



Final Design Report

For

Beckley Z-Way

State Project X241-ZWA/Y-1
Federal Project HPP-2007(050)D
County: Raleigh County

Submitted to:



**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

Submitted by:



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TABLE OF CONTENTS

SECTION 1 - PROJECT SUMMARY 2

 Segment 1 (US 19 from WV 3 to WV 307).....2

 Segment 2 WV 307 from US 19 to I-644

 Segment 7(Airport Road (CR 9/9) from I-64 to the Beckley – Raleigh County Airport)4

 Segment 8 (Eisenhower Drive Extension from US 19 to I-64)5

 Traffic Analysis Recommendations6

 Incident Management.....6

SECTION II - GEOTECHNICAL OVERVIEW 8

 Objective8

 Site Conditions.....8

 Geologic Overview9

SECTION III - ENVIRONMENTAL OVERVIEW 11

 I. Environmental Inventory13

 A. Historic and Archaeological Resources13

 B. Rare and Threatened Species14

 C. Cemeteries and Burial Grounds14

 D. Hazardous Waste, Underground Storage Tanks, Superfund Sites.....14

 E. Wetlands15

 F. Air Quality & Noise.....15

 G. Groundwater Resources & Existing Well Records.....15

 H. Other State and Federal Actions Required.....15

 II. Socioeconomic Impacts.....16

 A. Social.....16

 B. Economic.....19

 REFERENCES20

Appendix A - Evaluation Matrices 21

Appendix B - Design Criteria Summary..... 25

Appendix C - Cost Estimates 27

Appendix D - Acquisition Tables 34

Appendix E – Office Review Comments with Actions Taken 48

TABLE OF FIGURES

Figure 1: Vicinity Map..... 2

Figure 2: View Looking North on US 19 3

Figure 3: View Looking North on WV 307..... 6

Figure 4: Segment Location Map 7

Figure 5: MSHA Entrance 9

Figure 6: Geological Feature Map 10

Figure 7: US 19 North of WV 3..... 11

Figure 8: WV 307 North of US 19..... 11

Figure 9: Area of Potential Effect Map..... 12

Figure 10: Little Beaver Dam 13

Figure 11: National Register Listings in Raleigh County..... 13

Figure 12: Potentially Contaminated Soil Locations 14

Figure 13: Citgo Station at US 19 and WV 3 Intersection 14

Figure 14: EPA listed Superfund Sites 14

Figure 15: CERCLIS Sites in Raleigh County 15

Figure 16: Farmlands Within Project Area..... 17

Figure 17: Farmland Legends 18

Figure 18: Example of existing service related industries. 19

TABLE OF TABLES

Table 1: US 19 Segment Accident Summary 3

Table 2: US 19 Intersection Accident Summary 4

Table 3: WV 307 Segment Accident Summary..... 4

Table 4: WV 307 Intersection Accident Summary 4

Table 5: CR 9/9 Segment Accident Summary..... 5

Table 6: CR 9/9 Intersection Accident Summary 5

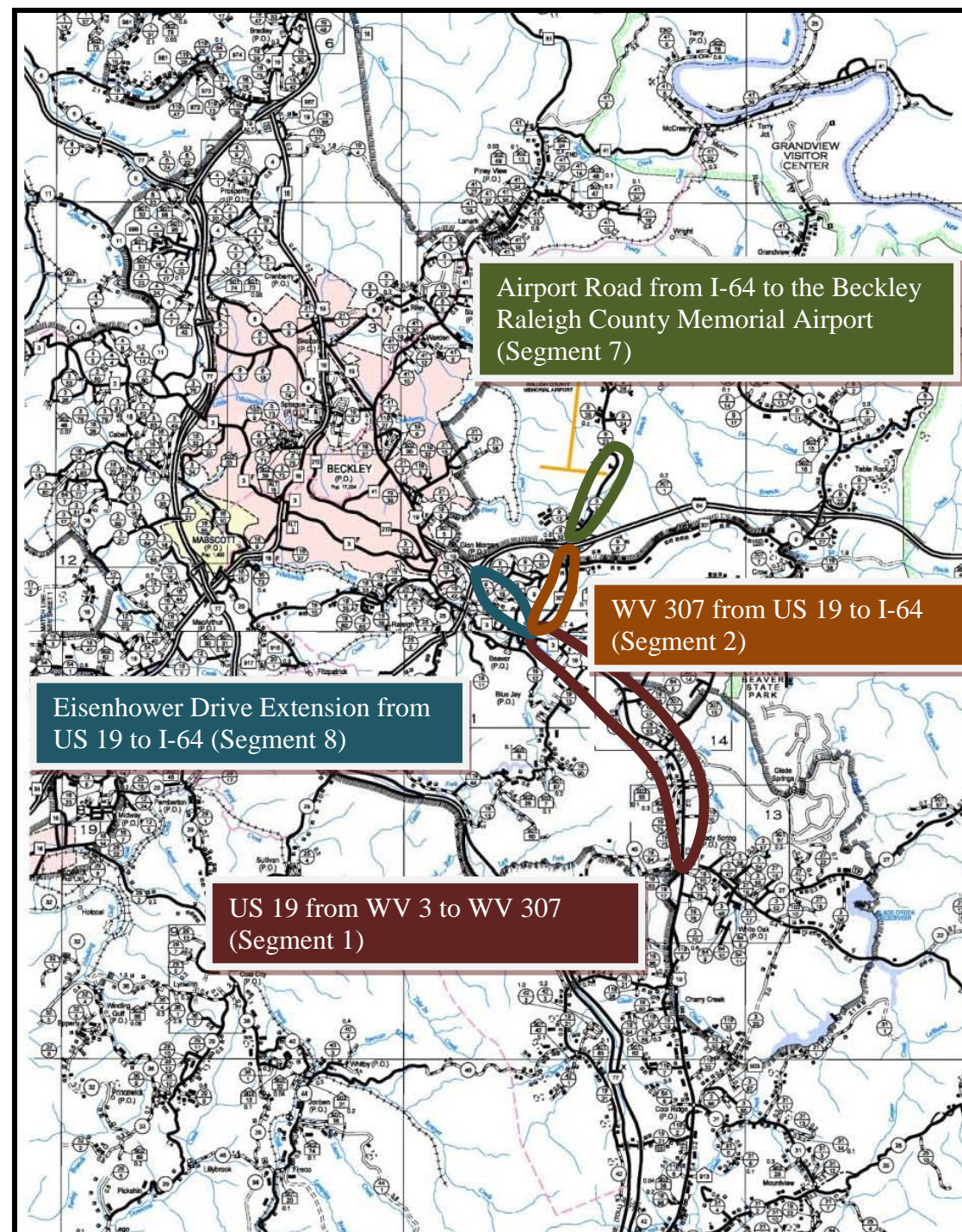


Figure 1: Vicinity Map

SECTION 1 - PROJECT SUMMARY

The Beckley Z-Way design study includes developing feasible alternates along four segments of roadway in Raleigh County, WV. The alternates will be further studied through the NEPA process with final alternates being selected for future design and construction projects. The segment numbering methodology maintains the segments identified in the original traffic study (Phase I). Three of the four segments involve potential improvements to the existing roadway. Segment 8 will be a new facility which connects US 19 directly to I-64. The construction of this segment helps alleviate congestion on the existing network by providing a convenient access to the City of Beckley and the commercial areas along Eisenhower and Robert C. Byrd Drives as well as the East Beckley Bypass. This study was developed assuming a connection from Shady Springs to a new interchange with I-64. An interstate system access change study may be required for the Segment 8 alternate. See Figure 1 for the project Vicinity Map.

Segment 1 (US 19 from WV 3 to WV 307)

Segment 1 starts in the Shady Springs area at the intersection of WV 3 and ends near WV 307 (Airport Road) in Beaver. A traffic study was conducted to determine the most feasible configuration for US 19. The analysis shows that a 3-lane typical section, two through lanes (one lane in each direction) and a continuous center turn lane, is appropriate. The speed limit for this segment is at 40 mph from the US 19/WV 3 Intersection north to Lewis Drive just to the southeast of Daniels. The speed limit varies from 40 to 50 mph along the alignment. The speed limit is 40 mph in the vicinity of the WV 3 intersection and in the vicinity of the WV 307 intersection. The intersections of US 19 with WV 3 and WV 307 are currently signalized.

The design criterion on US 19 is based upon Urban Arterial Functional Classification, with a minimum of 45 mph design speed for Alternates 3 through 6. Alternate 2 widens the existing roadway so no changes were made to the existing horizontal and vertical alignments. The typical section includes 12-foot wide through lanes and a 14-foot wide continuous center turn lane. A summary of the design criteria is shown in the appendix.

There are six potential alternates for widening US 19 (Segment 1):

- 1. No Build;
- 2. Widening along both sides using the existing alignment. (Less than 45 mph design speed);
- 3. Widening and reducing the sharpness of the existing horizontal and vertical curves;
- 4. Widening on the sides opposite of alternate 3;
- 5. Same alignment as Alternate #3, but uses a curb and gutter typical roadway section;
- 6. Same alignment as Alternate #4, but uses a curb and gutter typical roadway section.

To achieve the 45 mph design speed, vertical alignment adjustments were made to Alternates 3 through 6. If any of alternates 3 through 6 are selected to proceed into the design phase, special attention to the temporary traffic control design is required in the areas of vertical alignment adjustments.

Each of these alternates will be evaluated for cost and environmental impacts with a preferred option selected for final design. Extensive utility relocations will be required for Alternatives 2 through 6. A new signal will be added at the US 19 and Segment 8 intersection.



Figure 2: View Looking North on US 19

The land use along US 19 includes numerous commercial properties and a high demand for access. The three-lane typical section will provide better traffic flow by separating the left turning traffic from the through traffic. Table 1 shows the accident rates for various segments along US19. Table 2 shows the accident rates at selected intersections. The accident statistics show a predominance (60%) of rear-end type collisions all along this roadway segment. Another 15% of the accidents were either Access Conflict or Left turn. A three lane typical section reduces these accidents by separating left-turning traffic from the traffic flow. The highest concentration of accidents occurs on the section of US 19 between C&O Dam Road and Old Crow Road. The higher than average accident rate consists mostly of rear end type collisions. This area has closely spaced intersections and driveways along with a 6% grade and deficient sag vertical curve. The addition of the continuous left turn lane and increasing the sag vertical curve to a 45 mph design speed in alternates 3 thru 6 will help reduce these accidents. Access management also would help eliminate the turning conflicts. The US 19/WV3 intersection has the highest accident rate. However, the accident data was collected prior to the installation of a signal at this intersection. The signal should decrease the accident rate.

Table 1: US 19 Segment Accident Summary

Route Name	County	Start	Stop	Milepost (Start)	Milepost (Stop)	Distance (miles)	Number of accidents	Time Period (yrs.)	Volume (AADT)	R (section)	Versus Average (%)
US 19	Raleigh	WV 3	4 TH Street / Hampton Drive	8.78	9.78	1.00	14	3.5	15,650	70.0	34.0%
US 19	Raleigh	4 TH Street / Hampton Drive	WV 307 Grandview Road	9.78	10.45	0.67	23	3.5	17,200	156.2	75.8%
US 19	Raleigh	WV 307 Grandview Road	CR 19/15 4-H Lake Road	10.45	11.56	1.11	33	3.5	15,850	146.8	71.3%
US 19	Raleigh	CR 19/15 4-H Lake Road	CR 19/13 C & O Dam Road	11.56	12.17	0.61	17	35.	19,265	113.2	55.0%
US 19	Raleigh	CR 19/13 C & O Dam Road	CR 119/36 Old Crow Road	12.17	12.49	0.32	35	3.5	18,375	465.9	226.2%
US 19	Raleigh	CR 119/36 Old Crow Road	WV 307 Airport Road	12.49	12.90	0.41	25	3.5	21,600	221.0	107.3%

Table 2: US 19 Intersection Accident Summary

Route Name	Real Milepost	County	Intersection	Number of Accidents	Time Period (yrs.)	Intersection DEV	R (spot)	Route Name
WV 3	8.78	Raleigh	WV 3	33	3.5	14,700	1.76	
WV 307	10.45	Raleigh	WV 307	6	3.5	14,850	0.32	Rite Aid / IGA Parking
CR 19/15 4-H Lake Road	11.56	Raleigh	CR 19/15 (4-H Lake Road)	12	3.5	16,850	0.56	CR 19/37 (Dan Mont Vista)
CR 19/13 C & O Dam Road	12.17	Raleigh	CR 19/13	14	3.5	14,800	0.74	CR 19/99 (Price Street)
WV 307	12.90	Raleigh	WV 307 (Airport Road)	25	3.5	21,200	0.92	Walgreens / KFC Parking

Segment 2 WV 307 from US 19 to I-64

This segment of roadway has existing 10 foot lanes, little development, and a rural character. The 10-foot travel lanes do not meet lane width requirements for a roadway with an AADT>2000 vpd. Therefore this roadway will be widened to have 12-foot wide travel lanes with 8-foot wide shoulders. These wider travel lanes and shoulders helps increase the safety and increase capacity by reducing side friction. The horizontal and vertical alignments will remain intact. The speed limit for this segment is 45 mph.

There are two potential alternates for widening WV 307:

1. No Build;
2. Widen the typical section to 12-foot wide lanes with 8-foot wide shoulders. Six feet of the 8-foot wide shoulder should be paved.

The traffic demand for this segment will be reduced once Segment 8 is constructed. This lower demand will reduce the need for a continuous left turn lane. Additionally, there are few driveways and intersections within the middle of the alignment, which reduces the need for a turn lane. On this segment, the accident rate is lower than the statewide average. The accidents were concentrated at the two ends of the segment. The accidents were located within a quarter-mile of the US 19 Intersection and at the CR 9/9 intersection. Only two accidents occurred along the remaining segment length.

Table 3: WV 307 Segment Accident Summary

Route Name	Real Milepost	County	Intersection	Number of Accidents	Time Period (yrs.)	Intersection DEV	R (spot)	Route Name
WV 307 Airport Road	1.32	Raleigh	CR 9/9	6	3.5	8,250	0.57	Orchard Hill Road

Table 4: WV 307 Intersection Accident Summary

Route Name	County	Start	Stop	Milepost (Start)	Milepost (Stop)	Distance (miles)	Number of Accidents	Time Period (yrs.)	Volume (AADT)	R (section)	Versus Average (%)
WV 307	Raleigh	US 19	CR 9/9 Orchard Hill Road	0.10	1.32	1.22	27	3.5	12,950	133.8	64.9%

Segment 7 (Airport Road (CR 9/9) from I-64 to the Beckley – Raleigh County Airport)

This segment of roadway has existing 10 foot lanes, little development, and a rural character. The 10-foot travel lanes do not meet lane width requirements for a roadway with an AADT>2000 vpd. Therefore this roadway will be widened to have 12-foot wide travel lanes with 8-foot wide shoulders. These wider travel lanes and shoulders helps increase the safety and increases capacity by reducing side friction. The speed limit for segment 7 is 50 mph.

There are two potential alternates for widening WV 307 (Segment 7):

- 1. No Build;
- 2. Widening to 12-foot wide lanes and 6-foot wide paved shoulders and an 8-foot wide shoulders.

A continuous center turn lane option is not supported by the traffic volumes. Additionally, the driveways are located at a reasonable spacing, which diminishes the effect of the turn lane.

The accident rate for Airport Road is well below the statewide rate for county roads. However, there were 11 accidents over the 3.5 year period, which occurred near the entrance of the Mine Health and Safety Academy. The accidents were classified as single vehicle for 6 of the accidents. This section of the alignment has several horizontal and vertical curves. The horizontal curves have a minimum design speed of 45 mph, whereas one of the vertical curves has a design speed of 25 mph. The milepost location of these vertical curves does not correspond to the accident locations. The vertical curve in the vicinity of the Academy is 50 mph.

Table 5: CR 9/9 Segment Accident Summary

Route Name	County	Start	Stop	Milepost (Start)	Milepost (Stop)	Distance (miles)	Number of Accidents	Time Period (yrs.)	Volume (AADT)	R (section)	Versus Average (%)
CR 9/9 Airport Road	Raleigh	WV 307	Interstate 64 Interchange	0.00	0.81	0.81	6	3.5	9,350	62.0	19.3%
CR 9/9 Airport Road	Raleigh	Interstate 64 Interchange	Raleigh County Airport	0.81	1.81	1.00	16	3.5	8,550	146.5	45.5%

Table 6: CR 9/9 Intersection Accident Summary

Route Name	Real Milepost	County	Intersection	Number of Accidents	Time Period (yrs.)	Intersection DEV	R (spot)	Route Name
CR 9/9	0.11 to 0.37	Raleigh	Interstate 64 Interchange Ramps (EB & WB)	5	3.5	9,320	.0.42	Airport Road

Segment 8 (Eisenhower Drive Extension from US 19 to I-64)

This is new roadway from just southeast of the WV 307 intersection up to the existing I-64 interchange. This roadway segment will include a crossing of Little Beaver Creek. The traffic demand model showed an increase of the level of service on the existing roadways with the inclusion of this segment. This segment has a design speed of 45 mph. The typical section for this roadway will be a three lane, with a continuous center turn lane. An access modification study will be required for the I-64 interchange at milepost 124.

There are three potential alternates for the Eisenhower extension. The alignment studied for alternate 2 is closer to US 19 and does not allow a suitable connection to US 19. Both versions of Alternate 1 provide a feasible connection to US 19.

- 1. Alignment Alternate 1 - Grade separated intersection with WV 307.
- 2. Alignment Alternate 1 - At-grade intersection with WV 307.
- 3. Alignment Alternate 2 - Grade separated intersection with 307, with different starting point.

The I-64 Interchange will need to be modified to accommodate the southern access. This study presents a feasible option which will include;

- Providing I-64 eastbound off-ramp left turn lane and providing two southbound left turn lanes.
- Signalizing the eastbound ramps.
- Providing two receiving lanes on I-64 on-ramp.
- Signalizing the I-64 westbound ramps to accommodate northbound left turn and westbound left turn traffic.

Traffic Analysis Recommendations

Based on the analysis results associated with the construction of the Beckley Z-Way, the following roadway improvements should also be considered.

US 19 (South of East Beckley Bypass Connector)

- For unsignalized intersections with approximately 50 or more right turning vehicles for the mainline, right turn lanes should be considered. In most cases, 100 feet of storage should be adequate.

US 19 Unsignalized Intersections (South of East Beckley Bypass Connector)

- As needed, signalize if and when volumes meet signal warrants. The US 19 Connector intersection with the Bypass Extension, the at-grade intersection with WV 307 and the Bypass Extension and the I-64 Interchange ramp intersections would likely meet signal warrants.

US 19/East Beckley Bypass Connector Intersection

- Provide separate eastbound left turn lane and channelized right turn lane with an added lane southbound on US 19. The additional southbound lane can be dropped prior to CR 119/36 (Old Crow Road). Provide two northbound left turn lanes on US 19. The additional lane may be dropped prior to Trenton Lane.

East Beckley Bypass and Jersey Avenue

- Increase northbound left turn storage length as needed by restriping existing Two-Way Left Turn Lane

Incident Management

Reducing traffic congestion and improving roadway safety are high priorities. Traffic incidents are a major source of both highway congestion and safety problems. Incidents are estimated to cause approximately half of all traffic delay. Crashes that result from other incidents account for approximately 16 percent of all crashes and cause 18 percent of freeway deaths. For these reasons, FHWA strongly endorses the establishment and use of good traffic incident management. Effective transportation system management and operations depends on the aggressive management of temporary disruptions (caused by traffic incidents, work zones, weather, special events, etc.) in order to reduce the consequences of these disruptions and return the system to full capacity. The FHWA publication “Simplified Guide to the Incident Command System for TRANSPORTATION PROFESSIONALS, February 2006” outlines procedures and stakeholders for implementing a workable incident management plan and an incident command system.



Figure 3: View Looking North on WV 307

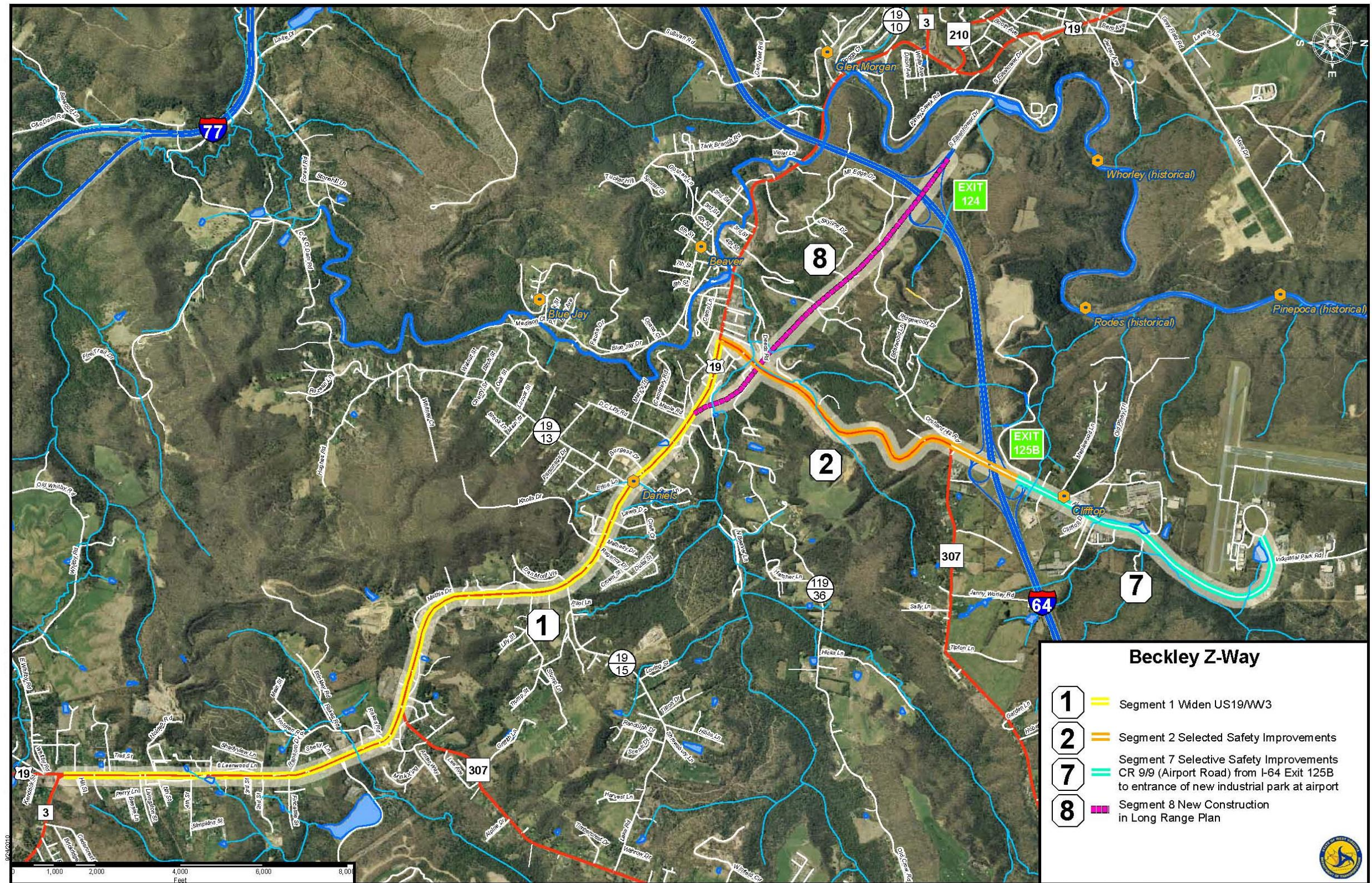


Figure 4: Segment Location Map

SECTION II - GEOTECHNICAL OVERVIEW

The purpose of this project is to improve accessibility through an area known as the Beckley Z-Way and to route more traffic through Beckley, West Virginia. The study limits for the Beckley Z-Way are shown on Figure 6. The corridor improvements are anticipated to include the following:

- widening along approximately 4.25 miles of US 19;
- widening about 1.5 miles of Airport Road to the north of I-64;
- widening about 1 mile of WV 307 to the south of I-64; and
- about 1.5 miles of new alignment from I-64 at Exit 124 to the south to US 19.

Objective

The primary objective of this geotechnical overview study was to review readily available site data and to identify potential geotechnical and/or geological features that may impact the planning, design, and/or construction of new or modified roadways in the corridor.

Site Conditions

A site visit has not been made by CDM Smith’s geotechnical personnel. However, a review of readily available aerial mapping, topographic mapping, and site photos has been made.

The topography of the study area may be characterized by rugged terrain where wooded hills typically overlook relatively narrow lowlands occupied by rivers, creeks and branches. Several branches or creeks extend under existing roadways within the study area. The elevations along most of the affected alignments range between about +2,200 feet near the intersection of US 19 and WV 307 and about +2,700 feet near the southern extent of the study area.

From this data review effort, it appears that a majority of the properties adjacent to US 19, which is primarily a two-lane facility within the study limits, are either residential or commercial. Overhead

power lines typically parallel one or both sides of the roadway. Existing cuts and fills along US 19 are unknown; however, thicknesses less than 10 feet appear common as the topography along the roadway often appears to be gently to moderately rolling. Some notable exceptions to this includes several cut slopes in rock and several retaining walls apparently built off the roadway shoulder to accommodate the West Virginia Department of Highways right of way. Several box culverts provide passage over Sand Branch, Beaver Creek and Little Beaver Creek. A bridge is also present on US 19 to allow access over WV 307.

The land use along existing WV 307, which is a two lane facility, was observed to be a mix of residential, commercial and undeveloped woodlands. This section of roadway from about US 19 to just west of I-64 at Exit 125B is winding and rises steadily to the north. Several large slopes, especially near the roadway’s horizontal curves, were observed. A sizable rock cut slope is present on the uphill side of the section of greatest horizontal curvature.

Airport Road extends north from I-64 at Exit 125B to Raleigh County Airport. Based on aerial mapping, this area is mostly undeveloped with some wooded areas. The ground surface elevations along this roadway and adjacent properties are about +2,500 feet and are relatively flat.

The proposed new roadway from US 19 and extending northwest towards I-64 at Exit 124 is mostly wooded and presently undeveloped although a portion of this area has been subject to past coal mining activities as described further below. It is anticipated that a new bridge over Beaver Creek may be required. The relief along this future roadway corridor is quite rolling with ground surface elevations increasing from south to north.

Geologic Overview

Based on the published geologic mapping, the study area is located in the Allegheny Plateau, which is comprised of Pennsylvanian and Permian strata containing minable coal beds. The rock strata in this area are likely comprised of cyclic sequences of sandstone, shale, clay, coal and limestone. No faults were identified within the limits of the corridor study.

It is anticipated that the study area has a very low karst potential (i.e., karst features are rare or absent). However, detailed geologic quadrangles containing the study area have not been reviewed.

Based on materials reviewed for this study, springs have not been identified within the study area. Regardless, it is possible that some locations contain wet weather springs.



Figure 5: MSHA Entrance

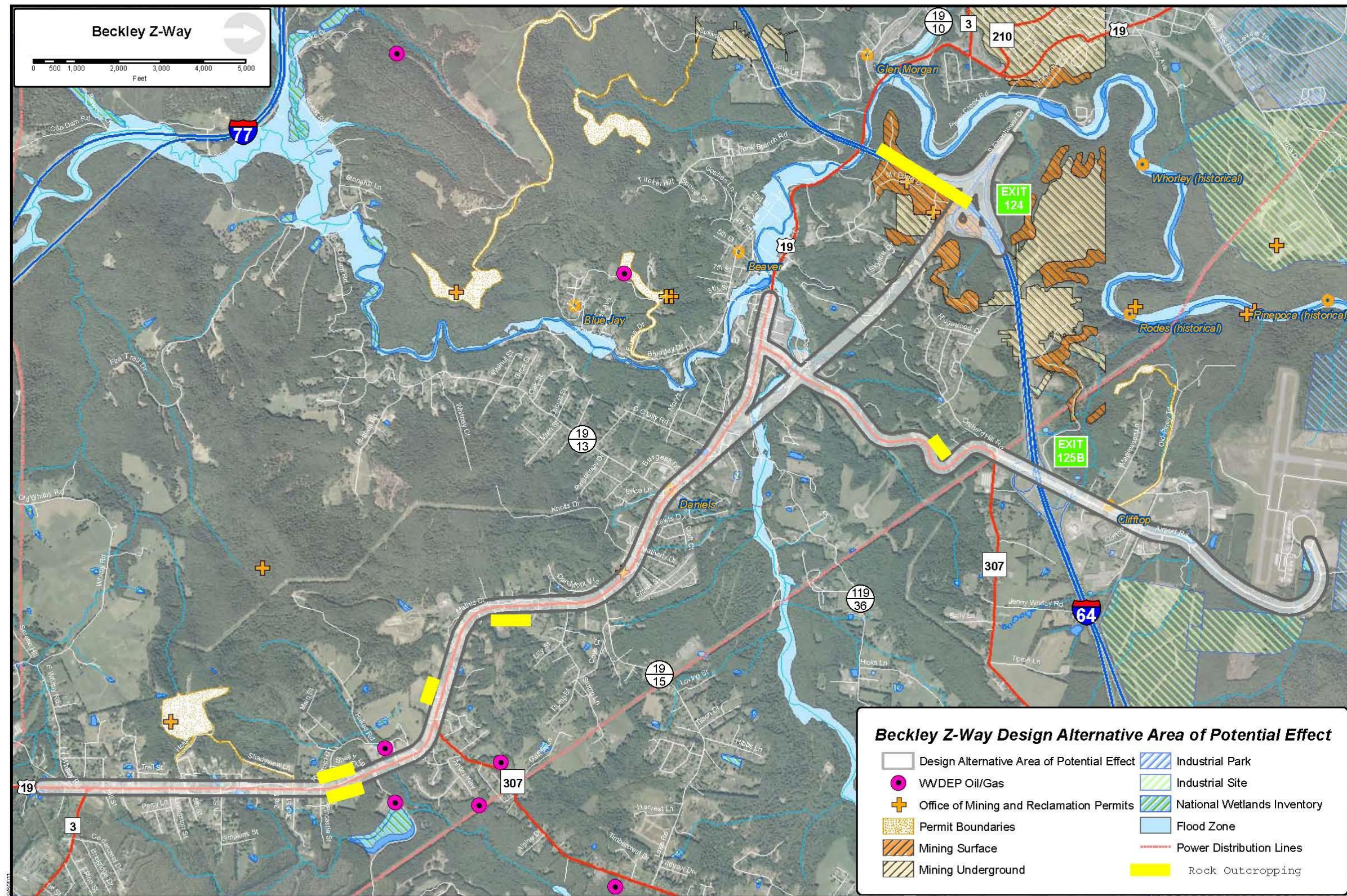


Figure 6: Geological Feature Map

SECTION III - ENVIRONMENTAL OVERVIEW

The Beckley Z-Way design study includes developing feasible alternates along four segments of roadway in Raleigh County, WV. See Figure 4: Segment Location Map. The alternates will be further studied through the National Environmental Policy Act (NEPA) process with a recommended alternate being selected for future design and construction projects.

This Environmental Overview is a level of documentation that identifies environmentally sensitive areas within the project area to aid in planning activities. This type of documentation provides a framework to identify environmentally sensitive areas and develop a scope to assist with the NEPA process. No in-depth research is warranted at this stage of project development. A field visit was conducted in July 2011 to view the project area. The primary area of concern will be focused on 250 feet of either side of the existing centerline for a total corridor of 500 feet as shown in Figure 9. This study corridor is typically referred to as Area of Potential Effect (APE).

Data was gathered using the Geographic Names Information System (GNIS) for all known places, features, and areas in the United States that are identified by a proper name. Each feature is located by state, county, and geographic coordinates; and referenced to Statewide Mapping Aerials.



Figure 7: US 19 North of WV 3



Figure 8: WV 307 North of US 19

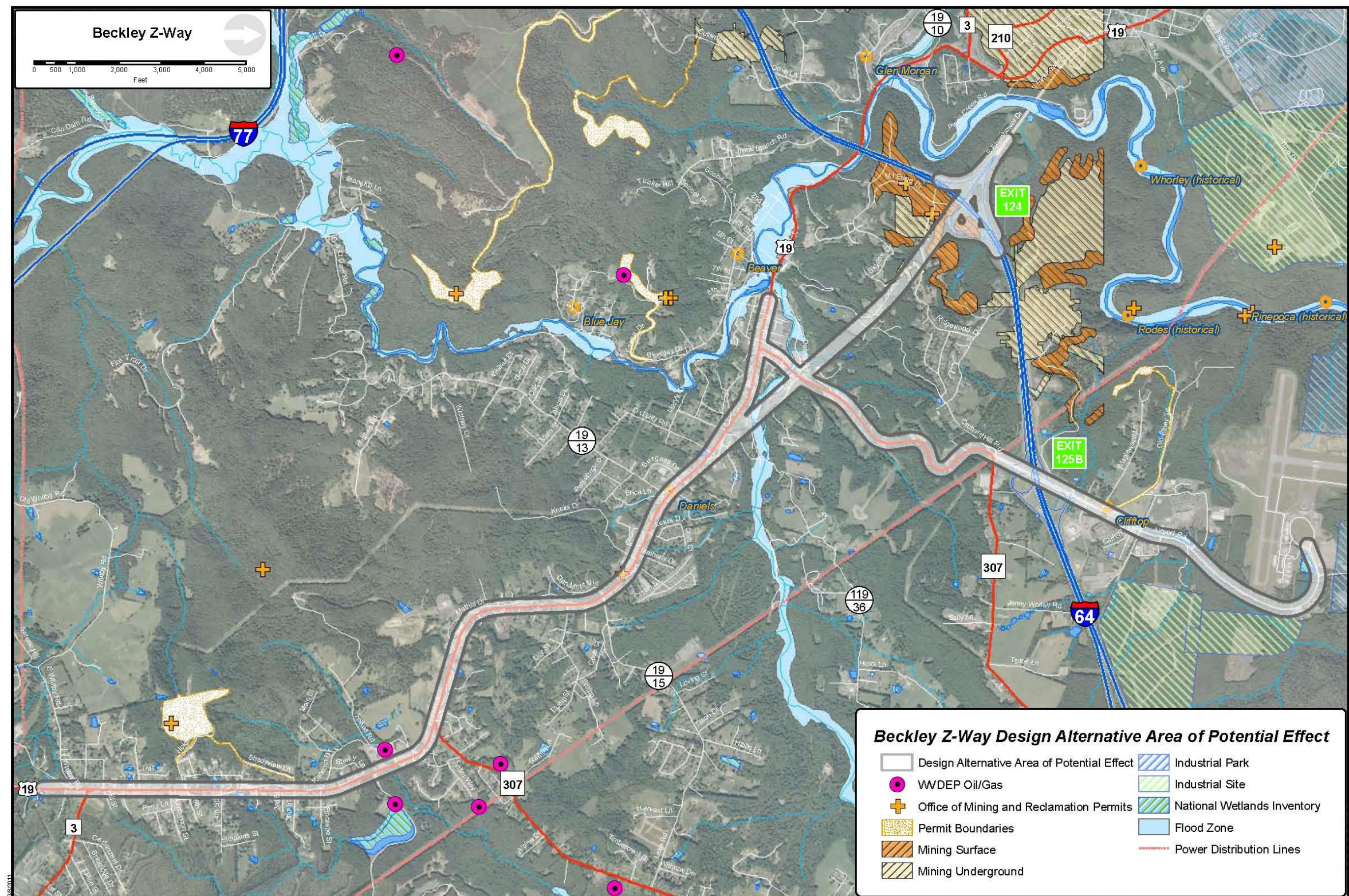


Figure 9: Area of Potential Effect Map

I. Environmental Inventory

A. Historic and Archaeological Resources

The National Register of Historic Places is a listing of historic and archaeological resources. Historic and archaeological resources can include districts, archaeological sites, buildings, structures and objects. Listed resources are generally at least fifty years old and possess historic and culture significance and integrity. Archival research at the West Virginia Division of Culture and History (WVDCH), Historic Preservation Unit was not conducted at this time. As this project is advanced through the development process, a thorough investigation into cultural resources will be completed at the WVDCH and the West Virginia State Historic Preservation Office (WVSHPO) utilizing their expansive reserves of documents, mapping, reports and files.



Figure 10: Little Beaver Dam

Archaeological Resources

The likelihood of archaeological resources in this area is small due to previous disturbance resulting from the construction of I-64, US 19 and adjacent industrial commercial and

residential development. Any previous deposits of archaeological resources have likely been impacted or removed by construction.

Historic Resources

A search for National Register of Historic Places listed properties was conducted by utilizing *Historic West Virginia, The National Register of Historic Places*, published by the WVDCH. Within the entirety of Raleigh County there are eight National Register of Historic listings.

Community	Name of Listing	Location
Beckley	Beckley Courthouse Square Historic District	Prince, Kanawha, Church, Lebanon, Howe, McCreery and Earwood Streets and Alaska and First Avenues
Beckley	Beckley Feed and Hardware Company	Prince Street
Crow	Little Beaver Dam	Little Beaver Creek
Beckley	Phillips-Sprague Mine	Beckley Exhibition Coal Mine
Sandstone	<u>St. Coleman's Roman Catholic Church and Cemetery</u>	New River
Hinton	<u>Trump-Lilly Farmstead</u>	
Sophia	<u>Sophia Historic District</u>	
Beckley	<u>Wildwood</u>	Laurel Terrace

Figure 11: National Register Listings in Raleigh County

There are no properties listed on the National Register of Historic Places within or near the project area. A site visit didn't identify any potential historic sites within the APE. An historic survey will be conducted during the scoping of the NEPA process to further determine if the project will impact potential historic structures.

B. Rare and Threatened Species

The West Virginia Department of Natural Resources (WVDNR), Wildlife Resources Section will be contacted to obtain information on any rare, threatened or endangered species (RTE) within the project area of potential effect. There have been several Indiana Bat Mist Net Surveys conducted to the north of this project. As of this study, there have been no bats found. During the next phase of the project, the US Fish and Wildlife service will additionally be contacted concerning potential RTE species.

C. Cemeteries and Burial Grounds

A query of the GNIS mapping database and examination of USGS topographical maps were conducted to identify locations of cemeteries and burial grounds within the project area. No cemeteries or burial grounds were found to be located within the project APE utilizing these resources. Further investigation into the cemeteries will be conducted during the course of this study.

D. Hazardous Waste, Underground Storage Tanks, Superfund Sites

Correspondence with the West Virginia Department of Environmental Protection will be initiated for information on any underground storage tanks, superfund sites or hazardous waste sites. Potential Sites Identified during a field investigation are listed.

Alternate	Station	Description
1	RT 1014+00 US 19	Active Service Station
1	LT 1025+50 US 19	Historic Service Station
1	RT 1037+00 US 19	Historic Service Station
1	RT 1054+00 US 19	Active Service Station
1	RT 1109+00 US 19	Active Service Station
1	LT 1127+00 US 19	Active Service Station
1	LT 1194+00 US 19	Active Service Station
1	LT 1223+50 US 19	Dry Cleaners
1	LT 2004+00 WV 307	Active Service Station
1	LT 2100+00 WV 307	Active Service Station

Figure 12: Potentially Contaminated Soil Locations



Figure 13: Citgo Station at US 19 and WV 3 Intersection

In addition to correspondence with the WVDEP, the United States Environmental Protection Agency (www.epa.gov) website was consulted. This website revealed a total of four Superfund sites are located in Raleigh County. These sites are listed below in Figure 14.

Site Name	EPA ID	NPL Status	City	County	Zip
Glen Morgan Drum Dump	WVD988767455	Non	Glen Morgan	Raleigh	25847
Hoffman Metal Removal	WVN000305643	Non	Mabscott	Raleigh	25827
Holly Hill Subdivision	WV0001095421	Non	Fairdale	Raleigh	25839
Sophia Battery Dump	WVSFN0305434	Non	Sophia	Raleigh	25921

Figure 14: EPA listed Superfund Sites

More detailed investigations will be conducted when alternates have been chosen. These investigations will determine if the sites listed in Figure 14 will be impacted. Also available

on the EPA website are Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Hazardous Waste Sites listings. Within Raleigh County, federally listed CERCLIS sites are shown in Figure 15. The exact locations of these sites are not known. General locations were provided by the EPA website, however their specific locations were not given and cannot be shown on project mapping due to the possibility of misidentification or mislabeling of a property. Upon establishment of alternatives and determination of a preferred alignment, further investigations to determine precise locations of the CERCLIS sites will need to be conducted.

EPA ID	Site Name	City	County	State	Non-NPL Status Code	Non-NPL Status Date	NPL Status Code
WVD016138760	Barker Junk Co., Inc.	Mabscott	Raleigh	WV	OS	7/2/2002	N
WVSFN0305434	Sophia Battery Dump	Sophia	Raleigh	WV	RW	4/24/2008	N
WV0002326486	Walton Mtn. Road Home	Rhodell	Raleigh	WV	RO	1/12/2000	N

Figure 15: CERCLIS Sites in Raleigh County

E. Wetlands

Within the study area, wetlands are present in areas where existing roadways traverse streams or rivers. United States Department of the Interior, National Wetland Inventory Maps has been reviewed for any locations of previously identified wetlands within the project area. The wetland boundaries are shown in Figure 9. The primary wetland area relates to Little Beaver Creek. The Z-Way project crosses the floodplain near the intersection of WV 307 and US 19. The other wetlands will be classified as the project progresses. Depending on the preferred alternate for the project, further investigations into registered wetlands within the APE will be warranted.

F. Air Quality & Noise

At this level of documentation air and noise monitoring is not required. Upon determination of a preferred alternate, these areas of concern will be examined in more detail.

G. Groundwater Resources & Existing Well Records

The underlying groundwater aquifer of the Beckley area is the New River Formation of the Pottsville Group, which is of Pennsylvanian Age. This geologic formation consists of thick layers of sandstone separated by thinner beds of shale, siltstone, and coal. Primary permeability, the movement of water directly through the pore spaces of rocks, is low throughout the area. Therefore, movement of groundwater is mostly by secondary permeability through the fractures, joints, and separations of the geologic formation. Wells that penetrate these few fractures generally have yields less than 1 gallon per minute per foot of drawdown. Yields are highly variable depending on the number of water-bearing openings penetrated by the well. In the Beckley area, this variability can result in wells located near each other having vastly different yields. Additionally, the United States Geological Survey (USGS) describes groundwater discharge to the many small streams in this area as insufficient to maintain flow during drought periods.

The State of West Virginia Department of Health and Human Resources, Bureau of Health reported that the Beckley Water Company provides public water for the entire study area, and their water sources are from one surface water plant and one groundwater plant. The surface water plant is located to the east of the project area at Glade Creek Reservoir, and the groundwater plant is located outside of the study area at Sweeneysburg. The only items within the study area related to public water supply are distribution lines and tanks. The Beckley-Raleigh County Board of Health reported that to their knowledge, there are no private water wells within the study area. The State of West Virginia Division of Environmental Protection, Office of Water Resources (WVDEP-OWR) stated that state law does not protect aquifer recharge areas.

H. Other State and Federal Actions Required

Other federal and state agency actions may be required when it has been determined what the preferred alternate will be. At this point, coordination with these agencies is not warranted, as this level of investigation is an overview and may include:

- Section 404 permit approval by the U.S. Army Corps of Engineers (Huntington District) for stream and wetland encroachment required for roadway construction,

- Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection,
- The US Fish and Wildlife Service and Marine Fisheries Service,
- National Pollution Discharge Elimination System (NPDES) Permit from the West Virginia Department of Environmental Protection,
- Contact any public land holders in the area and,
- Federal Emergency Management Agency (FEMA) for permits and coordination,
- Public Land Corporation easements.

II. Socioeconomic Impacts

A. Social

The City of Beckley is centrally located in southern West Virginia. It is situated about 60 miles (96 km) southeast of Charleston, West Virginia and 45 miles (72 km) north of Bluefield, West Virginia. Beckley serves as the seat of government for Raleigh County and is its largest municipality. Beckley is the commercial center of the rural, coal mining area of southern West Virginia. Several counties border Raleigh County: Boone and Wyoming on the west, Kanawha and Fayette on the north, Summers on the east and Mercer on the south. The New River shapes the eastern edge of the county.

Several major highways serve the Beckley and Raleigh County area. These highways include Interstate 77 (West Virginia Turnpike), Interstate 64 (I-64), and US Route 19 (Appalachian Corridor L).

The subject project is limited to a 250-foot wide buffer zone area on either side of the existing roadways. By utilizing the GNIS maps and the project field visit, it has been determined that there are no schools, libraries, parks or recreational facilities located within

the APE. Also established was the lack of public services within the APE, such as emergency services, waste disposal facilities and other similar services.

Industrial/commercial and residential are the two primary land uses within the project area.

Further correspondence with the Natural Resources Conservation Service will determine if there are Prime and Statewide Important Farmlands present in the project area.

Travel patterns will be modified and improved, because this project provides an additional access to I-64 and a connection from the Shady Springs area to the downtown Beckley area. Additionally, because the widening of the roadway is located at or near its current location, pedestrian and/or bicycle facilities will be improved by the construction of paved shoulders.

Effects on social groups will be minimal due to this project's location with respect to the location of the existing roadway, the amount of roadway being affected, and the limits of the project. Since this project is along an existing interstate, no impact will occur to social groups.

There will be no 4(f) impacts associated with this project. Any potential 4(f) properties are outside the APE of this project. Section 4(f) of the Department of Transportation Act of 1966 (49 USC 1653 (f)), that declares it a national policy that special effort be made to preserve the natural beauty of the countryside, public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

In accordance with the Presidential Executive Order on Environmental Justice, this project will be analyzed to determine the likelihood of impacts to minorities or disadvantaged populations. The project area may involve substantial relocations depending on the preferred alternate. Nevertheless, it is unlikely that any alignment chosen would have a disproportionate impact on environmental justice populations

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

Not prime farmland

All areas are prime farmland

Prime farmland if drained

Prime farmland if protected from flooding or not frequently flooded during the growing season

Prime farmland if irrigated

Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Prime farmland if irrigated and drained

Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Prime farmland if subsoiled, completely removing the root inhibiting soil layer

Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Prime farmland if irrigated and reclaimed of excess salts and sodium

Farmland of statewide importance

Farmland of local importance

Farmland of unique importance

Not rated or not available

Major Roads

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

MAP INFORMATION

Map Scale: 1:30,200 if printed on B size (11" x 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fayette and Raleigh Counties Area, West Virginia
Survey Area Data: Version 3, Mar 9, 2011

Date(s) aerial images were photographed: 8/25/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Figure 17: Farmland Legends

B. Economic

Beckley is the most populated municipality within Raleigh County. For decades Beckley and Raleigh County were known as an area of major coal production. While the coal mining industry is no longer at its peak, the city has grown into a regional commercial center providing wholesale, retail and services to the surrounding counties in southern West Virginia.

The economy of the project area should not be adversely impacted by the widening of US 19. There will be some temporary impacts caused by business relocations and during construction. There are numerous commercial properties which lie along US 19 that could be impacted depending on which alternate is chosen. The economy should not be detrimentally affected by the implementation of the project.



Figure 18: Example of existing service related industries.

REFERENCES

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2011 Wetlands and Deepwater Habitats Classification.

Online at <http://www.gisdatadepot.com/readme/nwi/nwicodes.html> (Accessed September 2011).

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2011 Web Soil Survey.

Online at <http://websoilsurvey.nrcs.usda.gov/app/> (Accessed October 2011).

Map WV

2011 WV Geologic and Economic Survey Interactive Mapping Portal.

Online at <http://ims.wvgs.wvnet.edu/index.html> (Accessed September 2011).

U.S. Department of Transportation, Federal Highway Administration

Simplified Guide to the Incident Command System for TRANSPORTATION PROFESSIONALS, February 2006

Appendix A - Evaluation Matrices

Beckley Z-Way Alignment Alternative Evaluation/Cost Matrix - FINAL							
Impact Category		Alternative No. 1	Alternative No. 2	Alternative No. 3	Alternative No. 4	Alternative No. 5	Alternative No. 6
Engineering							
Prelim. Length of US 19/WV3 Improvements	Feet	Existing Conditions	23,000	23,000	23,000	23,000	23,000
	Miles	Existing Conditions	4.36	4.36	4.36	4.36	4.36
Roadway Configuration		Existing Conditions Average 2 (11' Lanes). Many areas have less than a 2' Shoulder	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 2' Gutter with Curb	2 (12' Lanes) 14' Continuous Left Turn Lane 2' Gutter with Curb
Horizontal Geometry (Min Radius)		716'	716'	822'	822'	822'	822'
Financial / Costs							
Estimated Right of Way Acquisition Costs		\$0	\$27,270,000	\$24,770,000	\$20,675,000	\$25,050,000	\$27,690,000
Estimated Utility Relocation Cost		\$0	\$5,250,000	\$5,250,000	\$5,250,000	\$5,250,000	\$5,250,000
Estimated Construction Cost		\$0	\$20,393,290	\$19,767,010	\$19,865,290	\$23,498,898	\$23,503,698
Estimated Total Project Cost		\$0	\$52,913,290	\$49,787,010	\$45,790,290	\$53,798,898	\$56,443,698
Traffic Operations							
Number of Local Roadways Severed		None	None	None	None	None	None
Safety Constraints / Impacts		Existing Conditions	Increased safety in comparison to Alternative 1 due to the addition of a continuous left turn lane and widened template. The horizontal alignment follows the existing alignment and widening occurs to both sides of the existing roadway.	Increased safety in comparison to Alternative 1 due to the addition of a continuous left turn lane and widened template. Improved Horizontal Alignment.	Increased safety in comparison to Alternative 1 due to the addition of a continuous left turn lane and widened template. Improved Horizontal Alignment	Increased safety in comparison to Alternative 1 due to the addition of a continuous left turn lane and widened template. Improved Horizontal Alignment.	Increased safety in comparison to Alternative 1 due to the addition of a continuous left turn lane and widened template. Improved Horizontal Alignment
Human Environment							
Historic Resource Impacts		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Cemetery Impacts		None	None	None	None	None	None
Industrial Facilities Impacts (e.g. Chemical Plant)		None	None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Commercial Facilities Impacts (e.g. Businesses)		None	75	63	54	63	54
Residential Displacement (# houses)		None	52	28	35	28	35
Potential Land Development		TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Physical Impacts							
Potential Hazard Waste Site(s)		None	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations
Major (Public) Utility Conflicts / Impacts		None	Major Utility Relocations Required	Major Utility Relocations Required	Major Utility Relocations Required	Major Utility Relocations Required	Major Utility Relocations Required
Major (Private) Utility Conflicts / Impacts		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Potential Stream Impacts		None	101 LF	266 LF	158 LF	258 LF	196 LF

Beckley Z-Way Alignment Alternative Evaluation/Cost Matrix Segments 2 and 7 - FINAL				
Impact Category		Alternative No. 1	Alternative No. 2	Alternative No. 3
Engineering				
Prelim. Length of Airport Road	Feet	Existing Conditions	16,800	16,800
	Miles	Existing Conditions	3.18	3.18
Roadway Configuration		Existing Conditions Average 2 (11' Lanes). Many areas have less than a 2' Shoulder	2 (12' Lanes) 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders
Horizontal Geometry (Min Radius)		292.96'	292.96'	292.96'
Financial / Costs				
Estimated Right of Way Acquisition Costs		\$0	\$5,410,000	\$5,500,000
Estimated Utility Relocation Cost		\$0	\$5,250,000	\$5,250,000
Estimated Construction Cost		\$0	\$9,188,242	\$16,490,746
Estimated Total Project Cost		\$0	\$19,848,242	\$27,240,746
Traffic Operations				
Number of Local Roadways Severed		None	None	None
Safety Constraints / Impacts		Existing Conditions	Widened driving lanes and shoulder	Widened driving lanes, shoulder, and added a continous left turn lane
Human Environment				
Historic Resource Impacts		None	None	None
Cemetery Impacts		None	None	None
Industrial Facilities Impacts (e.g. Chemical Plant)		None	None	None
Commercial Facilities Impacts (e.g. Businesses)		None	None	None
Residential Displacement (# houses)		None	None	None
Potential Land Development		None	TO BE DETERMINED	TO BE DETERMINED
Physical Impacts				
Potential Hazard Waste Site(s)		None	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations
Major (Public) Utility Conflicts / Impacts		None	Major Utility Relocations Required	Major Utility Relocations Required
Major (Private) Utility Conflicts / Impacts		None	Major Utility Relocations Required	Major Utility Relocations Required
Potential Stream Impacts		None	101 LF	266 LF

Beckley Z-Way Alignment Alternative Evaluation/Cost Matrix Segment 8 and US 19 Connector - FINAL						
Impact Category		Alternative No. 1 - Overpass	Alternative No. 1 - At Grade	Alternative No. 2		US 19 Connector
Engineering						
Prelim. Length	Feet	9,800	9,800	8,300		2,100
	Miles	1.86	1.86	1.57		0.40
Roadway Configuration		2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders		2 (12' Lanes) 14' Continuous Left Turn Lane 2' Gutter with Curb
Horizontal Geometry (Min Radius)		6000'	6000'	1850'		371'
Financial / Costs						
Estimated Right of Way Acquisition Costs		\$10,275,000	\$9,985,000	\$9,985,000		\$2,760,000
Estimated Utility Relocation Cost		\$5,250,000	\$5,250,000	\$5,250,000		\$5,250,000
Estimated Construction Cost		\$34,016,570	\$49,957,028	\$39,331,480		\$5,159,483
Estimated Total Project Cost		\$62,711,053 (Includes US 19 Connector)	\$78,361,511 (Includes US 19 Connector)	\$67,735,963 (Includes US 19 Connector)		\$13,169,483
Traffic Operations						
Number of Local Roadways Severed		None	None	None		None
Safety Constraints / Impacts		New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an at grade intersection with WV 307/Airport Road.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road. Due to the close proximity of US 19, a connector road to US 19 does not meet current geometric design criteria.		New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road. Due to the close proximity of US 19, a connector road to US 19 is not feasible.
Human Environment						
Historic Resource Impacts		None	TO BE DETERMINED	TO BE DETERMINED		TO BE DETERMINED
Cemetery Impacts		None	TO BE DETERMINED	TO BE DETERMINED		TO BE DETERMINED
Industrial Facilities Impacts (e.g. Chemical Plant)		None	None	None		None
Commercial Facilities Impacts (e.g. Businesses)		13	13	13		13
Residential Displacement (# houses)		14	14	14		18
Potential Land Development		None	TO BE DETERMINED	TO BE DETERMINED		TO BE DETERMINED
Physical Impacts						
Potential Hazard Waste Site(s)		None	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations		Impacts to Existing and Historic Service Stations
Major (Public) Utility Conflicts / Impacts		None	Major Utility Relocations Required	Major Utility Relocations Required		Major Utility Relocations Required
Major (Private) Utility Conflicts / Impacts		None	TO BE DETERMINED	TO BE DETERMINED		TO BE DETERMINED
Potential Stream Impacts		72 LF	55 LF	55 LF		None

Appendix B - Design Criteria Summary

Beckley Z-Way

Functional Classification – Urban Arterial
Design Speed

Minimum Design Speed 45 mph – Mountainous Terrain

Horizontal Geometry

Maximum Radius of Curvature = 444’

Vertical Geometry

Minimum ‘K’ Vertical Crest = 61
Minimum ‘K’ Vertical Sag = 79
Maximum Grade = 9%
Minimum Vertical Clearance to Structures = 16 feet w/ 6” allowance for Overlay
Minimum Vertical Clearance to Pedestrian Overpass = 17’

Typical Section

Lane Widths (DHV>400) = 12 feet
Continuous Left Turn Lane Width = 14 feet
Usable (Paved) Outside Shoulders = 6 feet
Travel Lane Cross-Slope = 2%
Shoulder Cross Slope = 4%
Maximum Allowable Breakover (Outside Shoulder) = 3% (High-Side Superelevation)
Clear Zone Distance (DHV>1500) = 30’
Roadside (Foreslope) = 1V:4H
Roadside (Ditch) Width = 4’ Flat Bottom in Rock Cuts
Roadside (Backslope) = 1V:3H
Horizontal Clearance to Obstacles = 10 feet

Superelevation

Maximum Superelevation Rate = 8.0%

Design Vehicles

From Arterial to Local Road = SU
From Arterial to Industrial Plants = WB-50

Control Access

None

Structures

Full Width for Approach Roadway

Bridge Design Loading

HL93 using AASHTO LRFD Bridge Design Specifications

Design Exceptions

Segment 1 Alternate 2 Horizontal and Vertical Geometry Does Not Meet 45 mph Design Speed
Segment 2 and 7 Alternates 2 and 3 Horizontal and Vertical Geometry Does Not Meet 45 mph Design Speed

Appendix C - Cost Estimates

Segment 1 Alignment Alternative No. 2 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	127	LS	\$10,000.00	\$ 1,270,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	110,000	CY	\$12.00	\$ 1,320,000
207002-000	SUBGRADE	18,663	CY	\$52.00	\$ 970,476
207034-000	FABRIC FOR SEPARATION	111,978	SY	\$1.50	\$ 167,967
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	12,442	CY	\$120.00	\$ 1,493,040
401 ITEMS	SUPERPAVE HMA	73,905	TON	\$105.00	\$ 7,760,025
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	46,000	FT	\$12.00	\$ 552,000
606030-001	OUTLET PIPE	9,200	FT	\$12.00	\$ 110,400
607001	TYPE 1 GUARDRAIL - CLASS I	4,075	FT	\$12.00	\$ 48,900
	GUARDRAIL END TERMINAL	12	EA.	\$1,600.00	\$ 19,200
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	2	EA	\$135,000.00	\$ 270,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		0	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 16,994,408
20% E&C					3,398,882
CONSTRUCTION ESTIMATE					\$ 20,393,290
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$27,270,000.00	\$ 27,270,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 32,520,000
TOTAL PROJECT					\$ 52,913,290

Segment 1 Alignment Alternative No. 3 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$125,000.00	\$ 125,000
202001-000	BUILDING DEMOLITION	91	LS	\$10,000.00	\$ 910,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	108,000	CY	\$12.00	\$ 1,296,000
207002-000	SUBGRADE	18,663	CY	\$52.00	\$ 970,476
207034-000	FABRIC FOR SEPARATION	111,978	SY	\$1.50	\$ 167,967
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	12,442	CY	\$120.00	\$ 1,493,040
401 ITEMS	SUPERPAVE HMA	73,905	TON	\$105.00	\$ 7,760,025
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	46,000	FT	\$12.00	\$ 552,000
606030-001	OUTLET PIPE	9,200	FT	\$12.00	\$ 110,400
607001	TYPE 1 GUARDRAIL - CLASS I	3,600	FT	\$12.00	\$ 43,200
	GUARDRAIL END TERMINAL	12	EA.	\$1,000.00	\$ 12,000
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	2	EA	\$135,000.00	\$ 270,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		0	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 16,472,508
20% E&C					3,294,502
CONSTRUCTION ESTIMATE					\$ 19,767,010
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$24,770,000.00	\$ 24,770,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 30,020,000
TOTAL PROJECT					\$ 49,787,010

Segment 1 Alignment Alternative No. 4 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	89	LS	\$10,000.00	\$ 890,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	105,000	CY	\$12.00	\$ 1,260,000
207002-000	SUBGRADE	18,663	CY	\$52.00	\$ 970,476
207034-000	FABRIC FOR SEPARATION	111,978	SY	\$1.50	\$ 167,967
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	12,442	CY	\$120.00	\$ 1,493,040
401 ITEMS	SUPERPAVE HMA	73,905	TON	\$105.00	\$ 7,760,025
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	46,000	FT	\$12.00	\$ 552,000
606030-001	OUTLET PIPE	9,200	FT	\$12.00	\$ 110,400
607001	TYPE 1 GUARDRAIL - CLASS I	4,075	FT	\$12.00	\$ 48,900
	GUARDRAIL END TERMINAL	12	EA.	\$1,600.00	\$ 19,200
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	2	LS	\$135,000.00	\$ 270,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		0	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 16,554,408
20% E&C					3,310,882
CONSTRUCTION ESTIMATE					\$ 19,865,290
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$20,675,000.00	\$ 20,675,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 25,925,000
TOTAL PROJECT					\$ 45,790,290

Segment 1 Alignment Alternative No. 5 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	91	LS	\$10,000.00	\$ 910,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	103,000	CY	\$12.00	\$ 1,236,000
207002-000	SUBGRADE	16,107	CY	\$52.00	\$ 837,564
207034-000	FABRIC FOR SEPARATION	96,644	SY	\$1.50	\$ 144,966
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	10,738	CY	\$120.00	\$ 1,288,560
401 ITEMS	SUPERPAVE HMA	63,785	TON	\$105.00	\$ 6,697,425
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$85,000.00	\$ 85,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$910,000.00	\$ 910,000
605-ITEMS	DRAINAGE INLETS	130	EA.	\$1,500.00	\$ 195,000
606029-001	FREE DRAINING BASE TRENCH	46,000	FT	\$12.00	\$ 552,000
606030-001	OUTLET PIPE	9,200	FT	\$12.00	\$ 110,400
607001	TYPE 1 GUARDRAIL - CLASS I	4,075	FT	\$12.00	\$ 48,900
	GUARDRAIL END TERMINAL	12	EA.	\$1,600.00	\$ 19,200
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	46,000	LF	\$75.00	\$ 3,450,000
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	2	EA	\$135,000.00	\$ 270,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		0	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 19,582,415
20% E&C					3,916,483
CONSTRUCTION ESTIMATE					\$ 23,498,898
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$25,050,000.00	\$ 25,050,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 30,300,000
TOTAL PROJECT					\$ 53,798,898

Segment 1 Alignment Alternative No. 6 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	89	LS	\$10,000.00	\$ 890,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	105,000	CY	\$12.00	\$ 1,260,000
207002-000	SUBGRADE	16,107	CY	\$52.00	\$ 837,564
207034-000	FABRIC FOR SEPARATION	96,644	SY	\$1.50	\$ 144,966
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	10,738	CY	\$120.00	\$ 1,288,560
401 ITEMS	SUPERPAVE HMA	63,785	TON	\$105.00	\$ 6,697,425
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$85,000.00	\$ 85,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$910,000.00	\$ 910,000
605-ITEMS	DRAINAGE INLETS	130	EA.	\$1,500.00	\$ 195,000
606029-001	FREE DRAINING BASE TRENCH	46,000	FT	\$12.00	\$ 552,000
606030-001	OUTLET PIPE	9,200	FT	\$12.00	\$ 110,400
607001	TYPE 1 GUARDRAIL - CLASS I	4,075	FT	\$12.00	\$ 48,900
	GUARDRAIL END TERMINAL	12	EA.	\$1,600.00	\$ 19,200
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	46,000	LF	\$75.00	\$ 3,450,000
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	2	EA	\$135,000.00	\$ 270,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		1	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 19,586,415
20% E&C					3,917,283
CONSTRUCTION ESTIMATE					\$ 23,503,698
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$27,690,000.00	\$ 27,690,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 32,940,000
TOTAL PROJECT					\$ 56,443,698

Segement 2 and 7 Alignment Alternative No. 2 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	0	LS	\$10,000.00	\$ -
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	59,000	CY	\$12.00	\$ 708,000
207002-000	SUBGRADE	7,863	CY	\$52.00	\$ 408,876
207034-000	FABRIC FOR SEPARATION	47,178	SY	\$1.50	\$ 70,767
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	5,242	CY	\$120.00	\$ 629,040
401 ITEMS	SUPERPAVE HMA	31,137	TON	\$105.00	\$ 3,269,385
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	27,000	FT	\$12.00	\$ 324,000
606030-001	OUTLET PIPE	5,400	FT	\$12.00	\$ 64,800
607001	TYPE 1 GUARDRAIL - CLASS I	1,400	FT	\$12.00	\$ 16,800
	GUARDRAIL END TERMINAL	8	EA.	\$1,600.00	\$ 12,800
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$750,000.00	\$ 750,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$75,000.00	\$ 75,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	1	EA	\$135,000.00	\$ 135,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$170,000.00	\$ 170,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		1	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 7,656,868
20% E&C					1,531,374
CONSTRUCTION ESTIMATE					\$ 9,188,242
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$5,410,000.00	\$ 5,410,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 10,660,000
TOTAL PROJECT					\$ 19,848,242

Segement 2 and 7 Alignment Alternative No. 3 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	0	LS	\$10,000.00	\$ -
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	121,000	CY	\$12.00	\$ 1,452,000
207002-000	SUBGRADE	11,244	CY	\$52.00	\$ 584,688
207034-000	FABRIC FOR SEPARATION	67,467	SY	\$1.50	\$ 101,201
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	7,496	CY	\$120.00	\$ 899,520
401-ITEMS	SUPERPAVE HMA	44,528	TON	\$105.00	\$ 4,675,440
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	27,600	FT	\$12.00	\$ 331,200
606030-001	OUTLET PIPE	5,520	FT	\$12.00	\$ 66,240
607001	TYPE 1 GUARDRAIL - CLASS I	1,400	FT	\$12.00	\$ 16,800
	GUARDRAIL END TERMINAL	8	EA.	\$1,600.00	\$ 12,800
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	46,000	LF	\$75.00	\$ 3,450,000
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$750,000.00	\$ 750,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$75,000.00	\$ 75,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	1	EA	\$135,000.00	\$ 135,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$170,000.00	\$ 170,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		1	LS		\$ -
CONSTRUCTION SUBTOTAL 20% E&C					\$ 13,742,289 2,748,458
CONSTRUCTION ESTIMATE					\$ 16,490,746
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$5,500,000.00	\$ 5,500,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 10,750,000
TOTAL PROJECT					\$ 27,240,746

Segement 8 Alternative No. 1 Overpass Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	27	LS	\$10,000.00	\$ 270,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	1,154,000	CY	\$12.00	\$ 13,848,000
207002-000	SUBGRADE	7,578	CY	\$52.00	\$ 394,056
207034-000	FABRIC FOR SEPARATION	45,467	SY	\$1.50	\$ 68,201
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	5,052	CY	\$120.00	\$ 606,240
401-ITEMS	SUPERPAVE HMA	30,008	TON	\$105.00	\$ 3,150,840
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	18,600	FT	\$12.00	\$ 223,200
606030-001	OUTLET PIPE	3,720	FT	\$12.00	\$ 44,640
607001	TYPE 1 GUARDRAIL - CLASS I	7,800	FT	\$12.00	\$ 93,600
	GUARDRAIL END TERMINAL	16	EA.	\$1,600.00	\$ 25,600
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$75,000.00	\$ 75,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	3	EA	\$135,000.00	\$ 405,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$170,000.00	\$ 170,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
	LITTLE BEAVER CREEK BRIDGE (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$1,034,727.00	\$ 1,034,727.00
	WV 307 OVERPASS (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$5,415,638.00	\$ 5,415,638.00
CONSTRUCTION SUBTOTAL 20% E&C					\$ 28,347,142 5,669,428
CONSTRUCTION ESTIMATE					\$ 34,016,570
	US 19 CONNECTOR				
	US 19 CONNECTOR - SEE US 19 CONNECTOE ESTIMATE FOR DETAILS	1	LS	\$ 13,169,483	\$ 13,169,483
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$10,275,000.00	\$ 10,275,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 15,525,000
TOTAL PROJECT					\$ 62,711,053

Segement 8 Alternative No. 1 At-Grade Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	27	LS	\$10,000.00	\$ 270,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	2,235,000	CY	\$12.00	\$ 26,820,000
207002-000	SUBGRADE	7,985	CY	\$52.00	\$ 415,220
207034-000	FABRIC FOR SEPARATION	47,911	SY	\$1.50	\$ 71,867
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	5,323	CY	\$120.00	\$ 638,760
401 ITEMS	SUPERPAVE HMA	31,621	TON	\$105.00	\$ 3,320,205
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	19,600	FT	\$12.00	\$ 235,200
606030-001	OUTLET PIPE	3,920	FT	\$12.00	\$ 47,040
607001	TYPE 1 GUARDRAIL - CLASS I	3,500	FT	\$12.00	\$ 42,000
	GUARDRAIL END TERMINAL	8	EA.	\$1,600.00	\$ 12,800
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$75,000.00	\$ 75,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	4	EA	\$135,000.00	\$ 540,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$170,000.00	\$ 170,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
	LITTLE BEAVER CREEK BRIDGE (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$1,034,727.00	\$ 1,034,727.00
	WV 307 OVERPASS (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$5,415,638.00	\$ 5,415,638.00
CONSTRUCTION SUBTOTAL					\$ 41,630,857
20% E&C					8,326,171
CONSTRUCTION ESTIMATE					\$ 49,957,028
	US 19 CONNECTOR				
	US 19 CONNECTOR - SEE US 19 CONNECTOR ESTIMATE FOR DETAILS	1	LS	\$ 13,169,483	\$ 13,169,483
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$9,985,000.00	\$ 9,985,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 15,235,000
TOTAL PROJECT					\$ 78,361,511

Segement 8 Alternative No. 2 Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	27	LS	\$10,000.00	\$ 270,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	1,566,000	CY	\$12.00	\$ 18,792,000
207002-000	SUBGRADE	6,763	CY	\$52.00	\$ 351,676
207034-000	FABRIC FOR SEPARATION	40,578	SY	\$1.50	\$ 60,867
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	4,509	CY	\$120.00	\$ 541,080
401 ITEMS	SUPERPAVE HMA	26,781	TON	\$105.00	\$ 2,812,005
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$70,000.00	\$ 70,000
605-ITEMS	DRAINAGE INLETS	10	EA.	\$1,500.00	\$ 15,000
606029-001	FREE DRAINING BASE TRENCH	16,600	FT	\$12.00	\$ 199,200
606030-001	OUTLET PIPE	3,320	FT	\$12.00	\$ 39,840
607001	TYPE 1 GUARDRAIL - CLASS I	5,900	FT	\$12.00	\$ 70,800
	GUARDRAIL END TERMINAL	10	EA.	\$1,600.00	\$ 16,000
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$75,000.00	\$ 75,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS PER LOCATION	3	EA	\$135,000.00	\$ 405,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$170,000.00	\$ 170,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
	LITTLE BEAVER CREEK BRIDGE (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$1,034,727.00	\$ 1,034,727.00
	WV 307 OVERPASS (ESTIMATED AT \$201 PER SQ. FT.)	1	LS	\$5,415,638.00	\$ 5,415,638.00
CONSTRUCTION SUBTOTAL					\$ 32,776,233
20% E&C					6,555,247
CONSTRUCTION ESTIMATE					\$ 39,331,480
	US 19 CONNECTOR				
	US 19 CONNECTOR - SEE US 19 CONNECTOR ESTIMATE FOR DETAILS	1	LS	\$ 13,169,483	\$ 13,169,483
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$9,985,000.00	\$ 9,985,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 15,235,000
TOTAL PROJECT					\$ 67,735,963

US 19 Connector Cost Summary - FINAL					
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
	ROADWAY				
201001-000	CLEARING AND GRUBBING	1	LS	\$250,000.00	\$ 250,000
202001-000	BUILDING DEMOLITION	31	LS	\$10,000.00	\$ 310,000
204001-000	MOBILIZATION	1	LS	\$150,000.00	\$ 150,000
207001-001	UNCLASSIFIED EXCAVATION	0	CY	\$12.00	\$ -
207002-000	SUBGRADE	1,301	CY	\$52.00	\$ 67,652
207034-000	FABRIC FOR SEPARATION	7,804	SY	\$1.50	\$ 11,706
311006-001	OPEN GRADED FREE DRAINING BASE COURSE	867	CY	\$120.00	\$ 104,040
401-ITEMS	SUPERPAVE HMA	5,151	TON	\$105.00	\$ 540,855
	MAJOR DRAINAGE(PIPES> 36")				
	PIPE END SECTIONS	1	LS	\$60,000.00	\$ 60,000
	PIPES	1	LS	\$100,000.00	\$ 100,000
	MINOR DRAINAGE (PIPES < 36")				
604-ITEMS	MINOR DRAINAGE PIPES	1	LS	\$35,000.00	\$ 35,000
605-ITEMS	DRAINAGE INLETS	5	EA.	\$1,500.00	\$ 7,500
606029-001	FREE DRAINING BASE TRENCH	6,411	FT	\$12.00	\$ 76,932
606030-001	OUTLET PIPE	1,282	FT	\$12.00	\$ 15,384
607001	TYPE 1 GUARDRAIL - CLASS I	4,075	FT	\$12.00	\$ 48,900
	GUARDRAIL END TERMINAL	12	EA.	\$1,600.00	\$ 19,200
608002	RIGHT OF WAY FENCE, FARM FIELD TYPE	0	FT	\$4.00	\$ -
610-ITEMS	CONCRETE CURB AND GUTTER	0	LF	\$75.00	\$ -
633-ITEMS	DUMPED ROCK GUTTER	1	LS	\$50,000.00	\$ 50,000
636-ITEMS	MAINTENANCE OF TRAFFIC	1	LS	\$1,500,000.00	\$ 1,500,000
637-ITEMS	WATER FOR DUST PALLIATIVE	1,240	MGAL	\$10.00	\$ 12,400
638-ITEMS	PROJECT, RIGHT-OF-WAY, SURVEY MARKERS	1	LS	\$25,000.00	\$ 25,000
639-ITEMS	CONSTRUCTION LAYOUT STAKES	1	LS	\$50,000.00	\$ 50,000
640-ITEMS	FIELD OFFICE AND STORAGE BUILDING	1	LS	\$50,000.00	\$ 50,000
642-ITEMS	TEMPORARY PROJECT WATER POLLUTION CONTROL	1	LS	\$150,000.00	\$ 150,000
652-ITEMS	SEEDING AND MULCHING	1	LS	\$60,000.00	\$ 60,000
655-ITEMS	MATTING	1	LS	\$20,000.00	\$ 20,000
660-ITEMS	TRAFFIC SIGNALS	1	LS	\$135,000.00	\$ 135,000
	SIGNING & PAVEMENT MARKINGS				
657-ITEMS	ROADSIDE MOUNTED SIGN SUPPORTS	1	LS	\$50,000.00	\$ 50,000
661-ITEMS	TRAFFIC SIGNS AND DELINEATORS	1	LS	\$340,000.00	\$ 340,000
663-ITEMS	MISCELLANEOUS PAVEMENT MARKINGS	1	LS	\$60,000.00	\$ 60,000
	STRUCTURES				
		1	LS		\$ -
CONSTRUCTION SUBTOTAL					\$ 4,299,569
20% E&C					859,914
CONSTRUCTION ESTIMATE					\$ 5,159,483
	RIGHT OF WAY AND UTILITIES				
	RIGHT OF WAY ACQUISITION	1	LS	\$2,760,000.00	\$ 2,760,000.00
	UTILITY RELOCATION	1	LS	\$5,250,000.00	\$ 5,250,000.00
RW AND UTILITY ESTIMATE					\$ 8,010,000
TOTAL PROJECT					\$ 13,169,483

Appendix D - Acquisition Tables

ACQUISITION TABLE

PARCEL NUMBER	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
1	8,936	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	27,768	0.64	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3	78,003	1.79	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4	71,194	1.63	0	0	0.00	0	0.00	1,805	0.04	0	0.00	1,805	0.04
5	40,429	0.93	0	1,573	0.04	1,965	0.05	5,242	0.12	1,965	0.05	5,242	0.12
6	293,373	6.73	0	17,085	0.39	17,085	0.39	23,500	0.54	17,085	0.39	23,500	0.54
7	49,778	1.14	0	7,873	0.18	9,530	0.22	8,777	0.20	9,530	0.22	8,777	0.20
8	4,719	0.11	0	804	0.02	982	0.02	923	0.02	982	0.02	923	0.02
9	3,724	0.09	0	845	0.02	130	0.00	963	0.02	130	0.00	963	0.02
10	6,147	0.14	0	763	0.02	967	0.02	902	0.02	967	0.02	902	0.02
11	37,406	0.86	0	8,225	0.19	8,225	0.19	7,750	0.18	8,225	0.19	7,750	0.18
12	18,683	0.43	0	8,175	0.19	9,491	0.22	9,150	0.21	9,491	0.22	9,150	0.21
13	11,179	0.26	0	3,207	0.07	3,207	0.07	3,074	0.07	3,207	0.07	3,074	0.07
14	12,254	0.28	0	2,954	0.07	2,954	0.07	2,825	0.06	2,954	0.07	2,825	0.06
15	36,011	0.83	0	214	0.00	562	0.01	527	0.01	562	0.01	527	0.01
16	70,797	1.63	0	7,146	0.16	7,146	0.16	6,827	0.16	7,146	0.16	6,827	0.16
17	45,067	1.03	0	7,938	0.18	7,938	0.18	8,244	0.19	7,938	0.18	8,244	0.19
18	20,599	0.47	0	5,469	0.13	5,469	0.13	5,198	0.12	5,469	0.13	5,198	0.12
19	32,857	0.75	0	3,869	0.09	3,673	0.08	4,024	0.09	3,673	0.08	4,024	0.09
20	50,412	1.16	0	8,182	0.19	7,523	0.17	8,387	0.19	7,523	0.17	8,387	0.19
21	1,763,594	40.49	0	21,530	0.49	24,802	0.57	20,276	0.47	24,802	0.57	20,276	0.47
22	29,667	0.68	0	4,418	0.10	4,051	0.09	4,641	0.11	4,051	0.09	4,641	0.11
23	25,730	0.59	0	4,103	0.09	3,769	0.09	4,255	0.10	3,769	0.09	4,255	0.10
24	13,027	0.30	0	4,232	0.10	3,743	0.09	4,520	0.10	3,743	0.09	4,520	0.10
25	27,293	0.63	0	4,582	0.11	4,010	0.09	4,871	0.11	4,010	0.09	4,871	0.11
26	32,761	0.75	0	5,446	0.13	4,687	0.11	5,783	0.13	4,687	0.11	5,783	0.13
27	19,732	0.45	0	4,057	0.09	3,453	0.08	4,293	0.10	3,453	0.08	4,293	0.10
28	15,405	0.35	0	5,925	0.14	6,622	0.15	5,553	0.13	6,622	0.15	5,553	0.13
29	10,999	0.25	0	885	0.02	989	0.02	833	0.02	989	0.02	833	0.02
30	45,746	1.05	0	7,002	0.16	5,794	0.13	7,421	0.17	5,794	0.13	7,421	0.17
31	21,712	0.50	0	5,361	0.12	6,080	0.14	4,991	0.11	6,080	0.14	4,991	0.11
32	13,598	0.31	0	5,770	0.13	6,392	0.15	5,433	0.12	6,392	0.15	5,433	0.12
33	32,292	0.74	0	4,576	0.11	3,685	0.08	4,827	0.11	3,685	0.08	4,827	0.11
34	12,352	0.28	0	4,953	0.11	5,519	0.13	4,648	0.11	5,519	0.13	4,648	0.11
35	24,156	0.55	0	2,929	0.07	2,101	0.05	3,158	0.07	2,101	0.05	3,158	0.07
36	48,149	1.11	0	3,630	0.08	4,040	0.09	3,329	0.08	4,040	0.09	3,329	0.08
37	20,287	0.47	0	6,887	0.16	7,676	0.18	6,444	0.15	7,676	0.18	6,444	0.15
38	13,366	0.31	0	4,411	0.10	4,907	0.11	4,115	0.09	4,907	0.11	4,115	0.09
39	6,838	0.16	0	6,838	0.16	6,838	0.16	6,838	0.16	6,838	0.16	6,838	0.16
40	65,678	1.51	0	11,923	0.27	13,203	0.30	11,903	0.27	13,203	0.30	11,903	0.27
41	6,002	0.14	0	1,270	0.03	177	0.00	1,315	0.03	177	0.00	1,315	0.03
42	7,385	0.17	0	2,935	0.07	2,060	0.05	3,051	0.07	2,060	0.05	3,051	0.07
43	1,613	0.04	0	952	0.02	707	0.02	1,018	0.02	707	0.02	1,018	0.02
44	22,981	0.53	0	2,966	0.07	3,411	0.08	2,654	0.06	3,411	0.08	2,654	0.06
45	20,891	0.48	0	5,165	0.12	4,139	0.10	5,344	0.12	4,139	0.10	5,344	0.12
46	23,594	0.54	0	4,999	0.11	5,754	0.13	4,442	0.10	5,754	0.13	4,442	0.10
47	29,591	0.68	0	9,197	0.21	6,772	0.16	9,848	0.23	7,389	0.17	9,848	0.23
48	108,361	2.49	0	5,100	0.12	5,647	0.13	3,761	0.09	5,647	0.13	3,761	0.09
49	20,127	0.46	0	4,158	0.10	2,652	0.06	4,435	0.10	3,324	0.08	4,435	0.10

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
51	19,640	0.45	0	8,167	0.19	8,899	0.20	6,327	0.15	8,899	0.20	6,327	0.15
52	72,204	1.66	0	9,978	0.23	4,768	0.11	10,666	0.24	7,901	0.18	10,666	0.24
53	18,333	0.42	0	2,121	0.05	2,498	0.06	1,273	0.03	2,498	0.06	1,273	0.03
54	7,523	0.17	0	3,375	0.08	1,484	0.03	4,155	0.10	1,974	0.05	4,155	0.10
55	25,440	0.58	0	5,095	0.12	2,493	0.06	5,550	0.13	2,493	0.06	5,550	0.13
56	6,009	0.14	0	2,296	0.05	1,011	0.02	2,501	0.06	1,325	0.03	2,501	0.06
57	24,733	0.57	0	3,953	0.09	1,782	0.04	4,303	0.10	2,291	0.05	4,303	0.10
58	41,925	0.96	0	21,194	0.49	24,508	0.56	17,437	0.40	24,508	0.56	17,437	0.40
59	9,768	0.22	0	4,149	0.10	1,839	0.04	4,523	0.10	2,391	0.05	4,523	0.10
60	28,242	0.65	0	12,007	0.28	5,335	0.12	13,076	0.30	6,947	0.16	13,076	0.30
61	8,971	0.21	0	3,721	0.09	1,266	0.03	4,054	0.09	1,856	0.04	4,054	0.09
62	3,134	0.07	0	1,299	0.03	544	0.01	1,415	0.03	751	0.02	1,415	0.03
63	5,421	0.12	0	2,169	0.05	844	0.02	2,368	0.05	1,242	0.03	2,368	0.05
64	27,560	0.63	0	14,768	0.34	16,769	0.38	11,863	0.27	16,769	0.38	11,863	0.27
65	12,242	0.28	0	5,098	0.12	1,833	0.04	5,552	0.13	2,590	0.06	5,552	0.13
66	18,293	0.42	0	7,643	0.18	3,333	0.08	8,326	0.19	4,416	0.10	4,005	0.09
67	19,525	0.45	0	8,145	0.19	3,423	0.08	8,874	0.20	4,704	0.11	8,874	0.20
68	9,114	0.21	0	3,787	0.09	2,190	0.05	4,125	0.09	2,190	0.05	4,125	0.09
69	19,051	0.44	0	7,792	0.18	3,341	0.08	8,492	0.19	4,492	0.10	8,492	0.19
70	11,425	0.26	0	4,814	0.11	1,979	0.05	5,237	0.12	2,800	0.06	5,237	0.12
71	57,111	1.31	0	6,265	0.14	7,426	0.17	4,123	0.09	7,426	0.17	4,123	0.09
72	18,676	0.43	0	7,532	0.17	3,137	0.07	8,217	0.19	4,322	0.10	8,217	0.19
73	70,905	1.63	0	9,968	0.23	12,011	0.28	7,997	0.18	12,011	0.28	7,997	0.18
74	16,833	0.39	0	2,320	0.05	0	0.00	1,306	0.03	405	0.01	1,306	0.03
75	74,857	1.72	0	10,320	0.24	12,904	0.30	8,274	0.19	12,904	0.30	8,274	0.19
76	42,285	0.97	0	31,744	0.73	14,998	0.34	27,282	0.63	14,998	0.34	27,282	0.63
77	17,729	0.41	0	728	0.02	1,146	0.03	652	0.01	1,146	0.03	652	0.01
78	28,528	0.65	0	2,795	0.06	5,356	0.12	3,772	0.09	5,356	0.12	3,772	0.09
79	62,261	1.43	0	9,818	0.23	14,189	0.33	9,848	0.23	14,189	0.33	9,848	0.23
80	27,540	0.63	0	5,486	0.13	6,677	0.15	4,621	0.11	6,677	0.15	4,621	0.11
81	82,344	1.89	0	5,401	0.12	6,509	0.15	4,548	0.10	6,509	0.15	4,548	0.10
82	36,454	0.84	0	24,550	0.56	11,195	0.26	20,696	0.48	11,195	0.26	20,696	0.48
83	33,431	0.77	0	6,134	0.14	7,383	0.17	5,159	0.12	7,383	0.17	5,159	0.12
84	3,218	0.07	0	3,001	0.07	3,218	0.07	2,104	0.05	3,218	0.07	2,104	0.05
85	31,639	0.73	0	10,029	0.23	8,334	0.19	7,214	0.17	10,393	0.24	7,214	0.17
86	23,802	0.55	0	3,087	0.07	0	0.00	1,434	0.03	0	0.00	1,434	0.03
87	30,720	0.71	0	10,250	0.24	4,442	0.10	10,573	0.24	4,442	0.10	10,573	0.24
88	11,064	0.25	0	4,805	0.11	4,257	0.10	4,195	0.10	6,512	0.15	4,195	0.10
89	32,338	0.74	0	4,479	0.10	3,925	0.09	3,839	0.09	5,899	0.14	3,839	0.09
90	18,524	0.43	0	6,460	0.15	2,784	0.06	6,623	0.15	2,784	0.06	6,623	0.15
91	3,960	0.09	0	1,261	0.03	504	0.01	1,276	0.03	504	0.01	1,276	0.03
92	39,090	0.90	0	5,455	0.13	4,828	0.11	4,675	0.11	7,250	0.17	4,675	0.11
93	16,953	0.39	0	5,335	0.12	1,547	0.04	5,510	0.13	1,547	0.04	5,510	0.13
94	35,821	0.82	0	5,161	0.12	6,922	0.16	4,424	0.10	6,922	0.16	4,424	0.10
95	134,122	3.08	0	4,818	0.11	177	0.00	5,039	0.12	177	0.00	5,039	0.12
96	18,737	0.43	0	4,434	0.10	6,009	0.14	3,792	0.09	6,009	0.14	3,792	0.09
97	23,276	0.53	0	5,682	0.13	7,716	0.18	4,257	0.10	7,716	0.18	4,257	0.10
98	22,211	0.51	0	7,965	0.18	10,680	0.25	5,432	0.12	10,680	0.25	5,432	0.12
99	56,899	1.31	0	24,423	0.56	8,152	0.19	21,863	0.50	8,152	0.19	44	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
100	55,870	1.28	0	8,434	0.19	10,617	0.24	4,762	0.11	10,617	0.24	0	0.00
101	66,865	1.54	0	12,371	0.28	12,374	0.28	4,315	0.10	12,374	0.28	0	0.00
102	20,145	0.46	0	4,855	0.11	1,183	0.03	3,741	0.09	1,183	0.03	3,741	0.09
103	46,567	1.07	0	7,036	0.16	3,828	0.09	5,940	0.14	3,828	0.09	0	0.00
104	40,279	0.92	0	5,462	0.13	4,480	0.10	446	0.01	4,480	0.10	446	0.01
105	39,490	0.91	0	4,882	0.11	5,700	0.13	2,444	0.06	5,700	0.13	0	0.00
106	16,441	0.38	0	5,461	0.13	15,531	0.36	31,078	0.71	19,271	0.44	33,240	0.76
107	37,932	0.87	0	8,694	0.20	48,717	1.12	32,363	0.74	51,515	1.18	40,808	0.94
108	87,111	2.00	0	10,765	0.25	26,317	0.60	51,631	1.19	28,766	0.66	52,160	1.20
109	23,375	0.54	0	5,655	0.13	34,391	0.79	19,544	0.45	36,619	0.84	22,264	0.51
110	1,781,896	40.91	0	14,520	0.33	17,970	0.41	3,731	0.09	17,970	0.41	3,731	0.09
111	307,027	7.05	0	36,019	0.83	14,943	0.34	30,199	0.69	14,943	0.34	30,199	0.69
112	420,317	9.65	0	19,046	0.44	52,219	1.20	11,256	0.26	51,401	1.18	40,946	0.94
113	313,100	7.19	0	49,948	1.15	15,658	0.36	47,361	1.09	15,658	0.36	47,361	1.09
114	161,915	3.72	0	17,983	0.41	31,867	0.73	11,383	0.26	35,719	0.82	22,216	0.51
115	122,175	2.80	0	16,293	0.37	15,926	0.37	10,306	0.24	15,926	0.37	10,306	0.24
116	25,037	0.57	0	16,255	0.37	18,979	0.44	14,145	0.32	18,979	0.44	14,145	0.32
117	7,638	0.18	0	2,695	0.06	1,678	0.04	1,856	0.04	1,678	0.04	1,856	0.04
118	6,385	0.15	0	2,560	0.06	1,653	0.04	2,031	0.05	1,653	0.04	2,031	0.05
119	39,761	0.91	0	19,981	0.46	21,257	0.49	10,006	0.23	21,257	0.49	10,006	0.23
120	18,225	0.42	0	4,599	0.11	2,945	0.07	4,223	0.10	2,945	0.07	4,223	0.10
121	10,554	0.24	0	2,487	0.06	1,607	0.04	2,615	0.06	1,607	0.04	2,615	0.06
122	8,868	0.20	0	2,217	0.05	1,508	0.03	2,655	0.06	1,508	0.03	2,655	0.06
123	8,214	0.19	0	2,158	0.05	1,554	0.04	2,850	0.07	1,554	0.04	2,850	0.07
124	9,532	0.22	0	2,197	0.05	1,615	0.04	3,031	0.07	1,615	0.04	3,031	0.07
125	9,329	0.21	0	1,943	0.04	1,404	0.03	2,768	0.06	1,404	0.03	2,768	0.06
126	7,927	0.18	0	2,325	0.05	1,681	0.04	3,319	0.08	1,681	0.04	3,319	0.08
127	84,442	1.94	0	14,586	0.33	18,689	0.43	7,730	0.18	18,689	0.43	7,730	0.18
128	8,814	0.20	0	4,099	0.09	2,841	0.07	5,806	0.13	2,841	0.07	5,806	0.13
129	5,435	0.12	0	899	0.02	1,164	0.03	477	0.01	1,164	0.03	477	0.01
130	19,862	0.46	0	3,414	0.08	1,161	0.03	6,593	0.15	1,161	0.03	6,593	0.15
131	19,963	0.46	0	10,617	0.24	9,356	0.21	3,787	0.09	9,356	0.21	3,787	0.09
132	36,337	0.83	0	10,663	0.24	13,766	0.32	5,888	0.14	13,766	0.32	5,888	0.14
133	60,442	1.39	0	20,963	0.48	13,583	0.31	27,890	0.64	13,583	0.31	27,890	0.64
134	168,470	3.87	0	25,787	0.59	35,428	0.81	6,162	0.14	35,428	0.81	6,162	0.14
135	67,630	1.55	0	26,417	0.61	12,915	0.30	38,855	0.89	12,915	0.30	40,511	0.93
136	639,697	14.69	0	39,839	0.91	53,650	1.23	12,096	0.28	53,650	1.23	12,096	0.28
137	47,314	1.09	0	11,737	0.27	16,263	0.37	4,229	0.10	16,263	0.37	4,229	0.10
138	36,358	0.83	0	16,011	0.37	6,152	0.14	18,417	0.42	6,152	0.14	18,417	0.42
139	144,713	3.32	0	14,878	0.34	5,689	0.13	17,058	0.39	5,689	0.13	17,058	0.39
140	17,839	0.41	0	7,187	0.16	10,040	0.23	1,963	0.05	10,040	0.23	1,963	0.05
141	19,633	0.45	0	5,396	0.12	1,993	0.05	6,078	0.14	1,993	0.05	6,078	0.14
142	42,788	0.98	0	10,845	0.25	3,966	0.09	12,416	0.29	3,966	0.09	12,416	0.29
143	25,316	0.58	0	15,169	0.35	17,860	0.41	5,972	0.14	17,860	0.41	5,972	0.14
144	12,375	0.28	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
145	46,935	1.08	0	1,345	0.03	4,128	0.09	0	0.00	4,128	0.09	0	0.00
146	152,391	3.50	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
147	417,166	9.58	0	22,369	0.51	4,980	0.11	16,634	0.38	4,980	0.11	16,634	0.38
148	14,899	0.34	0	2,588	0.06	3,350	0.08	803	0.02	3,350	0.08	803	0.02
149	44,434	1.02	0	5,980	0.14	8,244	0.19	1,418	0.03	8,244	0.19	1,418	0.03

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
150	88,511	2.03	0	65,461	1.50	17,196	0.39	59,093	1.36	17,196	0.39	59,093	1.36
151	26,697	0.61	0	4,023	0.09	5,198	0.12	681	0.02	5,198	0.12	681	0.02
152	11,689	0.27	0	2,117	0.05	2,669	0.06	12	0.00	2,669	0.06	12	0.00
153	7,350	0.17	0	1,596	0.04	2,012	0.05	0	0.00	2,012	0.05	0	0.00
154	13,426	0.31	0	3,240	0.07	4,097	0.09	0	0.00	4,097	0.09	0	0.00
155	7,102	0.16	0	2,004	0.05	2,427	0.06	0	0.00	2,427	0.06	0	0.00
156	6,615	0.15	0	2,074	0.05	2,548	0.06	0	0.00	2,548	0.06	0	0.00
157	3,510	0.08	0	1,682	0.04	2,048	0.05	0	0.00	2,048	0.05	0	0.00
158	2,015	0.05	0	1,609	0.04	1,881	0.04	0	0.00	1,881	0.04	0	0.00
159	1,467	0.03	0	1,467	0.03	1,467	0.03	0	0.00	1,467	0.03	0	0.00
160	29,701	0.68	0	3,407	0.08	2,424	0.06	4,103	0.09	2,424	0.06	4,103	0.09
161	779	0.02	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
162	1,195	0.03	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
163	2,202	0.05	0	101	0.00	503	0.01	0	0.00	503	0.01	0	0.00
164	3,056	0.07	0	1,503	0.03	2,065	0.05	0	0.00	2,065	0.05	0	0.00
165	3,475	0.08	0	2,010	0.05	2,635	0.06	0	0.00	2,635	0.06	0	0.00
166	35,917	0.82	0	0	0.00	822	0.02	0	0.00	822	0.02	0	0.00
167	12,083	0.28	0	10,411	0.24	11,660	0.27	601	0.01	11,660	0.27	1,742	0.04
168	43,012	0.99	0	8,458	0.19	4,255	0.10	14,007	0.32	4,255	0.10	14,007	0.32
169	8,134	0.19	0	3,284	0.08	1,699	0.04	4,724	0.11	1,699	0.04	4,724	0.11
170	473,331	10.87	0	37,824	0.87	16,587	0.38	51,652	1.19	16,587	0.38	51,652	1.19
171	16,860	0.39	0	0	0.00	2,367	0.05	0	0.00	2,367	0.05	0	0.00
172	7,875	0.18	0	0	0.00	1,244	0.03	0	0.00	1,244	0.03	0	0.00
173	1,631	0.04	0	1,631	0.04	1,631	0.04	496	0.01	1,631	0.04	1,742	0.04
174	5,573	0.13	0	0	0.00	675	0.02	0	0.00	675	0.02	0	0.00
175	12,003	0.28	0	0	0.00	3,265	0.07	0	0.00	3,265	0.07	0	0.00
176	8,296	0.19	0	8,296	0.19	8,296	0.19	2,824	0.06	8,296	0.19	7,405	0.17
177	17,356	0.40	0	0	0.00	3,298	0.08	0	0.00	3,298	0.08	0	0.00
178	17,136	0.39	0	0	0.00	2,982	0.07	0	0.00	2,982	0.07	0	0.00
179	29,817	0.68	0	7,031	0.16	3,604	0.08	9,341	0.21	3,604	0.08	9,341	0.21
180	19,018	0.44	0	12,643	0.29	15,082	0.35	3,060	0.07	15,082	0.35	7,405	0.17
181	3,867	0.09	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
182	8,113	0.19	0	1,955	0.04	1,074	0.02	2,406	0.06	1,074	0.02	2,406	0.06
183	9,351	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
184	79,156	1.82	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
185	69,758	1.60	0	22,370	0.51	14,920	0.34	28,061	0.64	14,920	0.34	28,061	0.64
186	7,406	0.17	0	4,111	0.09	5,201	0.12	1,005	0.02	5,201	0.12	2,614	0.06
187	868,140	19.93	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
188	9,780	0.22	0	5,664	0.13	7,185	0.16	1,483	0.03	7,185	0.16	3,485	0.08
189	11,786	0.27	0	6,117	0.14	4,123	0.09	8,643	0.20	4,123	0.09	8,643	0.20
190	1,894	0.04	0	1,894	0.04	1,894	0.04	1,899	0.04	1,894	0.04	1,899	0.04
191	18,711	0.43	0	7,067	0.16	9,066	0.21	1,827	0.04	9,066	0.21	4,792	0.11
192	23,617	0.54	0	14,534	0.33	7,181	0.16	16,290	0.37	7,181	0.16	16,290	0.37
193	24,924	0.57	0	5,792	0.13	7,134	0.16	2,198	0.05	7,134	0.16	3,920	0.09
194	14,221	0.33	0	6,453	0.15	8,089	0.19	2,719	0.06	8,089	0.19	4,356	0.10
195	41,569	0.95	0	9,912	0.23	11,570	0.27	4,638	0.11	11,570	0.27	6,970	0.16
196	17,464	0.40	0	7,245	0.17	3,669	0.08	8,263	0.19	3,669	0.08	8,263	0.19
197	18,745	0.43	0	5,608	0.13	2,747	0.06	6,346	0.15	2,747	0.06	6,346	0.15
198	11,278	0.26	0	6,597	0.15	3,148	0.07	7,157	0.16	3,148	0.07	7,157	0.16
199	1,388,497	31.88	0	80,215	1.84	62,431	1.43	15,466	0.36	62,431	1.43	15,466	0.36

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
200	28,437	0.65	0	2,892	0.07	4,220	0.10	459	0.01	4,220	0.10	1,307	0.03
201	9,699	0.22	0	6,691	0.15	7,642	0.18	2,644	0.06	7,642	0.18	4,792	0.11
202	54,568	1.25	0	10,818	0.25	5,071	0.12	11,986	0.28	5,071	0.12	11,986	0.28
203	4,767	0.11	0	4,767	0.11	4,767	0.11	3,546	0.08	4,767	0.11	4,356	0.10
204	60,433	1.39	0	8,228	0.19	2,953	0.07	7,785	0.18	2,953	0.07	7,785	0.18
205	280,552	6.44	0	34,488	0.79	18,601	0.43	44,570	1.02	18,601	0.43	44,570	1.02
206	32,378	0.74	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
207	84,383	1.94	0	4,900	0.11	2,428	0.06	7,515	0.17	2,428	0.06	7,515	0.17
208	7,779	0.18	0	4,575	0.11	2,728	0.06	6,644	0.15	2,728	0.06	6,644	0.15
209	3,406	0.08	0	3,092	0.07	1,717	0.04	3,406	0.08	1,717	0.04	3,406	0.08
210	108,010	2.48	0	4,503	0.10	2,571	0.06	6,755	0.16	2,571	0.06	6,755	0.16
211	45,397	1.04	0	7,024	0.16	4,163	0.10	9,104	0.21	4,163	0.10	9,104	0.21
212	5,110	0.12	0	843	0.02	556	0.01	1,045	0.02	556	0.01	1,045	0.02
213	47,220	1.08	0	11,087	0.25	13,594	0.31	7,429	0.17	13,594	0.31	7,429	0.17
214	132,360	3.04	0	4,868	0.11	2,794	0.06	5,710	0.13	2,794	0.06	5,710	0.13
215	210,443	4.83	0	19,907	0.46	18,717	0.43	20,697	0.48	18,717	0.43	20,697	0.48
216	86,331	1.98	0	0	0.00	0	0.00	164	0.00	0	0.00	164	0.00
217	13,064	0.30	0	10,651	0.24	10,534	0.24	9,315	0.21	10,534	0.24	9,315	0.21
218	9,101	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
219	88,320	2.03	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
220	17,176	0.39	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
221	94,288	2.16	0	4,074	0.09	4,930	0.11	1,804	0.04	4,930	0.11	1,804	0.04
222	94,461	2.17	0	15,723	0.36	10,769	0.25	23,396	0.54	10,769	0.25	23,396	0.54
223	967	0.02	0	86	0.00	105	0.00	25	0.00	105	0.00	25	0.00
224	17,254	0.40	0	4,383	0.10	5,420	0.12	2,009	0.05	5,420	0.12	2,009	0.05
225	36,383	0.84	0	2,781	0.06	6,537	0.15	1,140	0.03	6,537	0.15	1,140	0.03
226	39,444	0.91	0	16,645	0.38	23,261	0.53	7,525	0.17	23,261	0.53	7,525	0.17
227	16,194	0.37	0	2,841	0.07	1,813	0.04	3,922	0.09	1,813	0.04	3,922	0.09
228	7,392	0.17	0	7,392	0.17	4,802	0.11	7,392	0.17	4,802	0.11	7,392	0.17
229	144,054	3.31	0	9,172	0.21	6,217	0.14	23,550	0.54	6,217	0.14	23,550	0.54
230	20,678	0.47	0	6,520	0.15	8,839	0.20	3,443	0.08	8,839	0.20	3,443	0.08
231	17,541	0.40	0	5,874	0.13	10,707	0.25	3,258	0.07	10,707	0.25	3,258	0.07
232	43,306	0.99	0	4,231	0.10	2,813	0.06	5,902	0.14	2,813	0.06	5,902	0.14
233	38,649	0.89	0	5,593	0.13	3,873	0.09	7,630	0.18	3,873	0.09	7,630	0.18
234	20,861	0.48	0	7,563	0.17	13,770	0.32	4,464	0.10	13,770	0.32	4,464	0.10
235	53,808	1.24	0	5,182	0.12	3,551	0.08	6,964	0.16	3,551	0.08	6,964	0.16
236	60,944	1.40	0	5,109	0.12	3,313	0.08	6,500	0.15	3,313	0.08	6,500	0.15
237	19,067	0.44	0	6,464	0.15	10,264	0.24	3,941	0.09	10,264	0.24	3,941	0.09
238	78,740	1.81	0	7,890	0.18	4,804	0.11	10,093	0.23	4,804	0.11	10,093	0.23
239	34,922	0.80	0	5,953	0.14	8,815	0.20	3,832	0.09	8,815	0.20	3,832	0.09
240	34,794	0.80	0	3,072	0.07	1,364	0.03	4,231	0.10	1,364	0.03	4,231	0.10
241	142,727	3.28	0	8,366	0.19	12,289	0.28	5,222	0.12	12,289	0.28	5,222	0.12
242	38,423	0.88	0	4,542	0.10	876	0.02	7,387	0.17	876	0.02	7,387	0.17
243	10,506	0.24	0	6,409	0.15	4,002	0.09	8,041	0.18	4,002	0.09	8,041	0.18
244	7,283	0.17	0	5,473	0.13	3,372	0.08	6,578	0.15	3,372	0.08	6,578	0.15
245	176,371	4.05	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
246	10,281	0.24	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
247	21,907	0.50	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
248	24,125	0.55	0	513	0.01	0	0.00	1,649	0.04	0	0.00	1,649	0.04
249	27,113	0.62	0	7,300	0.17	10,802	0.25	4,710	0.11	10,802	0.25	4,710	0.11

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
250	68,919	1.58	0	6,580	0.15	9,612	0.22	4,036	0.09	9,612	0.22	4,036	0.09
251	31,418	0.72	0	7,368	0.17	10,250	0.24	4,443	0.10	10,250	0.24	4,443	0.10
252	33,393	0.77	0	5,646	0.13	2,870	0.07	7,912	0.18	2,870	0.07	7,912	0.18
253	18,536	0.43	0	3,346	0.08	4,860	0.11	1,881	0.04	4,860	0.11	1,881	0.04
254	214,572	4.93	0	20,375	0.47	27,681	0.64	9,973	0.23	27,681	0.64	9,973	0.23
255	38,360	0.88	0	3,077	0.07	1,718	0.04	3,390	0.08	1,718	0.04	3,390	0.08
256	20,406	0.47	0	5,517	0.13	3,267	0.08	6,781	0.16	3,267	0.08	6,781	0.16
257	49,331	1.13	0	10,230	0.23	5,103	0.12	12,054	0.28	5,103	0.12	12,054	0.28
258	38,846	0.89	0	7,445	0.17	4,248	0.10	9,902	0.23	4,248	0.10	9,902	0.23
259	54,979	1.26	0	3,807	0.09	4,810	0.11	1,765	0.04	4,810	0.11	1,765	0.04
260	14,549	0.33	0	1,749	0.04	1,192	0.03	3,098	0.07	1,192	0.03	3,098	0.07
261	14,331	0.33	0	1,635	0.04	1,193	0.03	2,938	0.07	1,193	0.03	2,938	0.07
262	15,700	0.36	0	2,971	0.07	2,417	0.06	4,910	0.11	2,417	0.06	4,910	0.11
263	29,593	0.68	0	7,245	0.17	8,689	0.20	3,735	0.09	8,689	0.20	3,735	0.09
264	9,425	0.22	0	827	0.02	706	0.02	1,396	0.03	706	0.02	1,396	0.03
265	6,120	0.14	0	582	0.01	483	0.01	971	0.02	483	0.01	971	0.02
266	58,012	1.33	0	6,038	0.14	6,586	0.15	3,044	0.07	6,586	0.15	3,044	0.07
267	116,164	2.67	0	9,329	0.21	9,075	0.21	14,797	0.34	9,075	0.21	14,797	0.34
268	114,213	2.62	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
269	8,375	0.19	0	5,200	0.12	5,098	0.12	3,923	0.09	5,098	0.12	3,923	0.09
270	7,421	0.17	0	2,177	0.05	1,985	0.05	1,575	0.04	1,985	0.05	1,575	0.04
271	8,131	0.19	0	2,835	0.07	2,540	0.06	2,136	0.05	2,540	0.06	2,136	0.05
272	29,833	0.68	0	4,226	0.10	3,545	0.08	4,105	0.09	3,545	0.08	4,105	0.09
273	15,407	0.35	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
274	22,773	0.52	0	13,687	0.31	12,419	0.29	10,944	0.25	12,419	0.29	10,944	0.25
275	14,639	0.34	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
276	172,211	3.95	0	27,771	0.64	30,220	0.69	29,522	0.68	30,220	0.69	29,522	0.68
277	8,789	0.20	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
278	13,703	0.31	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
279	13,346	0.31	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
280	99,970	2.29	0	8,509	0.20	8,200	0.19	6,815	0.16	8,200	0.19	8,276	0.19
281	24,746	0.57	0	11,032	0.25	10,882	0.25	10,287	0.24	10,882	0.25	10,287	0.24
282	17,863	0.41	0	851	0.02	1,951	0.04	726	0.02	1,951	0.04	726	0.02
283	126,063	2.89	0	11,771	0.27	11,114	0.26	13,364	0.31	16,117	0.37	16,553	0.38
284	14,999	0.34	0	11,390	0.26	11,702	0.27	8,239	0.19	11,702	0.27	8,239	0.19
285	29,397	0.67	0	0	0.00	24	0.00	0	0.00	24	0.00	0	0.00
286	8,640	0.20	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
287	15,540	0.36	0	3,883	0.09	5,619	0.13	4,304	0.10	5,619	0.13	4,304	0.10
288	10,196	0.23	0	10,196	0.23	10,196	0.23	8,901	0.20	10,019	0.23	10,019	0.23
289	19,076	0.44	0	2,937	0.07	4,270	0.10	3,709	0.09	4,270	0.10	3,709	0.09
290	29,132	0.67	0	8,820	0.20	9,068	0.21	8,249	0.19	9,068	0.21	8,249	0.19
291	9,127	0.21	0	6,462	0.15	7,518	0.17	7,314	0.17	7,841	0.18	9,148	0.21
292	754	0.02	0	476	0.01	567	0.01	502	0.01	567	0.01	871	0.02
293	5,089	0.12	0	2,341	0.05	2,791	0.06	2,407	0.06	2,791	0.06	3,049	0.07
294	20,209	0.46	0	8,976	0.21	9,017	0.21	8,227	0.19	9,017	0.21	8,227	0.19
295	12,826	0.29	0	4,921	0.11	5,707	0.13	5,031	0.12	5,707	0.13	5,227	0.12
296	17,269	0.40	0	4,600	0.11	5,546	0.13	4,797	0.11	5,546	0.13	4,797	0.11
297	20,882	0.48	0	7,729	0.18	7,381	0.17	6,798	0.16	7,381	0.17	6,798	0.16
298	12,943	0.30	0	2,942	0.07	3,575	0.08	3,122	0.07	3,575	0.08	3,122	0.07
299	17,870	0.41	0	3,252	0.07	3,869	0.09	3,442	0.08	3,869	0.09	3,442	0.08

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
300	9,751	0.22	0	3,923	0.09	3,069	0.07	2,848	0.07	3,069	0.07	2,848	0.07
301	8,431	0.19	0	3,093	0.07	2,455	0.06	2,273	0.05	2,455	0.06	2,273	0.05
302	16,084	0.37	0	5,416	0.12	6,468	0.15	5,672	0.13	6,468	0.15	5,672	0.13
303	12,348	0.28	0	7,655	0.18	8,689	0.20	7,428	0.17	8,689	0.20	7,428	0.17
304	45,215	1.04	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
305	8,298	0.19	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
306	45,892	1.05	0	6,485	0.15	6,583	0.15	5,749	0.13	6,583	0.15	5,749	0.13
307	4,776	0.11	0	4,776	0.11	4,776	0.11	4,776	0.11	4,776	0.11	4,776	0.11
308	13,145	0.30	0	2,957	0.07	3,465	0.08	3,077	0.07	3,465	0.08	3,077	0.07
309	24,975	0.57	0	5,424	0.12	6,298	0.14	5,676	0.13	6,298	0.14	5,676	0.13
310	11,420	0.26	0	3,277	0.08	3,778	0.09	3,263	0.07	3,778	0.09	3,263	0.07
311	36,620	0.84	0	11,087	0.25	10,133	0.23	11,804	0.27	10,133	0.23	11,804	0.27
312	47,924	1.10	0	1,087	0.02	1,316	0.03	1,072	0.02	1,316	0.03	1,072	0.02
313	30,377	0.70	0	7,297	0.17	6,802	0.16	6,794	0.16	6,802	0.16	6,794	0.16
314	73,136	1.68	0	6,793	0.16	6,975	0.16	6,246	0.14	6,975	0.16	6,246	0.14
315	NOT USED		NOT USED								NOT USED		
316	8,821	0.20	0	2,848	0.07	2,290	0.05	1,526	0.04	2,290	0.05	1,526	0.04
317	9,443	0.22	0	3,094	0.07	1,241	0.03	1,259	0.03	1,241	0.03	1,259	0.03
318	37,950	0.87	0	410	0.01	143	0.00	644	0.01	143	0.00	644	0.01
319	9,983	0.23	0	0	0.00	0	0.00	70	0.00	0	0.00	70	0.00
320	9,321	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
321	7,790	0.18	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
322	8,950	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
323	41,078	0.94	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
324	8,223	0.19	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
325	9,295	0.21	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
326	8,449	0.19	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
327	245,822	5.64	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
328	101,519	2.33	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
329	40,912	0.94	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
330	49,239	1.13	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
331	55,777	1.28	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
332	15,189	0.35	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
333	44,193	1.01	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
334	NOT USED		NOT USED								NOT USED		
335	NOT USED		NOT USED								NOT USED		
336	210,073	4.82	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
337	35,504	0.82	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
338	4,039	0.09	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
339	812,061	18.64	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
340	12,089	0.28	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
341	95,837	2.20	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
342	32,733	0.75	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
343	197,842	4.54	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
344	928,794	21.32	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
345	28,992	0.67	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
346	1,228,222	28.20	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
347	78,814	1.81	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
348	28,910	0.66	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
349	485,404	11.14	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
350	1,330,124	30.54	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
351	223,558	5.13	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
352	2,002,822	45.98	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
353	5,411	0.12	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
354	167,690	3.85	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
355	81,889	1.88	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
356	87,017	2.00	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
357	11,875	0.27	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
358	52,359	1.20	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
359	16,732	0.38	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
360	23,772	0.55	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
361	19,930	0.46	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
362	82,339	1.89	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
363	6,283	0.14	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
364	70,180	1.61	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
365	15,996	0.37	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
366	15,438	0.35	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
367	264,367	6.07	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
368	21,225	0.49	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
369	299,554	6.88	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
370	415,715	9.54	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
371	1,951,583	44.80	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
372	1,992,770	45.75	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
373	1,273,757	29.24	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
374	27,955,462	641.77	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
375	458,047	10.52	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
376	1,496,029	34.34	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
377	4,248,452	97.53	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
378	15,324	0.35	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
379	305,933	7.02	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
380	14,033	0.32	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
381	5,100	0.12	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
382	9,569	0.22	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
383	67,051	1.54	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
384	3,389,986	77.82	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
385	3,761	0.09	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
386	824,479	18.93	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
387	606,113	13.91	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
388	45,092,966	1035.19	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
389	39,249	0.90	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
390	53,532	1.23	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
391	283,626	6.51	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
392	29,669	0.68	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
393	30,208	0.69	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
394	28,474	0.65	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
395	66,857	1.53	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
396	12,034	0.28	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
397	37,097	0.85	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
398	42,713	0.98	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
399	35,890	0.82	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENT 1 - US 19										
	AREA	AREA	ALT 1	ALT 2		ALT 3		ALT 4		ALT 5		ALT 6	
	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC	SF	AC
400	150,346	3.45	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
401	196,731	4.52	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
402	79,361,921	1821.90	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
403	158,911	3.65	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
404	107,001	2.46	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
405	173,028	3.97	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
406	29,439	0.68	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
407	38,530	0.88	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
408	17,360,460	398.54	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
409	5,354,881	122.93	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
410	512,016	11.75	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
411	983,920	22.59	0	804	0.02	0	0.00	0	0.00	0	0.00	0	0.00
412	14,783	0.34	0	1,175	0.03	0	0.00	2,652	0.06	0	0.00	2,652	0.06
413	16,644	0.38	0	1,864	0.04	0	0.00	0	0.00	0	0.00	0	0.00
414	16,290	0.37	0	1,018	0.02	0	0.00	0	0.00	0	0.00	0	0.00
415	13,718	0.31	0	124	0.00	0	0.00	0	0.00	0	0.00	0	0.00
416	16,214	0.37	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
417	41,667	0.96	0	0	0.00	1,633	0.04	0	0.00	1,633	0.04	0	0.00
418	197,190	4.53	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
419	12,298	0.28	0	0	0.00	0	0.00	3,871	0.09	0	0.00	3,871	0.09
420	41,370	0.95	0	0	0.00	0	0.00	1,063	0.02	2,614	0.06	4,792	0.11
421	11,642	0.27	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
422	7,845	0.18	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
423	54,079	1.24	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
424	27,960	0.64	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
425	1,311,175	30.10	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENTS 2 and 7 - WV 307/AIRPORT ROAD						SEGMENT 8 - US 19 CONNECTOR						US 19 CONNECTOR	
	AREA SF	AREA AC	ALT 1 AC	ALT 2		ALT 3			ALT 1 - OVERPASS		ALT 1 - AT GRADE		ALT 2		FOR CONNECTOR ONLY	
				SF	AC	SF	AC		SF	AC	SF	AC	SF	AC		
254	214,572	4.93	0	0	0.00	0	0.00		25,274	0.58	25,274	0.58	0	0.00	0	0.00
255	38,360	0.88	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
256	20,406	0.47	0	0	0.00	0	0.00		5,379	0.12	5,379	0.12	0	0.00	0	0.00
257	49,331	1.13	0	0	0.00	0	0.00		10,831	0.25	10,831	0.25	0	0.00	0	0.00
258	38,846	0.89	0	0	0.00	0	0.00		9,105	0.21	9,105	0.21	0	0.00	0	0.00
259	54,979	1.26	0	0	0.00	0	0.00		5,019	0.12	5,019	0.12	0	0.00	0	0.00
260	14,549	0.33	0	0	0.00	0	0.00		2,652	0.06	2,652	0.06	0	0.00	0	0.00
261	14,331	0.33	0	0	0.00	0	0.00		2,457	0.06	2,457	0.06	0	0.00	0	0.00
262	15,700	0.36	0	0	0.00	0	0.00		4,043	0.09	4,043	0.09	0	0.00	0	0.00
263	29,593	0.68	0	0	0.00	0	0.00		11,623	0.27	11,623	0.27	0	0.00	0	0.00
264	9,425	0.22	0	0	0.00	0	0.00		1,090	0.03	1,090	0.03	0	0.00	0	0.00
265	6,120	0.14	0	0	0.00	0	0.00		656	0.02	656	0.02	0	0.00	0	0.00
266	58,012	1.33	0	0	0.00	0	0.00		12,239	0.28	12,239	0.28	0	0.00	0	0.00
267	116,164	2.67	0	0	0.00	0	0.00		5,495	0.13	5,495	0.13	0	0.00	0	0.00
268	114,213	2.62	0	0	0.00	0	0.00		4,023	0.09	4,023	0.09	0	0.00	0	0.00
269	8,375	0.19	0	0	0.00	0	0.00		8,375	0.19	8,375	0.19	0	0.00	0	0.00
270	7,421	0.17	0	0	0.00	0	0.00		7,421	0.17	7,421	0.17	0	0.00	0	0.00
271	8,131	0.19	0	0	0.00	0	0.00		8,131	0.19	8,131	0.19	3,085	0.07	0	0.00
272	29,833	0.68	0	0	0.00	0	0.00		0	0.00	0	0.00	6,005	0.14	0	0.00
273	15,407	0.35	0	0	0.00	0	0.00		605	0.01	605	0.01	0	0.00	1,569	0.04
274	22,773	0.52	0	0	0.00	0	0.00		10,985	0.25	10,985	0.25	14,775	0.34	0	0.00
275	14,639	0.34	0	0	0.00	0	0.00		9,217	0.21	9,217	0.21	0	0.00	0	0.00
276	172,211	3.95	0	0	0.00	0	0.00		0	0.00	0	0.00	19,990	0.46	0	0.00
277	8,789	0.20	0	0	0.00	0	0.00		8,789	0.20	8,789	0.20	0	0.00	0	0.00
278	13,703	0.31	0	0	0.00	0	0.00		8,651	0.20	8,651	0.20	2,414	0.06	0	0.00
279	13,346	0.31	0	0	0.00	0	0.00		9,599	0.22	9,599	0.22	1,462	0.03	0	0.00
280	99,970	2.29	0	0	0.00	0	0.00		42,417	0.97	42,417	0.97	33,464	0.77	25,585	0.59
281	24,746	0.57	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
282	17,863	0.41	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
283	126,063	2.89	0	0	0.00	0	0.00		61,492	1.41	61,492	1.41	112,702	2.59	28,502	0.65
284	14,999	0.34	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
285	29,397	0.67	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
286	8,640	0.20	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
287	15,540	0.36	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	4,694	0.11
288	10,196	0.23	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	10,189	0.23
289	19,076	0.44	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,630	0.08
290	29,132	0.67	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	20,067	0.46
291	9,127	0.21	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	9,114	0.21
292	754	0.02	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	754	0.02
293	5,089	0.12	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,538	0.08
294	20,209	0.46	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	12,089	0.28
295	12,826	0.29	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	5,676	0.13
296	17,269	0.40	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	5,192	0.12
297	20,882	0.48	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	8,768	0.20
298	12,943	0.30	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,597	0.08
299	17,870	0.41	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,883	0.09

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENTS 2 and 7 - WV 307/AIRPORT ROAD						SEGMENT 8 - US 19 CONNECTOR						US 19 CONNECTOR	
	AREA	AREA	ALT 1 AC	ALT 2		ALT 3			ALT 1 - OVERPASS		ALT 1 - AT GRADE		ALT 2		FOR CONNECTOR ONLY	
	SF	AC		SF	AC	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC
300	9,751	0.22	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,939	0.09
301	8,431	0.19	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,106	0.07
302	16,084	0.37	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	6,491	0.15
303	12,348	0.28	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	7,646	0.18
304	45,215	1.04	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
305	8,298	0.19	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
306	45,892	1.05	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
307	4,776	0.11	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	4,780	0.11
308	13,145	0.30	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,513	0.08
309	24,975	0.57	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	6,454	0.15
310	11,420	0.26	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	3,798	0.09
311	36,620	0.84	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
312	47,924	1.10	0	11,879	0.27	11,879	0.27		0	0.00	0	0.00	0	0.00	0	0.00
313	30,377	0.70	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
314	73,136	1.68	0	9,595	0.22	9,595	0.22		0	0.00	0	0.00	0	0.00	0	0.00
315	NOT USED		NOT USED						NOT USED						NOT USED	
316	8,821	0.20	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
317	9,443	0.22	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
318	37,950	0.87	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
319	9,983	0.23	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
320	9,321	0.21	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
321	7,790	0.18	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
322	8,950	0.21	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
323	41,078	0.94	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
324	8,223	0.19	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
325	9,295	0.21	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
326	8,449	0.19	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
327	245,822	5.64	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
328	101,519	2.33	0	612	0.01	612	0.01		0	0.00	0	0.00	0	0.00	0	0.00
329	40,912	0.94	0	4,716	0.11	4,716	0.11		0	0.00	0	0.00	0	0.00	0	0.00
330	49,239	1.13	0	9,907	0.23	9,907	0.23		0	0.00	0	0.00	0	0.00	0	0.00
331	55,777	1.28	0	9,896	0.23	9,896	0.23		0	0.00	0	0.00	0	0.00	0	0.00
332	15,189	0.35	0	5,743	0.13	5,743	0.13		0	0.00	0	0.00	0	0.00	0	0.00
333	44,193	1.01	0	4,391	0.10	4,391	0.10		0	0.00	0	0.00	0	0.00	0	0.00
334	NOT USED		NOT USED						NOT USED						NOT USED	
335	NOT USED		NOT USED						NOT USED						NOT USED	
336	210,073	4.82	0	15,653	0.36	59,518	1.37		90,308	2.07	42,077	0.97	59,518	1.37	0	0.00
337	35,504	0.82	0	9,250	0.21	21,512	0.49		22,337	0.51	13,441	0.31	21,512	0.49	0	0.00
338	4,039	0.09	0	3,214	0.07	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
339	812,061	18.64	0	18,600	0.43	19,113	0.44		40,722	0.93	120,722	2.77	96,943	2.23	0	0.00
340	12,089	0.28	0	1,325	0.03	1,724	0.04		0	0.00	0	0.00	0	0.00	0	0.00
341	95,837	2.20	0	14,736	0.34	19,448	0.45		0	0.00	0	0.00	0	0.00	0	0.00
342	32,733	0.75	0	10,903	0.25	10,822	0.25		0	0.00	0	0.00	0	0.00	0	0.00
343	197,842	4.54	0	9,499	0.22	8,153	0.19		0	0.00	0	0.00	0	0.00	0	0.00
344	928,794	21.32	0	83,072	1.91	83,486	1.92		0	0.00	0	0.00	0	0.00	0	0.00
345	28,992	0.67	0	8,293	0.19	10,299	0.24		0	0.00	0	0.00	0	0.00	0	0.00
346	1,228,222	28.20	0	233,345	5.36	280,659	6.44		0	0.00	0	0.00	0	0.00	0	0.00
347	78,814	1.81	0	34,252	0.79	34,627	0.79		0	0.00	0	0.00	0	0.00	0	0.00
348	28,910	0.66	0	21,557	0.49	23,003	0.53		0	0.00	0	0.00	0	0.00	0	0.00
349	485,404	11.14	0	128,900	2.96	124,578	2.86		0	0.00	0	0.00	0	0.00	0	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENTS 2 and 7 - WV 307/AIRPORT ROAD						SEGMENT 8 - US 19 CONNECTOR						US 19 CONNECTOR	
	AREA	AREA	ALT 1 AC	ALT 2		ALT 3			ALT 1 - OVERPASS		ALT 1 - AT GRADE		ALT 2		FOR CONNECTOR ONLY	
	SF	AC		SF	AC	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC
350	1,330,124	30.54	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
351	223,558	5.13	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
352	2,002,822	45.98	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
353	5,411	0.12	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
354	167,690	3.85	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
355	81,889	1.88	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
356	87,017	2.00	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
357	11,875	0.27	0	3,498	0.08	4,220	0.10		0	0.00	0	0.00	0	0.00	0	0.00
358	52,359	1.20	0	4,107	0.09	6,239	0.14		0	0.00	0	0.00	0	0.00	0	0.00
359	16,732	0.38	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
360	23,772	0.55	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
361	19,930	0.46	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
362	82,339	1.89	0	0	0.00	7,052	0.16		0	0.00	0	0.00	0	0.00	0	0.00
363	6,283	0.14	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
364	70,180	1.61	0	7,820	0.18	10,115	0.23		0	0.00	0	0.00	0	0.00	0	0.00
365	15,996	0.37	0	785	0.02	1,115	0.03		0	0.00	0	0.00	0	0.00	0	0.00
366	15,438	0.35	0	693	0.02	996	0.02		0	0.00	0	0.00	0	0.00	0	0.00
367	264,367	6.07	0	1,454	0.03	2,292	0.05		0	0.00	0	0.00	0	0.00	0	0.00
368	21,225	0.49	0	13,215	0.30	15,619	0.36		0	0.00	0	0.00	0	0.00	0	0.00
369	299,554	6.88	0	7,262	0.17	5,701	0.13		0	0.00	0	0.00	0	0.00	0	0.00
370	415,715	9.54	0	11,724	0.27	9,657	0.22		0	0.00	0	0.00	0	0.00	0	0.00
371	1,951,583	44.80	0	103,396	2.37	97,511	2.24		0	0.00	0	0.00	0	0.00	0	0.00
372	1,992,770	45.75	0	80,943	1.86	78,548	1.80		0	0.00	0	0.00	0	0.00	0	0.00
373	1,273,757	29.24	0	44,141	1.01	41,066	0.94		0	0.00	0	0.00	0	0.00	0	0.00
374	27,955,462	641.77	0	53,103	1.22	21,391	0.49		0	0.00	0	0.00	0	0.00	0	0.00
375	458,047	10.52	0	45,447	1.04	45,447	1.04		0	0.00	0	0.00	0	0.00	0	0.00
376	1,496,029	34.34	0	177,909	4.08	220,775	5.07		0	0.00	0	0.00	0	0.00	0	0.00
377	4,248,452	97.53	0	44,330	1.02	184,915	4.25		0	0.00	0	0.00	0	0.00	0	0.00
378	15,324	0.35	0	10,443	0.24	9,646	0.22		0	0.00	0	0.00	0	0.00	0	0.00
379	305,933	7.02	0	54,594	1.25	54,349	1.25		0	0.00	0	0.00	0	0.00	0	0.00
380	14,033	0.32	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	475	0.01
381	5,100	0.12	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
382	9,569	0.22	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	1,034	0.02
383	67,051	1.54	0	0	0.00	0	0.00		39,650	0.91	38,903	0.89	22,707	0.52	0	0.00
384	3,389,986	77.82	0	122,330	2.81	135,392	3.11		281,402	6.46	263,388	6.05	326,804	7.50	0	0.00
385	3,761	0.09	0	0	0.00	0	0.00		3,761	0.09	3,531	0.08	3,592	0.08	0	0.00
386	824,479	18.93	0	0	0.00	0	0.00		297,616	6.83	309,015	7.09	278,840	6.40	0	0.00
387	606,113	13.91	0	0	0.00	0	0.00		82,090	1.88	149,101	3.42	129,077	2.96	0	0.00
388	45,092,966	1035.19	0	0	0.00	0	0.00		21,464	0.49	27,933	0.64	167,104	3.84	0	0.00
389	39,249	0.90	0	0	0.00	0	0.00		26,015	0.60	38,829	0.89	37,106	0.85	0	0.00
390	53,532	1.23	0	0	0.00	0	0.00		9,236	0.21	43,868	1.01	44,085	1.01	0	0.00
391	283,626	6.51	0	0	0.00	0	0.00		2,960	0.07	37,577	0.86	14,464	0.33	0	0.00
392	29,669	0.68	0	0	0.00	0	0.00		22,621	0.52	29,669	0.68	26,891	0.62	0	0.00
393	30,208	0.69	0	0	0.00	0	0.00		23,970	0.55	30,208	0.69	30,208	0.69	0	0.00
394	28,474	0.65	0	0	0.00	0	0.00		14,653	0.34	28,474	0.65	28,474	0.65	0	0.00
395	66,857	1.53	0	0	0.00	0	0.00		14,742	0.34	19,022	0.44	9,132	0.21	0	0.00
396	12,034	0.28	0	0	0.00	0	0.00		12,034	0.28	9,351	0.21	2,675	0.06	0	0.00
397	37,097	0.85	0	0	0.00	0	0.00		17,425	0.40	6,622	0.15	575	0.01	0	0.00
398	42,713	0.98	0	0	0.00	0	0.00		36,636	0.84	42,713	0.98	39,197	0.90	0	0.00
399	35,890	0.82	0	0	0.00	0	0.00		15,095	0.35	15,176	0.35	9,487	0.22	0	0.00

ACQUISITION TABLE

PARCEL	PARCEL TOTALS		SEGMENTS 2 and 7 - WV 307/AIRPORT ROAD						SEGMENT 8 - US 19 CONNECTOR						US 19 CONNECTOR	
	AREA	AREA	ALT 1 AC	ALT 2		ALT 3			ALT 1 - OVERPASS		ALT 1 - AT GRADE		ALT 2		FOR CONNECTOR ONLY	
	SF	AC		SF	AC	SF	AC		SF	AC	SF	AC	SF	AC	SF	AC
400	150,346	3.45	0	0	0.00	0	0.00		57,693	1.32	97,491	2.24	85,957	1.97	0	0.00
401	196,731	4.52	0	0	0.00	0	0.00		78,670	1.81	102,739	2.36	90,542	2.08	0	0.00
402	79,361,921	1821.90	0	0	0.00	0	0.00		432,767	9.93	507,635	11.65	459,628	10.55	0	0.00
403	158,911	3.65	0	0	0.00	0	0.00		60,255	1.38	69,254	1.59	61,795	1.42	0	0.00
404	107,001	2.46	0	0	0.00	0	0.00		34,818	0.80	39,447	0.91	34,346	0.79	0	0.00
405	173,028	3.97	0	0	0.00	0	0.00		28,801	0.66	37,640	0.86	26,115	0.60	0	0.00
406	29,439	0.68	0	0	0.00	0	0.00		19,399	0.45	23,369	0.54	44,352	1.02	0	0.00
407	38,530	0.88	0	0	0.00	0	0.00		5,641	0.13	11,573	0.27	5,201	0.12	0	0.00
408	17,360,460	398.54	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
409	5,354,881	122.93	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
410	512,016	11.75	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
411	983,920	22.59	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
412	14,783	0.34	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
413	16,644	0.38	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
414	16,290	0.37	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
415	13,718	0.31	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
416	16,214	0.37	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
417	41,667	0.96	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
418	197,190	4.53	0	889	0.02	433	0.01		0	0.00	0	0.00	0	0.00	0	0.00
419	12,298	0.28	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
420	41,370	0.95	0	0	0.00	0	0.00		0	0.00	0	0.00	0	0.00	0	0.00
421	11,642	0.27	0	0	0.00	0	0.00		1,504	0.03	1,504	0.03	0	0.00	0	0.00
422	7,845	0.18	0	0	0.00	0	0.00		1,366	0.03	1,366	0.03	0	0.00	6,478	0.15
423	54,079	1.24	0	0	0.00	0	0.00		200	0.00	200	0.00		0.00	0	0.00
424	27,960	0.64	0	0	0.00	0	0.00		0	0.00	0	0.00	9,309	0.21	0	0.00
425	1,311,175	30.10	0	0	0.00	0	0.00		27,215	0.62	27,215	0.62	27,215	0.62	0	0.00
426															1,632	0.04
427															157	0.00
428															786	0.02
429															5,940	0.14
430															10,277	0.24
431															374	0.01
432															2,782	0.06
433															14,116	0.32
434															5,779	0.13
435															7,939	0.18
436															7,041	0.16

Appendix E

Office Review Comments with Actions Taken

MINUTES OF MEETING

DATE OF REVIEW: July 15, 2014

TO: Mr. Timothy R. Priddy, WVDOH Project Manager

PROJECT NUMBER: State Project X241-ZWA/Y-1.00
Federal Project HPP-2007(050)D

DESCRIPTION: Beckley Z-Way Design Study

Office Review Meeting

PARTICIPANTS: Tim Priddy, WVDOH-DDR
Elwood Penn, WVDOH-RPL
Don Meadows, WVDOH-DT
Randy Epperly, WVDOH-DDE
Yuvonne Smith, FHWA
Larry Clegg, CDM Smith
Brad Johnson, CDM Smith
Joe Crittenden, CDM Smith

The purpose of this meeting was to discuss the Office Review Plan Submission. The meeting was held on July 15, 2014. Listed below are comments that were documented during the course of the review meeting.

Comments:

- 1. Comment: Hard copies of typed comments concerning the traffic report were provided at the start of the review.

Action: No Response needed.

- 2. Comment: Appears to be inconsistencies in the traffic growth rates in the traffic report for different intersections. Verify the growth rates and add a section to the report explaining the growth rates and forecast parameters used for the project. Consider updating the AM Peak K-factor and D-factor if it is determined the AM Peak is overestimating forecast volumes.

Action: The overestimation has no impact on the intersection analysis and resulting conclusions

- 3. Comment: In the traffic report add analysis for the segment 8 at-grade alternative.

Action: The suggested alternative has been added.

- 4. Comment: A fourth leg has been recently added to the WV 3/US 19 intersection at the Dollar General store. Please reflect this in the traffic report.

Action: This fourth leg is private entrance. The signal operation is governed by the WV-3 traffic

- 5. Comment: Add the location of existing and proposed traffic signals into the traffic report and design study report.

Action: Table 1 shows the existing traffic signals. A traffic warrant analysis would have to be conducted to address proposed signals along the Z-Way. The US 19 Connector intersection with the Bypass Extension, at the at-grade intersection with WV 307 and the Bypass Extension and the I-64 Interchange ramp intersections would likely meet signal warrants.

6. Comment: Provide traffic analysis software files to the WVDOH.

Action: These files will be provided.

7. Comment: Add a left turn lane from US 19 onto Greystone Drive at the US 19 Connector on both the study plans and traffic report.

Action: A left turn lane from Segment 8/US 19 Connector onto Greystone Drive is shown on the plan sheet for the Segment 8 Alternate 1 Overpass alternative. The Segment 8 Alternate 1 At-grade alternative will use the proposed continuous center turn lane to provide access into Greystone Drive. The horizontal and vertical alignments for Segment 8 Alternate 2 do not accommodate a safe design and so this alternative is not recommended. The radius for the horizontal curve is 250 feet which is a 25 MPH design speed using an 8% maximum superelevation rate. An 8% superelevation at a stop condition may cause additional operational issues during inclement weather. Additionally, the vertical alignment exceeds 16% and does not meet any design criteria contained within DD-601.

8. Comment: If possible, eliminate all retaining walls.

Action: The retaining wall locations were shown as a possible option subject to detailed Right-Of-Way acquisition estimates versus construction costs. The options are remaining within the report until detailed environmental assessments, subsurface investigation, and other salient information is obtained for the final design phase of the project.

~~**9.** Comment: In the design report the consultant is to recommend which sections of the project should be constructed in which sequence.~~

Action: Comment rescinded by WVDOH.

10. Comment: Add critical cross sections in areas with maximum cut and fill.

Action: Additional cross sections were added at selected critical locations to supplement the 500 foot interval cross sections.

11. Comment: Within the design report mention constructability problems within areas with adjusted vertical alignments.

Action: The following paragraph was added to the design report; to achieve the 45 mph design speed, vertical alignment adjustments were made to Alternates 3 through 6. If any of alternates 3 through 6 are selected to proceed into the design phase, special attention to the temporary traffic control design is required in the areas of vertical alignment adjustments.

12. Comment: Add an overview sheet for the US 19 Connector to Segment 8.

Action: Overview sheets were added for all US 19 Connectors to Segment 8.

13. Comment: Add a cross section for Segment 8 under the I-64 Bridge.

Action: An Alternate 1 Overpass section showing Segment 8 under the I-64 Bridge is shown on sheet 223, Alternate 1 At-grade is shown on sheet 241, and Alternate 2 is shown on sheet 259. The sections are shown in the upper right corner of the appropriate plan sheet.

14. Comment: Add a typical section for Segment 8 under the I-64 Bridge.

Action: A section showing Segment 8 under the I-64 Bridge for Alternate 1 Overpass is shown on sheet 223, Alternate 1 At-grade is shown on sheet 241, and Alternate 2 is shown on sheet 259. The sections are shown in the upper right corner of the appropriate plan sheet.

15. Comment: Revise the Segment 8 profiles to a natural scale.

Action: The Segment 8 profiles were revised to a natural scale as requested.

16. Comment: Show design exceptions in the report for each segment.

Action: Design exceptions are shown in Appendix B of the Design Report.

17. Comment: Verify maximum grade used in the design criteria and terrain type.

Action: The maximum grade for urban arterials in mountainous terrain is listed as 9% in Table 7-4 of the 2011 "A Policy on Geometric Design of Highways and Streets".

18. Comment: Incorporate review comments with actions taken into the design report.

Action: The review comments with the actions taken will be incorporated into the design report.

19. Comment: Verify statement in the drainage report about drainage area being in error.

Action: The statement was revised to read; "The Little Beaver drainage area was verified using Maptech Terrain Professional.

20. Comment: In the design report, estimate the length of stream impacts for each segment's alternative.

Action: The estimated length of stream impacts is located on the appropriate evaluation matrix.

21. Comment: In the design report cost estimates for Segment 8, add a line item for the US 19 Connector and add a note on the US 19 Connector estimate that the number was carried to appropriate alternatives.

Action: A line was added into the detailed estimates showing the anticipated cost of the US 19 Connector.

Prepared by: CDM Smith

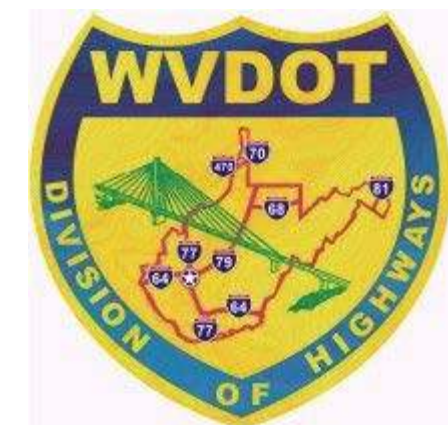
ALIGNMENT ALTERNATIVE STUDY REPORT

STATE PROJECT X341-ZWA/Y-6.22 02
FEDERAL PROJECT STP-0019(429)D
BEAVER – SOUTH EISENHOWER DRIVE
RALEIGH COUNTY

PREPARED BY:



PREPARED FOR:



APRIL 2018

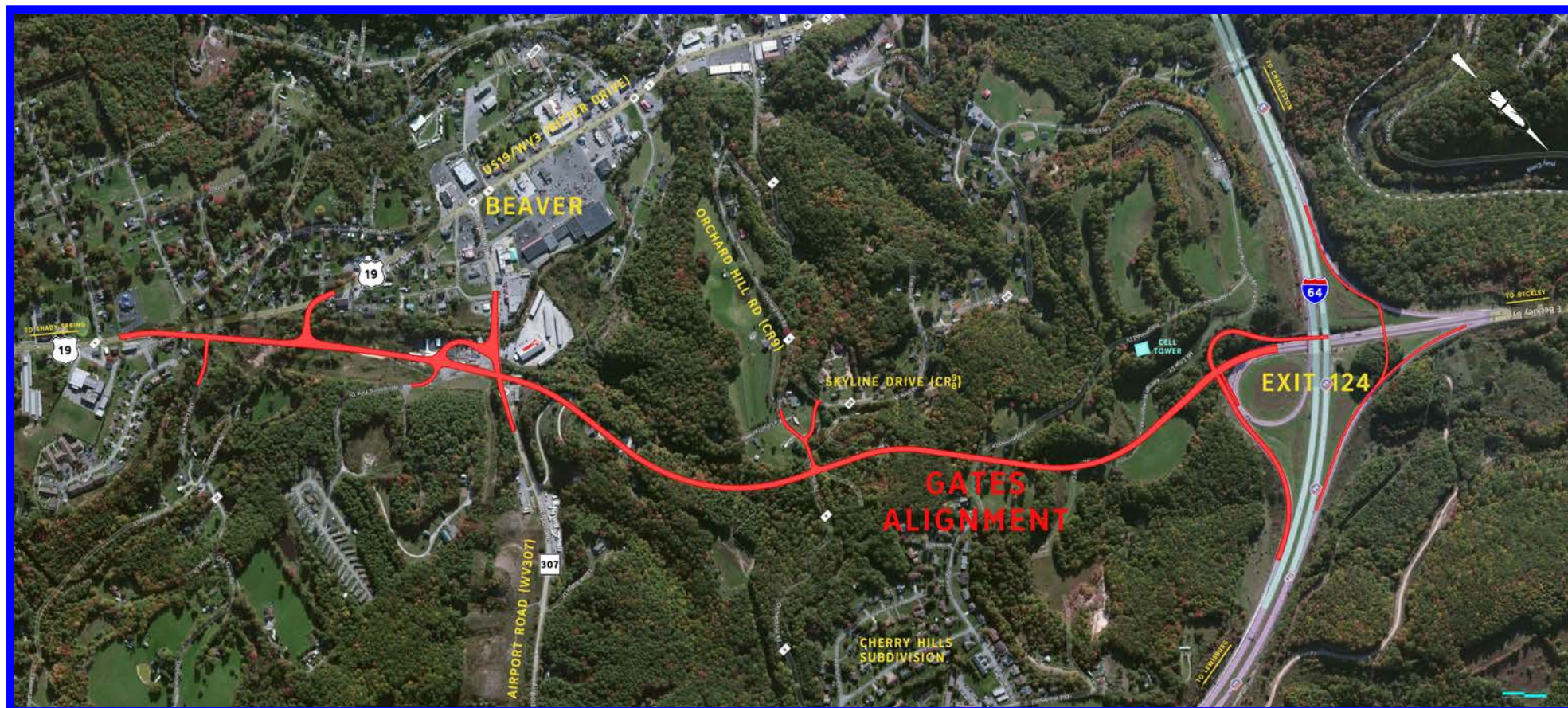


TABLE OF CONTENTS

SECTION 1 - PROJECT SUMMARY 3

 Figure 1: Comparison of Study Alignments 4

SECTION 2 – ROADWAY IMPROVEMENTS 5

 Mainline 5

 Side Roads and Connector Roads 5

 Mainline & Side Roads Temporary Traffic Control..... 5

 Interchange Improvements..... 6

 Interchange Temporary Traffic Control..... 7

 Jughandle, Eastbound Ramps and US 19 Reconstruction 7

 WB Exit Ramps 7

 WB Entrance Ramp 7

 Short Term Interchange Traffic Routing 7

 Roadway Impacts..... 7

SECTION 3 – STRUCTURES 9

 Box Culvert beneath Relocated US19 at Station 306+77 9

 Box Culvert beneath Airport Road at Station 79+76..... 9

 Bridge at Airport Road at Station 82+75 9

SECTION 4 – HYDRAULICS 10

 Summary 10

 Available Data 10

 Hydrology 10

 Hydraulic Modeling 10

 HEC-RAS Plan Files..... 11

SECTION 5 - GEOTECHNICAL OVERVIEW 12

 Summary 12

 Stratigraphy and Structure 13

 Mining Information..... 13

SECTION 6 – ENVIRONMENTAL OVERVIEW..... 13

SECTION 7 – TRAFFIC ANALYSIS 13

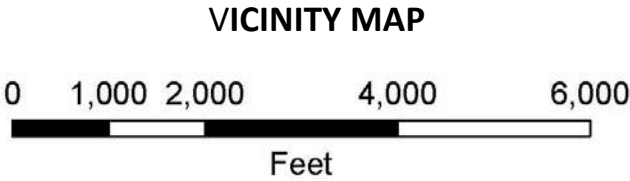
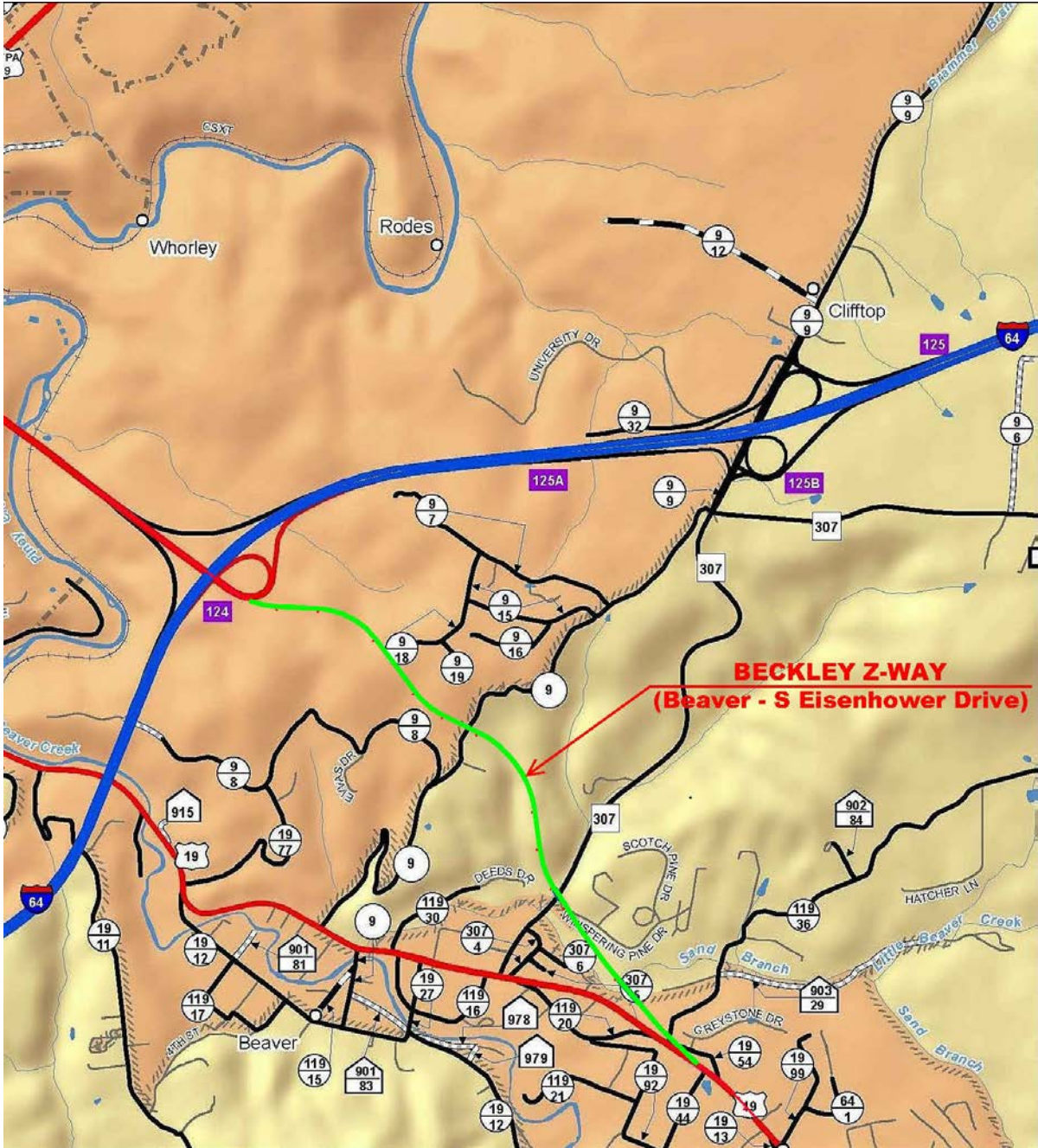
Appendix A – Evaluation Matrix..... 21

Appendix B – Design Criteria Summary 23

Appendix C – Construction Cost Estimate 27

Appendix D – Acquisition Tables..... 29

Appendix E – Hydraulic Analysis 34



SECTION 1 - PROJECT SUMMARY

The purpose of this Alignment Alternative Report is to provide an alternative alignment option for the segment of the Beckley Z-Way from Beaver to the I-64 Exit I24 Interchange. The original alignment alternatives considered for this segment of the Z-Way was developed in the Beckley Z-Way Final Design Report Study by CDM Smith in November 2014. In the original 2014 Beckley Z-Way Design Report the Beaver – South Eisenhower Drive segment was called Segment 8. In the original report three various alignments studied.

- Alternate No 1 Overpass – An alignment with a bridge over WV307 (Airport Road)
- Alternate No. 1 At Grade - An alignment with at-grade intersection over WV307 (Airport Road)
- Alternate No. 2 (Overpass) -Alignment with a begin project moved about 1000' to the north.

In addition, the original study also had a separate alignment alternative connecting the existing US19 to the new Z-Way near the south end of the project.

The Gates alternative alignment is somewhat similar to the original Alternate No. 2 with a starting point further to the south and an overpass over Airport Road (WV307). However, the Gates alignment does have some significant differences from the earlier CDM Smith Study Alignments (see Figure 1 for a comparison of the Alignments). A few of the differences are listed below:

- A more curved alignment between the Skyline Drive and Cherry Hills subdivision to minimize community impacts.
- The connector road between the Z-way and US19 is moved to the north and is included as part of the Gates alignment.
- Improvements to Airport Road (WV307) adding a center turn lane to accommodate right turn and left turn lanes onto the Z-Way connector ramps from Airport Road.

- The original study did not have a connection to Orchard Hill Road or Skyline Drive. Connector roads to both Orchard Hill Road (CR9) and Skyline Drive (CR9/8) providing access to the local residences along the route have been added.
- Shifted alignment on the mainline on the north end of the project near the interchange to minimize earthwork and avoid an existing Cell Tower.

The Gates alignment begins at the northern termini of the Z-Way project, Shady Spring – Beaver, near the intersection of US19 (Ritter Drive) & County Route 19/36 (Old Crow Road). This segment of the Z-Way will diverge to the northwest away from US19 and continues on to the northwest crossing over WV307 (Airport Road) approximately 1100 feet north of the US19 & WV307 intersection at Beaver. From WV307 the alignment continues to the northwest through mountainous terrain where it crosses County Route 9 (Orchard Hill Road) and then onto the northern termini location at the I-64 Exit 124 Beckley-Eisenhower Drive Interchange. This segment will be a new facility which connects US 19 directly to I-64. The construction of this segment will help alleviate congestion in the Beaver area, especially at US19 & WV307 intersection, by providing a more direct route and more convenient access to the commercial areas along Eisenhower Drive and Robert C. Byrd Drive.

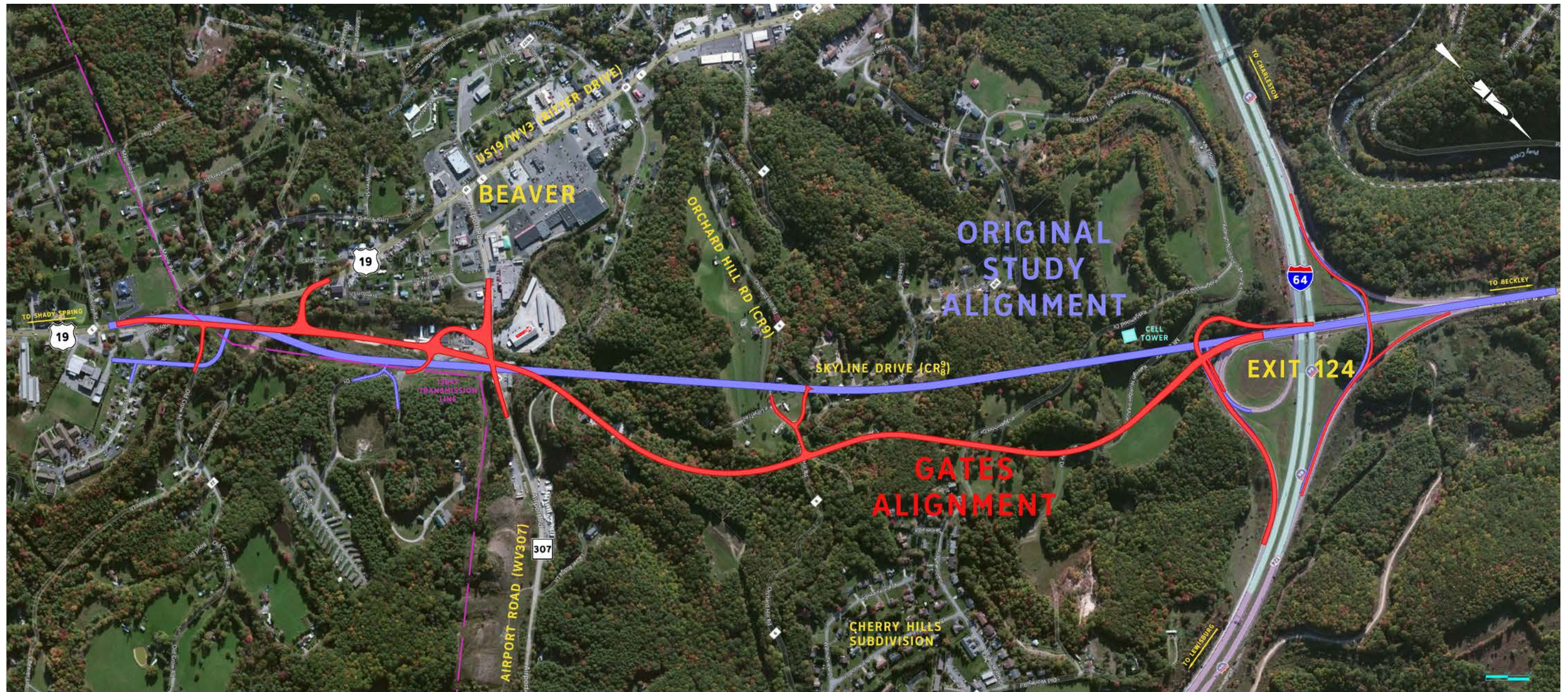


Figure 1: Comparison of Study Alignments

SECTION 2 – ROADWAY IMPROVEMENTS

Mainline

The Beaver to South Eisenhower Drive project is part of the Beckley Z-Way project. The project begins at the north termini of the Shady Spring – Beaver project at Sta 292+95 and runs to the I-64 Exit 124 Interchange at Sta 393+88. This project is a 1.91 mile three-lane highway with a center turn lane that will provide better access to the nearby communities of Beaver, Daniels and Shady Spring to Interstate 64 and the commercial and retail areas of Beckley along Eisenhower and Robert C. Byrd Drive. In addition, the project will help alleviate local traffic congestion in the Beaver area and provide a safer facility for the travelling public. All design has been done to meet the AASHTO Policy on Geometric Design of Highways and Streets 2011, 6th edition. All of the specific design criteria for the project can be found in Appendix B.

Side Roads and Connector Roads

The Beaver – S Eisenhower Drive projects includes connections to six local roads.

- Old Crow Road (CR 119/36) at Sta 299+00 Rt (340 ft)
- Ritter Drive (US Route 19/ WV 3) at Sta 305+75 Lt (460 ft)
- Airport Road Ramp (WV307) at Sta 315+00 Lt (485 ft)
- Airport Road Improvements at Sta 319+20 (980 ft)
- Pine Haven Road at Sta 315+00 Rt (270 ft)
- Orchard Hill Road (CR 9) at Sta 343+25 Lt (505 ft)
- Skyline Drive (CR 9/8) at Sta 343+25 Lt (300 ft)

The total length of all side road improvements is 3,340 feet (0.63 miles). Airport road will also be widened to accommodate a center turn lane primarily to add right and left turn lanes from Airport Road to the Connector Ramp to the Z-Way.

Mainline & Side Roads Temporary Traffic Control

Most of the Temporary Traffic Control issues will be fairly routine. Below is a summary of some of the proposed traffic control at each side road on the project.

- Begin Project connection to US19 Sta 293+00 to Sta 296+50 – Traffic will be maintained on the existing road throughout construction of the mainline. The tie-in connection at the beginning of the project back to US19 have to be one of the segments of the project to complete. Phased construction will be utilized to complete the tie-in in this area.
- Old Crow Road (CR119/36) – Sta 299+00 Rt, Similar to the tie-in to US19, traffic will be maintained on the existing roads during construction of the Z-Way and the final connection to the Z-Way will need to be done near the end of the project.
- Old US19 Connection – Sta 305+75 Lt, Similar to the tie-in to US19 and Old Crow Road, traffic will be maintained on the existing roads during construction of the Z-Way and the final connection to the US19 will need to be done near the end of the project. However, it would be possible to construct the Z-Way from the Begin Project Sta 292+95 to about Sta 306+00 and shift local traffic to this 1300 feet section of the Z-Way prior to construction the remainder of the Z-Way but it would not be preferable.
- Airport Road Ramps and Pine Haven Ramps – Sta 315+00 Rt & Lt. Since the Z-Way embankment covers over Pine Haven Road, either a temporary road on the right side of the fill slope will need to be constructed for the Pine Haven community access or the Ramps will need to be complete entirely before the roadway fill can be constructed from Sta 615+00 to Sta 319+00.
- Airport Road Improvements – Since most of the Airport Road improvements are an overlay and widening scenario, traffic control should be fairly routine. However the proposed Box Culvert at Sta 79+75 for Little Beaver Creek does present the largest traffic control challenge on the project. It is the intent to extend the box culvert approximately 4 feet upstream of what is necessary to accommodate temporary traffic so that two-lane traffic can be maintained on Airport Road at all times while the box culvert is built in phases. In general, traffic will be maintained on the existing road while the upstream side of the box is built. Two-way traffic will then be moved onto the new box culvert while the downstream portion of the box is constructed.
- Airport Road Overpass Bridge – Since the bridge is to be built on new embankment fills and set

back from Airport Road, there should be minimal traffic disruption during construction. However the road will have to be closed temporarily when the beams are set.

- Orchard Hill Road/ Skyline Drive – Traffic Control should be fairly straight forward in this area since Orchard Hill Road will be closed during construction.

Interchange Improvements

The Interchange Design Criteria Listings have been established based on West Virginia Department of Transportation Division of Highways Design Directives and AASHTO's A Policy of Geometric Design of Highways and Streets, 2011 Sixth Edition (AASHTO Green Book) and direction from the West Virginia Department of Transportation Division of Highways (DOH). The US Route 19 Corridor utilized a design speed of 45 MPH and maximum superelevation of 4% as directed by DOH. South of the interchange with I-64, the typical section will be 2-11' travel lanes, 1-14' center turn lane and 11' auxiliary turn lanes as required. Within the I-64 Interchange, there will be 1 or 2-12' travel lanes and 12' auxiliary turn lanes as required. Auxiliary lanes have been introduced with tapers in accordance with DD-622, and lane shift tapers are developed with a speed-to-1 foot taper rate. A painted 12' median will be provided and median barrier and impact attenuators will be used to protect the existing overpass bridge piers, as well as to tie into the existing condition north of the interchange. The proposed horizontal and vertical geometry will extend north beyond the interchange to provide access to the existing US Route 19 and closely mimic the existing horizontal and vertical geometry through the interchange. South of the interchange, US Route 19 will require additional right-of-way for the new alignment. The proposed minimum vertical clearance is 20'-8", under the I-64 EB structure. It is anticipated that additional topographical survey will be required from STA 378+00 to 395+00 to accurately tie down final plans.

The jughandle design speed varies from 40 MPH to 15 MPH as it approaches a stop condition. Maximum superelevation in the jughandle, which is part of the US Route 19 Corridor, is also 4%. The jughandle lane width will vary from 1-16' lane to 2-15' lanes. A small retaining wall or concrete barrier may be required under the bridge, the proposed horizontal and vertical geometry ties in with the US Route 19 and the I-64 EB Entrance Ramp. The jughandle meets the US Route 19, EB ramp intersection at a 96°11'39" angle. The proposed minimum vertical clearance under the I-64 EB Structure is 18'-8". A rock cut will be required

along the right side of the jughandle. The jughandle will require additional right-of-way. It is anticipated that additional topographical survey will be required from STA 920+00 to 923+00 to accurately tie down final plans and develop wall or barrier elevations, if required.

I-64 EB entrance ramp design speed varies from 20 MPH to 50 MPH as the ramp approaches the Interstate. The ramp will have 2-15' lanes and will be tapered to match existing conditions before the tie in. Existing horizontal geometry could not be used as the curve leading up to I-64 EB could not meet 50 MPH design speed criteria. The horizontal geometry departs US Route 19 with a 95°34'48" angle. No additional right-of-way is required for this ramp. The ramp will require 362' of guard rail to connect a cut slope terminal with the existing guard rail. It is anticipated that additional topographical survey will be required from STA 711+00 to 713+00 to accurately tie down final plans.

I-64 EB exit ramp design speed is 25 MPH as an exit ramp in accordance with *AASHTO Green Book*, page 10-89, Loop Ramps. As the ramp approaches a stop condition, a 20 MPH design speed is utilized. The ramp horizontal geometry is parallel to the I-64 EB entrance ramp as it approaches US Route 19. The vertical geometry approaching US Route 19 is a graphic grade controlled by the I-64 EB entrance ramp as it approaches a stop condition. The horizontal geometry approaches US Route 19 with a 96°10'12" angle. No additional right-of-way is required for this ramp. It is anticipated that additional topographical survey will be required from STA 849+00 to 850+50 to accurately tie down final plans.

The I-64 WB exit ramp design speed is 45 MPH, and the I-64 WB exit ramp spur has a 15 MPH design speed as it is approaching a stop condition. The I-64 WB exit ramp is 1-16' lane and the I-64 WB exit ramp spur is 1-16' lane that develops off of the I-64 WB exit ramp as it approaches US Route 19 for southbound access.

The I-64 WB exit ramp approaches US Route 19 northbound and maintains its own lane going northbound. No additional right-of-way is required for this ramp. The ramp will require 400' of guard rail from the existing guard rail to the end of the fill condition, and an additional 575' of guard rail to connect a cut slope terminal to the existing guard rail. It is anticipated that additional topographical survey will be required from STA 404+00 to 406+00 and 424+00 to 426+00 to accurately tie down final plans.

The I-64 WB entrance ramp design speed varies from 15 MPH at the at-grade ramp terminal tie to 50 MPH

as the ramp approaches the interstate. The baseline of the I-64 WB entrance ramp departs US Route 19 at a 105°00'00" angle and the first curve on the alignment is within the at-grade ramp terminal intersection warping and does not meet superelevation. As traffic approaches the interstate the design speed increases to 50 MPH with the second curve meeting superelevation. No additional right-of-way is required for this ramp. It is anticipated that additional topographical survey will be required from STA 688+00 to 690+00 to accurately tie down final plans.

Intersections at US Route 19 and I-64 westbound ramps and US Route 19 and I-64 eastbound ramps and jughandle will be both signalized. They have been analyzed and provide AASHTO Case D Sight Distance, allowing all vehicles at stop bars to see all other vehicles at stop bars.

Interchange Temporary Traffic Control

Jughandle, Eastbound Ramps and US 19 Reconstruction

Phase 1: With traffic maintained on existing roadways, construct US 19 (371+00 to 375+00), Jughandle and construct a temporary roadway immediately adjacent to and south of the proposed WB Ramps/US 19 intersection connecting US 19 to existing ramps in the vicinity of Station 703+50. Construct a second temporary roadway from the jughandle (924+50) to US 19 (377+50).

Phase 2: Shift EB Ramp Traffic to the jughandle utilizing two-way traffic on the jughandle and temporary roadway widening constructed in Phase 1. Reconstruct new US 19/EB Ramp intersection as room allows. Construct EB Entrance Ramp from 705+00 to 708+00 and US 19 from 375+00 to 377+00.

Phase 3: Construct final tie-ins as necessary along US 19 and along the Eastbound Ramps.

WB Exit Ramps

Phase 1: With traffic on the existing roadway, construct temporary widening/ temporary roadway from 405+00 (left side) to create a temporary connection with US 19 in the vicinity of Station 389+00.

Phase 2: Shift WB Exit Ramp traffic to the temporary roadway constructed in Phase 1. Reconstruct right side of the WB Exit Ramp to the proposed condition.

Phase 3: Shift traffic to the newly constructed portion of the WB Exit Ramp. Construct the left side of the WB Exit Ramp and the WB Exit Ramp Spur to proposed condition.

WB Entrance Ramp

Phase 1: With traffic shifted to the right side of the existing WB Entrance Ramp, construct the proposed US 19/WB Entrance Ramp intersection and reconstruct the existing ramp from 683+50 left to 689+50 left.

Phase 2- With traffic on the newly constructed left portion of the ramp, reconstruct the right side of the ramp to the proposed condition.

Short Term Interchange Traffic Routing

Traffic routing contingency plan: Detour traffic from US Route 19 to I-64 WB onto I-64 EB for one exit to Airport Road where it will rejoin I-64 EB. I-64 EB traffic to US Route 19 will continue past the closed ramp one exit to Airport Road where it will exit and rejoin I-64 WB to exit for US Route 19. Working concurrently with construction of US Route 19, detour traffic from US Route 19 to I-64 EB south along the new US Route 19 and follow Airport Road to the interchange with I-64. Traffic from I-64 WB will exit one interchange prior at Airport Road and follow Airport Road to its new intersection with US Route 19.

Roadway Impacts

The Gates Alternative Alignment as well as the Original Study Alignment have several impacts. The Environmental Impacts will be detailed in the upcoming Environmental Assessment being prepared by Skelly and Loy under separate contract with the WVDOH. However, a brief summary of some of the known impacts are as follows:

Stream Impacts – Approximately 1000’ of Little Beaver Creek will be impacted at two locations (Sta 304+00 to Sta 308+00 and Sta 317+50 to 318+50).

Wetland Impacts – Identified in previous Shady – Beaver Z-Way project

- Wetland WL11 (0.635 Ac)
- Wetland WL12 (0.061 Ac)

- Wetland WL13 (0.031 Ac)
- Other wetlands are likely to be identified in the Beaver – S Eisenhower Drive Environmental Assessment when completed

Residential & Commercial Structure Impacts – A total of 22 structures are to be demolished on the project. Of these 22, three are commercial properties and 10 are residences. The Commercial and residential structures to be demolished are listed:

1. Sta 299+50 Rt Residence
2. Sta 300+00 LT Commercial Business (First Properties Solutions)
3. Sta307+00 Lt Residence
4. Sta 317+50 Lt Commercial business (Subway)
5. Sta 320+00 CL Two Apartment Complexes
6. Sta 327+00 CL Residence
7. Sta 331+25 Rt Residence
8. Sta 342+25 Lt Residence
9. Sta 343+00 Lt Residence
10. Sta 344+25 Lt Residence
11. Sta 344+50 Lt Residence
12. Sta 348+00 CL Residence
13. Sta 354+00 Rt Residence

In addition to the three commercial properties listed above, an additional four commercial are likely to be impacted but not require a structure demolition. They are:

- Woodland Amenities (on Airport Road) Sta 80+00 to 82+00 Rt
- Pine Haven/Whispering Pines (on Airport Road) Sta 82+00 to 84+00 Rt
- Strip Mall (on Airport Road) Sta 76+00 to Sta 80+00 Lt
- 84 Lumber (on Airport Road) Sta 81+00 Lt

Utility Impacts – There are several significant utility impacts on the project.

Overhead Electric and Phone – Along US19, Airport Road and Orchard Hill Road, there are the typical overhead lines adjacent to the road which will require relocation. In addition, AEP has a 138kV transmission line which crosses the mainline at Sta 299+00 and runs along the right side of the road until Sta 320+00. It is the believed that the Z-Way construction will not require the AEP Transmission line to be relocated.

Water – Both Beckley Water and Raleigh County Public Service District have major water mains throughout the project.

- Beckley Water has a 14” line along US19 at the beginning of the project
- Beckley Water has a 24” waterline which crosses under Airport Road at about Sta 316+40
- Raleigh County has a 14” waterline which crosses the mainline at Sta 337+85.
- All of these water mains will require relocation along with several other smaller water lines in the project area.

Sewer – Shady Spring Public Service District has several gravity sewer lines which will require relocation:

- Sewer lines at the beginning of the project along US19 at Sta 292+95 to Sta 297+00
- Sewer main following Little Beaver Creek from Sta 303+00 to Sta 307+00
- Sewer lines along Airport Road from Sta 79+50 to Sta 86+75
- The existing sewer lines crossing overtop of the existing twin culverts along Airport Road will be particularly difficult to relocate since the existing culverts are to be replaced with a new box culvert of a deeper structure depth.

Gas – Mountaineer Gas has several facilities adjacent to US19 and Airport Road that will require relocation. In addition, a gas main crossing at Sta 338+00 near Orchard Hill Road will also require relocation.

SECTION 3 – STRUCTURES

Box Culvert beneath Relocated US19 at Station 306+77

A new precast box culvert will be required to carry a relocated portion of Little Beaver Creek beneath Relocated US Route 19 at Station 306+77.5. The box will be constructed on a 2.3% slope. To limit the hydraulic impact to the surrounding area the culvert section will be 20' x 12'. Cast-in-place wingwalls will be located at each end of the box. The culvert will be approximately 216' in length and be located under approximately 30' of fill.

Box Culvert beneath Airport Road at Station 79+76

An existing twin corrugated metal culvert type structure is carrying Little Beaver Creek beneath Airport Road at Station 79+76. Extension of this culvert is required as Airport Road is being widened in this area to accommodate a right hand turn lane onto the Relocated US Route 19. However, extending this type of culvert structure is impractical as it would require a 40' long concrete span at each end of the structure. Therefore, the culvert structure will be replaced with an 18' x 10' precast box culvert. Due to the large ADT along Airport Road at this location, the box culvert will be constructed in phases to maintain two lanes of traffic at all times. The box culvert will be approximately 84' long and constructed on a grade of 3.96%. Fill over the top of the box will range in depth from 0 to 3'. Cast-in-place wingwalls oriented at a 45 degree angle to the box will be constructed at each end to accommodate the 2:1 fill slopes.

Bridge at Airport Road at Station 82+75

A new overpass bridge will be required to carry Relocated US Route 19 over Airport Road at Station 82+75. The bridge will be a 95' single span structure on integral abutments located behind MSE walls. The bridge will be oriented on a 23 degree skew to the Relocated US Route 19 to parallel Airport Road beneath. The MSE walls will be located outside the horizontal clear zone of Airport Road. Based on the proposed profile of the structure, the low chord will be located well above the minimum vertical clearance requirement of 16' for Airport Road. It is anticipated that the superstructure will consist of 36" steel rolled beams spaced at approximately 9'-0" supporting a Class H Concrete Deck. The structure will carry two 12' traffic lanes, a center turn lane, and 6' shoulders on each side for a clear width of 48'-0". Type F Barriers will be located

on each side resulting in an out-to-out width of 50'-6". Maximum height of the MSE walls will be approximately 30' with the maximum length of MSE wall being approximately 70'. Three of the MSE walls will be located along 2:1 fill slopes. However, the northwest corner of the bridge will be located along a 1:1 reinforced earth fill slope to limit the impact of the bridge fill slope on the adjacent 84 Lumber property and parking lot.

SECTION 4 – HYDRAULICS

Summary

Little Beaver Creek will be impacted in two locations for this project. A new 20’ x 12’ precast box culvert will be required to carry a relocated portion of Little Beaver Creek beneath Relocated US Route 19 at Station 306+77. Also, an existing twin corrugated metal culvert type structure carrying Little Beaver Creek beneath Airport Road at Station 79+76 will be replaced with an 18’ x 10’ precast box culvert.

The alternate studied for this project produces no rise in backwater when compared to the existing condition model for Little Beaver Creek in the preliminary hydraulic model. With these preliminary results, it is anticipated that backwater conditions will be within FEMA and WVDOH guidelines for backwater at stream crossings. A more detailed model will be developed when the project is finalized.

Available Data

No original plans for the existing twin culverts at Airport Road were located. Hydrologic data for this site was not available. No existing hydraulic model was available. There is a Flood Insurance Study (FIS) available for Little Beaver Creek which includes the limits of this project. Design Discharges were determined using the hydrologic runoff estimation methods presented in the 2007 WVDOH Drainage Manual and verified with the FIS in the vicinity of this project. The Flood Insurance Rate Map (FIRM) for Little Beaver Creek indicates the project is located within the FEMA 100-year floodplain in Flood Hazard Zone AE. The Base Flood Elevation (BFE) for Relocated US Route 19 at Station 306+77 is approximately 2174 ft. The BFE for Airport Road at Station 79+76 is approximately 2204 ft. Information from available data is included in Appendix E – Hydraulic Analysis.

Hydrology

Drainage areas were calculated using the USGS Topography Map. The drainage area of Little Beaver Creek for Relocated US Route 19 at Station 306+77 is 14.37 square miles and for Airport Road at Station 79+76 it is 14.49 square miles. Design Discharges for this project were determined using the hydrologic runoff estimation methods found in the 2007 WVDOH Drainage Manual. The TR-55 method was utilized to determine Design Discharges and verified with the Flood Insurance Study.

Water surface elevations for Normal Pool were field surveyed at the existing culvert on Airport Road at Station 79+76. The normal pool elevation and OHW was determined to be approximately 2167 and 2168.5, respectively. Drainage design calculations are included in Appendix E – Hydraulic Analysis.

Hydraulic Modeling

The preliminary hydraulic model was created in HEC-RAS using stream cross section data obtained from the project mapping. The model extends a distance of approximately 650 feet upstream of the proposed US 19 culvert and 250 feet downstream of the Airport Road culvert. These distances should be sufficient to allow for fully expanded stream flow both upstream and downstream of the existing and proposed culverts.

The average slope of the stream in the vicinity of the bridge was also obtained from the project mapping and was then used to calculate the upstream and downstream normal depths within HEC-RAS.

All of the culverts for this project were modeled utilizing the Bridge/Culvert Data Editor. The preliminary modeling approach for each of the culverts was the energy method with supercritical flow regime. Analysis was performed to compare new conditions to existing conditions. For each condition, water surface elevations were determined for the 25-year, 50-year, and 100-year storms. Since the difference in discharges between the two culvert locations was insignificant, the greater flows were modeled throughout the reach. The existing and proposed culverts each pass the three respective storms in the preliminary model. The water surface elevation of 100-year storm was corroborated with the FIS Flood Profiles and the FEMA BFE and the proposed condition was shown to produce no rise in backwater when compared to the existing model. The preliminary backwater summary table is included below and the HEC-RAS files are available for further review.

BACKWATER SUMMARY TABLE

For $Q_{100} = 2812$ cfs

RIVER SECTION	WATER SURFACE ELEVATION (EXISTING)	WATER SURFACE ELEVATION (PROPOSED)	NOTES
3800	2218.88	2218.88	
3600	2213.29	2213.29	
3200	2204.91	2204.91	
3000	2201.83	NA	Stream relocation
2800	2198.96	2206.71	Stream relocation
2600	NA	PROPOSED US19 CULVERT	Stream relocation
2400	2193.57	2193.37	Stream relocation
2200	2188.54	2188.54	
2000	2185.09	2185.09	
1800	2179.58	2179.58	
1600	2176.95	2176.95	
1400	2174.53	2174.53	
1270	EXISTING AIRPORT RD CULVERT	PROPOSED AIRPORT RD CULVERT	
1200	2165.77	2168.01	Localized drop at existing culvert outlet.
1000	2165.10	2165.10	

HEC-RAS Plan Files

The HEC-RAS model was developed using two project files. The existing conditions for Little Beaver Creek for both the Airport Road and US 19 sites, along with the proposed culvert at Airport Road are modeled in the project file named B2EHECAHM.prj. The Little Beaver Creek stream relocation and the proposed culvert at US 19 are modeled in the project file named PROPOSEDB2EHECAHM.prj. Comparison of water surface elevations at common river stations between the models verified that the projects do not influence each other during the proposed conditions. A final hydraulic model including the proposed culverts at Airport Road and Relocated US 19 on the same reach will be further developed in the next stages of the project design.

Plan	Plan File	Geometry File
Prelim Little Beaver Creek: B2EHECAHM.prj		
Existing Little Beaver Creek	B2EHECAHM.p02	B2EHECAHM.g02
Airport Rd Proposed 18x10 Box Culvert	B2EHECAHM.p03	B2EHECAHM.g03
Prelim Proposed US19 Box with relocation: PROPOSEDB2EHECAHM.prj		
Proposed US 19 with Relocation	PROPOSEDB2EHECAHM.p02	PROPOSEDB2EHECAHM.g03

SECTION 5 - GEOTECHNICAL OVERVIEW

Summary

This geotechnical overview is for approximately two miles of new roadway connecting US Route 19 in Beaver with Interstate 64 at the South Eisenhower Drive Interchange in Raleigh County, West Virginia. The observations and comments provided in this overview are based on a recent site visit performed by NGE’s geotechnical engineer as well as research of available information.

The project will extend from Station 293+00 to about 380+00. The initial section of new roadway extending from about Station 295+00 to Station 322+00 will consist principally of fill embankment up to a maximum thickness of about 55 feet. Beyond Station 322+00 to the end of the project, most of the roadway will be in cut with a maximum cut slope height of about 180 feet. The existing ground surface elevation along the planned roadway alignment ranges from about 2,180 to 2,540 feet.

Our engineer performed a visit on March 29, 2018 to examine the terrain, existing roadway conditions, geologic features, and to look for evidence of old or existing landslides and groundwater springs. Cut and fill slopes of existing roadways in the area appeared to be stable. No landslides or groundwater springs were observed. There were indications of some active rock fall in a few of the exposed cut slopes and rock outcrops. The low-lying areas adjacent to an existing creek between Stations 304+50 to about 310+00 appeared to be wet and swampy. It is likely that the soils in this area consist of soft, wet alluvial soils. Some undercutting of soft soils and use of select rock fill will likely be necessary in this area to provide adequate stability for the planned fill embankment. The culvert planned to carry the creek under the new roadway may also require undercutting and placement of select rock fill to control settlement.

Numerous existing roadway cut slopes and rock outcrops were examined in the project area to assess the rock strata types likely to be encountered in the project cuts. Following is a summary of the rock types observed and the approximate corresponding elevation range:

Approximate Elevation Range	Observed Rock Strata Description
2,170 to 2,300 feet	Primarily soft to medium hard shale with some thin interbedded sandstone layers. Sandstone layers visible in this zone appeared to be thinly bedded to blocky and susceptible to rock fall.
2,300 to 2,360 feet	Massive bedded hard sandstone of good quality.
2,360 to 2,500 feet	Primarily soft to medium hard shale with some thin interbedded sandstone layers.

Based on observations of existing roadway cut slopes in the area, we expect the soil overburden will likely be about 10 ft. or less in thickness in the planned cut slope sections except in areas where old strip spoil fill is suspected at the western end of the project. We anticipate that 2H:1V cut slopes in the soil overburden will have adequate stability. Hard sandstone bedrock encountered in the approximate elevation range for 2,300 to 2,360 feet would likely classify was WVDOH Type 1 rock and could be sloped at 1/4H:1V. Most of the remaining rock strata observed at the site would fall in the range of Type 3 and Type 4 bedrock. For preliminary design purposes, we recommend the following cut slope configuration considerations:

- The cut slopes should be designed in accordance with guidelines provided in the West Virginia Division of Highways, Design Directive 403 and considering the various soil and bedrock strata present at the site. The cut slope design should consists of a series of benches and slopes, with the slope ratio and height between benches depending on the type of material to be excavated.
- For preliminary design, we recommend assuming an overall vertical interval between rock benches of 40 feet and rock bench widths of 20 ft. with a 15:1 (H:V) slope toward the roadway. We recommend an overall rock cut slope of 1H:1V except for the interval where massive hard sandstone was observed (approximate elevation range for 2,300 to 2,360 ft.) The upper 10 ft. of cuts should be assumed to be soil material sloped at a 2H:1V ratio to Station 358+00. Beyond Station 358+00 to the end of the project, it is expected that the cuts will encounter some strip mine spoil fill which should be graded no steeper than 2H:1V. We recommend an assumed soil overburden thickness in this strip-mined area of 50 feet.

Stratigraphy and Structure

Geologic data was obtained from various sources including the West Virginia Geologic and Economic Survey (WVGES) in Morgantown, WV, the Geologic Map of West Virginia (WVGES, 1968, revised 1986) and online resources provided by the WVGES. Near-surface strata in the project vicinity belong to the lower New River Formation and upper Pocahontas Formation of the Pennsylvanian System. The New River formation is composed primarily of sandstone, with lesser amounts of shale, siltstone and several minable coal seams, including the Sewell, Beckley, Fire Creek, and Pocahontas No. 8 and No. 9 Coals. The Flattop Mountain Sandstone marks the boundary between the New River and underlying Pocahontas Formation, which is also comprised primarily of sandstone and includes the Pocahontas No. 1 through 7 coals.

Geologic mapping indicates there are no major structural features located along the project alignment. Structural contours of the base of the Beckley coal indicate strata in the area are dipping gently to the northwest

Mining Information

Mining research was conducted using the WVGES internet database. According to readily available information, the Beckley seam has been surface and deep mined in the project area. The mined areas occur along the western end of the project alignment between approximate Station 350+00 and 380+00. The deep mine workings are old room-and-pillar operations carried out in the 1940's. The elevation of the Beckley seam varies between approximately 2,360 and 2,480 feet in this area.

Based on the mining data collected from this study, it appears that some strip mine spoil will be encountered between Station 358+00 to the end of the project. It appears that the planned roadway cuts will come within close proximity but will miss the deep mine workings from approximate Station 350+00 to 360+00.

SECTION 6 – ENVIRONMENTAL OVERVIEW

The WVDOH has Skelly & Loy, Inc currently under contract to prepare an environmental assessment (EA) for the project. The EA will fully explain the purpose and need for the project, examine a range of alternatives, identify potential impacts, and document agency and public participation. The EA is expected to be completed in mid to late 2018. A narrative of the Environmental Impacts is not included in this report since it will be addressed in the Environmental Assessment prepared by Skelly & Loy.

SECTION 7 – TRAFFIC ANALYSIS

HDR Engineering, Inc has prepared a separate Draft Traffic Study evaluating the current and future traffic conditions along the Z-Way. The Traffic Study also assesses the impacts to Interstate I-64 and the interchange modifications to I-64 Exit 124. In addition, an extensive Traffic analysis was performed using the VISSIM Traffic Simulation Model.

Appendix A – Evaluation Matrix

Beaver - S Eisenhower Drive Alignment Alternative Evaluation/Cost Matrix						
Impact Category		CDM Smith Alternative No. 1 - Overpass	CDM Smith Alternative No. 1 - At Grade	CDM Smith Alternative No. 2	CDM Smith US 19 Connector	Gates Alternate Alignment
Engineering						
Prelim. Length	Feet	9,800	9,800	8,300	2,100	Mainline 10,093', Side Roads 3,340'
	Miles	1.86	1.86	1.57	0.40	2.54
Roadway Configuration		2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders	2 (12' Lanes) 14' Continuous Left Turn Lane 2' Gutter with Curb	2 (11' Lanes) 14' Continuous Left Turn Lane 6' Paved Shoulders
Horizontal Geometry (Min Radius)		6000'	6000'	1850'	371'	711'
Financial / Costs						
Estimated Right of Way Acquisition Costs		\$10,275,000	\$9,985,000	\$9,985,000	\$2,760,000	?
Estimated Utility Relocation Cost		\$5,250,000	\$5,250,000	\$5,250,000	\$5,250,000	?
Estimated Construction Cost		\$34,016,570	\$49,957,028	\$39,331,480	\$5,159,483	\$39,873,589
Estimated Total Project Cost		\$62,711,053 (Includes US 19 Connector)	\$78,361,511 (Includes US 19 Connector)	\$67,735,963 (Includes US 19 Connector)	\$13,169,483	?
Traffic Operations						
Number of Local Roadways Severed		None	None	None	None	6
Safety Constraints / Impacts		New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an at grade intersection with WV 307/Airport Road.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road. Due to the close proximity of US 19, a connector road to US 19 does not meet current geometric design criteria.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an overpass at WV 307/Airport Road. Due to the close proximity of US 19, a connector road to US 19 is not feasible.	New Alignment that connects to the I-64/Eisenhower Interchange. Provides an at grade intersection with WV 307/Airport Road.
Human Environment						
Historic Resource Impacts		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Cemetery Impacts		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Industrial Facilities Impacts (e.g. Chemical Plant)		None	None	None	None	None
Commercial Facilities Impacts (e.g. Businesses)		13	13	13	13	6
Residential Displacement (# houses)		14	14	14	18	10
Potential Land Development		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Physical Impacts						
Potential Hazard Waste Site(s)		None	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations	Impacts to Existing and Historic Service Stations	TO BE DETERMINED
Major (Public) Utility Conflicts / Impacts		None	Major Utility Relocations Required	Major Utility Relocations Required	Major Utility Relocations Required	Major Utility Relocations Required
Major (Private) Utility Conflicts / Impacts		None	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED
Potential Stream Impacts		72 LF	55 LF	55 LF	None	1000 LF

Appendix B – Design Criteria Summary

US 19 Rural Arterials Two-Lane Arterial		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	11'-12' Lanes	11'-12' Lanes	DD-601, Pg 10 of 24, Table 7-3 (ADT > 2000) Lanes to transition from 12' to 11' south of ramps
	Shoulder Widths	6'-8' Shoulders	6'-8' Shoulders	DD-601, Pg 10 of 24, Table 7-3 (ADT > 2000) Shoulder to transition from 8' to 6' south of ramps
	Travel Lanes	2 Lanes	2 Lanes (plus Auxillary Lanes)	Traffic Study
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 12 of 24
	Cross Slope (Maximum)	4.0%	4.0%	Provided by DOH using urban criteria DD-610, Pg 6 of 8
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	711'	711'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	2011 AASHTO Green Book, Pg 3-119
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 11 of 24 Including an additional 0.5' for future overlays
	Design Speed	45 MPH	45 MPH	Design Speed provided by DOH
	Stopping Sight Distances (Minimum)	360'	360'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 7-3, Table 7-1
	Vertical Curves K-Value Crest	61	61	2011 AASHTO Green Book, Pg 3-155, Table 3-34
	Vertical Curves K-Value Sag	79	79	2011 AASHTO Green Book, Pg 3-161, Table 3-36
	Vertical Grades (Maximum)	7%	7%	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 7-4, Table 7-2
Roadside	Clear Sidewalk Width	N/A (Paved Shoulder)	N/A (Paved Shoulder)	DD-813 Pg 8 or 9
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 11 of 24; AASHTO Roadside Design Guide, Pg 3-3

Jughandle Interchange Ramp		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	15'-16' Lanes	15'-16' Lanes*	DD-602, Pg 1 of 1 *Due to radius < 200', lane widths to be evaluated with turning templates
	Shoulder Widths	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	DD-602, Pg 1 of 1
	Travel Lanes	1-2	1-2	DD-602 Pg 1 of 1; Traffic Study
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 9 of 24
	Cross Slope (Maximum)	4.0%	4.0%	Provided by DOH using urban criteria DD-610, Pg. 6 of 8
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	533'-42'	533'-150'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	DD-610, Pg 5 of 8
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 8 of 24 Including an additional 0.5' for future overlays
	Design Speed	40 MPH to Stop Condition (15 MPH)	40 MPH to Stop Condition (15 MPH)	2011 AASHTO Green Book, Pg 10-89 Table 10-1 (Mainline 45 MPH)
	Stopping Sight Distances (Minimum)	305'-80'	305'-80'	DD-601, Pg 10 of 24, 2011 AASHTO Green Book, Pg 7-3, Table 3-7, AASHTO Green Book Pg 3- 155, Table 3-34
	Vertical Curves K-Value Crest	44-3	44-3	2011 AASHTO Green Book, Pg 3-155, Table 3-34
	Vertical Curves K-Value Sag	64-10	64-10	2011 AASHTO Green Book, Pg 3-161, Table 3-36
	Vertical Grades (Maximum)	5%-8%	5%	DD-610, Pg 3 of 8, Table 7-4
Roadside	Clear Sidewalk Width	N/A	N/A	DD-610, Pg 8 of 8; DD-813 Pg 8 of 9
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 5 of 24; AASHTO Roadside Design Guide, Pg 3-3

I-64 WB Entrance Ramp Interchange Ramp		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	16'	16'	DD-602, Pg 1 of 1
	Shoulder Widths	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	DD-602, Pg 1 of 1
	Travel Lanes	1	1	DD-602, Pg 1 of 1; Traffic Study (Match Existing)
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 9 of 24
	Cross Slope (Maximum)	8.0%	8.0%	DD-601, Pg 9 of 24
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	758'-38'	758'-38'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	DD-610, Pg 5 of 8
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 8 of 24 Including an additional 0.5' for future overlays
	Design Speed	50 MPH - 15 MPH	50 MPH - 15 MPH	AASHTO Green Book, Pg 10-89 (15 MPH at grade ramp terminal)
	Stopping Sight Distances (Minimum)	425'-80'	425'-80'	DD-610, Pg 2 of 8, Table 3-1
	Vertical Curves K-Value Crest	84-3	84	2011 AASHTO Green Book, Pg 3-155, Table 3-34 (Approaching interstate)
	Vertical Curves K-Value Sag	96-10	10	2011 AASHTO Green Book, Pg 3-161, Table 3-36 (At grade ramp terminal)
	Vertical Grades (Maximum)	5%-8%	5%	2011 AASHTO Green Book, Pg 10-92
Roadside	Clear Sidewalk Width	N/A	N/A	Interstate Ramp
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 5 of 24; AASHTO Roadside Design Guide, Pg 3-3, Table 3-1

I-64 WB Exit Ramp Interchange Ramp		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	16'	16'	DD-602, Pg 1 of 1
	Shoulder Widths	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	DD-602, Pg 1 of 1
	Travel Lanes	1	1	DD-602, Pg 1 of 1; Traffic Study (Match Existing)
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 9 of 24
	Cross Slope (Maximum)	8.0%	8.0%	DD-601, Pg 9 of 24
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	587' (38'*)	1390' (300'*)	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	DD-610, Pg 5 of 8
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 8 of 24 Including an additional 0.5' for future overlays
	Design Speed	45 MPH (15 MPH*)	45 MPH (15 MPH*)	2011 AASHTO Green Book, Pg 10-89 Table 10- 1; DD-624; Ramp Deceleration length table (mainline design speed = 75 MPH)
	Stopping Sight Distances (Minimum)	360' (80'*)	360' (80'*)	DD-610, Pg 2 of 8, Table 3-1
	Vertical Curves K-Value Crest	61 (3'*)	61	2011 AASHTO Green Book, Pg 3-155, Table 3-34
	Vertical Curves K-Value Sag	79 (10'*)	79 (10'*)	2011 AASHTO Green Book, Pg 3-161, Table 3-36
	Vertical Grades (Maximum)	5%-8%	7% (7%*)	2011 AASHTO Green Book Pg 10-92
Roadside	Clear Sidewalk Width	N/A	N/A	Interstate Ramp
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 5 of 24; AASHTO Roadside Design Guide, Pg 3-3, Table 3-1

I-64 EB Entrance Ramp Interchange Ramp		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	15'	15'	DD-602, Pg 1 of 1
	Shoulder Widths	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	DD-602, Pg 1 of 1
	Travel Lanes	2	2	DD-602, Pg 1 of 1; Traffic Study (Match Existing)
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 9 of 24
	Cross Slope (Maximum)	8.0%	8.0%	DD-601, Pg 9 of 24
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	758'-76'	758'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	DD-610, Pg 5 of 8
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 8 of 24 Including an additional 0.5' for future overlays
	Design Speed	50 MPH - 20 MPH	50 MPH - 20 MPH	Posted Advisory Speed = 25 MPH; 2011 AASHTO Green Book Pg 10-89 (20 MPH at grade terminal)
	Stopping Sight Distances (Minimum)	425'-115'	425'-115'	DD-610, Pg 2 of 8, Table 3-1
	Vertical Curves K-Value Crest	84-7	84	2011 AASHTO Green Book, Pg 3-155, Table 3-34 (Approaching Interstate)
	Vertical Curves K-Value Sag	96-17	17	2011 AASHTO Green Book, Pg 3-161, Table 3-36 (At grade ramp terminal)
	Vertical Grades (Maximum)	5%-8%	5%	2011 AASHTO Green Book, Pg 10-92
Roadside	Clear Sidewalk Width	N/A	N/A	Interstate Ramp
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 5 of 24; AASHTO Roadside Design Guide, Pg 3-3, Table 3-1

I-64 EB Exit Ramp Interchange Ramp		DD DESIGN CRITERIA	RECOMMENDED	SOURCE(S), COMMENTS, JUSTIFICATION
Roadway	Lane Widths	15'-16'	15'-16'	DD-602, Pg 1 of 1; Tapers to 2-15' lanes
	Shoulder Widths	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	Rt: 8'-0" to face of guardrail or intersection of slope without guardrail; with a 5' paved section LT: 4'-0" to face of guardrail or intersection of slope without guardrail; with a 3' paved shoulder	DD-602, Pg 1 of 1
	Travel Lanes	1	1	DD-602, Pg 1 of 1; Traffic Study (Match Existing)
	Cross Slopes (Minimum)	2.0%	2.0%	DD-601, Pg 9 of 24
	Cross Slope (Maximum)	8.0%	8.0%	DD-601, Pg 9 of 24
	Bridge Widths (Two-Lane Facilities)	N/A	N/A	N/A
	Minimum Radius	134'	200'	DD-601, Pg 10 of 24; 2011 AASHTO Green Book, Pg 3-32, Table 3-7
	Vertical Grades (Minimum)	0.5%	0.5%	DD-610, Pg 5 of 8
	Vertical Clearance (Minimum)	16.5'	16.5'	DD-601, Pg 8 of 24 Including an additional 0.5' for future overlays
	Design Speed	25 MPH	25 MPH to Stop Condition (20 MPH)	Mainline Posted Speed = 70 MPH; 2011 AASHTO Green Book Pg 10-89 (Loop Ramps)
	Stopping Sight Distances (Minimum)	155'-115'	155'-115'	DD-610, Pg 2 of 8, Table 3-1
	Vertical Curves K-Value Crest	12-7	12-7	2011 AASHTO Green Book, Pg 3-155, Table 3-34
	Vertical Curves K-Value Sag	26-17	26-17	2011 AASHTO Green Book, Pg 3-161, Table 3-36
	Vertical Grades (Maximum)	5%-8%	5%	2011 AASHTO Green Book, Pg 10-92
Roadside	Clear Sidewalk Width	N/A	N/A	Interstate Ramp
	Clear-Zone Widths	12'-14'	12'-14'	DD-601, Pg 5 of 24; AASHTO Roadside Design Guide, Pg 3-3, Table 3-1

Appendix C – Construction Cost Estimate

CONSTRUCTION COST ESTIMATE

Federal Project: STP-0019(429)D
State Project: X341-ZWAY-6.22 02
BEAVER - SOUTH EISENHOWER DR.

ITEM NUMBER	PRINCIPAL OR ALTERNATIVE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY						
201001-000		CLEARING AND GRUBBING	LS	1	\$400,000.00	\$400,000
202001-000		BUILDING DEMOLITION NUMBER,	LS	22	\$5,000.00	\$110,000
204001-000		MOBILIZATION	LS	1	\$1,000,000.00	\$1,000,000
207001-001		UNCLASSIFIED EXCAVATION	CY	1983463	\$7.00	\$13,884,241
207002-000		SUBGRADE	CY	8185	\$50.00	\$409,250
207034-000		FABRIC FOR SEPARATION	SY	95358	\$2.00	\$190,716
307001-000		AGGREGATE BASE COURSE, CLASS 1	CY	14821	\$75.00	\$1,111,575
307001-000		AGGREGATE BASE COURSE, CLASS 3	CY	100	\$75.00	\$7,500
307001-000		AGGREGATE BASE COURSE, CLASS 10	CY	286	\$75.00	\$21,450
408002-001		ASPHALT MATERIAL	GA	450	\$2.00	\$900
415005-001		REMOVE EXISTING PAVEMENT SURFACE	SY	4500	\$4.00	\$18,000
601002-001		CLASS B CONCRETE	CY	12	\$1,000.00	\$12,000
604-ITEMS		DRAINAGE PIPES	LS	1	\$1,125,000.00	\$1,125,000
605-ITEMS		DRAINAGE INLETS	LS	1	\$200,000.00	\$200,000
606029-001		FREE DRAINING BASE TRENCH	LF	12375	\$10.00	\$123,750
606030-001		OUTLET PIPE, 6 IN.	LF	500	\$20.00	\$10,000
607001-001		TYPE I GUARDRAIL, CLASS I	LF	\$150	\$15.00	\$77,250
607065-001		FLARED END TERMINAL	EA	9	\$1,000.00	\$9,000
610003-003		COMBINATION CONCRETE CURB AND GUTTER, TYPE III	LF	658	\$45.00	\$29,610
610003-004		COMBINATION CONCRETE CURB AND GUTTER, TYPE IV	LF	336	\$42.00	\$14,112
622003-001		CANTILEVER MAILBOX SUPPORT	EA	20	\$300.00	\$6,000
633003-001		DUMPED ROCK GUTTER	CY	500	\$60.00	\$30,000
636-ITEMS		MAINTENANCE OF TRAFFIC	LS	1	\$180,000.00	\$180,000
637001-001		WATER FOR DUST PALLIATIVE	MG	300	\$50.00	\$15,000
638002-001		RIGHT OF WAY MARKER	EA	102	\$100.00	\$10,200
638003-001		SURVEY MARKER	EA	100	\$300.00	\$30,000
638004-001		OUTLET MARKER	EA	2	\$210.00	\$420
639001-001		CONSTRUCTION LAYOUT STAKE	LS	1	\$100,000.00	\$100,000
640002-001		LARGE FIELD OFFICE AND STORAGE BUILDING	MO	15	\$2,000.00	\$30,000
640003-001		BUILDING EQUIPMENT	LS	1	\$1,500.00	\$1,500
642-ITEMS		TEMPORARY PROJECT WATER POLLUTION CONTROL	LS	1	\$390,000.00	\$390,000
652-ITEMS		SEEDING AND MULCHING	LS	1	\$85,000.00	\$85,000
699000-001		ON JOB TRAINING	HR	2000	\$0.80	\$1,600
ASPHALT PAVEMENT						
401001-040		SUPERPAVE BASE CRSE, SG, TY 19	TN	9623	\$100.00	\$962,300
401001-050		SUPERPAVE BASE CRSE, SG, TY 37.5	TN	29349	\$100.00	\$2,934,900
402001-040		SUPERPAVE SKID PVT, SG, TY 9.5	TN	4786	\$100.00	\$478,600
401003-011		SUPERPAVE PCH/LEV CRSE, SG	TN	95	\$100.00	\$9,500
636002-001		AGGREGATE FOR MAINTAINING TRAFFIC, STONE OR GRAVEL	TN	2000	\$35.00	\$70,000
REINFORCED CONCRETE BOX CULVERTS						
601002-001		CLASS B CONCRETE	CY	150	\$600.00	\$90,000
602001-001		REINFORCING STEEL BAR	LB	22500	\$1.50	\$33,750
603029-001		PRECAST REINFORCED CONCRETE HEADWALL	SF	168	\$100.00	\$16,800
604070-		20 X 12 PRECAST CONCRETE BOX CULVERT	LF	216	\$3,000.00	\$648,000
604070-148		18 X 10 PRECAST CONCRETE BOX CULVERT	LF	84	\$2,500.00	\$210,000
639001-001		CONSTRUCTION LAYOUT STAKE	LS	1	\$10,000.00	\$10,000

CONSTRUCTION COST ESTIMATE

Federal Project: STP-0019(429)D
State Project: X341-ZWAY-6.22 02
BEAVER - SOUTH EISENHOWER DR.

ITEM NUMBER	PRINCIPAL OR ALTERNATIVE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
SIGNING, SIGNAL & PAVEMENT MARKINGS						
657-ITEMS		ROADSIDE MOUNTED SIGN SUPPORTS	LS	1	\$80,000.00	\$80,000
660-ITEMS		TRAFFIC SIGNALS PER LOCATION	LF	2	\$150,000.00	\$300,000
661-ITEMS		TRAFFIC SIGNS AND DELINEATORS	LS	1	\$85,000.00	\$85,000
663-ITEMS		MICELANEOUS PAVEMENT MARKINGS	LS	1	\$210,000.00	\$210,000
WATER RELOCATION						
639001-001		CONSTRUCTION LAYOUT STAKE	LS	1	\$10,000.00	\$10,000
670004-		24 INCH DUCTILE IRON PIPE	LF	740	\$200.00	\$148,000
670007-		6 INCH PLASTIC PIPE	LF	1,300	\$55.00	\$71,500
670007-		14 INCH PLASTIC PIPE	LF	250	\$180.00	\$45,000
675021-		30 INCH CASING PIPE	LF	250	\$250.00	\$62,500
675021-		48 INCH CASING PIPE	LF	155	\$420.00	\$65,100
SANITARY SEWER RELOCATION						
639001-001		CONSTRUCTION LAYOUT STAKE	LS	1	\$10,000.00	\$10,000
675007-022		8 INCH PLASTIC SEWER PIPE	LF	1500	\$40.00	\$60,000
675014-001		MANHOLE COMPLETE, INCLUDING CASTING	EA	10	\$4,500.00	\$45,000
675015-001		DROP MANHOLE COMPLETE, INCLUDING CASTING	EA	2	\$5,500.00	\$11,000
675017-001		ABANDONING MANHOLE	EA	3	\$700.00	\$2,100
REINFORCED SOIL SLOPE						
606029-001		FREE DRAINING BASE TRENCH	LF	250	\$10.00	\$2,500
606030-001		OUTLET PIPE, 6 IN.	LF	30	\$20.00	\$600
639001-001		CONSTRUCTION LAYOUT STAKE	LS	1	\$10,000.00	\$10,000
645001-001		PRIMARY REINFORCEMENT, 3404 LB/FT	SY	8000	\$10.00	\$80,000
645001-001		SECONDARY REINFORCEMENT, 104 LB/FT	SY	4800	\$13.00	\$62,400
STRUCTURE						
		WV 307 OVERPASS (ESTIMATED AT \$300 PER SF)	LS	1	\$1,500,000.00	\$1,500,000
INTERCHANGE						
207001-001		UNCLASSIFIED EXCAVATION	CY	331601	\$7.00	\$2,321,207
207002-000		SUBGRADE	CY	5120	\$50.00	\$256,000
207034-000		FABRIC FOR SEPARATION	SY	30703	\$2.00	\$61,406
311006-001		OPEN GRADED FREE DRAINING BASE COURSE	CY	3414	\$125.00	\$426,750
501001-010		10 INCH NON-REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT	SY	30703	\$110.00	\$3,377,330
604-ITEMS		DRAINAGE PIPES	LS	1	\$100,000.00	\$100,000
605-ITEMS		DRAINAGE INLETS	LS	1	\$30,000.00	\$30,000
607001-001		TYPE I GUARDRAIL, CLASS I	LF	1479	\$15.00	\$22,185
610006-005		MEDIAN, TYPE V	LF	652	\$55.00	\$35,860
636-ITEMS		MAINTENANCE OF TRAFFIC	LS	1	\$225,000.00	\$225,000
642-ITEMS		TEMPORARY PROJECT WATER POLLUTION CONTROL	LS	1	\$75,000.00	\$75,000
652-ITEMS		SEEDING AND MULCHING	LS	1	\$25,000.00	\$25,000
660-ITEMS		TRAFFIC SIGNALS PER LOCATION	LF	2	\$150,000.00	\$300,000
664001-016		IMPACT ATTENUATING DEVICE, TYPE VIII	EA	4	\$18,000.00	\$72,000

ROADWAY SUBTOTAL \$35,286,362
ENGINEERING & CONTINGENCY @ 13% \$4,587,227
GRAND TOTAL \$39,873,589

Appendix D – Acquisition Tables

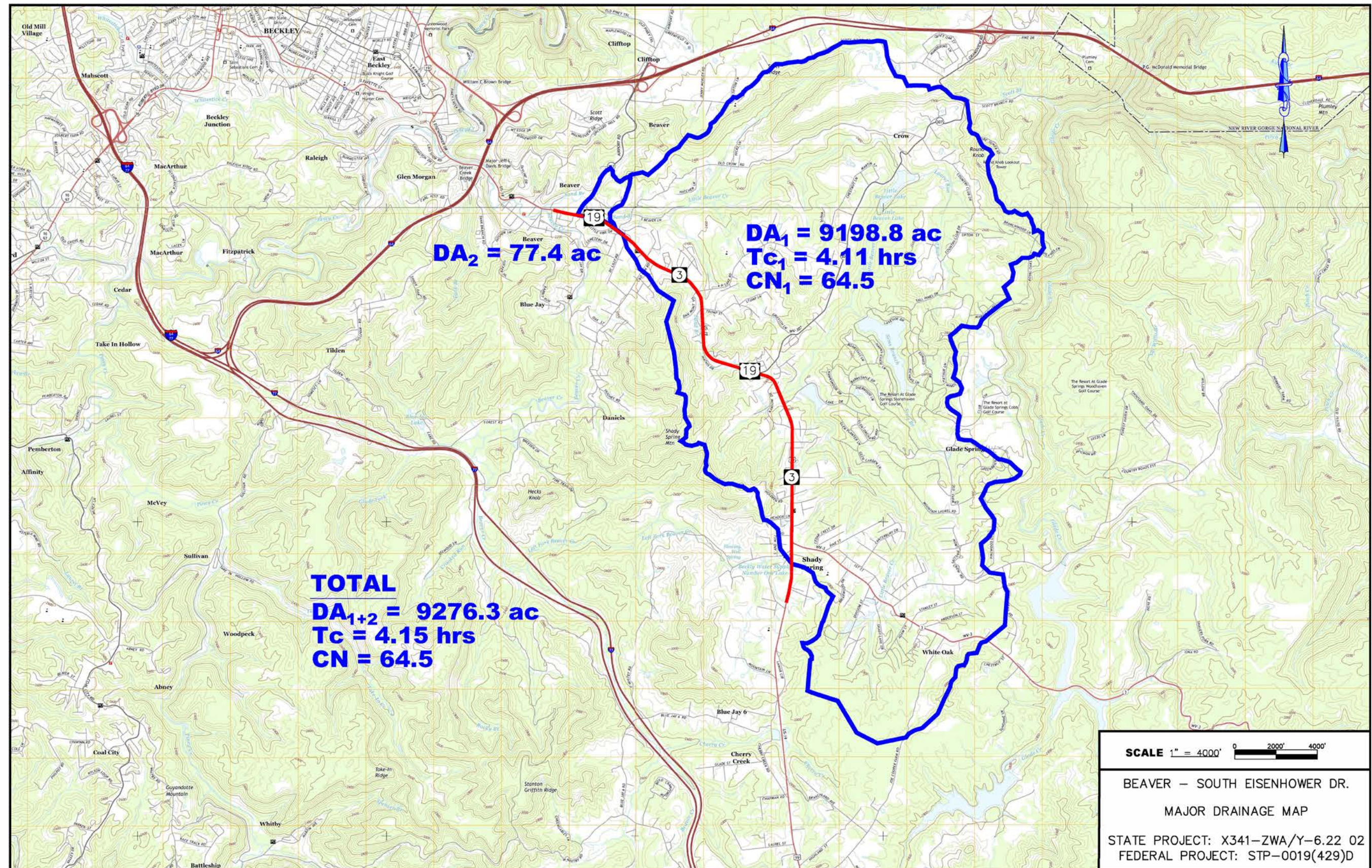
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PARCEL NO.	PLAN SHEET NO.	TITLE HOLDER	RECORDED		AREA - SQ. FT. (UNLESS OTHERWISE NOTED)										REMARKS	R/W DEED RECORD	
			DEED BOOK	PAGE NO.	TRACT NO.	C/A	NON-C/A	EASEMENT		REMAINING			TOTAL TAKEN	PARCEL TOTAL		DEED BOOK	PAGE NO.
								TYPE	AREA	LEFT	RIGHT	TOTAL					
30		James Daniel and Tammy Daniel	5065	7504			0.97 Ac.			0.91 Ac.	0	0.91 Ac.	0.97 Ac.	1.88 Ac.	PARCEL TOTAL CALCULATED		
		AKA James P. Daniel and Tammy Daniel	5009	9270													
31		Charlotte L. Painter	5003	9161										1.35 Ac.	PARCEL TOTAL CALCULATED		
32		Scott A. Hensley and Regina Beth Hensley	5050	4935			7.27 Ac.			1.17 Ac.	0.91 Ac.	2.08 Ac.	7.27 Ac.	9.346 Ac.	PARCEL TOTAL FROM DEED		
33		Richard Canterbury	5021	2709			1.36 Ac.			0	0.37 Ac. 16,117	0.37 Ac. 16,117	1.36 Ac.	1.73 Ac.	PARCEL TOTAL CALCULATED		
34		William G. Bihler and Wendy U. Bihler	5019	963	1		0.62 Ac. 26,875			0	1.41 Ac.	1.41 Ac.	0.62 Ac. 26,875	2.030 Ac.	PARCEL TOTAL FROM DEED		
					2			TSRE	0.04 Ac. 1,708								
35		Kathy Green	5048	3517			0.04 Ac. 1,708			0.96 Ac. 41,818	0	0.96 Ac. 41,818	0.04 Ac. 1,708	1.0 Ac.	PARCEL TOTAL FROM DEED		
36		Roy Rogers Tanner, Jr	5062	1649			1.75 Ac.			4.40 Ac.	0	4.40 Ac.	1.75 Ac.	6.15 Ac.	PARCEL TOTAL FROM DEED		
		AKA Roy Rogers Tanner, Jr.	5062	7261													
37		Donna Jean Lucas	5033	4688			17.72 Ac.			104.66 Ac.	17.30 Ac.	121.96 Ac.	17.72 Ac.	139.68 Ac.	PARCEL TOTAL FROM DEED		
38		Frank A. Lacek and Ruth Lacek	551	557			0.002 Ac. 93			5.438 Ac.	0	5.438 Ac.	0.002 Ac. 93	5.44 Ac.	PARCEL TOTAL FROM DEED		
39		Unknown (Private Drive)													TOTAL TAKE		
40		Unknown (Private Drive)					0.006 Ac. 281							0.006 Ac. 281	PARCEL TOTAL UNABLE TO DETERMINE		
41		Daryl R. Williams	5013	6382			0.03 Ac. 1,307			0	0.102 Ac. 4,443	0.102 Ac. 4,443	0.03 Ac. 1,307	0.132 Ac.	PARCEL TOTAL FROM DEED		

Appendix E – Hydraulic Analysis



WV Flood Map



Map created on April 3, 2018

Flood Hazard Area:
Flood Hazard Area: Location is WITHIN the FEMA 100-year floodplain.

Flood Hazard Zone: AE

Stream: Little Beaver Creek

FEMA Issued Flood Map: 54081C0219E

Watershed (HUC8): Lower New (5050004)

Advisory Flood Height: N/A

Water Depth: About 7.0 ft (Source: HAZUS)

Elevation: About 2168 ft

Location (long, lat): (81.132958 W, 37.751006 N)

Location (UTM17N): (488288, 4178197)

Contacts: Raleigh

CRS Information: N/A

Flood Profile: 54081_038

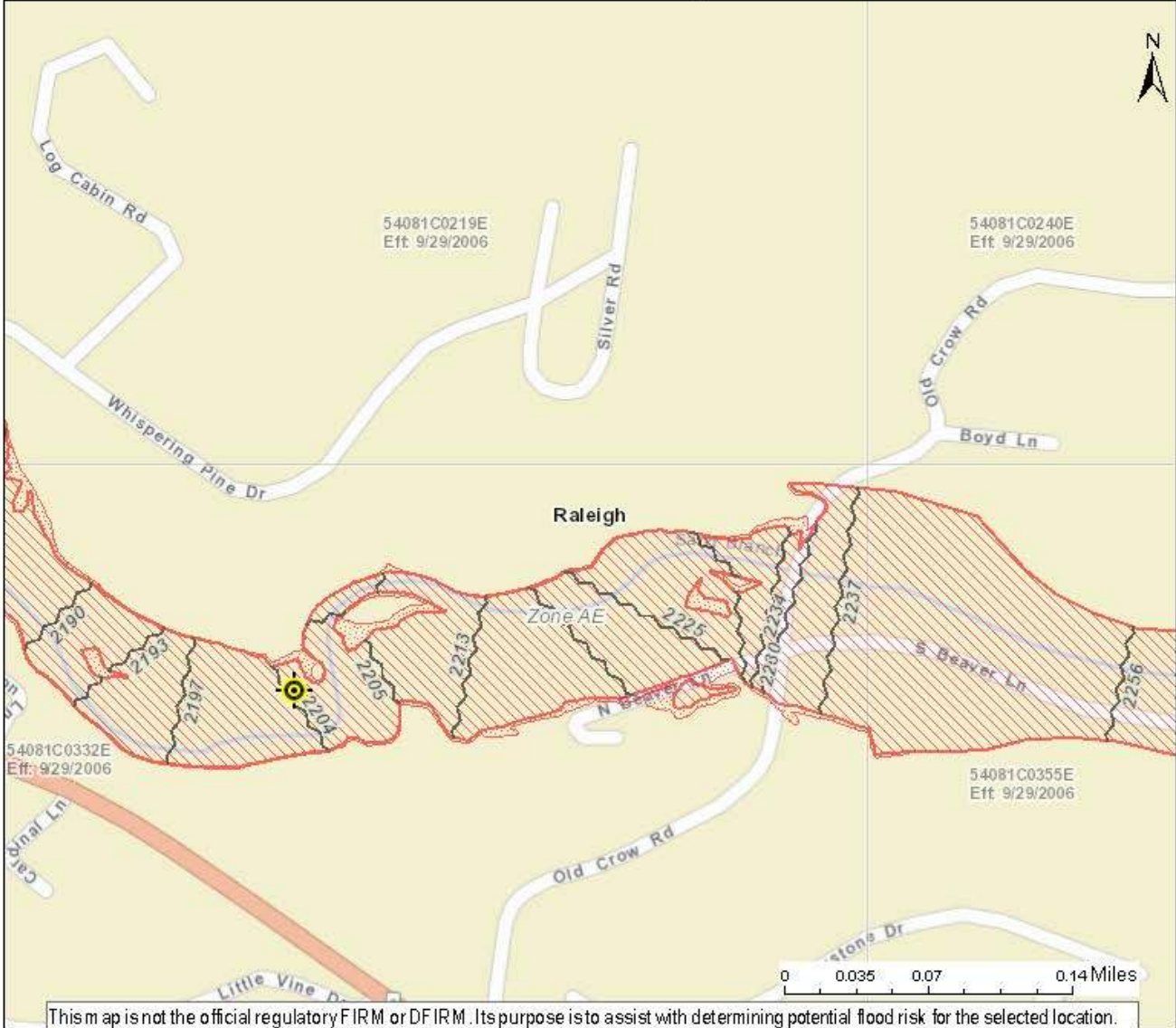
HEC-RAS Model: N/A

Parcel Number: 41-08-1004-9999-0002 Tax Info N

User Notes:
Beaver - S. Eisenhower
Little Beaver Creek
Airport Road

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.
WV Flood Tool (<http://www.MapWV.gov/flood>) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.

WV Flood Map



Map created on 4/12/2018

Flood Hazard Area:
Location is WITHIN the FEMA 100-year floodplain.

Flood Hazard Zone: AE

Stream: Little Beaver Creek

Watershed (HUC8): Lower New (5050004)

Flood Height: Refer to FIS report for BFE

Water Depth: About 4.0 ft (Source: HAZUS)

Elevation: About 2202 ft (Source: SAMS 2003)

Location (long, lat): (-81.129019, 37.748760)

Community&ID: Raleigh County (540169)

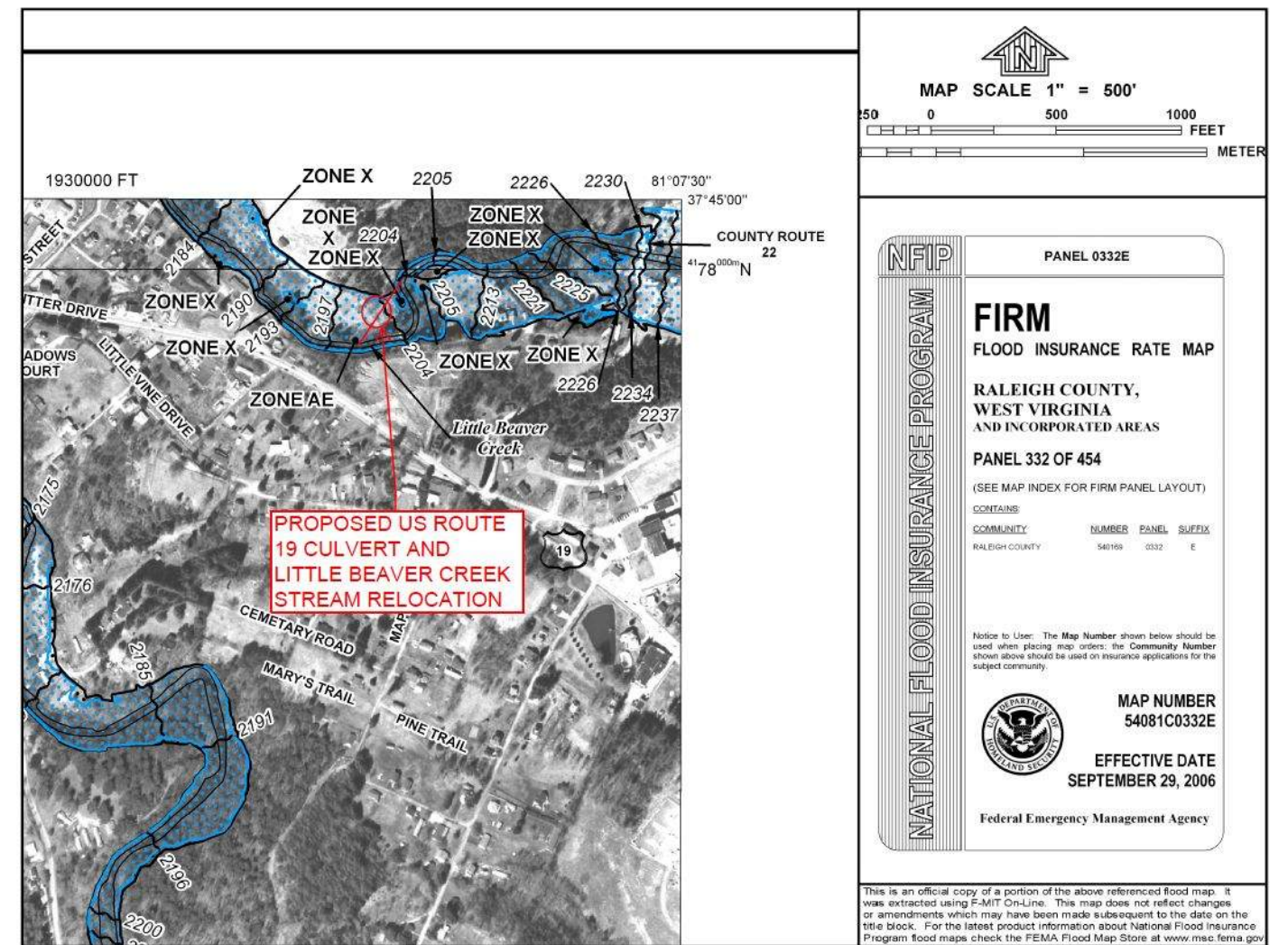
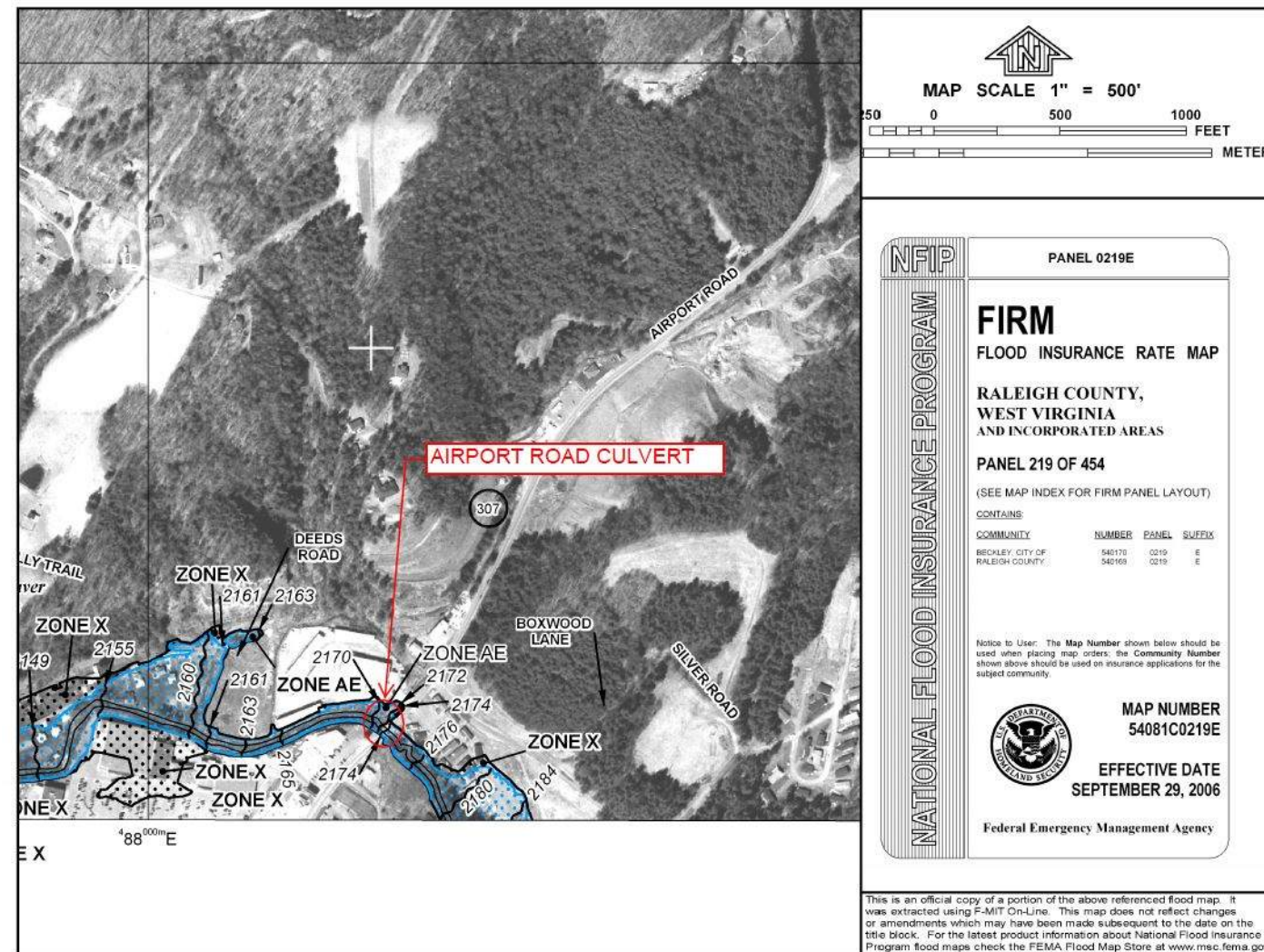
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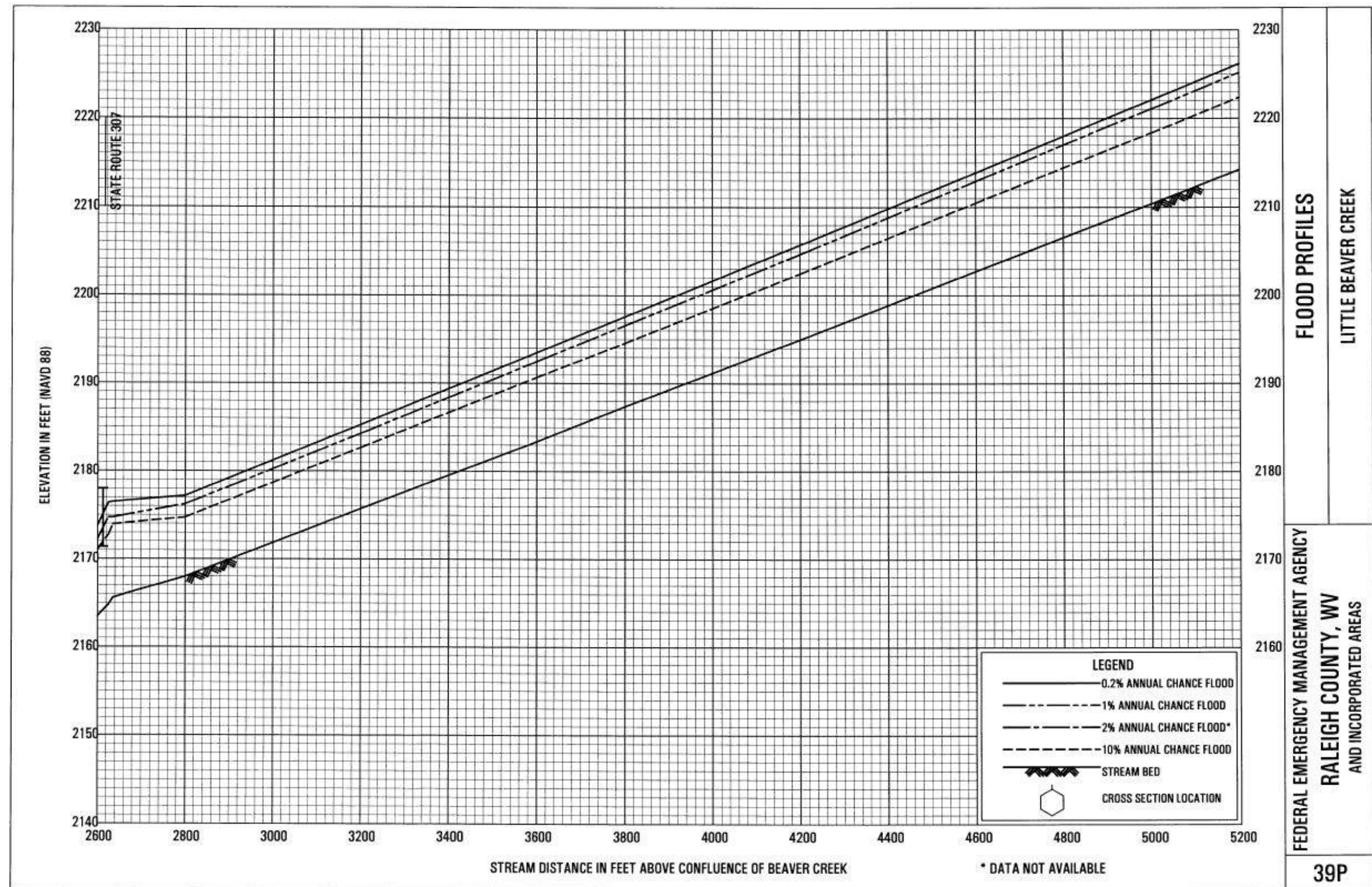
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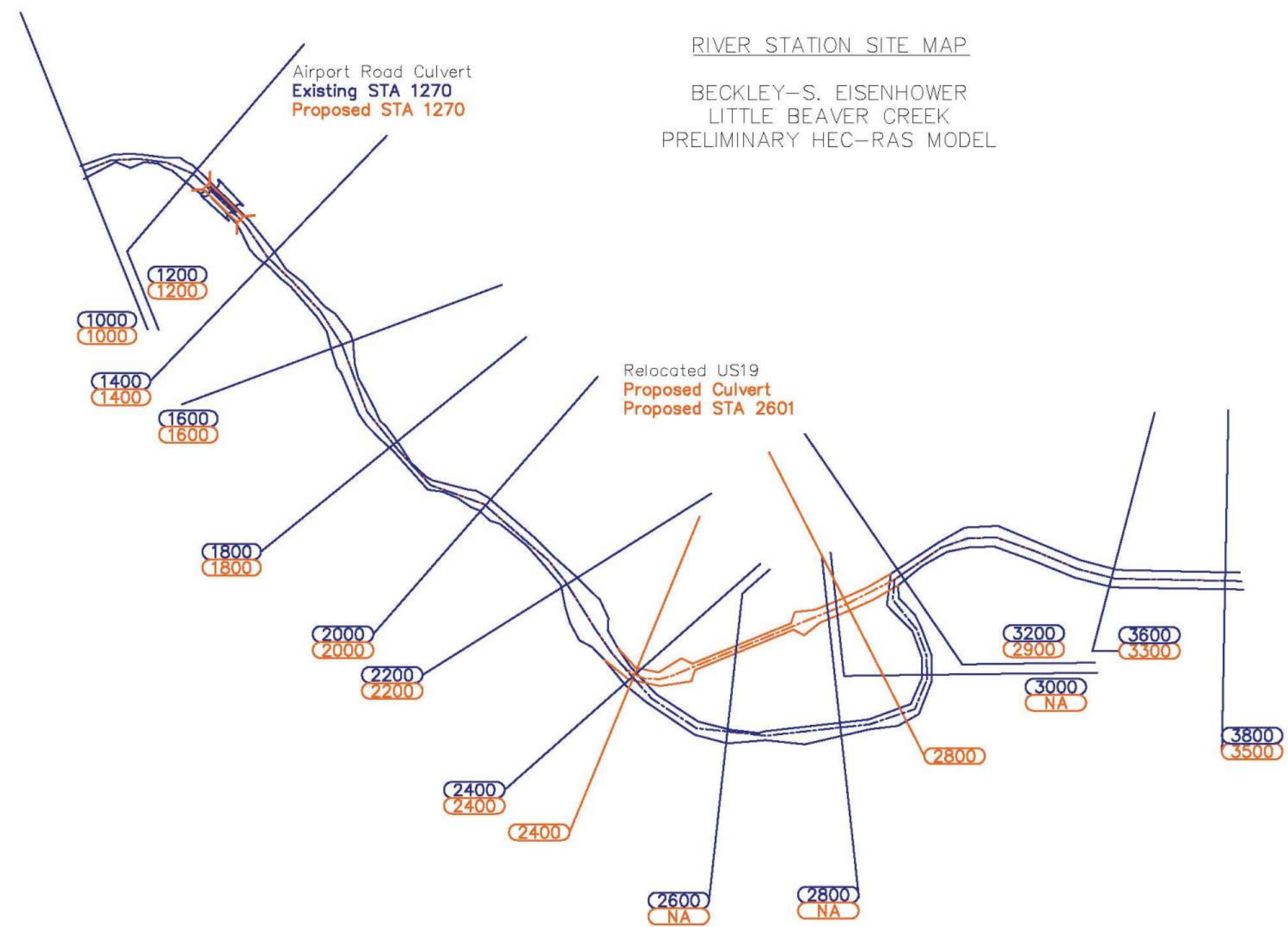
Address: multiple addresses

User Notes:
Beckley - S. Eisenhower
Little Beaver Creek
US Route 19

Disclaimer:
The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. WV Flood Tool (<http://www.MapWV.gov/flood>) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.







PEAK DISCHARGE COMPUTATION FORM 4-1		
CALCULATED BY: JCS		DATE: 4/11/2018
CHECKED BY: JWC		DATE: 4/11/2018
PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.		STATE PROJECT NUMBER: X341-ZWAY-Y-6.22 02
AREA NUMBER: 1		ATTACH WATERSHED MAP
LOCATION DESCRIPTION: Beaver WV (Little Beaver Creek)		Little Beaver Creek @ Sta 306+77
DRAINAGE AREA = 9198.80 Ac		14.37 mi ²
DESIGN RETURN PERIOD: 50 YEARS		
RATIONAL METHOD		
1 acre - 200 acres		
TIME OF CONCENTRATION		
OVERLAND FLOW		
SHEET FLOW		
T _{tsh} = 22.8 Min.		
SHALLOW CONCENTRATED FLOW		
T _{tsc} = 1.0 Min.		
CHANNEL FLOW 0		
T _{tch} = 1.2 Min.		
T _c = T _{tsh} + T _{tsc} + 0		
Note: all three flow segments may not be present.		
Rainfall Intensity i = 3.5 in/hr		
C A CA		
See Attachment		
Total 9198.8 #REF!		
Weighted Coefficient "C" = #REF!		
C = Σ (CA) / Σ A		
Q = #REF! cfs		
SELECTED DESIGN DISCHARGE		
Q(50) = 2203 cfs		
REASON FOR SELECTION (BASED ON COMPARISON) SEE SECTION 4.3.4		

PEAK DISCHARGE COMPUTATION FORM 4-1		
CALCULATED BY: JCS		DATE: 4/11/2018
CHECKED BY: JWC		DATE: 4/11/2018
PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.		STATE PROJECT NUMBER: X341-ZWAY-Y-6.22 02
AREA NUMBER: 1		ATTACH WATERSHED MAP
LOCATION DESCRIPTION: Beaver WV (Little Beaver Creek)		Little Beaver Creek @ Sta 306+77
DRAINAGE AREA = 9198.80 Ac		14.37 mi ²
DESIGN RETURN PERIOD: 100 YEARS		
RATIONAL METHOD		
1 acre - 200 acres		
TIME OF CONCENTRATION		
OVERLAND FLOW		
SHEET FLOW		
T _{tsh} = 22.8 Min.		
SHALLOW CONCENTRATED FLOW		
T _{tsc} = 1.0 Min.		
CHANNEL FLOW 0		
T _{tch} = 1.2 Min.		
T _c = T _{tsh} + T _{tsc} + 0		
Note: all three flow segments may not be present.		
Rainfall Intensity i = 3.5 in/hr		
C A CA		
See Attachment		
Total 9198.8 #REF!		
Weighted Coefficient "C" = #REF!		
C = Σ (CA) / Σ A		
Q = #REF! cfs		
SELECTED DESIGN DISCHARGE		
Q(100) = 2810 cfs		
REASON FOR SELECTION (BASED ON COMPARISON) SEE SECTION 4.3.4		

RUNOFF CURVE NUMBER DETERMINATION

MAJOR DRAINAGE - TR-55 Method

No.	Desc	Type	C	Acres	CxA
1	residential area, Daniels	D/C	85	173.6	14756
2	residential area, large lots	C	79	70.7	5585.3
3	residential area, large lots	C	75	19.9	1492.5
4	residential, pasture	B & C	74	108.6	8036.4
5	golf course		80	141.7	11336
6	farm, residential, trailer park	B	74	48.2	3566.8
7	residential area, Daniels Elem., pasture	C	86	18.1	1556.6
8	residential area	C	83	205.9	17089.7
9	residential area	C	77	128.8	9917.6
10	residential area, farmland	C	82	94.7	7765.4
11	grass, brush, bare soil, former motorcycle track	C	87	29.3	2549.1
12	grass, brush, bare soil, Aspen excavation area	B	82	23.9	1959.8
13	residential	C	81	90.2	7306.2
14	farm	C	82	50.7	4157.4
15	residential area	C	80	295.4	23632
16	residential area, Shady Spring High School	C	83	287.9	23895.7
17	residential area	B & C	80	55.3	4424
18	residential area	C	80	131.4	10512
19	residential area, White Oak	D	84	95.1	7988.4
20	residential area	D	86	260.6	22411.6
21	residential area	C	79	13.4	1058.6
22	pasture in Glade Springs	D	86	31.5	2709
23	residential area, Glade Springs	C	79	764.7	60411.3
24	pasture	B & C	79	52.4	4139.6
25	pasture, good condition	D	80	28.7	2296
26	pasture, good condition	D	80	14.7	1176
27	brush, weeds, grass	B	56	6.1	341.6
28	pasture	B	69	26.7	1842.3
29	residential, large lots		84	54.50	4578
30	residential, pasture	B	72	21.70	1562.4
31	residential, pasture, Crow	B	74	79.10	5853.4
32	remaining wooded areas	B	55	5775.30	317641.5
				9198.80	593548.20

Weighted C = 64.5

EXISTING CHANNEL/PIPE TOC CALCULATIONS

Channel Pipe	Slope (ft/ft)	Width (ft)	Fore Slope	Back Slope	Manning's N	A (sf)	R	d (ft)	Vel (fps)	Length (ft)	TOC (min)	Remarks
1	0.045	0	2	1	0.04	0.38	0.21	0.50	2.77	3907	23.5	
2	0.02	2	2	1	0.04	3.60	0.62	1.00	3.84	7867	34.2	
3	0.022	4	2	1	0.04	5.50	0.72	1.00	4.44	7920	29.7	
4	0.007	6	2	1	0.04	7.50	0.78	1.00	2.64	6230	39.4	
6	0.02	6	2	1	0.04	7.50	0.78	1.00	4.45	1681	6.3	
7	0.014	8	2	1	0.04	9.50	0.82	1.00	3.85	7339	31.8	
8	0.016	10	2	1	0.04	18.38	1.19	1.50	5.28	2904	9.2	
9	0.017	10	2	1	0.04	18.38	1.19	1.50	5.45	5755	17.6	
10	0.01	15	2	1	0.04	25.88	1.27	1.50	4.35	3907	15.0	
11	0.019	25	2	1	0.035	55.00	1.74	2.00	8.46	3960	7.8	
12	0.027	25	2	1	0.035	55.00	1.74	2.00	10.09	1014	1.7	

TIME OF CONCENTRATION			PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.									PROJECT # <u>X341-ZWA/Y-6.22.02</u>				1 of 1	
INLET ID		SHEET FLOW					SHALLOW CONCENTRATED FLOW					PIPE & DITCH FLOW			REMARKS		
INLET NUMBER	STATION	n roughness coefficient	L, Flow Length, ft < 100'	P _{2.04} Rainfall Depth	S, Slope	Tc sheet Flow	k surface coefficient	S, Slope ft/ft	V, Velocity	L, flow Length	Tsc Shallow Conc Flow	V, Velocity	L, flow Length	Tc Pipe/Ditch Flow	Total Time of Conc		
			ft	in	ft/ft	min		ft/ft	ft/sec	ft	min	ft/sec	ft	min	min		
1	2	3	4	5	6	7											
		0.8	100	2.51	0.088	23.3	2.5	0.0780	0.70	300	7.2	2.77	3907.00	23.5	54.04	see channels	
												3.84	7867.00	34.2	88.2	see channels	
												4.4	7920.00	29.7	117.9	see channels	
												2.6	6230.00	39.4	157.3	see channels	
												4.45	1681.00	6.3	163.6	see channels	
												3.85	7339.00	31.8	195.4	see channels	
												5.28	2904.00	9.2	204.6	see channels	
												5.45	5755.00	17.6	222.2	see channels	
												4.35	3907.00	15.0	237.2	see channels	
												8.46	3960.00	7.8	245.0	see channels	
												10.09	1014.00	1.7	246.6	see channels	

Unit Peak Discharge Equation (Table 4-14) pg 4-63

25YR

la/P	C ₀	C ₁	C ₂
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	3.9
0.40	2.364	-0.599	1.11
0.45	2.292	-0.570	0.48
0.50	2.202	-0.516	0.11

T_c = 4.11
la/P = 0.270

qu
la = 0.1 129.91
la = 0.3 109.26
qu
la = 0.270171 112.34

100 YR

la/P	C ₀	C ₁	0.11
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	-0.088
0.40	2.364	-0.599	-0.056
0.45	2.292	-0.570	-0.023
0.50	2.202	-0.516	-0.013

T_c = 4.11
la/P = 0.217

qu
la = 0.1 129.91
la = 0.3 109.26
qu
la = 0.2173 117.80

50 YR

la/P	C ₀	C ₁	C ₂
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	-0.088
0.40	2.364	-0.599	-0.056
0.45	2.292	-0.570	-0.023
0.50	2.202	-0.516	-0.013

T_c = 4.11
la/P = 0.242

qu
la = 0.1 129.91
la = 0.3 109.26
qu
la = 0.2417 115.28

PEAK DISCHARGE COMPUTATION FORM 4-1				
CALCULATED BY: JCS		DATE: 4/11/2018	PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.	
CHECKED BY: JWC		DATE: 4/11/2018	STATE PROJECT NUMBER: X341-ZWAY-Y-6.22 02	
AREA NUMBER: 1		ATTACH WATERSHED MAP		Little Beaver Creek at Airport Road Sta 79+76
LOCATION DESCRIPTION: Beaver WV (Little Beaver Creek)		DESIGN RETURN PERIOD: 25 YEARS		
DRAINAGE AREA = 9276.30 Ac		14.49 mi ²		
RATIONAL METHOD 1 acre - 200 acres		TR - 55 5 acres - 16,000 acres		USGS METHOD 0.1 square miles - 8,371 square miles
TIME OF CONCENTRATION OVERLAND FLOW SHEET FLOW T _{tsh} = 22.8 Min.		INFO FROM WORKSHEET 4-1 CN = 64.5 24 hr P = 4.07 S = 5.49 Runoff Depth Q = 1.04		REGION RANGES: North: 0.13 mi ² to 1,516 mi ² South: 0.10 mi ² to 8,371 mi ² East: 0.22 mi ² to 1,486 mi ²
SHALLOW CONCENTRATED FLOW T _{tsc} = 1.0 Min.		INFO FROM WORKSHEET 4-2 T _c = 4.15 hr.		
CHANNEL FLOW 0		INITIAL ABSTRACTION (Table 4-13)		
T _{tch} = 1.2 Min.		I _a = 1.10 I _a / P = 0.270		
T _c = T _{tsh} + T _{tsc} + 0		UNIT PEAK DISCHARGE q _u		REGION: EASTERN <input type="checkbox"/>
Note: all three flow segments may not be present.		USE T _c AND I _a / P WITH CHART 4-8		CENTRAL <input checked="" type="checkbox"/>
Rainfall Intensity i = 3.5 in/hr		qu = 111.5 cfs / mi ² / in		WESTERN <input type="checkbox"/>
C A CA		POND AND SWAMP AREAS		EQUATION:
See Attachment		Percent of watershed = 0 %		FROM TABLE 4-15 OR TABLE 4-16
Total 9276.3 #REF!		(Table 4-8) Factor F _p = 1		Eqn: Q(25) = 206A ^{0.816}
Weighted Coefficient "C" = #REF!		PEAK DISCHARGE		
C = Σ (CA) / Σ A		q _p = q _u (A in mi ²) Q F _p		
Q = #REF! cfs		q _p = 1680.3		Q = 1825.15 cfs
SELECTED DESIGN DISCHARGE		REASON FOR SELECTION (BASED ON COMPARISON) SEE SECTION 4.3.4		
Q(25) = 1680 cfs				

PEAK DISCHARGE COMPUTATION FORM 4-1				
CALCULATED BY: JCS		DATE: 4/11/2018	PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.	
CHECKED BY: JWC		DATE: 4/11/2018	STATE PROJECT NUMBER: X341-ZWAY-Y-6.22 02	
AREA NUMBER: 1		ATTACH WATERSHED MAP		Little Beaver Creek at Airport Road Sta 79+76
LOCATION DESCRIPTION: Beaver WV (Little Beaver Creek)		DESIGN RETURN PERIOD: 50 YEARS		
DRAINAGE AREA = 9276.30 Ac		14.49 mi ²		
RATIONAL METHOD 1 acre - 200 acres		TR - 55 5 acres - 16,000 acres		USGS METHOD 0.1 square miles - 8,371 square miles
TIME OF CONCENTRATION OVERLAND FLOW SHEET FLOW T _{tsh} = 22.8 Min.		INFO FROM WORKSHEET 4-1 CN = 64.5 24 hr P = 4.55 S = 5.49 Runoff Depth Q = 1.33		REGION RANGES: North: 0.13 mi ² to 1,516 mi ² South: 0.10 mi ² to 8,371 mi ² East: 0.22 mi ² to 1,486 mi ²
SHALLOW CONCENTRATED FLOW T _{tsc} = 1.0 Min.		INFO FROM WORKSHEET 4-2 T _c = 4.15 hr.		
CHANNEL FLOW 0		INITIAL ABSTRACTION (Table 4-13)		
T _{tch} = 1.2 Min.		I _a = 1.10 I _a / P = 0.242		
T _c = T _{tsh} + T _{tsc} + 0		UNIT PEAK DISCHARGE q _u		REGION: EASTERN <input type="checkbox"/>
Note: all three flow segments may not be present.		USE T _c AND I _a / P WITH CHART 4-8		CENTRAL <input checked="" type="checkbox"/>
Rainfall Intensity i = 3.5 in/hr		qu = 114.4 cfs / mi ² / in		WESTERN <input type="checkbox"/>
C A CA		POND AND SWAMP AREAS		EQUATION:
See Attachment		Percent of watershed = 0 %		FROM TABLE 4-15 OR TABLE 4-16
Total 9276.3 #REF!		(Table 4-8) Factor F _p = 1		Eqn: Q(50) = 250A ^{0.807}
Weighted Coefficient "C" = #REF!		PEAK DISCHARGE		
C = Σ (CA) / Σ A		q _p = q _u (A in mi ²) Q F _p		
Q = #REF! cfs		q _p = 2204.9		Q = 2162.3 cfs
SELECTED DESIGN DISCHARGE		REASON FOR SELECTION (BASED ON COMPARISON) SEE SECTION 4.3.4		
Q(50) = 2205 cfs				

PEAK DISCHARGE COMPUTATION FORM 4-1					
CALCULATED BY: JCS		DATE: 4/11/2018	PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.		
CHECKED BY: JWC		DATE: 4/11/2018	STATE PROJECT NUMBER: X341-ZWAY-Y-6.22 02		
AREA NUMBER: 1		ATTACH WATERSHED MAP		Little Beaver Creek at Airport Road Sta 79+76	
LOCATION DESCRIPTION: Beaver WV (Little Beaver Creek)		DESIGN RETURN PERIOD: 100 YEARS			
DRAINAGE AREA = 9276.30 Ac		14.49 mi ²			
RATIONAL METHOD 1 acre - 200 acres		TR - 55 5 acres - 16,000 acres		USGS METHOD 0.1 square miles - 8,371 square miles	
TIME OF CONCENTRATION OVERLAND FLOW SHEET FLOW T _{tsh} = 22.8 Min. SHALLOW CONCENTRATED FLOW T _{tsc} = 1.0 Min. CHANNEL FLOW 0 T _{tch} = 1.2 Min. T _c = T _{tsh} + T _{tsc} + 0 Note: all three flow segments may not be present. Rainfall Intensity i = 3.5 in/hr C A CA See Attachment _____ _____ Total 9276.3 #REF! Weighted Coefficient "C" = #REF! C = Σ (CA) / Σ A		INFO FROM WORKSHEET 4-1 CN = 64.5 24 hr P = 5.06 S = 5.49 Runoff Depth Q = 1.66 INFO FROM WORKSHEET 4-2 T _c = 4.15 hr. INITIAL ABSTRACTION (Table 4-13) I _a = 1.10 I _a / P = 0.217 UNIT PEAK DISCHARGE q _u USE T _c AND I _a / P WITH CHART 4-8 q _u = 116.9 cfs / mi ² / in POND AND SWAMP AREAS Percent of watershed = 0 % (Table 4-8) Factor F _p = 1 PEAK DISCHARGE q _p = q _u (A in mi ²) Q F _p q _p = 2811.9		REGION RANGES: North: 0.13 mi ² to 1,516 mi ² South: 0.10 mi ² to 8,371 mi ² East: 0.22 mi ² to 1,486 mi ² REGION: EASTERN <input type="checkbox"/> CENTRAL <input checked="" type="checkbox"/> WESTERN <input type="checkbox"/> EQUATION: FROM TABLE 4-15 OR TABLE 4-16 Eqn: Q(100) = 297A ^{0.800} Q = 2521.2 cfs	
SELECTED DESIGN DISCHARGE Q(100) = 2812 cfs		REASON FOR SELECTION (BASED ON COMPARISON) SEE SECTION 4.3.4			

RUNOFF CURVE NUMBER DETERMINATION

MAJOR DRAINAGE - TR-55 Method

No.	Desc	Type	C	Acres	CxA
1	residential area, Daniels	D/C	85	173.6	14756
2	residential area, large lots	C	79	70.7	5585.3
3	residential area, large lots	C	75	19.9	1492.5
4	residential, pasture	B & C	74	108.6	8036.4
5	golf course		80	141.7	11336
6	farm, residential, trailer park	B	74	48.2	3566.8
7	residential area, Daniels Elem., pasture	C	86	18.1	1556.6
8	residential area	C	83	205.9	17089.7
9	residential area	C	77	128.8	9917.6
10	residential area, farmland	C	82	94.7	7765.4
11	grass, brush, bare soil, former motorcycle track	C	87	29.3	2549.1
12	grass, brush, bare soil, Aspen excavation area	B	82	23.9	1959.8
13	residential	C	81	90.2	7306.2
14	farm	C	82	50.7	4157.4
15	residential area	C	80	295.4	23632
16	residential area, Shady Spring High School	C	83	287.9	23895.7
17	residential area	B & C	80	55.3	4424
18	residential area	C	80	131.4	10512
19	residential area, White Oak	D	84	95.1	7988.4
20	residential area	D	86	260.6	22411.6
21	residential area	C	79	13.4	1058.6
22	pasture in Glade Springs	D	86	31.5	2709
23	residential area, Glade Springs	C	79	764.7	60411.3
24	pasture	B & C	79	52.4	4139.6
25	pasture, good condition	D	80	28.7	2296
26	pasture, good condition	D	80	14.7	1176
27	brush, weeds, grass	B	56	6.1	341.6
28	pasture	B	69	26.7	1842.3
29	residential, large lots		84	54.50	4578
30	residential, pasture	B	72	21.70	1562.4
31	residential, pasture, Crow	B	74	79.10	5853.4
32	remaining wooded areas	B	55	5775.30	317641.5
33	business	Urban Land	94	2.81	264.14
34	residential	A	57	7.94	452.58
35	business/residential	C	83	1.45	120.35
36	wooded - B Soil	B	55	20.15	1108.25
37	wooded - C Soil	C	70	20.00	1400
38	grassy meadow - A Soil	A	49	6.53	319.97
39	grassy meadow - Urban	Urban Land	94	3.41	320.54
40	residential, trailer park	C	83	4.18	346.94
41	grassy meadow, campground	C	82	6.58	539.56
42	thick grass meadow adjacent to Airport Road	B	56	4.45	249.2
				9276.30	598669.73

Weighted C = 64.5

EXISTING CHANNEL/PIPE TOC CALCULATIONS

Channel Pipe	Slope (ft/ft)	Width (ft)	Fore Slope	Back Slope	Manning's N	A (sf)	R	d (ft)	Vel (fps)	Length (ft)	TOC (min)	Remarks
1	0.045	0	2	1	0.04	0.38	0.21	0.50	2.77	3907	23.5	
2	0.02	2	2	1	0.04	3.50	0.62	1.00	3.84	7867	34.2	
3	0.022	4	2	1	0.04	5.50	0.72	1.00	4.44	7920	29.7	
4	0.007	6	2	1	0.04	7.50	0.78	1.00	2.64	6230	39.4	
6	0.02	6	2	1	0.04	7.50	0.78	1.00	4.45	1681	6.3	
7	0.014	8	2	1	0.04	9.50	0.82	1.00	3.85	7339	31.8	
8	0.016	10	2	1	0.04	18.38	1.19	1.50	5.28	2904	9.2	
9	0.017	10	2	1	0.04	18.38	1.19	1.50	5.45	5755	17.6	
10	0.01	15	2	1	0.04	25.88	1.27	1.50	4.35	3907	15.0	
11	0.019	25	2	1	0.035	56.00	1.74	2.00	8.46	3960	7.8	
12	0.027	25	2	1	0.035	56.00	1.74	2.00	10.09	1014	1.7	
13	0.012	25	2	1	0.035	56.00	1.74	2.00	6.72	200	0.5	additional area
14	0.028	25	2	1	0.035	56.00	1.74	2.00	10.27	900	1.5	additional area
15	0.029	25	2	1	0.035	56.00	1.74	2.00	10.45	300	0.5	additional area

TIME OF CONCENTRATION				PROJECT NAME: BEAVER - SOUTH EISENHOWER DR.								PROJECT # <u>X341-ZWA/Y-6.22.02</u>				1 of 1	
INLET ID		SHEET FLOW					SHALLOW CONCENTRATED FLOW					PIPE & DITCH FLOW					REMARKS
INLET NUMBER	STATION	n roughness coefficient	L, Flow Length, ft < 100'	P ₂₋₂₄ Rainfall Depth	S, Slope	Tc sheet Flow	k surface coefficient	S, Slope ft/ft	V, Velocity	L, flow Length	Tsc Shallow Conc Flow	V, Velocity	L, flow Length	Tc Pipe/Ditch Flow	Total Time of Conc		
			ft	in	ft/ft	min		ft/ft	ft/sec	ft	min	ft/sec	ft	min	min		
1	2	3	4	5	6	7											
		0.8	100	2.51	0.088	23.3	2.5	0.0780	0.70	300	7.2	2.77	3907.00	23.5	54.04	see channels	
												3.84	7867.00	34.2	88.2	see channels	
												4.4	7920.00	29.7	117.9	see channels	
												2.6	6230.00	39.4	157.3	see channels	
												4.45	1681.00	6.3	163.6	see channels	
												3.85	7339.00	31.8	195.4	see channels	
												5.28	2904.00	9.2	204.6	see channels	
												5.45	5755.00	17.6	222.2	see channels	
												4.35	3907.00	15.0	237.2	see channels	
												8.46	3960.00	7.8	245.0	see channels	
												10.09	1014.00	1.7	246.6	see channels	
												6.72	200.00	0.5	247.1	see channels	
												10.27	900.00	1.5	248.6	see channels	
												10.45	300.00	0.5	249.1	see channels	

Unit Peak Discharge Equation (Table 4-14) pg 4-63

25YR			
la/P	C ₀	C ₁	C ₂
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	3.9
0.40	2.364	-0.599	1.11
0.45	2.292	-0.570	0.48
0.50	2.202	-0.516	0.11

T_c = 4.15

la/P = 0.270

qu
la = 0.1 128.88
la = 0.3 108.44

qu
la = 0.270017 111.50

3.9
1.11
0.48

100 YR			
la/P	C ₀	C ₁	0.11
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	-0.088
0.40	2.364	-0.599	-0.056
0.45	2.292	-0.570	-0.023
0.50	2.202	-0.516	-0.013

T_c = 4.15

la/P = 0.217

qu
la = 0.1 128.88
la = 0.3 108.44

qu
la = 0.2172 116.90

50 YR			
la/P	C ₀	C ₁	C ₂
0.1	2.553	-0.615	-0.164
0.30	2.465	-0.623	-0.117
0.35	2.419	-0.616	-0.088
0.40	2.364	-0.599	-0.056
0.45	2.292	-0.570	-0.023
0.50	2.202	-0.516	-0.013

T_c = 4.15

la/P = 0.242

qu
la = 0.1 128.88
la = 0.3 108.44

qu
la = 0.2415 114.41

