conditions. The operational analysis of future traffic on this alternate demonstrates how the intersection would operate if the intersection were signalized with the addition of eastbound and westbound left-turn lanes.

The installation of a traffic signal with the addition of eastbound and westbound left-turn lanes

significantly improves delay, queues, and levels of service at the intersection. The analysis demonstrated that the intersection is anticipated to operate with acceptable levels of service on all approaches during both peak hours in 2050.

Based on these capacity analyses, the traffic control modification to a signalized intersection results in acceptable operations through 2050. Safety considerations of a signalized intersection along a high- speed facility should be considered, but this alternate has been shown to be viable based on traffic operations.

This alternative includes reconstruction of the SH-4 pavement to be able to stand up to traffic braking for a red light. The Fox Lane pavement is anticipated to be a widen and overlay section to add left turn lanes. The construction sequencing would require shifting traffic on SH-4 with some temporary pavement widening to reconstruct the SH-4 paving half at a time. Fox lane would be widened while maintaining traffic on the existing lanes and the final overlay placed under traffic.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

Alt. 1F AT-GRADE

Click on the image below to interact with the map.

This alternative increases the length of the deceleration right turn lanes and offsets them 12 feet from the through lanes for the northbound and southbound directions. The traffic operation of the intersection isn't changed from what is shown for the previous at-grade alternatives. This alternative provides a safety improvement by increasing the visibility of through traffic to traffic stopped on Fox Lane by shifting turning traffic away from the through traffic. A layout of this alternative is included in the attached conceptual plans.

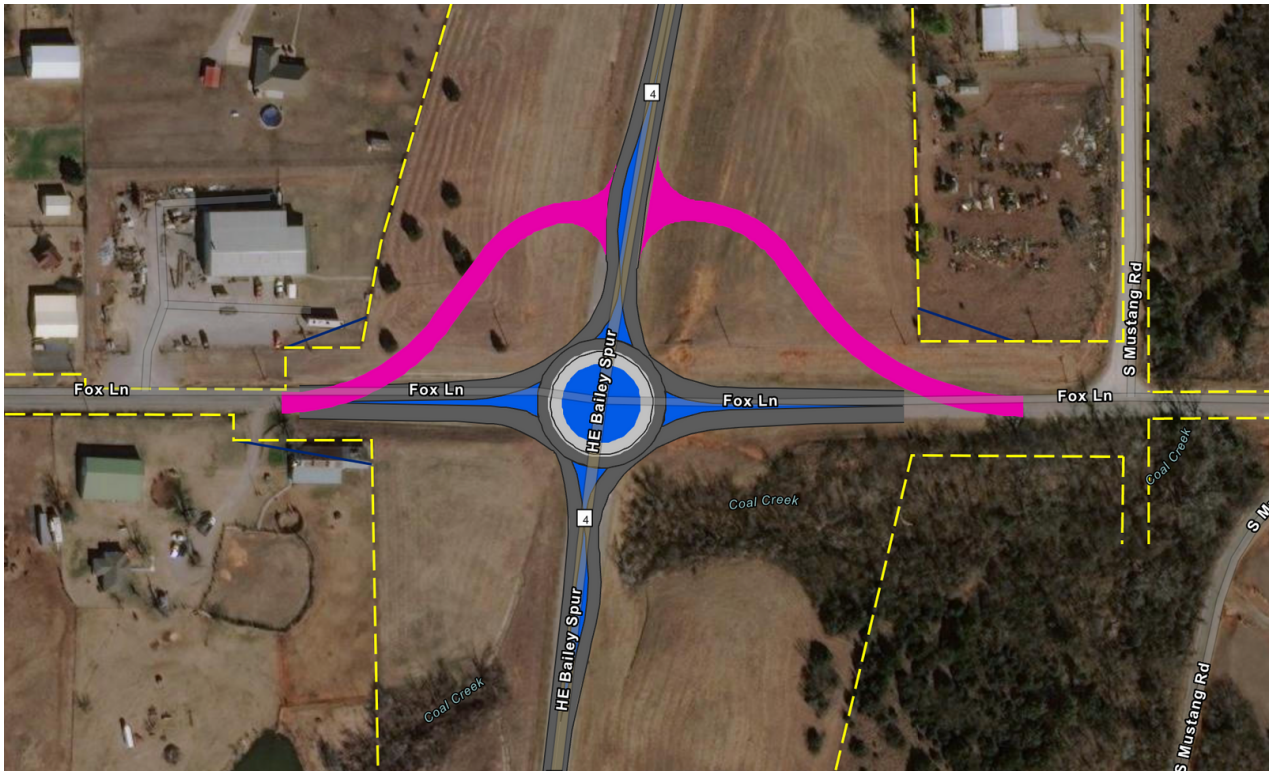
When design traffic data for 2030 and 2050 were analyzed at the intersection, delays at the intersection became significantly worse. By 2030, the eastbound approach will have a delay over 300 seconds per vehicle delay during the a.m. peak hour and over a 370-foot queue.

The construction sequencing for this alternative would leave SH-4 and Fox Lane traffic in their existing lanes while construction of the longer and wider offset deceleration/right lanes occurs to the outside. The existing lanes would have an overlay placed under traffic.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

Alt. 2A ROUNDABOUT

Click on the image below to interact with the map.



A single lane roundabout is included as one of the alternatives to modify the existing intersection. The roundabout as shown in the conceptual drawing has a total diameter of 162′-8″, an apron width of 14′, and a lane width of 16′ and has been designed to allow a WB-67 truck to travel through with the trailer wheels tracking up on the apron. The design speed through the roundabout is 25mph. The construction of a single-lane roundabout increases capacity and safety at the intersection and improves operations more than any alternate 1 scenarios except for the signalized intersection.

Based on 2030 traffic conditions, the roundabout would operate with good levels of service, but the southbound approach is expected to operate at a level of service "F" by 2050. This would result in a queue approximately 506 feet in length and an overall intersection level of service "F."Based on these capacity analyses, the capacity improvement of a single-lane roundabout would improve operations at the intersection but would not provide enough capacity for acceptable operations in 2050.The construction of a roundabout could be used as an interim improvement until an ultimate design is constructed.

Construction sequencing will require temporary paving for Fox Lane and SH-4 to move traffic to while the roundabout is built. Efficient construction would be provided by utilizing the space available in the present right-of-way to build an at-grade detour to the north of the existing Fox Lane alignment, creating a new intersection location. The roundabout can be built one half at a time while SH-4 traffic is maintained on a combination of the existing pavement and temporary pavement widening. The roundabout could also be offset from the existing intersection to improve constructability without building the detour. Other sequencing options are available but would result in building the roundabout in quadrants with several traffic shifts and very low speeds through the intersection.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

Alt. 2B ROUNDABOUT

Click on the image below to interact with the map.

This roundabout is included as one of the alternatives to modify the existing intersection. The roundabout as shown in the conceptual drawing also has a total diameter of 162′-8″, an apron width of 14′, and a lane width of 16′ and has been designed to allow a WB-67 truck to travel through with the trailer wheels tracking up on the apron. Right-turn bypass lanes have been added to the north side of the roundabout to improve the traffic operations based on the dominant turn movements.

The operational analysis of future traffic on this alternate demonstrates how the intersection would operate if the intersection were converted to a single-lane roundabout intersection with right-turn bypass lanes for the southbound and westbound approaches.

The construction of a single-lane roundabout and bypass lanes increases capacity and safety at the intersection and improves operations more than any alternate 1 scenarios including the signalized intersection. Based on 2050 traffic conditions, the roundabout would operate with good levels of service at least through the year 2050.

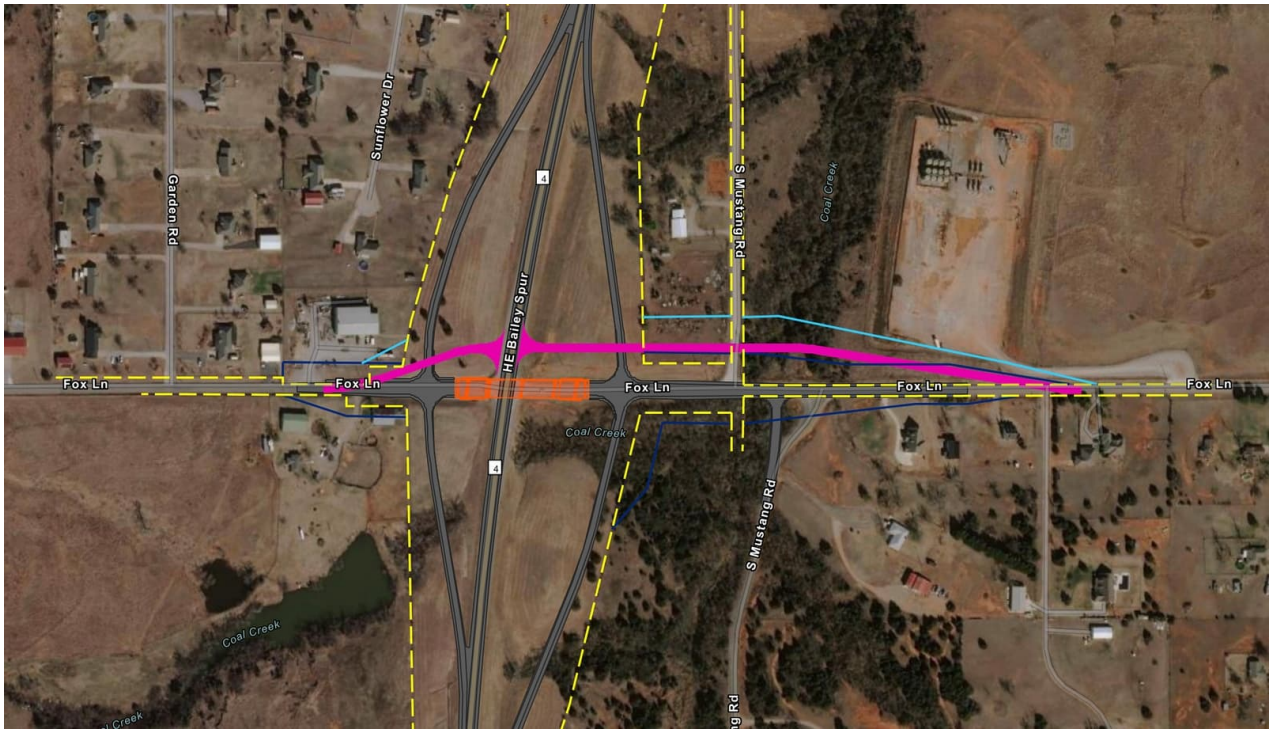
Based on these capacity analyses, the capacity improvement of a single-lane roundabout with bypass lanes would improve operations at the intersection through the year 2050 and is a viable option based on traffic operations. Consideration of the number or trucks through this intersection should be made during design if this alternate is pursued.

This alternative is shown offset from the existing SH-4 and Fox Lane Intersection to reduce the impacts to traffic during the roundabout construction. Additional sub-phases and temporary paving will be required to complete all legs of the roundabout.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

Alt. 3A INTERCHANGE

Click on the image below to interact with the map.



This alternative maintains traffic on the existing SH-4 roadway and reconstructs Fox Lane to go over. The existing SH-4 paving is included as an overlay of the existing paving and full depth widening to increase the shoulder widths from 2 feet wide to 8 feet wide. The interchange ramps have been designed to work with the divided configuration for SH-4 with minor reconstruction if this should be built in the future. The bridge GP&E shows a four-span structure to allow SH-4 with a 6 feet wide shoulder on the south side of the bridge to provide defined pedestrian access at this location.

The proposed roadway for Fox Lane is shown as a three-lane section with 8 feet wide shoulders to provide left turn lanes at the interchange ramps. The proposed profile for Fox Lane to cross over SH-4 requires up to 25 feet of embankment to provide the required bridge clearance over SH-4. Due to the existing grade of Fox Lane, the Fox Lane intersection with Mustang Road to the west of SH-4 will be impacted with approximately 10 feet of embankment to be able to meet a 45 mph design speed on Fox Lane.

The profile of Fox Lane shown in the attached plans does provide the required sight distances for

passenger car and truck left turns as show in Tables 9-7 through 9-11 of the current AASHTO Green Book. Construction sequencing will require temporary pavement widening and detour alignment for the Fox Lane traffic to shift traffic off the existing alignment while the embankment and new paving is placed. Building the temporary paving and detour to the north of the existing alignment appears to be the best option due to a drainage channel to the south of Fox Lane. Additional phasing coordination of the detour and the interchange ramp construction will be needed to maintain traffic throughout the project.

Additional permanent right-of-way will be needed along Fox Lane to the west and east of SH-4.

Alt. 3B INTERCHANGE

Click on the image below to interact with the map.

This alternative reconstructs the SH-4 grade to go over Fox Lane. The bridge GP&E shows a three-span structure to clear the new wider paving shown on Fox Lane. The interchange ramps have been designed to work with the divided configuration for SH-4 with minor reconstruction if this should be built in the future. The ramp intersections with Fox Lane are closer to SH-4 than they are for the previous alternative to minimize additional right-of-way acquisition and developed property impacts. This closer intersection spacing does not negatively impact the traffic operations of Fox Lane through the interchange.

The profile of Fox Lane is shown to reconstruct Fox Lane as close to the existing profile as possible and meet the criteria for a 45 mph design speed. The sight distance requirements for passenger cars and trucks are met.

Construction sequencing will require moving SH-4 traffic off the current alignment to place the embankment and new paving required to carry SH-4 over Fox Lane. The most economical way to accomplish this is to build the new interchange ramps early in the project phasing so SH-4 traffic can be

diverted to the ramps while the SH-4 embankment, paving, and bridge construction are completed. This would create two temporary highway intersection locations on Fox Lane. Another option is to build an at-grade detour offset from the existing SH-4 option for the length of the project to have one intersection location, but this would be more expensive option with a significant amount of temporary paving to be removed at the completion of the project.

Alt. 3B2 INTERCHANGE

Click on the image below to interact with the map.

OKLAHOMA Transportation

Click on the image below to interact with the map.

For this Alternative, the new SH-4 alignment is offset 44 feet east of the SH-4 centerline of survey line shown in the attached conceptual plans so it is located where the northbound lanes of SH-4 would be for the ultimate divided four-lane configuration. The bridge GP&E shows a three-span structure to clear the new wider paving shown on Fox Lane. The southbound interchange ramps have been designed to work with the divided configuration for SH-4 with minor reconstruction if this should be built in the future.

The construction sequencing for this alternative allows SH-4 traffic to remain on the existing roadway for most of the project duration while the SH-4 offset and ramps are constructed. Temporary pavement widening or detours will be needed at the north and south ends of the project where the SH-4 offset connects back to the existing alignment. Some temporary paving will be needed to maintain traffic on Fox Lane while the widened section of Fox Lane is constructed.