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# EXECUTIVE SUMMARY

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Proposed Roadway—  
U.S. Highway 31 to New Castle Road  
Gardendale, Alabama

## Advance Planning, Programming, and Logical Engineering (APPLE) Program

Prepared for:  
**THE CITY OF GARDENDALE**  
  
**THE REGIONAL PLANNING  
COMMISSION OF GREATER  
BIRMINGHAM**

February, 2018

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Advance Planning, Programming, and Logical Engineering (APPLE) Study

Proposed New Roadway

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## **INTRODUCTION**

An APPLE study was prepared for the City of Gardendale through funding made available by the Regional Planning Commission of Greater Birmingham to study the feasibility, design features, and potential cost for the construction of a new collector roadway from U.S. Highway 31 to New Castle Road in Gardendale, Alabama. The study was undertaken by a team of engineering firms concentrating on various aspects of the design:

- LBYD, Inc. performed conceptual design of the proposed roadway and cost estimating
- Skipper Consulting, Inc. performed a traffic study for the proposed roadway
- Terracon Consultants performed a cursory mine records review of the alignment of the proposed roadway
- Spectrum Environmental performed a desktop review of the Waters of the U.S. for the alignment of the proposed roadway

## **CONCEPTUAL DESIGN**

Conceptual design efforts were performed by LBYD, Inc. The proposed roadway alignment extends from U.S. Highway 31 to New Castle Road in the City of Gardendale, Alabama. Two alternatives were developed. The primary difference between the alternatives is the location of the connection to U.S. Highway 31. The terminus of Alternate 1 of the proposed roadway is on U.S. Highway 31 approximately 1,100 feet north of Mount Olive Boulevard. The terminus of Alternate 2 of the proposed roadway is at the intersection of U.S. Highway 31 and Mount Olive Boulevard. Alternative 2 would require rerouting of Moncrief Road. Both alternatives share a common terminus on New Castle Road approximately 2.8

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miles north of Tarrant Road. The proposed roadway is approximately 3.9 miles in length. A vicinity map of the proposed roadway alignment is shown in Figure 1.



Figure 1. Project Location Map (source: Skipper Consulting)

Study efforts performed for the proposed roadway alignment included plan and profile sheets, earthwork cut and fill, a bridge plan for the crossing of Black Creek at approximately Station 80+00, and an environmental impact plan. The environmental impact plan indicates locations of streams and possible wetland areas.

The overall plan is shown in Figure 2. Samples of the plan, profile, earthwork, and environmental impact plans are shown in Figures 3 through 6. For complete conceptual plans prepared by LBYD, please consult the final project documentation.

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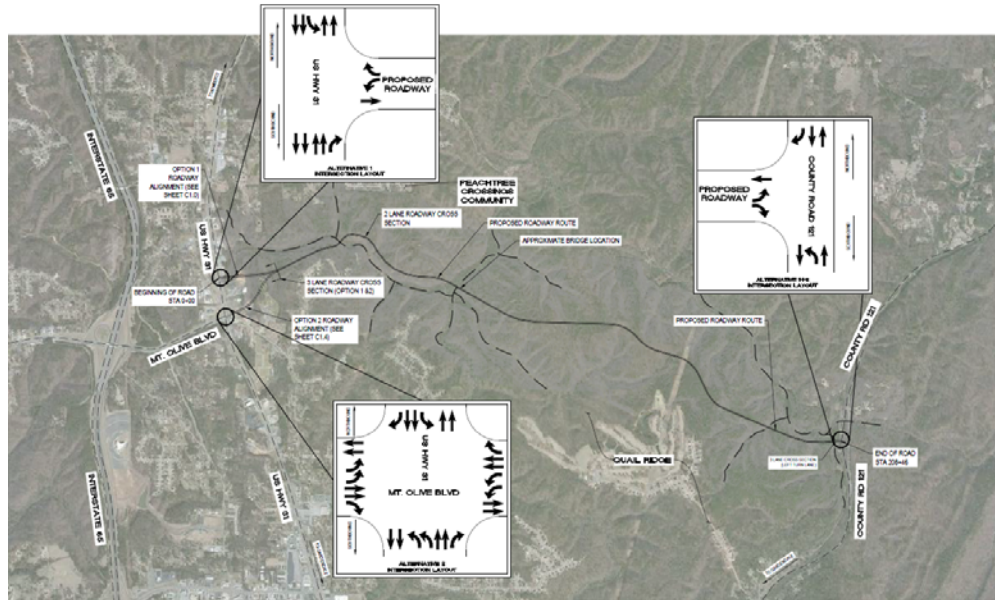


Figure 2. Overall Plan



Figure 3. Sample Plan

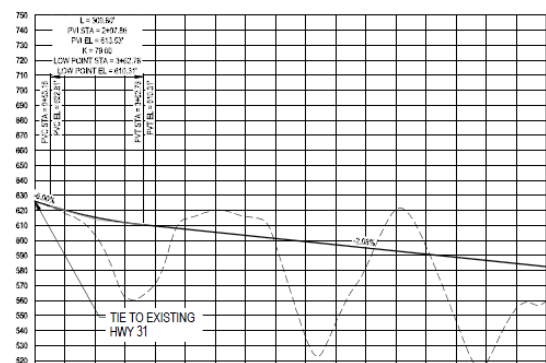


Figure 4. Sample Profile



Figure 5. Sample Earthwork Plan



Figure 6. Sample Environmental Impact

(source: LBYD)

## COST ESTIMATE

Cost estimates were prepared for the proposed roadway by LBYD, Inc. Utility relocation and right-of-way costs are not included in the cost estimates. The cost estimates were prepared assuming either federal aid funding or no federal aid funding. Both alternatives were included in the estimates. A summary of the estimates is shown in Table 1. For complete cost estimates prepared by LBYD, please consult the final project documentation.

**Table 1**  
**Cost Estimate Summary**

<i>Alternative</i>	<i>Federal Aid</i>	<i>Non-Federal Aid</i>
Alternate 1	\$16,284,000	\$15,238,000
Alternate 2	\$15,994,000	\$15,121,000

*(source: LBYD)*

## TRAFFIC STUDY

A traffic study was performed by Skipper Consulting, Inc. to determine anticipated future traffic volumes on the proposed roadway. Currently, U.S. Highway 31 north of Mount Olive Boulevard carries approximately 14,000 vehicles per day. New Castle Road carries 2,550 vehicles per day. These traffic volumes are anticipated to increase to 22,100 vehicles per day on U.S. Highway 31 and 4,000 vehicles per day on New Castle Road by the year 2040.

Traffic on the proposed new roadway would be generated by two sources: 1) development along the proposed roadway, and 2) cut-through traffic between U.S. Highway 31 and New Castle Road. In order to determine traffic generated by development along the new roadway, a potential land use plan for properties which would have access to the corridor was developed. A map of the corridor with the adjacent properties delineated is shown in Figure 7. By the year 2040, it is anticipated that the proposed roadway would provide access to approximately 34,000 square feet of retail, 15,000 square feet of office, 410,000 square feet of light industrial, and 400 residential dwelling units. This development would generate approximately 8,500 trips per day and approximately 770 peak hour trips.



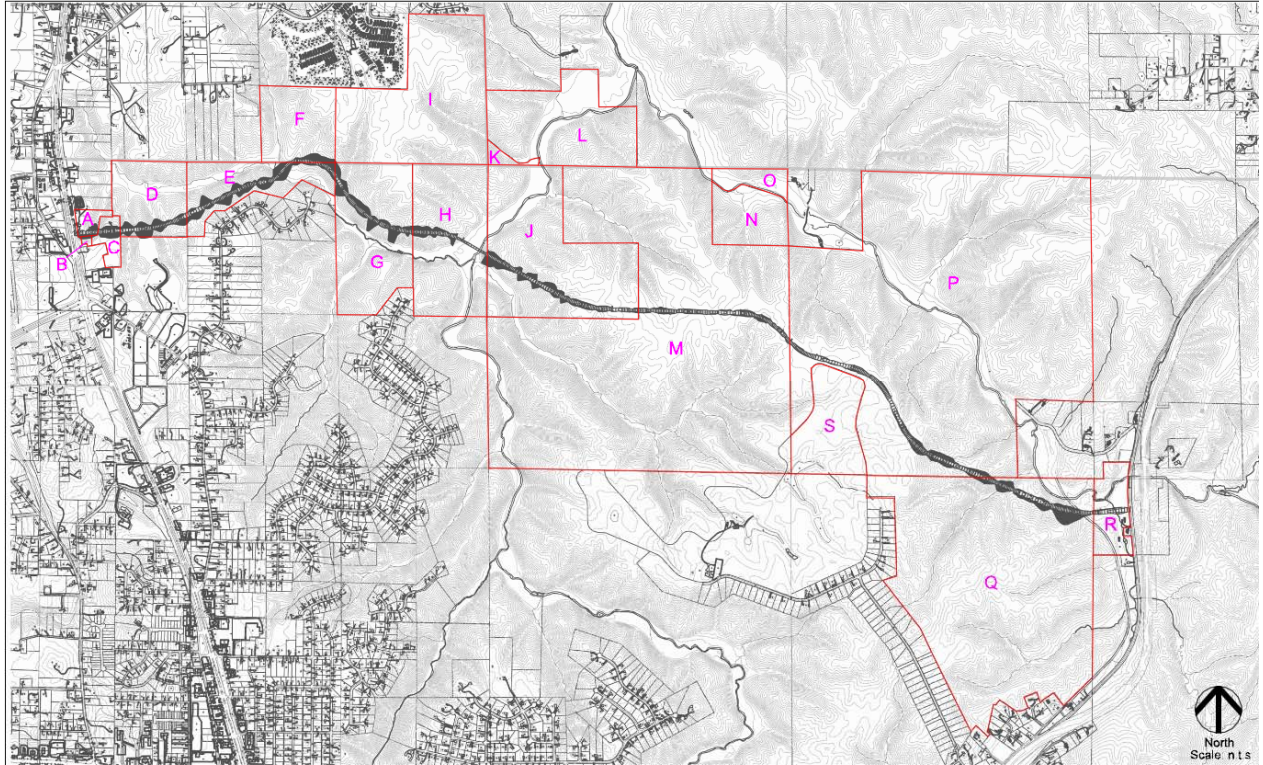


Figure 7. Adjacent Properties (source: LBYD and Skipper Consulting)

Cut-through traffic was estimated using the travel demand model for the Birmingham MPO region. In the year 2040, it is anticipated that the daily cut-through traffic between U.S. Highway 31 and New Castle Road on the proposed roadway would be approximately 7,200 vehicles per day. Projected 2040 total traffic volumes on the proposed roadway and other roadways in the vicinity are shown in Figure 8. (Note: only Alternate 1 is shown in Figure 8. Results for Alternate 2 are similar).

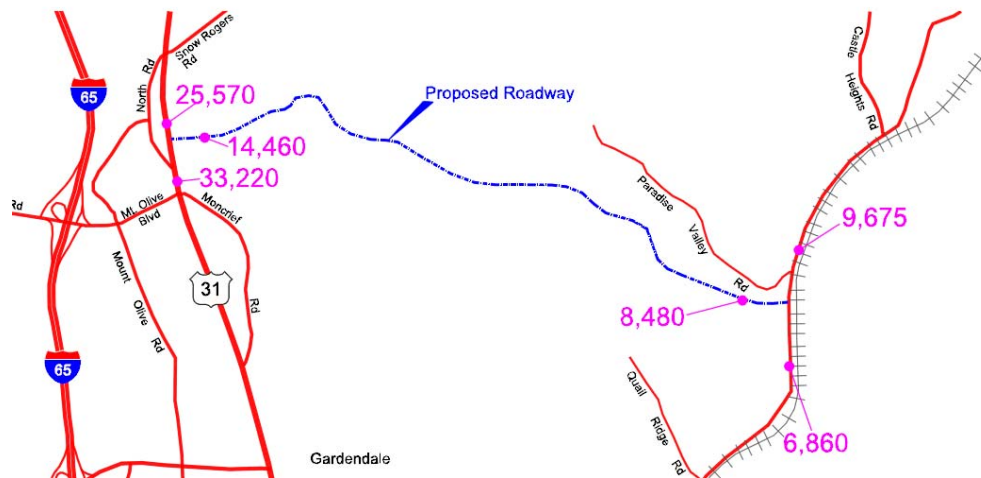


Figure 8. Projected 2040 Daily Traffic Volumes (source: Skipper Consulting)

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The results of the traffic analyses indicate that the proposed roadway would need to be three lanes in cross section near U.S. Highway 31 and then taper to a two lane undivided roadway for the rest of the alignment. The 2040 roadway segment capacity analysis for the proposed roadway and for other roadways in the vicinity is shown in Table 2.

**Table 2**  
**2040 Build Daily Roadway Segment Capacity Analysis**

<i>Roadway</i>	<i>Classification</i>	<i>Cross Section</i>	<i>Daily Volume</i>	<i>Capacity</i>	<i>v/c Ratio</i>	<i>Level of Service</i>
U.S. Highway 31 north of Proposed Roadway	Minor Arterial	4 Lane Divided	25,570 vpd	33,900 vpd	0.75	E
U.S. Highway 31 south of Proposed Roadway	Minor Arterial	4 lane Divided	33,220 vpd	33,900 vpd	0.98	E
New Castle Road north of Proposed Roadway	Major Collector	2 Lane Undivided	9,675 vpd	16,600 vpd	0.58	C
New Castle Road south of Proposed Roadway	Major Collector	2 Lane Undivided	6,860 vpd	16,600 vpd	0.41	B
Proposed Roadway east of U.S. Highway 31	Collector	2 Lane Undivided	14,460 vpd	16,600 vpd	0.87	E
		3 Lane		20,800 vpd	0.70	D
Proposed Roadway west of U.S. Highway 31	Collector	2 Lane Undivided	8,480 vpd	16,600 vpd	0.52	C

*(source: Skipper Consulting)*

The proposed roadway would provide a beneficial impact to traffic on Tarrant Road. Tarrant Road connects U.S. Highway 31 to New Castle Road south of the proposed roadway alignment. Figure 9 shows the impact of the proposed roadway on traffic on Tarrant Road.

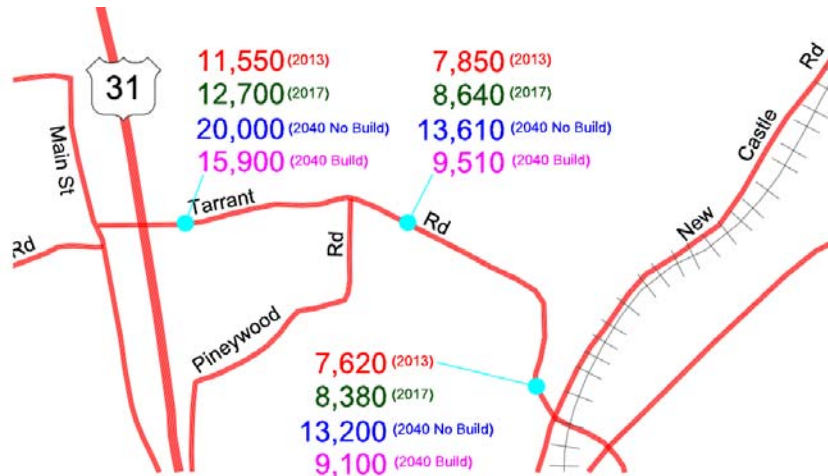


Figure 9. Tarrant Road Traffic Impact (source: Skipper Consulting)

For the complete traffic study prepared by Skipper Consulting, please consult the final project documentation.

## MINE RECORDS

A mine records review was performed by Terracon for the alignment of the proposed roadway. Published mining records and previous mining history of the site were included in the review. The information reviewed included available surface and strip mining and underground mining information from the Alabama Department of Industrial Relations Mining and Reclamation Division, U.S.G.S topographic quadrangle maps and historical aerial photography, and published geologic and coal seam information. This exercise was undertaken due to concern of ground subsidence along the roadway alignment due to potential collapse of mine roof materials.

The mining records review also included reviewing documentation of the elevation of abandoned underground mine works, coal seams, and coal seam outcrops. This information was used to estimate the depth of overburden overlying abandoned mine works, and a risk assessment based on depth of overburden was performed.

Published information from the Geologic Survey of Alabama indicates that the project site lies within the Warrior Basin district of the Cumberland Plateau physiographic section. The project site is underlain by the Pottsville Formation of Pennsylvanian age. This formation includes thin to thick bedded coal seams.



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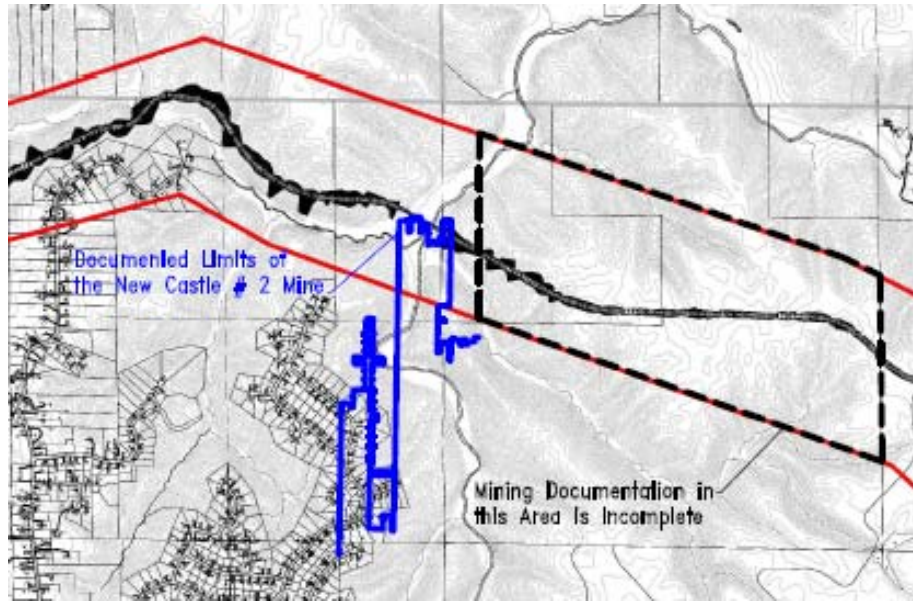
The total thickness of the Pottsville Formation in the area is 2,800 feet. Numerous underground and surface mines extracted coal from the Pottsville Formation within Jefferson County. Available mine maps indicate the mining in the site vicinity progressed north from the main portal or coal outcrop, with the depth of the underground mines increasing toward the north.

Available mine records indicate that the mines underlying the planned roadway are typical room and pillar mining operations. Coal pillars formed the main roof support during the mining operations. Often the coal pillars were robbed upon final retreat from the mine. However, the mine maps reviewed for this study did not show robbing of the coal pillars.

The available mining documents indicate that a portion of the planned roadway alignment is underlain by the abandoned mine works of the New Castle #2 mine. The New Castle #2 Mine was a typical room and pillar mining operation, operated from about 1936 to 1949. The available mining documents did not indicate the presence of surface mining within the proposed alignment.

A complete map of New Castle #2 Mine is not available. The available documentation indicates that a portion of the New Castle #2 Mine lies within Section 6, Township 16 South, Range 2 West. The available documentation is incomplete in Section 6, and therefore the full extent of abandoned mine works within Section 6 could not be determined. Figure 10 illustrates the known area of mining on New Castle #2 Mine and the area where documentation is incomplete.

Recorded mine elevations within the roadway alignment are on the order of about El. 215 feet. Surface elevations of the roadway range from about El. 400 feet to El. 440 feet within the mapped limits of New Castle #2 Mine works. There is approximately 185 feet to 225 feet of overburden covering the abandoned mine where it is documented within the roadway alignment. In the undocumented portion of the New Castle #2 Mine within Section 6, the estimated overburden is on the order of about 185 feet to 500 feet.



*Figure 10. New Castle Mine #2 (source: Terracon)*

Two risk zones are identified associated with roadway construction over abandoned mine works. “Low risk” zones are areas believed to be natural with no evidence of previous mining activity or undermined areas that have greater than somewhere in the range of 100 to 150 feet of cover between the existing grades and the abandoned underground mine works. Low risk zones are generally suitable for proposed construction. However, the owner must accept some risk of ground subsidence due to a mine roof collapse.

Areas with less than 100 feet of overburden between the existing grade and the abandoned underground mine works are commonly considered “high risk” zones. These areas are at a high risk for ground subsidence in the event of the collapse of the abandoned mine roof. It is recommended that both risk zones not be developed without a thorough field program to assess the possible risk.

For the complete cursory mine review prepared by Terracon, please consult the final project documentation.

## **WATERS OF THE U.S.**

A preliminary desktop evaluation of the Waters of the United States (WOTUS) was performed by Spectrum Environmental for the proposed roadway alignment. Sources of information used in the desktop review included U.S.G.S. topographical maps, aerial photographs, and U.S. Fish and Wildlife Services (USFWS) National Wetlands Inventory (NWI) map and site layout plan maps.

The desktop review of the proposed roadway alignment was performed within the proposed roadway boundaries by determining areas of interest observed by using USGS topographic lines to depict the presence of streams and potential wetlands. These areas have a high probability of requiring coordination with the U.S. Army Corps of Engineers (COE). Potential WOTUS areas were identified on topographic maps. There are twenty (20) possible stream segments (perennial and intermittent) and four (4) potential wetland areas located within the boundary of the proposed roadway alignment. The actual number can only be determined upon the completion of a pedestrian WOTUS delineation and confirmation by the COE.

Figures 11, 12, and 13 provide information concerning the WOTUS desktop review. Figure 11 is the USGS topographical map used for the review. Figure 12 is the USFWS NWI map. Figure 13 is a sample delineation of streams and wetlands which was completed for the project. For the complete desktop WOTUS letter prepared by Spectrum Environmental, please consult the final project documentation.

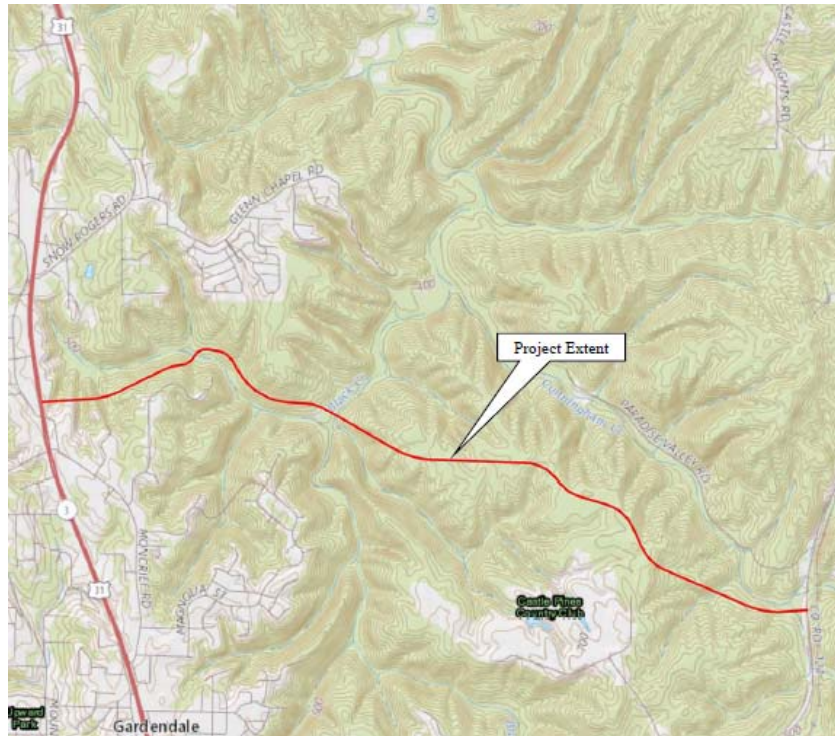


Figure 11. USGS Topographical Map for WOTUS Review (source: Spectrum)



Figure 12. USFWS NWI Map for WOTUS Review (source: Spectrum)

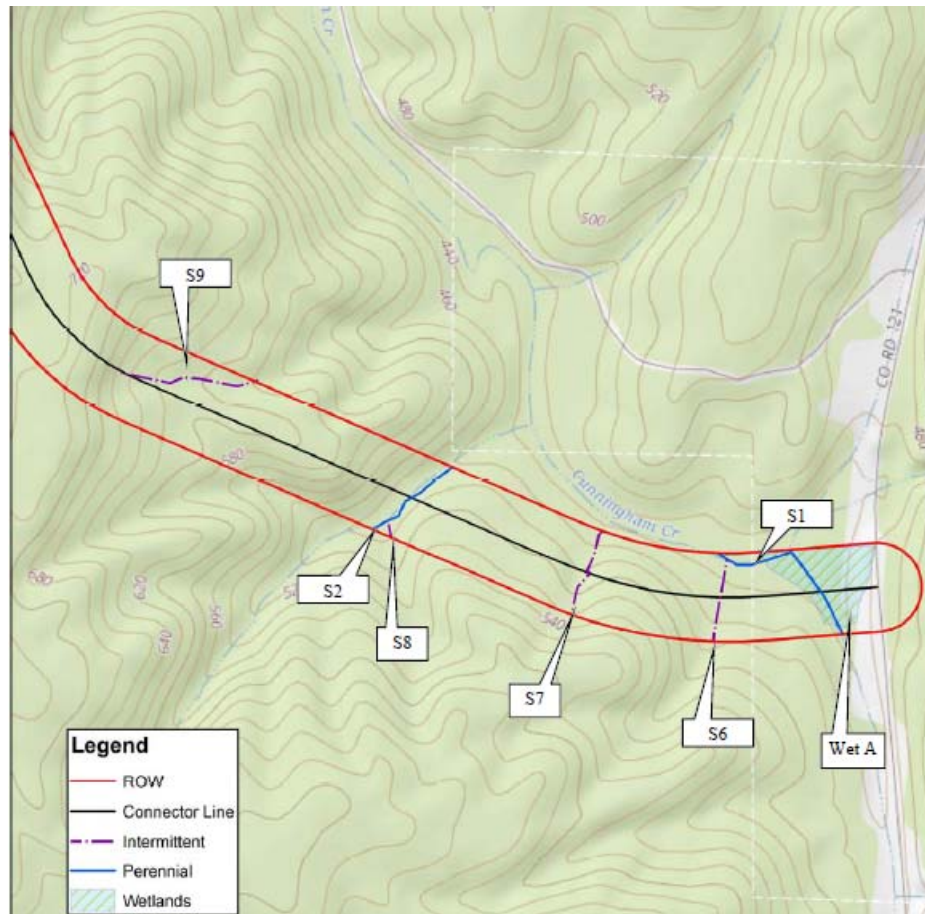


Figure 13. Sample WOTUS Delineation from Desktop Review (source: Spectrum)