Advanced Planning Report for
Crestwood Boulevard APPLE Study
RPC Project No. 1289.30

Regional Planning Commission of Greater Birmingham


ASSOCIATES


## Executive Summary

## Study Initiation and Study Area

This study was initiated by the City of Birmingham through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the Regional Planning Commission of Greater Birmingham (RPCGB). The City requested professional planning assistance in evaluating the feasibility of improvements for pedestrians and bicyclists along the following continuous roadway segments:

- 3rd Avenue South from $41^{\text {st }}$ Street South to $44^{\text {th }}$ Street South
- $4^{\text {th }}$ Avenue South from $44^{\text {th }}$ Street South to $45^{\text {th }}$ Street South
- $5^{\text {th }}$ Avenue South from $45^{\text {th }}$ Street South to $47^{\text {th }}$ Street South
- Crestwood Boulevard from $47^{\text {th }}$ Street South to Oporto Madrid Boulevard.


## Purpose of the Study

This study was undertaken to assess the feasibility of improving accommodations for pedestrians and bicyclists along the study corridor between $41^{\text {st }}$ Street South and Oporto Madrid Boulevard. This Advance Planning Report includes:

- The process used to identify potential improvement options,
- The resulting improvement options that were developed from that process, and
- An evaluation of potential positive and negative impacts to the area and adjacent properties that may be associated with each potential improvement.

If the City chooses to move forward with an improvement project for the area, a more detailed Environmental Planning Study would be required for federally funded projects.

## Improvement Options

Although the main focus of this study is to identify pedestrian and bicycle improvement alternatives, a review of the vehicular traffic operations was also conducted. Knowing how the roadway is functioning from a motor vehicle perspective provides a complete picture of how pedestrians and cyclists are impacted by the existing traffic volumes.

After feedback from stakeholders, improvement recommendations will be structured using horizon intervals to assign each recommendation an attainable project timeline for the City of Birmingham. The following timeframes will be used to prioritize improvements and set reasonable goals:

- Short Term Improvements (0-3 Years): Low-cost improvements such as signing, striping, pedestrian landings, sidewalk maintenance, vegetation removal, etc.
- Long Term Improvements (3-10 Years): Medium-cost, more involved improvements such as signal upgrades, existing structure rehabilitation, lane channelization, new sidewalk installation, etc.
- Visionary Improvements (10+ Years): High-cost, comprehensive improvements such as roadway widening, intersection reconfiguration, new structure installation, etc.

Figures 12-20 depict short term improvement options, Figures 23-29 depict long term improvement options, and the typical sections in Figures 31-33 show potential visionary improvement options.

## Stakeholder Involvement

A project kickoff meeting was held at Birmingham City Hall on November 21, 2019. Representatives from the City, the RPCGB, and Sain Associates attended the meeting and discussed project background, identify study priorities, and determine expectations for the scope of the study. The City expressed the desire to prioritize evaluation of northsouth crossings along the corridor due to limited fiscal resources available to implement recommendations from this study.

Additionally, a virtual meeting was conducted on March 31, 2020, to discuss preliminary improvement recommendations. Representatives from the City, the RPCGB, and Sain Associates were in attendance. A two-week comment period followed this meeting to gather feedback prior to submission of the advanced planning report.

## Next Steps

If the City chooses to move forward with implementing the preferred alternative at each location using federal funds, the next step would be to request inclusion of a project in the upcoming Birmingham MPO Transportation Improvement Plan (TIP) for Fiscal Years 2024 - 2027. It is possible for the City to have a project included in the current TIP; however, the MPO has advised that the current available funding has been allocated and maximized.

Once funds are in place for a project an environmental document will need to be prepared. The environmental document must include technical studies and public involvement outreach necessary to comply with procedures of the National Environmental Policy Act (NEPA). Once the environmental study has been completed, design would be finalized, followed by construction. If it is determined that additional right-of-way is required, acquisition would be conducted prior to construction. If the City chooses to implement improvements using only local funding, this will allow expedited design and construction, fewer plan reviews, and less environmental documentation required.

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## 1 Introduction

This study was initiated by the City of Birmingham through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the Regional Planning Commission of Greater Birmingham (RPCGB). The City requested professional planning assistance in evaluating the feasibility of improvements for pedestrians and bicyclists along the following continuous roadway segments:

- $3^{\text {rd }}$ Avenue South from $41^{\text {st }}$ Street South to $44^{\text {th }}$ Street South
- $4^{\text {th }}$ Avenue South from $44^{\text {th }}$ Street South to $45^{\text {th }}$ Street South
- $5^{\text {th }}$ Avenue South from $45^{\text {th }}$ Street South to $47^{\text {th }}$ Street South
- Crestwood Boulevard from $47^{\text {th }}$ Street South to Oporto Madrid Boulevard.

A map showing the location of the study area is shown in Figure 1.

### 1.1 Purpose of the Study

This study was undertaken to assess the feasibility of improving accommodations for pedestrians and bicyclists along the study corridor between $41^{\text {st }}$ Street South and Oporto Madrid Boulevard. This Advance Planning Report includes:

- The process used to identify potential improvement options,
- The resulting improvement options that were developed from that process, and
- An evaluation of potential positive and negative impacts to the area and adjacent properties that may be associated with each potential improvement.

If the City chooses to move forward with an improvement project for the area, a more detailed Environmental Planning Study would be required for federally funded projects.

### 1.2 Study Approach

The study involves a two-stage process. The first stage, an evaluation of the existing conditions and constraints, was presented in the Existing Conditions Summary. Existing traffic data was been collected and a capacity analysis of the existing conditions has been prepared. Although the main focus of this study is to identify pedestrian and bicycle improvement alternatives, a review of the vehicular traffic operations was also conducted. Knowing how the roadway is functioning from a motor vehicle perspective provides a complete picture of how pedestrians and cyclists are impacted by the existing traffic volumes and how the area will be affected with future traffic volumes.

All information was compiled and evaluated to define the needs of the corridor and identify constraints and opportunities for improvement. A field review was performed as part of stage one. This field review consisted of observing peak hour traffic patterns
and investigating what impacts various improvement options would have to the study area.

For stage two, an evaluation of improvements was conducted and improvement options have been developed to address identified deficiencies in the pedestrian and bicycle networks. Improvement options will be developed and evaluated relative to their ability to address the purpose and need for the project (build options). During the project kickoff meeting held on November 21, 2019, the City identified several priority intersections throughout the study segment. Existing conditions analysis and improvement recommendations are not limited to the following intersections, but a higher priority is given to them in the overall study.

- $3^{\text {rd }}$ Avenue South at $41^{\text {st }}$ Street South
- $4^{\text {th }}$ Avenue South at $^{\text {th }}$ Avenue South $\& 45^{\text {th }}$ Street South
- $5^{\text {th }}$ Avenue South at Crestwood Boulevard
- Crestwood Boulevard at $56^{\text {th }}$ Street South
- Crestwood Boulevard at Oporto Madrid Boulevard


Figure 1: Study Area Location Map

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## 2 Base Conditions

### 2.1 Description of the Study Area

The 3.2-mile study segment, as shown in Figure 1, is entirely within Birmingham city limits and serves as a connector between Irondale, Avondale, and downtown Birmingham. The study segment runs concurrently with US Highway 78 (State Route 4) along several streets throughout the study area:

- $3^{\text {rd }}$ Avenue South (from $41^{\text {st }}$ Street to $44^{\text {th }}$ Street)
- $4^{\text {th }}$ Avenue South ( $44^{\text {th }}$ Street South to $45^{\text {th }}$ Street South)
- $5^{\text {th }}$ Avenue South ( $45^{\text {th }}$ Street South to $47^{\text {th }}$ Street South)
- Crestwood Boulevard ( $47^{\text {th }}$ Street South to Oporto Madrid Boulevard)

The land use adjacent to the study segment is predominantly residential and commercial. On the western end of the study area, the community of Avondale hosts many restaurants and businesses along $41^{\text {st }}$ Street South and several multifamily residential developments along $3^{\text {rd }}$ Avenue South. East of the Crestwood Boulevard intersection with $5^{\text {th }}$ Avenue South, the adjacent land use is mainly residential with driveways accessing single-family homes. At the $56^{\text {th }}$ Street South intersection with Crestwood Boulevard, a shopping center and a neighborhood park lie on the north side of Crestwood Boulevard. On the eastern end of the study area, Crestwood Boulevard provides access to a number of large commercial developments with retail, dining, and office space.

Established residential neighborhoods are located north and south of the study area. They generate commuter trips during AM and PM peak hours. High volumes of commuters use Crestwood Boulevard to access downtown Birmingham from Irondale, Crestline, and other communities east of Birmingham. Bicycle and pedestrian activity is evident in these communities, but many factors reduce its prominence in the study area.

### 2.2 Geometrics

Crestwood Boulevard is a four-lane divided roadway and is classified as a principal arterial. The study segment has a 45 MPH speed limit on the eastern portion of the study area, while speed limit drops to 40 MPH at Crestwood Park towards the western portion of the study area. The study area contains eleven (11) signalized intersections. Lane widths vary throughout the study area, and there are various center turn lane accommodations throughout the study area along Crestwood Boulevard. Several side streets throughout the study area intersect Crestwood Boulevard at a skew, creating unconventional intersections at multiple locations.

Table 1 contains a high-level inventory of Crestwood Boulevard's cross sections throughout the study segment.

Table 1: Cross Section Details for the Study Corridor

| Street Name | Street Segment | Cross Section | Approximate Pavement Width* | Sidewalk |
| :---: | :---: | :---: | :---: | :---: |
| $3{ }^{\text {rd }}$ Ave S | $41^{\text {st }}$ St S to 42 ${ }^{\text {nd }} \mathrm{St}$ S | 5-Lane with TwoWay Left Turn Lane | 48' | Both Sides |
| $3{ }^{\text {rd }}$ Ave S | $42^{\text {nd }} \mathrm{St} \mathrm{S}$ to $44^{\text {th }} \mathrm{St}$ S | 4-Lane Divided with Parking | 64' | Both Sides |
| $4^{\text {th }}$ Ave S | $44^{\text {th }}$ St S to $5^{\text {th }}$ Ave S | 5-Lane with Center Turn Lane | 64' | Both Sides |
| ${ }^{51 \mathrm{~h}}$ Ave S | $4^{\text {th }}$ Ave $S$ to Crestwood Blvd | 2-Lanes Westbound, <br> 3 Lanes Eastbound, Center Turn Lane | 64' | Both Sides |
| Crestwood Blvd | $5^{\text {th }}$ Ave S to 53rd St S | 4-Lane Divided | $52^{\prime}$ | None |
| Crestwood Blvd | 53rd St S to Crestwood Park Driveway | 4-Lane Divided with Eastbound Paved Shoulder | 72'-88' | None |
| Crestwood Blvd | Crestwood Park Driveway to Crest Green Rd | 4-Lane Divided with Paved Shoulders | 98' | None |
| Crestwood Blvd | Crest Green Rd to Crestway Baptist Church Driveway | 4-Lane Divided | $60^{\prime}-86^{\prime}$ | None |
| Crestwood Blvd | Crestway Baptist Church Driveway to Oporto Madrid Blvd | 4-Lane Divided with Varying Auxiliary Lanes | 98' | None |

*including median where present

Further detail regarding each segment of the study area can be found in Section 2.3, and Appendix A contains figures with a photo location key and information on the study area geometry.

### 2.3 Field Observations

Field reviews were performed on Wednesday, August 2, 2018 from 11:00 AM to 2:00 PM, Tuesday, January 7, 2020 from 4:00 PM to 5:30 PM, and Wednesday, January 8, 2020 from 7:00 AM to 9:30 AM.

## $41^{\text {st }}$ Street South to $5^{\text {th }}$ Avenue South (MP 100.76 - MP 101.33)

The $3^{\text {rd }}$ Avenue South intersection with $41^{\text {st }}$ Street South represents the western terminus of the study area. Lane widths near the intersection vary, with most ranging from 9 feet to 11 feet wide. Pedestrian accommodations include pedestrian signal heads on two approaches and sidewalks on each approach. During the PM peak hour and into the late evening, many pedestrians utilize these facilities to reach the nearby shops and restaurants. Photo 1 displays a view of the intersection from its southwest corner.


Photo 1: Looking northeast at the $3^{\text {rd }}$ Avenue South intersection with 41 st Street
There is an ongoing road diet project on $41^{\text {st }}$ Street South from $5^{\text {th }}$ Avenue South to $1^{\text {st }}$ Avenue South. As of this study, construction is expected to begin during the summer of 2020. This project is programmed with the Transportation Improvement Plan (TIP) and funded by the Congestion Mitigation and Air Quality (CMAQ) program.

From $41^{\text {st }}$ Street South to $42^{\text {nd }}$ Street South, $3^{\text {rd }}$ Avenue South maintains a five-lane typical section with sidewalks. At $42{ }^{\text {nd }}$ Street South, the roadway widens to include a six-foot wide grass median and parallel parking for nearby businesses and residents. Overhead lighting is currently installed throughout the segment.

## Crestwood Boulevard at $5^{\text {th }}$ Avenue South (MP 101.33 - MP 101.56)

Photo 2 displays the view of $5^{\text {th }}$ Avenue South at $47^{\text {th }}$ Street South looking westbound. There are sidewalks on both sides of $5^{\text {th }}$ Avenue South in this area; however, crossing opportunities are limited due to free-flowing vehicular movements. The only crosswalks in the area are located at the $46^{\text {th }}$ Street South intersection and just west of the $5^{\text {th }}$ Avenue South intersection with $4^{\text {th }}$ Avenue South. This segment carries 27,507 vehicles per day, making it the highest-volume segment within the study area. The typical section reflects this with three eastbound lanes, two westbound lanes, and center turn lanes.


Photo 2: Looking westbound along Crestwood Boulevard between 46th Street and 47th Street
Photo 3 displays the view of $5^{\text {th }}$ Avenue South at $47^{\text {th }}$ Street South looking eastbound at its eastern intersection with Crestwood Boulevard. With two roadways coming together for approximately 1000 feet before diverging again, $5^{\text {th }}$ Avenue South behaves similarly to a weaving section. The intersection design seen at Crestwood Boulevard and $5^{\text {th }}$ Avenue South is ideal for moving large motor vehicle traffic volumes without decreasing speeds.


Photo 3: Looking eastbound along Crestwood Boulevard at its eastern intersection with 5th Avenue
$5^{\text {th }}$ Avenue South to $56^{\text {th }}$ Street South (MP 101.56 - MP 102.40)
Just east of the Crestwood Boulevard intersection with $7^{\text {th }}$ Avenue South, there is a closed pedestrian tunnel under Crestwood Boulevard. The City has received requests to open the tunnel back up; however, it is in poor condition and not compliant with the Americans with Disabilities Act (ADA). The grade of the walkway descending to the tunnel is steeper than is allowed by the ADA Act, which would put the City at risk legally if the tunnel were opened in its current condition. With extensive improvements, this tunnel would provide a safer connection of the Avondale sidewalk network to Crestwood Park and vice versa. Photo 4 shows a view of the sloping pathway down to the tunnel, while Photo 5 shows the closed portion of the former pedestrian tunnel.


Photo 4: Looking east at the walkway descending to the closed pedestrian tunnel


Photo 5: View of the tunnel opening from the south side of Crestwood Boulevard

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## Crestwood Boulevard at $5^{\text {th }}$ Street (MP 102.40)

The Crestwood Boulevard intersection with $56^{\text {th }}$ Street South is a priority intersection that gives access to Crestwood neighborhoods to the north and south, the shopping center on the northwest corner of the intersection, and Crestwood Park for vehicles, pedestrians, and cyclists. A short sidewalk section gives pedestrians access to the shopping center adjacent to the intersection. The shopping center has approximately 40,000 square feet of retail and restaurant space. The signal design for this intersection is unorthodox; the traffic signal cabinet is in the median, and the side street signal heads are in the center of the intersection. Photo 6 displays the intersection from its southeastern corner.


Photo 6: Looking northwest at the Crestwood Boulevard intersection with 56th Street
Crestwood Park is a bicycle and pedestrian destination just west of the Crestwood Shopping Center. Several pedestrians were observed crossing Crestwood Boulevard near $54^{\text {th }}$ Street South to access Crestwood Park via the existing pedestrian bridge. There are no sidewalks in the area, and the path down to the pedestrian bridge from Crestwood Boulevard is not ADA-accessible. The existing pedestrian bridge itself is not a long-term solution for adequately accommodating this pedestrian movement due to its condition.

## 56th ${ }^{\text {th }}$ Street South to Crestway Baptist Church Access (MP 102.40 - MP 103.33)

This segment of Crestwood Boulevard is a four-lane divided roadway that has a number of residential driveways for approximately 2,500 feet east of the $56^{\text {th }}$ Street South intersection. At the Crestway Baptist Church Access, Crestwood Boulevard begins its transition to giving access to large commercial developments rather than residential neighborhoods. Between $56^{\text {th }}$ Street South and Crest Green Drive, some residents use the 10 -foot wide paved shoulders for parking. The grassed median contains trees and short concrete bollards. The purpose of the concrete bollards is unclear, but they, along with the trees, present a clear zone issue. There are no sidewalks within this segment of Crestwood Boulevard.

Crestway Baptist Church Driveway to Oporto Madrid Boulevard (MP 103.33 - MP 104.00)
Five of the eleven signalized intersections within the study area are contained in this 0.7 mile stretch of Crestwood Boulevard. Several commercial developments have access to Crestwood Boulevard within this segment, though some are inactive. The Crestwood Boulevard intersection with Oporto Madrid Boulevard is the largest intersection by traffic volume in the study area, connecting the Crestline and Irondale communities with the East Lake community. There are sidewalks along the west side of Oporto Madrid Boulevard at Crestwood Boulevard. Crestwood Boulevard itself does not have sidewalks in this area, leaving a number of commercial destinations without pedestrian connectivity. Photo 7 shows the intersection of Oporto Madrid Boulevard and Crestwood Boulevard from its southeastern corner.


Photo 7: Looking northeast at the Crestwood Boulevard intersection with Oporto Madrid Boulevard

There appears to be a number of underutilized intersections and turn lanes in this section. Implementation of access management principles could benefit the corridor and provide opportunities for pedestrian and bicycle connectivity that are not feasible with the current geometrics of Crestwood Boulevard.

## 3 Existing Vehicular Traffic Operations Evaluation

The interaction between vehicular traffic, pedestrians, and bicyclists plays an important role in the level of security and comfort all users experience. Examining the vehicular traffic operations aids in understanding how pedestrian and bicyclist facilities could function within the study corridor.

### 3.1 Data Collection

Quality Counts, LLC performed peak hour turning movement counts at the following locations:

- 3rd Avenue South at $41^{\text {st }}$ Street South
- $4^{\text {th }}$ Avenue South at $5^{\text {th }}$ Avenue South
- Crestwood Boulevard at $5^{\text {th }}$ Avenue South
- Crestwood Boulevard at $56^{\text {th }}$ Street South
- Crestwood Boulevard at Cresthill Road
- Crestwood Boulevard at Oporto Madrid Boulevard

Counts were performed on Tuesday, December 3, 2019. The existing peak hour traffic counts can be found in Appendix B. 24-hour volume, speed data, and vehicle classification data was collected throughout the study area at five (5) locations and is available upon request; Table 2 summarizes the results of the speed data with commonly-referenced metrics.

Table 2: Study Corridor Volume and Speed Data Summary

| Location Description | 24-Hour Volume (veh) | Heavy Vehicle \% | Posted Speed Limit | $\begin{aligned} & 85^{\text {th }} \\ & \% \text {-ile } \\ & \text { Speed } \end{aligned}$ | Average Speed |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $3{ }^{\text {rd }}$ Ave S - West of 43 ${ }^{\text {rd }}$ St S | 14,925 | 3\% | 40 MPH | 45 MPH | 39 MPH |
| $5^{\text {th }}$ Ave S - Between $46^{\text {th }}$ St S \& 46 ${ }^{\text {th }}$ St S | 27,505 | 4\% | 40 MPH | 43 MPH | 36 MPH |
| Crestwood Blvd - East of $7^{\text {th }}$ Ave S | 18,087 | 5\% | 40 MPH | 54 MPH | 48 MPH |
| Crestwood Blvd - Between $58^{\text {th }}$ St S and $10^{\text {th }}$ Ave $S$ | 17,691 | 3\% | 45 MPH | 51 MPH | 44 MPH |
| Crestwood Blvd - East of Cresthill Rd | 20,904 | 5.5\% | 45 MPH | 43 MPH | 33 MPH |

### 3.2 Existing Capacity Analysis

Sain Associates conducted an abbreviated capacity analysis for vehicular traffic at several intersections within the study area using Trafficware's Synchro 10 software. Traffic capacities are expressed as levels of service (LOS) ranging from "A" (free-flow conditions) to "F" (very congested conditions). For vehicular mobility, LOS "C" is generally considered desirable, while LOS "D" is considered acceptable during peak hours of traffic flow. A detailed description of each LOS designation is included in Appendix C. Table 3 summarizes the existing LOS for the morning (AM) and afternoon (PM) peak hours based on intersection approach.

The levels of service indicate acceptable operating conditions for motor vehicles in the study area and excess capacity at some intersections. The LOS E on the Crestwood Boulevard eastbound approach to $56^{\text {th }}$ Street South is likely due to a combination of the
high PM peak hour through volumes on Crestwood Boulevard and the phasing at the intersection. The mainline left turn phases are protected-only at this intersection, which means that vehicles are only allowed to turn left when receiving a green arrow. This produces extended red time for mainline vehicles during most signal cycles. A similar situation occurs during the AM peak hour on the westbound approach, but the volumes are lower and effects on the movement's LOS are lessened. Further documentation from the existing conditions capacity analysis can be found in Appendix D.

### 3.3 Crash Data

The information presented in this section is exempt from open records, discovery or admission under Alabama Law and 23 U.S.C. §§ 148(h)(4) and 409). The collection of safety data is encouraged to actively address safety issues on regional, local, and site specific levels. Congress has laws, 23 U.S.C. § $148(\mathrm{~h})(4)$ and 23 U.S.C. § 409 which prohibit the production under open records and the discovery or admission of crash and safety data from being admitted into evidence in a Federal or state court proceeding. This document contains text, charts, tables, graphs, lists, and diagrams for the purpose of identifying and evaluating safety enhancements in the project area. These materials are protected under 23 U.S.C. § 409 and 23 U.S.C. § $148(\mathrm{~h})(4)$. In addition, the Supreme Court in Ex parte Alabama Dept. of Trans., 757 So. 2d 371 (Ala. 1999) found that these are sensitive materials exempt from the Alabama Open Records Act.

Crash data for this analysis was provided by the Regional Planning Commission of Greater Birmingham (RPCGB). Data included crash information from January 2016 to December 2018 from the Critical Analysis Reporting Environment (CARE) database maintained by the Center for Advanced Public Safety (CAPS) at The University of Alabama. The data is summarized as follows:

- Two hundred and eighty-eight (288) total crashes reported,
- One (1) fatal crash,
- Three (3) incapacitating injury crashes,
- Thirteen (13) non-incapacitating injury crashes,
- Thirty-one (31) possible injury crashes, and
- Two hundred and twenty-six (226) property damage only crashes.
- Fourteen (14) crashes reported no crash severity.

The majority of the reported crashes in the dataset involved rear-end collisions, which typically result in low-severity. This is typical considering the prevalence of signalized intersections along the study corridor. $24 \%$ of crashes involved angle collisions, which can be attributed to the increased number of driveways throughout the segment and the protected-permissive side street phasing at many signalized intersections
throughout the study area. No reported crashes in the dataset involved pedestrians or bicyclists. Figure 2 shows the breakdown of the crash dataset by collision type.


Figure 2: Crash Data Breakdown by Collision Type
Crashes are to some degree random events; therefore, crash frequencies naturally fluctuate over time at a given site. This randomness indicates that short-term crash frequencies alone are not a reliable estimator of long-term crash frequency. The crash fluctuation over time makes it difficult to determine whether changes in the observed crash frequency are due to changes in site conditions or are due to natural fluctuations. When a period with high crash frequency is observed, it is statistically probable that the following period will have low crash frequency. This tendency is known as regression-to-the-mean (RTM). Not accounting for the effects of RTM introduces the potential for "RTM bias" (Refer to the Highway Safety Manual for more information).

Within the study area, the City identified several priority intersections to evaluate in a more detailed manner. The study corridor intersections with $41^{\text {st }}$ Street South, $5^{\text {th }}$ Avenue South, 56th Street South, Cresthill Road, and Oporto Madrid Boulevard are included in the following analysis. The total amount of crashes at these intersections within the dataset is two hundred and sixteen (216) crashes. The breakdown of crash severity at the priority intersections mirrors that of the entire study area dataset.

Protected-permissive signal phasing is a common theme throughout multiple priority intersections. Though it is generally efficient for vehicle traffic and is unavoidable at certain locations, this type of signal phasing results in more confusion for drivers when they are required to interpret who has the right-of-way at the intersection. This is evident in the higher share of low-severity angle collisions at each intersection with this
method of signal phasing. Pedestrian interaction adds another layer of complication to this scenario, so each intersection should be evaluated on a case-by-case basis.

The Crestwood Boulevard intersection with $5^{\text {th }}$ Avenue South is unconventional, but less than $6 \%$ of the reported crashes at priority intersections occurred at this location. The Crestwood Boulevard intersection with Oporto Madrid Boulevard has the highest representation of reported crashes in the dataset; however, low-severity rear end and sideswipe collisions occurred in the vast majority of studied crashes. The intersection experiences the highest traffic volumes within the study area, so this trend is typical given the context of the intersection and the study area.

## 4 Bicycle and Pedestrian Accommodations

The land use along the corridor is predominantly residential and commercial. The Avondale community, Crestwood Park, the shopping center on the northwest corner of Crestwood Boulevard and $56^{\text {th }}$ Street South, and the many commercial establishments near Oporto Madrid Boulevard are potential pedestrian and bicycle trip generators located within or adjacent to the study area. Figure 3 displays a map of the study area overlaid with nearby pedestrian and bicycle facilities, existing and planned bus stops, trip generators, and destinations. This map is also included in Appendix E.

The following points summarize bicycle and pedestrian accommodation information from section 2.3 of this report:

- Pedestrian facilities exist consistently between $41^{\text {st }}$ Street South and $5^{\text {th }}$ Avenue South, with sidewalks lining both sides of 3rd Avenue South, $4^{\text {th }}$ Avenue South, and $5^{\text {th }}$ Avenue South.
- Handicap ramps and pedestrian signal heads are located at the $41^{\text {st }}$ Street South intersection. The sidewalks terminate approximately 550 feet east of the $7^{\text {th }}$ Avenue intersection with Crestwood Boulevard.
- Pedestrian signage and crosswalk pavement markings in the area are in poor condition.
- There is a 40 -foot long connector sidewalk at the $56^{\text {th }}$ Street intersection that is paired with a crosswalk and pedestrian signal heads, but no other sidewalk facilities are nearby.

East of the $5^{\text {th }}$ Avenue intersections, pedestrian accommodations are minimal along Crestwood Boulevard and on residential streets parallel to Crestwood Boulevard. Steep terrain renders the installation of sidewalks impractical in many locations, so strategic connections to the existing network between origins and destinations will be explored in addition to major improvements along Crestwood Boulevard.

There are no bicycle-specific facilities along Crestwood Boulevard; however, by law cyclists are allowed to use roadway travel lanes. There are no dedicated bike lanes for cyclists within the study corridor. Despite evidence of recreational pedestrian and cyclist activity in the study segment, the majority of roadway users would not feel comfortable walking or travelling by bicycle in this area due to the lack of accommodating facilities. As discussed in section 2.4.1, the measured vehicle speeds on Crestwood Boulevard are a major deterrent for potential pedestrians and cyclists. The roadway geometry suggests to commuting drivers that higher speeds are suitable, whereas the adjacent communities use nearby facilities for recreation, shopping, dining, and other activities involving walking and cycling. The B-Active Plan (see Section 5.3), adopted by the RPCGB in March 2019, rated Crestwood Boulevard with a Level of Comfort (LOC) 5, meaning the road is not suitable for bicycle traffic. Roads with a LOC 5 typically require a significant buffer and/or barrier to provide users with a comfortable environment for cycling. Without reduction in vehicle speeds, any feasible pedestrian or bicycle facility interacting with Crestwood Boulevard is not sustainable from a roadway safety standpoint.


Figure 3: Multimodal Inventory within the Study Area

## 5 Existing Documents and Adjacent Projects

Several documents were reviewed to evaluate the existing conditions of the study area. This section summarizes the documents that were reviewed.

### 5.1 Alabama Statewide Bicycle and Pedestrian Plan (2017)

The Alabama Statewide Bicycle and Pedestrian Plan was finalized in 2017. The purpose of the plan is to establish a vision that supports walking and bicycling as modes of transportation in the state and help guide investment in bicycle and pedestrian facilities that maximize limited available funding. The plan was developed by the Alabama Department of Transportation (ALDOT) and stakeholders to provide guidelines for safe bicycle and pedestrian facilities. The plan promotes walking and bicycling as safe, comfortable, and convenient modes of transportation in all communities across the state for people of all ages and abilities. The Alabama Statewide Bicycle and Pedestrian Plan identifies Vision Bicycle Corridors and priority corridors along these Vision Corridors. Crestwood Boulevard falls within the priority corridor in the Birmingham Area. Specific bicycle and pedestrian facilities are not recommended for Crestwood Boulevard, but the plan does provide guidance for implementing accommodations.

Design guidance associated with pedestrian improvements suggests the installation of sidewalk on both sides. For urban roadways with a speed limit of 45 MPH , design guidance includes 6 foot bike lanes. If a buffer of 3 feet is used to separate vehicular traffic from the bicycle lane, a width of 4 or 5 feet may be used for the bicycle lane. The Plan specifies that urban roadways have curb and gutter and rural roadways have shoulder and ditch cross sections, but Crestwood Boulevard is an urban facility with both types of typical sections present within the study area. Sidewalks with a width of 6 to 8 feet and a buffer of 4 to 6 feet are ideal to separate vehicular traffic from pedestrians.

### 5.2 City of Birmingham Comprehensive Plan (2012)

In 2012, the City of Birmingham released its first comprehensive plan based on a community process since 1961. The plan was a result of the discussions between citizens, business owners, and other stakeholders to transform Birmingham into a city that:

- People choose as a place to live
- Has a connected network of walkable urban places
- Is innovative and prosperous, with a diversified and sustainable economy
- Is the most sustainable, "greenest" city in the South
- Has its success built on local and regional partnerships

Chapter 2 of the comprehensive plan shows a comparison between input from the City of Birmingham versus input from residents when identifying a common set of priority elements that should be a part of the city's 20-year vision and statement of principles. The number one priority for both City and residents is "a high quality transportation system of well-maintained streets, complete bicycle and pedestrian networks, and excellent public transportation connecting employment, community, and visitor destinations". The Plan emphasizes that bicycle and pedestrian facilities are priorities for the City of Birmingham.

### 5.3 B-Active: The Active Transportation Plan for the Greater Birmingham Region

 (2019)The study area for the B-Active Plan includes the Birmingham Metropolitan Planning Area, comprising Jefferson and Shelby counties, as well as portions of Blount and St. Clair counties. Active transportation systems are important to a region as they provide mobility, economic development, public health, and sustainability, promoting transportation equity and improving quality of life. The Active Transportation Plan includes several principles that guide its development. Two of the most applicable to the Crestwood Boulevard APPLE study include:

- Provide the region's residents with improved access to transportation infrastructure and services, helping to address daily travel needs and opportunities with minimal cost, time, or physical danger
- Encourage and support opportunities to create livable places, developing communities that afford existing and future residents a chance to enjoy a better quality of life, lead healthy lifestyles, and enjoy opportunities to work, live, and play.

The B-Active Plan defines Crestwood Boulevard east of $5^{\text {th }}$ Avenue South as a Policy Road and the study area section west of $5^{\text {th }}$ Avenue South as a Primary Network. These designations imply a greater emphasis and ease for implementing bicycle and pedestrian accommodations west of $5^{\text {th }}$ Avenue South.

### 5.4 The Red Rock Ridge and Valley Trail System Master Plan (2014)

The Freshwater Land Trust is a conservation organization that aims to build trails and conserve land throughout central Alabama with the goal of connecting communities and increasing healthy recreational opportunities. Within this Plan, the Jones Valley Trail Corridor has several connectors near the study area:

- Crestwood-Clairmont Connector - Connects to Crestwood Park via 54 ${ }^{\text {th }}$ Street South and crosses Crestwood Boulevard
- $12^{\text {th }} / 56^{\text {th }}$ Street South Connector - Along $56^{\text {th }}$ Street South from Crestwood Boulevard to $5^{\text {th }}$ Avenue South
- $41^{\text {st }}$ Street South Trail $-1^{\text {st }}$ Avenue North to $5^{\text {th }}$ Avenue South


## 5.5 $41^{\text {st }}$ Street Road Diet Project (2019-2020)

Currently, the City of Birmingham is pursuing a road diet project along $41^{\text {st }}$ Street from $5^{\text {th }}$ Avenue South to $1^{\text {st }}$ Avenue North. Construction is planned for the summer of 2020. This Crestwood Boulevard APPLE study will include the new geometry in any analysis performed at the intersection of Crestwood Boulevard and $41^{\text {st }}$ Street South.

### 5.6 US-1 1/US-78 East Alternatives Analysis (2016)

The Regional Planning Commission of Greater Birmingham (RPCGB) and the Birmingham-Jefferson County Transit Authority (BJCTA) tasked Whitman, Requardt and Associates, LLP (WRA) to study the US-11 and US-78 routes for their transit, complete streets, and land use investment. The goal was to identify improvements that can be implemented with limited local and federal funds. The US-11/US-78 East Alternatives Analysis study area coincides with the study area analyzed for this APPLE study in several ways. Two Bus Rapid Transit (BRT) routes established for US-11 and US-78, respectively, pass through the study area. The line serving the Eastwood area follows Crestwood Boulevard through the entire study area, while the US-11 route follows $5^{\text {th }}$ Avenue towards Woodlawn. At the intersection of Crestwood Boulevard and $41^{\text {st }}$ Street South, the study recommends a BRT superstop to serve Avondale. Additionally, superstops are identified along Crestwood Boulevard at the $5^{\text {th }}$ Avenue/45th Street intersection and the $56^{\text {th }}$ Street intersection.

The Alternatives Analysis also outlines high-level plans for bicycle and pedestrian facility routes, cross sections, and intersection recommendations. The recommendations relevant for this APPLE study terminate east of $56^{\text {th }}$ Street, but a superstop is also identified near Oporto Madrid Boulevard and the former Eastwood Mall. The following recommendations can be found in the US-11/US-78 East Alternatives Analysis Report:

- Bicycle route that follows $5^{\text {th }}$ Avenue to Crestwood Boulevard to $4^{\text {th }}$ Avenue to $3^{\text {rd }}$ Avenue to $49^{\text {th }}$ Street to $8^{\text {th }}$ Terrace through Crestwood Park, and continues east along Crestwood Boulevard from $56^{\text {th }}$ Street.
- Bicycle route along $56^{\text {th }}$ Street, crossing Crestwood Boulevard.
- Roundabout installation at the eastern intersection of Crestwood Boulevard and $5^{\text {th }}$ Avenue.
- Road diet for $5^{\text {th }}$ Avenue with the following typical section: $5^{\prime}$ sidewalk, curb and gutter, 5' bicycle lane, 4' buffer, 12' travel lane, 12' travel lane, 4' buffer, 5' bicycle lane, curb and gutter, $5^{\prime}$ grass strip, and a $5^{\prime}$ sidewalk.

This APPLE study will aim to complement all BRT-related recommendations and evaluate the pedestrian, bicycle, and traffic operations recommendations for their ability to address the purpose and need of both studies.

### 5.7 ALDOT Horizontal Curve Study (2017)

The Horizontal Curve Study evaluated safety improvements for various high-crash locations around the state of Alabama. One such site was located along Crestwood Boulevard within the study area from mile point 102.8 to mile point 103.0, which is located in the area of $58^{\text {th }}$ Street and Crest Green Road. The following recommendations were developed during the course of the study at this site:

## Short Term Improvements:

1. Remove all of the concrete bollards in the median between approximate mile points 102.1 to 102.9.
2. Install traversable drain covers over the median drains throughout the study segment.
3. Clear vegetation to improve sight distance from the side roads.
4. Between 53rd Street and Crest Green Road (approximate mile points 102.1 to 102.9), verify the need for left turn lanes and right turn lanes. If they are warranted, extend the turn lanes so that they have 275 feet of storage length and 100 feet of taper length.

## Long Term Improvements:

5. Relocate the utility poles outside of the clear zone throughout the segment.
6. Upon the next scheduled resurfacing, install four (4) feet wide inside shoulders with shoulder rumble strips. In areas where there are no outside shoulders, install four (4) feet wide shoulders. Install shoulder rumble strips along the outside shoulder throughout the segment. If shoulder widening is not possible due to the trees in the median, then remove the trees where necessary.

A figure from the final report depicting the improvements is shown in Figure 4. The numbers listed above correspond to the improvement callouts in Figure 4.


Figure 4: ALDOT Horizontal Curve Study recommendations within the study area
Crestwood Boulevard APPLE Study
Advanced Planning Report
City of Birmingham, Alabama

## 6 Environmental Features

A search of documents, databases, a field review, and compilation of GIS data was performed to analyze existing conditions and identify environmental features. This section further discusses the gathered data.

### 6.1 Historic Assets

A search of various databases was performed to identify any known historic properties. This section summarizes this research. Should the City opt to utilize federal monies to fund improvement projects within this area, a complete cultural resources study and report should be performed.

## The National Register of Historic Places (NRHP)

A search of the NRHP shows that a portion of the study corridor is located within the Avondale Park Historic District. The district was entered in the National Register in January of 1998. There are 425 contributing buildings, 1 contributing site, 2 contributing structures, and 97 non-contributing buildings. The applicable National Register criteria qualifying the property for listing is that the "property is associated with events that have made a significant contribution to the broad patterns of history" and the "property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction."

Additionally, the former Continental Gin Company on the north side of Crestwood Boulevard between $44^{\text {th }}$ Street and $47^{\text {th }}$ Street is listed as a historic site on the NRHP. The building was entered in the National Register in November of 1980, citing its architectural and engineering significance as a design-build project that functioned as a top industrial performer in Birmingham during its operational life. There are 7 contributing buildings within the NRHP boundary.

Both historic sites are outlined in blue on Figure 5, while the study segment of Crestwood Boulevard is shown in red.


Figure 5: NRHP Properties Adjacent to the Study Area

## Alabama Register of Landmarks and Heritage (ARLH)

There are no recorded ARLH properties within the study area.

## Alabama Historic Cemetery Register (AHCR)

There are no AHCR cemeteries recorded within the study area.

### 6.2 Section 4(f) Properties

The U.S. Department of Transportation Act of 1996 included a Section 4(f) which provided for consideration of park and recreation areas, wildlife and waterfowl refuges, and historic sites during transportation project development. Although this Act is now implemented by the Federal Highway Administration (FHWA) through the regulation 23 Code of Federal Regulations (CFR) 774, Section 4(f) is still used to describe the above mentioned property types. The Avondale Park Historic District and Continental Gin Company site listed on the NRHP are likely designated as Section 4(f) properties, as is

Crestwood Park. A de minimis may be required during design if any improvements affect Crestwood Park or either historic site; however, issues associated with Section 4(f) properties are not anticipated due to the nature of most improvements enhancing or complementing these locations rather than having an adverse effect on them.

### 6.3 Threatened and Endangered Species

A search using the US Fish and Wildlife Service's IPaC Information for Planning and Consultation database revealed a list of known or expected threatened or endangered species located within the study area. According to this list, there are several species of bats, turtles, fish, salamanders, clams, plants, and migratory birds potentially located within the study area which could be impacted by activities in the study area. No critical habitats are listed within the study area. The full list of species can be found in Appendix F. Based on this information a Threatened and Endangered Species survey would be required should the City opt to utilize federal monies to fund improvement projects within this area.

### 6.4 Streams and Wetlands

Per the National Wetlands Inventory, there are no known wetlands on record within the study area.

### 6.5 Hazardous Materials Properties

A search of the Alabama Department of Environmental Management's (ADEM) Cleanup Properties Inventory database and GIS Inspector tool was performed. Per these sources, there are four underground storage tank (UST) sites within the study area. Two UST sites are located on the southeast and southwest corners of the Crestwood Boulevard intersection with $41^{\text {st }}$ Street, and two UST sites are located on the south side of Crestwood Boulevard near $46^{\text {th }}$ Street and $47^{\text {th }}$ Street. Should the City elect to move forward with improvements using Federal or State money, a hazardous materials clearance letter will have to be obtained from ALDOT's Environmental Technical Section (ETS).

### 6.6 Environmental Justice

Environmental Justice is a component of the National Environmental Policy Act (NEPA) that seeks to ensure that all socio-economic groups share in the benefits and burdens of Federal transportation projects. Two areas of environmental justice that frequently become a concern are areas with a high minority population or areas where the majority of the inhabitants are members of low income households. Table 4 provides a very brief overview of the socioeconomic demographics of the study area as shown in the 2017 American Community Survey (ACS) Five-Year Estimate, a statistical survey by the U.S. Census Bureau. Supplemental data was also integrated with the EPA's

Environmental Justice Screening Tool (EJ Screen). When compared to census information for the City of Birmingham and Jefferson County, the percentage of minority population and percentage of population with less than high school education within the study area are less than the same metrics of the City and the County. The low income population percentage of the study area exceeds that of the City and the County. Any implemented improvements should not create disproportionately adverse effects on this identified environmental justice community. With improvements for this study centering on pedestrian and bicycle mobility, adverse effects on the community are unlikely. The proper steps outlined by the EPA for community involvement on projects should be followed.

Table 4: Socioeconomic Overview

| Socioeconomic Metric | EJ Screen <br> Selected <br> Area | City of <br> Birmingham | Jefferson County |
| :--- | :---: | :---: | :---: |
| Population Total | 15,330 | 212,265 | 659,460 |
| Minority Population | $42 \%$ | $74 \%$ | $47 \%$ |
| Low Income Population | $39 \%$ | $28 \%$ | $18 \%$ |
| Population with Less Than High <br> School Education | $9 \%$ | $14 \%$ | $11 \%$ |

Source: EPA EJ Screen Tool, 2017 ACS 5-Year Estimates
Additional data from the EPA's Environmental Justice Screening Tool can be found in Appendix G.

## 7 Improvement Recommendations

Improvement recommendations are structured using horizon intervals to assign each recommendation an attainable project timeline for the City of Birmingham. The following timeframes will be used to prioritize improvements and set reasonable goals:

- Short Term Improvement Recommendations (0-3 Years): Low-cost, detailed improvements such as signing, striping, pedestrian landings, sidewalk maintenance, vegetation removal, etc.
- Long Term Recommendations (3-10 Years): Medium-cost, high-level, and more involved improvements such as signal upgrades, existing structure rehabilitation, lane channelization, new sidewalk installation, etc.
- Visionary Improvement Recommendations (10+ Years): High-cost, high-level, and comprehensive improvements such as roadway widening, intersection reconfiguration, new structure installation, etc.

Though the vision for this study corridor achieves a complete street, the fiscal resources are not there to immediately achieve full continuity for all modes of transportation. However, the recommended improvement horizon intervals provide the City with a feasible path towards a complete street vision for the study corridor. Moving forward, the City should also use redevelopment as an opportunity to partner with private developers to reduce the gaps in between multimodal facilities.

The following list outlines a few of the evaluated improvements that were ultimately not recommended as a part of this study:

- Road diet along the main study corridor - Though AADT volumes fit general criteria for road diet application, the peak hour volumes exceed roadway capacity for a scenario with fewer travel lanes.
- Roundabout at the intersection of $5^{\text {th }}$ Avenue South and Crestwood Boulevard The large intersection footprint would be conducive to a large multilane roundabout; however, the peak hour volumes are too high and distributed in such a way as to make a two-lane roundabout an inefficient intersection design.
- Short term pedestrian and Bicycle improvements through the $5^{\text {th }}$ Avenue South area - The free-flowing right turn movement from $5^{\text {th }}$ Avenue South at its intersection with $4^{\text {th }}$ Avenue South prevents a cost-effective way to provide a continuous bicycle accommodation in the area shown outlined with a red box on Figure 6. A rework of the entire cross-section throughout this area would be required, which is most likely cost-prohibitive for the immediate future. Instead, feasible spot improvements were explored in detail.


Figure 6: 5th Avenue South Area

- Reopen the $7^{\text {th }}$ Avenue pedestrian tunnel immediately - An existing facility mentioned by stakeholders exists below Crestwood Boulevard near $7^{\text {th }}$ Avenue South. This closed pedestrian tunnel is discussed further in Section 2.3. Overall, the largest concerns for immediate opening are due to the surrounding sidewalk grades. There are significant ADA compliance issues in the vicinity of the tunnel.
- The tunnel width is $7^{\prime}$. The minimum width required by the ADA would be $4^{\prime}$. The sidewalk descending to the tunnel entrance is approximately $4.5^{\prime}$ wide.
- The tunnel height is approximately $7^{\prime}$. The minimum height required is $7^{\prime}$.
- The grade of the sidewalk descending to the tunnel entrance on the south side of Crestwood Boulevard is approximately $17 \%$. This is well above the required $5 \%$ or less. There are also steps located at the tunnel entrance landing, which is another roadblock to ADA compliance.
- The tunnel entrance on the north side of Crestwood Boulevard was inaccessible and not measured as a part of this study.
- Further study is required to determine the cost of decreasing grades and constructing additional ADA compliant access on the north side of the tunnel. This study is recommended in the Long Term Improvements of this report.


### 7.1 Short Term Improvement Recommendations (0-3 Years)

The following improvement recommendations correspond to the numbered callouts on Figures 12-20:

1. Refer to $41^{\text {st }}$ Street South streetscape project plans for the western terminus of the study corridor at $41^{\text {st }}$ Street South. The most recent plans can be found in Appendix H.
2. Install sharrows on the following roadway segments:
a. $\quad 2^{\text {nd }}$ Avenue South between $41^{\text {st }}$ Street South and $42^{\text {nd }}$ Street South.
b. $\quad 42^{\text {nd }}$ Street South between $2^{\text {nd }}$ Avenue South and $3^{\text {rd }}$ Avenue South.
c. $\quad 42^{\text {nd }}$ Street South between $3^{\text {rd }}$ Avenue South and $4^{\text {th }}$ Avenue South.
3. Throughout the study segment, repair all inlet covers and ensure all existing sidewalks are clear and maintained.
4. Refer to the City's plans for restriping along $4^{\text {th }}$ Avenue South to include uphill bicycle lanes. The most recent plans can be found in Appendix I.
5. Restripe $3^{\text {rd }}$ Avenue South to include buffered bicycle lanes (see Figure 7) from $42^{\text {nd }}$ Street South to $43^{\text {rd }}$ Street South. Explore a public-private partnership to route bicycles through the Old Continental Gin Company property north of 3rd Avenue South, $4^{\text {th }}$ Avenue South, and $5^{\text {th }}$ Avenue South towards low-stress routes in Crestwood. Additional signage will be required, per the MUTCD.


Figure 7: Buffered Bicycle Lane (Source: NACTO)
6. Improve mid-block crossing on 3rd Avenue South between 42 nd Street South and 43rd Street South to include refreshed striping, bulb outs (see Figure 8), more defined median refuge island, and a Z-configuration offset median crosswalk design (see Figure 9).


Figure 8: Bulb-Out (Source: FHWA)


Figure 9: Z-Configuration Crosswalk Design (Source: FHWA)
7. Extend the eastbound bicycle lane installation along $3^{\text {rd }}$ Avenue South to the $5^{\text {th }}$ Avenue South intersection via $4^{\text {th }}$ Avenue South.
8. Extend the westbound bicycle lane installation along $3^{\text {rd }}$ Avenue South to the $44^{\text {th }}$ Street South intersection and close the skewed intersection approach to $3^{\text {rd }}$ Avenue South.
9. Close the channelized right turn lane from eastbound $3^{\text {rd }}$ Avenue South to westbound $4^{\text {th }}$ Avenue South to decrease conflict with the bicycle lanes. Extend sidewalk along the south side of 3 rd Avenue South to reduce pedestrian crossing width on $4^{\text {th }}$ Avenue South. Install additional pedestrian signal heads at the installed crosswalk and appropriate signage, per the MUTCD.
10. Remove the outer right turn lane at the eastbound $4^{\text {th }}$ Avenue South approach and install striping or a raised island. Restripe all pavement markings, including crosswalks, stop lines, and turn lane skip striping at the intersection of $4^{\text {th }}$ Avenue South and $44^{\text {th }}$ Street South. Move the stop line of the eastbound approach further east, as shown on the improvement figure.
11. At the northeast corner of the intersection of $4^{\text {th }}$ Avenue South and $44^{\text {th }}$ Street South, close the access to the shopping center, improve the sidewalk in the area with raised curb and a defined walkway, and utilize the excess pavement on the right shoulder for a future transit stop.
12. Improve the pedestrian crosswalk at the intersection of 4th Avenue South and 5th Avenue South. Improve the definition of the sidewalk to connect to existing sidewalk. Install a two-stage left turn queue box (see Figure 10) for bicycles to cross the road with the existing pedestrian signal phase. Add green pavement markings for a defined bicycle crossing. Partner with the adjacent property owner on the
north side of the study corridor to install bicycle racks or parking on the north side of the crosswalk at the intersection of $4^{\text {th }}$ Avenue South and $5^{\text {th }}$ Avenue South. Additional signage will be required, per the MUTCD.


Figure 10: Two-Stage Left Turn Queue Box (Source: NACTO)
13. Restripe existing crosswalk at the intersection of 5th Avenue South and 46th Street South.
14. Remove concrete bollards in the median of Crestwood Boulevard between 53rd Street South and Crest Green Road.
15. Perform a road diet on 56th Street South from Crestwood Boulevard to 9th Avenue South, restriping the roadway as shown on the improvement figure. Close one redundant access to the adjacent shopping center.
16. Collect turning movement counts and perform an all-way stop control study at the intersection of $9^{\text {th }}$ Avenue South and $56^{\text {th }}$ Street South. Consider bicycle and pedestrian accommodation recommendations as a part of the study.
17. Remove five (5) trees in median just west of Crest Green Road to improve the intersection sight distance from Crest Green Road. Consider replacing the trees with new landscaping that will not inhibit sight distance and will comply with ALDOT standards for landscaping within the right-of-way.
18. Add a crosswalk on Crestwood Boulevard at the main entrance to the Crestwood Festival Shopping Center to allow access to transit stops on the north side of

Crestwood Boulevard. Install pedestrian signal phases and push-buttons in conjunction with the crosswalk installation.
19. Install crosswalks on Crestwood Boulevard at Cresthill Road to allow crossing at the intersection. Install sidewalk on both sides of Crestwood Boulevard to connect the adjacent parking lots. Install pedestrian signal phases, push-buttons in conjunction with the crosswalk installation, and required signage per the MUTCD.
20. Restripe crosswalk at the intersection of Crestwood Boulevard and the former Century Plaza access.
21. Improve pedestrian crosswalks and landings at the intersection of Crestwood Boulevard and Oporto Madrid Boulevard to include continental striping design and ADA-compliant pedestrian landings. Perform curb cuts (see Figure 11) where sidewalk is shown on the improvement figure to define a walking path. Where crosswalks traverse the median, widen existing median curb cuts to a minimum of six (6) feet. Additional signage will be required, per the MUTCD.


Figure 11: Pedestrian Crossing at Channelized Right Turn (Source: FHWA)


Figure 12: Short Term Improvement Recommendations (41st Street South to 43rd Street South)


Figure 13: Short Term Improvement Recommendations (43rd Street to 5th Avenue South)


Figure 14: Short Term Improvement Recommendations (4th Avenue South to 5th Avenue South)


Figure 15: Short Term Improvement Recommendations (53rd Street South to 56th Street South)


Figure 16: Short Term Improvement Recommendations (56th Street South)


Figure 17: Short Term Improvement Recommendations (Crest Green Road)


Figure 18: Short Term Improvement Recommendations (Crestwood Festival)


Figure 19: Short Term Improvement Recommendations (Cresthill Rd to former Century Plaza)


Figure 20: Short Term Improvement Recommendations (Oporto Madrid Boulevard)

### 7.2 Long Term Improvement Recommendations (3-10 Years)

The following long term improvement recommendations correspond to the numbered callouts on Figures 23-29:

1. Install a pedestrian hybrid beacon (see Figure 21) at the improved mid-block crossing on $3^{\text {rd }}$ Avenue South between $42^{\text {nd }}$ Street South and $43^{\text {rd }}$ Street South. Coordinate signal phasing and offsets with the signalized intersections at $41^{\text {st }}$ Street South and $44^{\text {th }}$ Street South.


Figure 21: Pedestrian Hybrid Beacon Example (Source: FHWA)
2. Refer to the City's plans for restriping $5^{\text {th }}$ Avenue South west of US-78. A proposed cross section from the City is included in Appendix J.
3. Partner with property owners to implement a bicycle route or install a multi-use path through the Old Continental Gin Company property from $3^{\text {rd }}$ Avenue South to $46^{\text {th }}$ Street South in order to provide cyclists with a critical, low-stress connection between the Crestwood and Avondale neighborhoods. Appendix K contains a map provided by the City with a preliminary route for consideration.
4. Convert the eastbound $5^{\text {th }}$ Avenue South approach from a free flowing right turn movement to a signalized movement by adjusting the angle of the approach and installing a raised grass island. Install a new signal head for the converted eastbound $5^{\text {th }}$ Avenue South right turn movement and ensure that the signal head face is not visible to eastbound $4^{\text {th }}$ Avenue South motorists. Utilize a right turn overlap phase with the existing protected westbound $5^{\text {th }}$ Avenue South left turn phase and allow motorists to perform right turns on red (RTOR) after yielding to eastbound $4^{\text {th }}$

Avenue South motorists. Close access to $45^{\text {th }}$ Street South and install a row of street parking along $5^{\text {th }}$ Avenue South between $45^{\text {th }}$ Street South and $46^{\text {th }}$ Street South.
5. Convert the right turn lane from westbound 5th Avenue South to westbound 5th Avenue South at Crestwood Boulevard to a smart channel configuration (see Figure 22). Convert the eastbound right turn lane from Crestwood Boulevard to 5th Avenue South to a smart channel configuration.

## Current AASHTO Standard



Recommended Design


Figure 22: Smart Channel Right Turn Lane Geometry (Source: FHWA)
6. Perform a road diet along $5^{\text {th }}$ Avenue South east of $48^{\text {th }}$ Street South. Further study will be required beyond the scope of this study to determine detailed aspects of a road diet along $5^{\text {th }}$ Avenue South between $48^{\text {th }}$ Street South and the Woodlawn neighborhood.
7. Perform a structural analysis and conduct a detailed study to determine improvements necessary to bring the $7^{\text {th }}$ Avenue South pedestrian tunnel up to ADA compliance standards.
a. Required width: 4' minimum, 10' preferred.
b. Required vertical clearance: 7' minimum, 8' preferred.
c. Sidewalk Slope Restrictions: Less than $5 \%$ required.
8. Install pedestrian hybrid beacons and an offset median crosswalk on Crestwood Boulevard just west of $54^{\text {th }}$ Street South. Replace the existing pedestrian bridge across a drainage channel on the north side of Crestwood Boulevard to complete the connection to Crestwood Park. Add sidewalk along the west side of $54^{\text {th }}$ Street South to define the appropriate path from neighborhood streets to the Crestwood Boulevard crosswalk.
9. Install sidewalk along the west side of 56th Street South to enhance the road diet described in the short term improvements (\#14). Install a sidewalk on the east side of $56^{\text {th }}$ Street South from Crestwood Boulevard to $10^{\text {th }}$ Avenue South. Add a crosswalk and pedestrian signal head on the northbound $56{ }^{\text {th }}$ Street South approach to Crestwood Boulevard to connect the existing crosswalk with the proposed sidewalk. Install ADA-compliant pedestrian landings at the southwest corner of the intersection at $56^{\text {th }}$ Street South and Crestwood Boulevard.
10. Install a mini-roundabout within the existing pavement footprint at the intersection of 56th Street South and 10th Avenue South. Install lighting at the intersection.
11. Install a sidewalk on the south side of Crestwood Boulevard from Cresthill Road to Oporto Madrid Boulevard.
12. In conjunction with any redevelopment of the former Century Plaza property, partner with the developer to install a sidewalk along Crestwood Boulevard from Cresthill Road to Oporto Madrid Boulevard.


Figure 23: Long Term Improvement Recommendations (42nd Street South to 43rd Street South)


Figure 24: Long Term Improvement Recommendations (44th Street South to 46th Street South)


Figure 25: Long Term Improvement Recommendations (5th Avenue South to 7th Avenue South)


Figure 26: Long Term Improvement Recommendations (53rd Street South to 56th Street South)


Figure 27: Long Term Improvement Recommendations (56th Street South)


Figure 28: Long Term Improvement Recommendations (Cresthill Road to former Century Plaza)


Figure 29: Long Term Improvement Recommendations (Oporto Madrid Boulevard)

### 7.3 Visionary Improvement Recommendations (10+ Years)

Implementing comprehensive bicycle and pedestrian facilities throughout the corridor will require invasive roadway reconstruction within the right-of-way. Visionary improvement recommendations can be found below in the form of typical sections. Figure 30 displays a single-line diagram of the study corridor that identifies the appropriate typical sections between logical points. Logical points were determined by existing infrastructure, roadway width, right-of-way availability, terrain features, and observed multimodal use. Figures 31-33 display the typical sections (\#1-\#3). Refer to Table 1 in Section 2.2 for existing pavement widths. Sidewalk width is not included in the existing pavement widths.


Figure 30: Study Corridor Single-Line Sketch by Typical Section

## Typical Section \#1

- $3^{\text {rd }} / 4^{\text {th }} / 5^{\text {th }}$ Avenue South (US-78) from $41^{\text {st }}$ Street South to $5^{\text {th }}$ Avenue South


Right-of-Way Varies based on Alignment ( $74^{\prime}-80^{\prime}$ )
Figure 31: Typical Section \#1

## Typical Section \#2

- Crestwood Boulevard (US-78) from 53rd Street South to Crest Green Road
- Crestwood Boulevard (US-78) from Crestway Baptist Church to Oporto Madrid Boulevard

| 10' <br> MultiUse Path |  |  | $10^{\prime}$ <br> Flexible Use (Parking, Turn Lane, etc.) | 10' Westbound Travel Lane | 10' <br> Westbound <br> Travel <br> Lane | 12' Grass Median or Center Turn Lane | $10^{\prime}$ Eastbound Travel Lane | $10^{\prime}$ <br> Eastbound Travel Lane | $10^{\prime}$ <br> Flexible Use (Parking, Turn Lane, etc.) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |

Right-of-Way Varies based on Alignment (90')
Figure 32: Typical Section \#2

## Typical Section \#3

- Crestwood Boulevard (US-78) from 5th Avenue South to 53rd Street South
- Crestwood Boulevard (US-78) from Crest Green Road to Crestway Baptist Church Driveway


Right-of-Way Varies based on Alignment (52')
Figure 33: Typical Section \#3

## 5th Avenue South Area

The segment of $5^{\text {th }}$ Avenue South between $45^{\text {th }}$ Street South and Crestwood Boulevard cannot be adequately conveyed without additional context. Typical Section \#1 is proposed for this segment; however, more variation from the typical section will be required due to the skewed intersections at its endpoints. Figure 34 identifies key context to maintaining satisfactory vehicular operational performance while establishing a safer multimodal network.
$5^{\text {th }}$ Ave $S$ at Crestwood Blvd Convert to a more compact T-intersection and use excess space for creative freedom on pedestrian and bicycle facilities as well as integrating adjacent business function.

Impacts to Driveways and Parking Lots - Consolidate access points and improve side streets in such a way that improves access to businesses away from the footprint of $5^{\text {th }}$ Ave S and reduces bicycle and pedestrian conflicts.

## Lane Balance \& Continuity -

 US-78 runs along $4^{\text {th }}$ Ave $S$ to $5^{\text {th }}$ Ave $S$ to Crestwood Blvd in this area. This route must maintain two travel lanes. (See diagram to the right. A, $B, C$, and D represent US-78 lanes that must have continuity.)
## $5^{\text {th }}$ Ave $S$ at $4^{\text {th }}$ Ave $S$

Realignment - Bring
eastbound $5^{\text {th }}$ Ave $S$ traffic to a stop and remove the third lane on $5^{\text {th }}$ Ave $S$ between $45^{\text {th }}$ St $S$ and $47^{\text {th }} \mathrm{St}$ S. Realign roadway downstream to maintain lane balance.

Figure 34: 5th Avenue South Area Contextual Concepts related to the Proposed Typical Section

### 7.4 Opinions of Probable Cost

Planning level opinions of probable cost were prepared for the improvement recommendations for each studied intersection. Each estimate is based on the engineer's experiences and qualifications and represents the engineer's best judgment within the industry. The engineer does not guarantee that proposals, bids, or actual costs will not vary from the engineer's opinion of probable cost. Tables 5-7 provide a summary of costs estimated in 2020 dollars for the improvement recommendations. For budgeting future year projects, the City will need to escalate the costs to future year dollars.

A contingency of at least $25 \%$ was included in each estimate. This contingency cost includes miscellaneous and/or unknown items that cannot be quantified at the time the study was conducted. The $25 \%$ contingency does not cover utility or right-of-way costs. Many of the improvements can be installed within the present right-of-way and without utility relocation. Where applicable, costs associated with utility relocation and/or right-of-way acquisition have been included in the opinion of probable cost.

Some of the improvement recommendations can be implemented solely with City funds. However, it is likely that federal or state funding would be required for many of the recommended improvements. ALDOT indirect costs were included in each cost estimate and were estimated at $13.63 \%$ of the total project costs.

## Short Term Improvements

Each short term improvement from Section 7.1 is included in Table 5, with the exception of improvements \#1, \#3, \#4, and \#16. Improvement \#1 is an existing project estimated to begin construction in Summer 2020, improvement \#3 addresses corridor-wide maintenance recommendations, improvement \#4 is beyond the scope of this study and was not evaluated with the same level of detail as the other recommendations, and improvement \# 16 contains further study recommendations.

Within the short term improvement recommendations, they were grouped into logical projects based on location, improvement type, and difficulty. Furthermore, the $3^{\text {rd }}$ Avenue South restriping and pedestrian improvements between 42nd Street South and $46^{\text {th }}$ Street South were split into two phases. The first phase includes restriping of Crestwood Boulevard and the bicycle and pedestrian crossing improvements necessary to the function of the restriping concept. Utility relocation and right-of-way acquisition is not expected for phase 1 and is therefore not included in the opinion of probable cost. The second phase is generally focused on more robust pedestrian improvements located near the intersection of $4^{\text {th }}$ Avenue South and $44^{\text {th }}$ Street South which will likely require utility relocation; however, it is expected that these
improvements can be installed within the present right-of-way. Each improvement number from Section 7.1 is included with its appropriate project in Table 5. The project groupings shown in Table 5 are a recommendation based on the experience of the engineer intended to streamline the presentation of the estimated cost rather than present one estimated cost for all improvements. The City may elect to implement a different strategy, especially as additional budget information presents itself. Planninglevel information regarding the opinions of probable cost for these short term improvements can be found in Appendix L.

Table 5: Short Term Improvements Opinions of Probable Cost
\(\left.$$
\begin{array}{|c|c|}\hline \text { Short Term Improvement } & \begin{array}{c}\text { Opinion of } \\
\text { Probable Cost }\end{array}
$$ <br>
\hline 3rd Ave S Restriping \& Pedestrian Improvements - Phase 1 (\#2,\#5-8, \#12, <br>

\#13)\end{array}\right]\)| 3rd Ave S Restriping \& Pedestrian Improvements - Phase 2 (\#9-11) | $\$ 360,000$ |
| :---: | :---: |
| 56 th St S Road Diet - Restriping \& Driveway Closure (\#16) | $\$ 80,000$ |
| Crestwood Blvd Median Improvements (\#14,\#17) | $\$ 90,000$ |
| Crestwood Blvd at Crestwood Festival Pedestrian Improvements (\#18) | $\$ 360,000$ |
| Crestwood Blvd at Cresthill Rd Pedestrian Improvements (\#19,\#20) | $\$ 320,000$ |
| Crestwood Blvd at Oporto-Madrid Blvd Pedestrian Improvements (\#21) | $\$ 120,000$ |

## Long Term Improvements

The long term improvements found in Section 7.2 were also grouped in the same manner described above with the short term improvements. Table 6 lists recommended projects along with the appropriate long term improvements corresponding to the numbers presented in Section 7.2. Long term improvements \#2, \#3, \#6, and \#7 are beyond the scope of this study and were not estimated from a cost standpoint. Planning-level information regarding the opinions of probable cost for these short term improvements can be found in Appendix L. Utility relocation and right-of-way costs are included where applicable.

Table 6: Long Term Improvements Opinions of Probable Cost

| Improvement | Opinion of Probable Cost |
| :---: | :---: |
| $3^{\text {rd }}$ Ave S Pedestrian Hybrid Beacon between $42{ }^{\text {nd }}$ St S \& 43 ${ }^{\text {rd }}$ St S (\#1) | \$230,000 |
| $4^{\text {th }}$ Ave S at $5^{\text {th }}$ Ave S Intersection Realignment (\#4) | \$340,000 |
| $5^{\text {th }}$ Ave S at Crestwood Blvd Intersection Realignment (\#5) | \$840,000 |
| Crestwood Blvd at 54 ${ }^{\text {th }}$ St S Pedestrian Improvements (\#8) | \$670,000 |
| 56 ${ }^{\text {th }}$ St S Sidewalks \& Mini-Roundabout Installation (\#9,\#10) | \$1,130,000 |
| Crestwood Blvd Sidewalks from Cresthill Rd to Oporto Madrid Blvd (\#11, \#12) | \$1,460,000 |

Visionary Improvements
Visionary improvements were recommended by typical sections throughout the study corridor. Similarly, opinions of probable cost were developed on a per-segment basis according to the typical sections found in Section 7.3. Table 7 lists the opinion of probable cost for each segment. Right-of-way acquisition and utility relocation costs are included in these estimates. Planning-level information regarding the opinions of probable cost for these short term improvements can be found in Appendix L.

Table 7: Visionary Improvements Opinions of Probable Cost

Improvement | Opinion of |
| :---: |
| Probable Cost |

$3^{\text {rd }}$ Ave $S / 4^{\text {th }}$ Ave $S / 5^{\text {th }}$ Ave $S\left(\right.$ US-78) from $41^{\text {st }}$ St $S$ to $5^{\text {th }}$ Ave $S \quad \$ 6,030,000$

| Crestwood Blvd (US-78) from 5th Ave S to 53rd St S | $\$ 4,290,000$ |
| :---: | :---: |
| Crestwood Blvd (US-78) from 53rd St S to Crest Green Rd | $\$ 4,690,000$ |
| Crestwood Blvd (US-78) from Crest Green Rd to Crestway Baptist | $\$ 4,280,000$ |
| Church Driveway | $\$ 3,840,000$ |
| Crestwood Blvd (US-78) from Crestway Baptist Church Driveway <br> to Oporto Madrid Blvd |  |

## 8 Potential Funding Sources

Costs associated with the design and construction of the proposed improvements could exceed the City's current available resources. This section discusses funding sources that are available to aid in design and construction. Federal programs are administered by the Alabama Department of Transportation. Table 3 details funding sources, the category of the source and type of project for which the funding can be used.

Table 8: Funding Options

| Funding Source | Category | Match Type |
| :--- | :---: | :---: |
| Transportation Alternatives Program (TAP) | Federal | 80\% Federal $/ 20 \%$ City |
| Recreational Trail Program (RTP)* | Federal | $80 \%$ Federal / 20\% City |
| Rebuild Alabama Act - Annual Grant Program | State | Up to $100 \%$ State |
| Local Municipality | Local | $100 \%$ Local |

*not currently available

### 8.1 Federal Funding

The Transportation Alternatives Program (TAP) is an $80 \%$ Federal/20\% Local match program continued through the Fixing America's Surface Transportation (FAST) Act. TAP funding is available for projects defined as transportation alternatives. Example of transportation alternatives include the following scenarios: on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhance mobility, community improvement activities such as historic preservation and vegetation management, environmental mitigation related to stormwater and habitat connectivity, recreational trail projects, safe routes to school projects, and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways. TAP funding can be pursued through an application with RPCGB and ALDOT. The same application can be used for submittal to ALDOT and RPCGB. The application deadline for ALDOT is May 15, 2020 and the deadline for RPCGB is May 22, 2020. The total amount of federal participating funding for a project is capped at $\$ 800,000$ ( $\$ 640,000$ federal/ $\$ 160,000$ local match). The application and guidelines are included in Appendix $M$ and can be found at the below link.
https://www.dot.state.al.us/tweb/operations/index.html
https://www.fhwa.dot.gov/environment/transportation_alternatives/
The Recreational Trail Program (RTP) is a federal program that is administered by the Alabama Department of Economic and Community Affairs (ADECA). Currently, Congress has not authorized funding for new projects; however, funding is anticipated to be appropriated in the near future. Once funding becomes available, ADECA will host an application workshop. In previous cycles, the RTP has allowed varying maximum
grant amounts based on the trail type $1 \$ 200,000$ for non-motorized, single-use trails; $\$ 400,000$ for non-motorized, diverse-use trails). Applicable permissible uses include: development of urban trail linkages; development of trailside and trailhead facilities; acquisition of easement for trail use; and construction of new trails.
https://www.fhwa.dot.gov/environment/recreational trails/

### 8.2 State Funding

The Rebuild Alabama Act authorizes the ALDOT Annual Grant Program, a $\$ 10$ million fund, for which cities and counties may apply. Additionally, the Program provides the opportunity for cities and counties to partner with the State on larger projects where adequate local funding may not be available. There is not a specified or required match for local governments to take on, but any funds that local governments can leverage to team with ALDOT to fund a project could play a role in the decision making process. Up to $\$ 250,000$ per project can be awarded from this fund, and funds must be used for construction or a federal match when construction is imminent.

### 8.3 Local Funding

The City has the option to fund the design and construction of their preferred alternative using only local funds. Choosing this route allows the project design and construction to have shorter timelines and the potential for reduced project costs since fewer plan reviews would be required and City guidelines will govern the project design. It is also possible that the City could team with another local municipality to share the cost burden. The timeline for a locally funded project is estimated at 2-4 years.

## 9 Next Steps

If the City chooses to move forward with implementing the preferred alternative at each location using federal funds, the next step would be to request inclusion of a project in the upcoming Birmingham MPO Transportation Improvement Plan (TIP) for Fiscal Years 2024 - 2027. It is possible for the City to have a project included in the current TIP; however, the MPO has advised that the current available funding has been allocated and maximized.

Once funds are in place for a project an environmental document will need to be prepared. The environmental document must include technical studies and public involvement outreach necessary to comply with procedures of the National Environmental Policy Act (NEPA). Once the environmental study has been completed, design would be finalized, followed by construction. If it is determined that additional right-of-way is required, acquisition would be conducted prior to construction. If the

City chooses to implement improvements using only local funding, this will allow expedited design and construction, fewer plan reviews, and less environmental documentation required.

## Appendix A - Study Area Geometrics and Photo Location Key










## Appendix B - Raw Traffic Data


Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:00 AM -- 8:15 AM


| 15-Min Count Period Beginning At | 41st St S(Northbound) |  |  |  | 41st St S(Southbound) |  |  |  | 3rd Ave S (Eastbound) |  |  |  | $\begin{gathered} \text { 3rd Ave S } \\ \text { (Westbound) } \\ \hline \end{gathered}$ |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 7:00 AM | 8 | 16 | 4 | 0 | 10 | 8 | 8 | 0 | 2 | 41 | 0 | 0 | 0 | 214 | 18 | 0 | 329 |  |
| 7:15 AM | 17 | 11 | 8 | 0 | 3 | 9 | 12 | 0 | 5 | 40 | 3 | 0 | 1 | 272 | 29 | 0 | 410 |  |
| 7:30 AM | 25 | 20 | 8 | 0 | 13 | 3 | 8 | 0 | 3 | 42 | 1 | 0 | 8 | 323 | 32 | 0 | 486 |  |
| 7:45 AM | 22 | 12 | 9 | 0 | 19 | 11 | 8 | 0 | 2 | 41 | 0 | 0 | 10 | 325 | 37 | 0 | 496 | 1721 |
| 8:00 AM | 18 | 39 | 5 | 0 | 16 | 43 | 18 | 1 | 6 | 35 | 0 | 0 | 4 | 332 | 35 | 0 | 552 | 1944 |
| 8:15 AM | 15 | 30 | 8 | 0 | 19 | 29 | 28 | 0 | 1 | 44 | 3 | 0 | 4 | 245 | 36 | 0 | 462 | 1996 |
| 8:30 AM | 8 | 21 | 5 | 0 | 27 | 44 | 24 | 0 | 5 | 40 | 2 | 0 | 3 | 199 | 30 | 0 | 408 | 1918 |
| 8:45 AM | 8 | 24 | 4 | 0 | 24 | 33 | 21 | 0 | 1 | 32 | 1 | 0 | 5 | 193 | 27 | 0 | 373 | 1795 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 72 | 156 | 20 | 0 | 64 | 172 | 72 | 4 | 24 | 140 | 0 | 0 | 16 | 1328 | 140 | 0 |  | 8 |
| Heavy Trucks Buses | 8 | 0 | 0 |  | 12 | 8 | 8 |  | 8 | 12 | 0 |  | 0 | 56 | 8 |  |  | 0 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 4 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:


Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM


| 15-Min Count Period Beginning At | 5th Ave S (Northbound) |  |  |  | 5th Ave S (Southbound) |  |  |  | 4th Ave S (Eastbound) |  |  |  | 4th Ave S(Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 7:00 AM | 0 | 0 | 1 | 0 | 47 | 0 | 1 | 0 | 0 | 67 | 0 | 0 | 0 | 146 | 255 | 0 | 517 |  |
| 7:15 AM | 0 | 0 | 2 | 0 | 38 | 0 | 0 | 0 | 0 | 68 | 0 | 0 | 0 | 217 | 360 | 0 | 685 |  |
| 7:30 AM | 0 | 0 | 5 | 0 | 69 | 0 | 0 | 0 | 0 | 83 | 1 | 0 | 0 | 229 | 407 | 0 | 794 |  |
| 7:45 AM | 0 | 0 | 3 | 0 | 60 | 0 | 0 | 0 | 0 | 88 | 0 | 0 | 1 | 228 | 460 | 1 | 841 | 2837 |
| 8:00 AM | 0 | 0 | 2 | 0 | 74 | 0 | 0 | 0 | 0 | 90 | 2 | 0 | 1 | 182 | 406 | 1 | 758 | 3078 |
| 8:15 AM | 0 | 0 | 6 | 0 | 70 | 0 | 0 | 0 | 0 | 69 | 0 | 0 | 0 | 159 | 331 | 0 | 635 | 3028 |
| 8:30 AM | 0 | 0 | 1 | 0 | 83 | 0 | 1 | 0 | 0 | 91 | 1 | 0 | 0 | 163 | 271 | 0 | 611 | 2845 |
| 8:45 AM | 0 | 0 | 2 | 0 | 70 | 0 | 0 | 0 | 0 | 73 | 0 | 0 | 0 | 155 | 250 | 1 | 551 | 2555 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 0 | 12 | 0 | 240 | 0 | 0 | 0 | 0 | 352 | 0 | 0 | 4 | 912 | 1840 | 4 |  | 64 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 4 | 0 | 0 |  | 0 | 20 | 0 |  | 0 | 24 | 48 |  |  | 6 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:


Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

DATA THAT DRIVES COMMUNITIES


| 15-Min Count Period Beginning At | 5th Ave S (Northbound) |  |  |  | 5th Ave S (Southbound) |  |  |  | Crestwood Blvd (Eastbound) |  |  |  | Crestwood Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 44 | 67 | 0 | 0 | 0 | 281 | 2 | 0 | 554 |  |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 207 | 0 | 50 | 69 | 0 | 0 | 0 | 333 | 2 | 0 | 661 |  |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 239 | 0 | 65 | 83 | 0 | 0 | 0 | 435 | 1 | 0 | 823 |  |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 0 | 53 | 109 | 0 | 0 | 0 | 437 | 2 | 0 | 826 | 2864 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 223 | 0 | 55 | 110 | 0 | 0 | 0 | 399 | 1 | 0 | 788 | 3098 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 167 | 0 | 52 | 94 | 0 | 0 | 0 | 299 | 3 | 0 | 615 | 3052 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 152 | 0 | 52 | 116 | 0 | 0 | 0 | 259 | 0 | 0 | 579 | 2808 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 146 | 0 | 41 | 105 | 0 | 0 | 0 | 252 | 2 | 0 | 546 | 2528 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 0 | 0 | 0 | 0 | 0 | 900 | 0 | 212 | 436 | 0 | 0 | 0 | 1748 | 8 | 0 |  | 04 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 32 |  | 16 | 24 | 0 |  | 0 | 44 | 4 |  |  | 0 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  |  |

Comments:

Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

Quality Counts


| 15-Min Count Period Beginning At | 5th Ave S (Northbound) |  |  |  | 5th Ave S (Southbound) |  |  |  | Crestwood Blvd (Eastbound) |  |  |  | Crestwood Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 0 | 213 | 339 | 0 | 0 | 0 | 122 | 3 | 0 | 748 |  |
| 4:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 203 | 341 | 0 | 0 | 0 | 129 | 1 | 0 | 764 |  |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 196 | 326 | 0 | 0 | 0 | 120 | 6 | 0 | 715 |  |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 75 | 0 | 242 | 421 | 0 | 0 | 0 | 120 | 8 | 0 | 866 | 3093 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 253 | 427 | 0 | 0 | 0 | 125 | 2 | 0 | 869 | 3214 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 0 | 257 | 448 | 0 | 0 | 0 | 152 | 4 | 0 | 949 | 3399 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 219 | 396 | 0 | 0 | 0 | 137 | 2 | 0 | 806 | 3490 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 0 | 147 | 316 | 0 | 0 | 0 | 128 | 3 | 0 | 657 | 3281 |
| Peak 15-Min Flowrates | Northbound |  |  |  | Southbound |  |  |  | Eastbound |  |  |  | Westbound |  |  |  | Total |  |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |  |
| All Vehicles | 0 | 0 | 0 | 0 | 0 | 0 | 352 | 0 | 1028 | 1792 | 0 | 0 | 0 | 608 | 16 | 0 |  | 96 |
| Heavy Trucks Buses | 0 | 0 | 0 |  | 0 | 0 | 12 |  | 20 | 8 | 0 |  | 0 | 12 | 0 |  |  | 2 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  |  |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  | 0 |
| Comments: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |





Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM


| 15-Min Count Period Beginning At | $\begin{gathered} \text { Cresthill Rd } \\ \text { (Northbound) } \\ \hline \end{gathered}$ |  |  |  | Cresthill Rd (Southbound) |  |  |  | $\begin{aligned} & \hline \text { Crestwood Blvd } \\ & \text { (Eastbound) } \\ & \hline \end{aligned}$ |  |  |  | Crestwood Blvd (Westbound) |  |  |  | Total | Hourly Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| 4:00 PM | 17 | 3 | 14 | 0 | 6 | 5 | 9 | 0 | 8 | 328 | 26 | 1 | 7 | 170 | 17 | 0 | 611 |  |
| 4:15 PM | 18 | 8 | 8 | 0 | 9 | 6 | 8 | 0 | 3 | 355 | 27 | 1 | 9 | 151 | 14 | 1 | 618 |  |
| 4:30 PM | 17 | 2 | 17 | 0 | 16 | 4 | 5 | 0 | 12 | 339 | 23 | 0 | 22 | 178 | 13 | 0 | 648 |  |
| 4:45 PM | 21 | 5 | 8 | 0 | 15 | 4 | 9 | 0 | 14 | 373 | 32 | 1 | 13 | 178 | 8 | 0 | 681 | 2558 |
| 5:00 PM | 18 | 2 | 17 | 0 | 16 | 9 | 6 | 0 | 17 | 372 | 29 | 0 | 10 | 176 | 12 | 0 | 684 | 2631 |
| 5:15 PM | 16 | 0 | 19 | 0 | 14 | 9 | 8 | 0 | 8 | 319 | 32 | 1 | 9 | 191 | 12 | 0 | 638 | 2651 |
| 5:30 PM | 18 | 4 | 7 | 0 | 8 | 7 | 11 | 0 | 7 | 287 | 34 | 0 | 11 | 174 | 9 | 0 | 577 | 2580 |
| 5:45 PM | 21 | 6 | 17 | 0 | 19 | 0 | 6 | 0 | 10 | 361 | 45 | 0 | 12 | 148 | 13 | 0 | 658 | 2557 |
| Peak 15-Min |  | North | ound |  |  | South | ound |  |  | Eastb | und |  |  | West | ound |  |  |  |
| Flowrates | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U | Left | Thru | Right | U |  |  |
| All Vehicles | 72 | 8 | 68 | 0 | 64 | 36 | 24 | 0 | 68 | 1488 | 116 | 0 | 40 | 704 | 48 | 0 |  | 36 |
| Heavy Trucks Buses | 0 | 0 | 4 |  | 0 | 0 | 0 |  | 0 | 16 | 0 |  | 0 | 12 | 0 |  |  | 2 |
| Pedestrians |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |  |  |  | 0 |
| Bicycles Scooters | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  | 0 | 0 | 0 |  |  | 0 |

Comments:



## Appendix C - LOS Description

## Levels of Service Signalized Intersections

Level of service criteria for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period.

Level of service A describes operations with very low delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of service B describes operations with delay in the range of > 10 to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of service C describes operations with delay in the range of > 20 to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of service $D$ describes operations with delay in the range of $>35$ to 55 seconds per vehicle. At level D , the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high vehicle/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of service E describes operations with delay in the range of $>55$ to 80 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high vehicle/capacity ratios. Individual cycle failures are frequent occurrences.

Level of service $F$ describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

## Levels of Service Unsignalized Intersections

Level of service criteria for unsignalized intersections is stated in terms of average control delay. Control delay is defined as the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The criteria for each level of service are cited in the table below.

| Level of <br> Service | Average Control Delay <br> (seconds/vehicle) |
| :---: | :---: |
| A | $0-10$ |
| B | $>10-15$ |
| C | $>15-25$ |
| D | $>25-35$ |
| E | $>50$ |
| F |  |

## Levels of Service Daily Volume

The criteria for daily level of service are derived from ALDOT defined roadway capacities for urban 2-lane and 3-lane arterials and are cited in the table below.

| Level of <br> Service | Daily Service Volume |  |
| :---: | ---: | ---: |
|  | 2-lane | 3-lane |
| A | 6,500 | 8,200 |
| B | 9,400 | 11,600 |
| C | 11,600 | 14,400 |
| D | 14,000 | 17,500 |
| E | 18,700 | 23,300 |
| F | $>18,700$ | $>23,300$ |

## Appendix D - Existing Conditions Capacity Analysis

|  | 4 | $\rightarrow$ | 7 | 7 | 4 |  | 4 | $\dagger$ | 7 | $\cdots$ | 1 | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 中 ${ }^{\text {a }}$ |  | ${ }^{1}$ | 中 ${ }^{\text {a }}$ |  | ${ }^{7}$ | $\uparrow$ |  | ${ }^{7}$ | F |  |
| Traffic Volume (vph) | 12 | 162 | 4 | 26 | 1225 | 140 | 80 | 101 | 30 | 67 | 86 | 62 |
| Future Volume (vph) | 12 | 162 | 4 | 26 | 1225 | 140 | 80 | 101 | 30 | 67 | 86 | 62 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 200 |  | 0 | 200 |  | 0 | 200 |  | 0 | 200 |  | 0 |
| Storage Lanes | 1 |  | 0 | 1 |  | 0 | 1 |  | 0 | 1 |  | 0 |
| Taper Length (ft) | 25 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  | 0.997 |  |  | 0.985 |  |  | 0.966 |  |  | 0.937 |  |
| Flt Protected | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd. Flow (prot) | 1770 | 3529 | 0 | 1770 | 3486 | 0 | 1770 | 1799 | 0 | 1770 | 1745 | 0 |
| Flt Permitted | 0.119 |  |  | 0.636 |  |  | 0.653 |  |  | 0.554 |  |  |
| Satd. Flow (perm) | 222 | 3529 | 0 | 1185 | 3486 | 0 | 1216 | 1799 | 0 | 1032 | 1745 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  | 4 |  |  | 21 |  |  | 20 |  |  | 17 |  |
| Link Speed (mph) |  | 40 |  |  | 40 |  |  | 30 |  |  | 30 |  |
| Link Distance (ft) |  | 741 |  |  | 528 |  |  | 336 |  |  | 342 |  |
| Travel Time (s) |  | 12.6 |  |  | 9.0 |  |  | 7.6 |  |  | 7.8 |  |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 13 | 180 | 4 | 29 | 1361 | 156 | 89 | 112 | 33 | 74 | 96 | 69 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow (vph) | 13 | 184 | 0 | 29 | 1517 | 0 | 89 | 145 | 0 | 74 | 165 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 12 |  |  | 12 |  |  | 12 |  |  | 12 |  |
| Link Offset(ft) |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  | Yes |  |  | Yes |  |  | Yes |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | Perm | NA |  | Perm | NA |  | Perm | NA |  | pm+pt | NA |  |
| Protected Phases |  | 4 |  |  | 8 |  |  | 2 |  | 1 | 6 |  |
| Permitted Phases | 4 |  |  | 8 |  |  | 2 |  |  | 6 |  |  |
| Minimum Split (s) | 26.5 | 26.5 |  | 26.5 | 26.5 |  | 26.5 | 26.5 |  | 9.5 | 26.5 |  |
| Total Split (s) | 38.0 | 38.0 |  | 38.0 | 38.0 |  | 27.4 | 27.4 |  | 9.6 | 37.0 |  |
| Total Split (\%) | 50.7\% | 50.7\% |  | 50.7\% | 50.7\% |  | 36.5\% | 36.5\% |  | 12.8\% | 49.3\% |  |
| Maximum Green (s) | 33.5 | 33.5 |  | 33.5 | 33.5 |  | 22.9 | 22.9 |  | 5.1 | 32.5 |  |
| Yellow Time (s) | 3.5 | 3.5 |  | 3.5 | 3.5 |  | 3.5 | 3.5 |  | 3.5 | 3.5 |  |
| All-Red Time (s) | 1.0 | 1.0 |  | 1.0 | 1.0 |  | 1.0 | 1.0 |  | 1.0 | 1.0 |  |
| Lost Time Adjust (s) | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |
| Total Lost Time (s) | 4.5 | 4.5 |  | 4.5 | 4.5 |  | 4.5 | 4.5 |  | 4.5 | 4.5 |  |
| Lead/Lag |  |  |  |  |  |  | Lag | Lag |  | Lead |  |  |
| Lead-Lag Optimize? |  |  |  |  |  |  | Yes | Yes |  | Yes |  |  |
| Walk Time (s) | 4.0 | 4.0 |  | 4.0 | 4.0 |  | 4.0 | 4.0 |  |  | 4.0 |  |
| Flash Dont Walk (s) | 18.0 | 18.0 |  | 18.0 | 18.0 |  | 15.0 | 15.0 |  |  | 15.0 |  |
| Pedestrian Calls (\#/hr) | 0 | 0 |  | 0 | 0 |  | 0 | 0 |  |  | 0 |  |
| Act Effct Green (s) | 33.5 | 33.5 |  | 33.5 | 33.5 |  | 22.9 | 22.9 |  | 32.5 | 32.5 |  |
| Actuated g/C Ratio | 0.45 | 0.45 |  | 0.45 | 0.45 |  | 0.31 | 0.31 |  | 0.43 | 0.43 |  |
| v/c Ratio | 0.13 | 0.12 |  | 0.05 | 0.97 |  | 0.24 | 0.26 |  | 0.15 | 0.22 |  |


|  |  |  |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |

## Intersection Summary

Area Type: Other

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0\%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Pretimed

## Maximum v/c Ratio: 0.97

```
Intersection Signal Delay: 30.5
Intersection LOS: C
```

Intersection Capacity Utilization 62.3\% ICU Level of Service B
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.


|  | $\rightarrow$ | 2 | \% |  | - | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBT | EBR | WBL | WBT | NEL | NER |
| Lane Configurations | 性 |  | ${ }^{7}$ | 44 |  | 「 |
| Traffic Volume (vph) | 287 | 1 | 732 | 1468 | 0 | 338 |
| Future Volume (vph) | 287 | 1 | 732 | 1468 | 0 | 338 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) |  | 0 | 225 |  | 0 | 0 |
| Storage Lanes |  | 0 | 1 |  | 0 | 1 |
| Taper Length (ft) |  |  | 25 |  | 25 |  |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Frt |  |  |  |  |  | 0.865 |
| Flt Protected |  |  | 0.950 |  |  |  |
| Satd. Flow (prot) | 3539 | 0 | 1770 | 3539 | 0 | 1611 |
| Flt Permitted |  |  | 0.455 |  |  |  |
| Satd. Flow (perm) | 3539 | 0 | 848 | 3539 | 0 | 1611 |
| Right Turn on Red |  | Yes |  |  |  | Yes |
| Satd. Flow (RTOR) | 1 |  |  |  |  |  |
| Link Speed (mph) | 40 |  |  | 40 | 30 |  |
| Link Distance (ft) | 516 |  |  | 353 | 435 |  |
| Travel Time (s) | 8.8 |  |  | 6.0 | 9.9 |  |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj. Flow (vph) | 315 | 1 | 804 | 1613 | 0 | 371 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |
| Lane Group Flow (vph) | 316 | 0 | 804 | 1613 | 0 | 371 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 |  |  | 12 | 0 |  |
| Link Offset(ft) | 0 |  |  | 0 | 0 |  |
| Crosswalk Width(ft) | 16 |  |  | 16 | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) |  | 9 | 15 |  | 15 | 9 |
| Turn Type | NA |  | pm+pt | NA |  | Perm |
| Protected Phases | 4 |  | 3 | 8 |  |  |
| Permitted Phases |  |  | 8 |  |  | 34 |
| Minimum Split (s) | 22.5 |  | 9.5 | 22.5 |  |  |
| Total Split (s) | 24.0 |  | 36.0 | 60.0 |  |  |
| Total Split (\%) | 40.0\% |  | 60.0\% | 100.0\% |  |  |
| Maximum Green (s) | 19.5 |  | 31.5 | 55.5 |  |  |
| Yellow Time (s) | 3.5 |  | 3.5 | 3.5 |  |  |
| All-Red Time (s) | 1.0 |  | 1.0 | 1.0 |  |  |
| Lost Time Adjust (s) | 0.0 |  | 0.0 | 0.0 |  |  |
| Total Lost Time (s) | 4.5 |  | 4.5 | 4.5 |  |  |
| Lead/Lag | Lag |  | Lead |  |  |  |
| Lead-Lag Optimize? | Yes |  | Yes |  |  |  |
| Act Effct Green (s) | 19.5 |  | 55.5 | 60.0 |  | 60.0 |
| Actuated g/C Ratio | 0.32 |  | 0.92 | 1.00 |  | 1.00 |
| v/c Ratio | 0.27 |  | 0.63 | 0.46 |  | 0.23 |
| Control Delay | 15.8 |  | 3.6 | 0.4 |  | 0.3 |
| Queue Delay | 0.0 |  | 0.0 | 0.0 |  | 0.0 |
| Total Delay | 15.8 |  | 3.6 | 0.4 |  | 0.3 |



Splits and Phases: 2: 5th Ave S \& 4th Ave S



|  |  | $\rightarrow$ | 4 |  |  | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Stops (vph) | 182 | 0 | 610 |  |  | 1 |
| Fuel Used(gal) | 4 | 2 | 21 |  |  | 6 |
| CO Emissions (g/hr) | 276 | 112 | 1454 |  |  | 397 |
| NOx Emissions (g/hr) | 54 | 22 | 283 |  |  | 77 |
| VOC Emissions (g/hr) | 64 | 26 | 337 |  |  | 92 |
| Dilemma Vehicles (\#) | 0 | 0 | 88 |  |  | 0 |
| Queue Length 50th (ft) | 52 | 0 | 155 |  |  | 0 |
| Queue Length 95th (ft) | 85 | 0 | 203 |  |  | 0 |
| Internal Link Dist (f) |  | 468 | 1281 |  | 839 |  |
| Turn Bay Length (ft) |  |  |  |  |  |  |
| Base Capacity (vph) | 579 | 3539 | 2541 |  |  | 1611 |
| Starvation Cap Reductn | 0 | 0 | 0 |  |  | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 |  |  | 0 |
| Storage Cap Reductn | 0 | 0 | 0 |  |  | 0 |
| Reduced v/c Ratio | 0.39 | 0.13 | 0.59 |  |  | 0.51 |
| Intersection Summary |  |  |  |  |  |  |
| Area Type: Other |  |  |  |  |  |  |
| Cycle Length: 80 |  |  |  |  |  |  |
| Actuated Cycle Length: 80 |  |  |  |  |  |  |
| Offset: 0 (0\%), Referenced to phase 2: and 6:, Start of Green |  |  |  |  |  |  |
| Natural Cycle: 40 |  |  |  |  |  |  |
| Control Type: Pretimed |  |  |  |  |  |  |
| Maximum v/c Ratio: 0.59 |  |  |  |  |  |  |
| Intersection Signal Delay: 6.0 |  |  |  |  | sectio | OS: A |
| Intersection Capacity Utilization 93.7\% |  |  |  |  | Leve | Service F |
| Analysis Period (min) 15 |  |  |  |  |  |  |

Splits and Phases: 3: 5th Ave S \& Crestwood Blvd


|  | 4 | $\rightarrow$ |  | 7 |  | 4 | 4 | 9 | 7 | ( | $\frac{1}{1}$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 | T | ${ }^{7}$ | 44 | 「 |  | \$ |  | ${ }^{1}$ | 个 |  |
| Traffic Volume (vph) | 14 | 401 | 12 | 15 | 1150 | 55 | 36 | 29 | 17 | 94 | 54 | 100 |
| Future Volume (vph) | 14 | 401 | 12 | 15 | 1150 | 55 | 36 | 29 | 17 | 94 | 54 | 100 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 200 |  | 200 | 120 |  | 120 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 1 |  | 1 | 0 |  | 0 | 1 |  | 0 |
| Taper Length (ft) | 25 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.972 |  |  | 0.902 |  |
| Flt Protected | 0.950 |  |  | 0.950 |  |  |  | 0.978 |  | 0.950 |  |  |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1771 | 0 | 1770 | 1680 | 0 |
| Flt Permitted | 0.950 |  |  | 0.950 |  |  |  | 0.837 |  | 0.716 |  |  |
| Satd. Flow (perm) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1515 | 0 | 1334 | 1680 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  |  | 65 |  |  | 65 |  | 15 |  |  | 107 |  |
| Link Speed (mph) |  | 45 |  |  | 45 |  |  | 30 |  |  | 30 |  |
| Link Distance (ft) |  | 734 |  |  | 602 |  |  | 333 |  |  | 479 |  |
| Travel Time (s) |  | 11.1 |  |  | 9.1 |  |  | 7.6 |  |  | 10.9 |  |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 16 | 456 | 14 | 17 | 1307 | 63 | 41 | 33 | 19 | 107 | 61 | 114 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow (vph) | 16 | 456 | 14 | 17 | 1307 | 63 | 0 | 93 | 0 | 107 | 175 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 32 |  |  | 32 |  |  | 0 |  |  | 12 |  |
| Link Offset(ft) |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Perm | NA |  | Perm | NA |  |
| Protected Phases | 7 | 4 |  | 3 | 8 |  |  | 2 |  |  | 6 |  |
| Permitted Phases |  |  | 4 |  |  | 8 | 2 |  |  | 6 |  |  |
| Minimum Split (s) | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 41.5 | 41.5 |  | 41.5 | 41.5 |  |
| Total Split (s) | 9.5 | 49.0 | 49.0 | 9.5 | 49.0 | 49.0 | 41.5 | 41.5 |  | 41.5 | 41.5 |  |
| Total Split (\%) | 9.5\% | 49.0\% | 49.0\% | 9.5\% | 49.0\% | 49.0\% | 41.5\% | 41.5\% |  | 41.5\% | 41.5\% |  |
| Maximum Green (s) | 5.0 | 44.5 | 44.5 | 5.0 | 44.5 | 44.5 | 37.0 | 37.0 |  | 37.0 | 37.0 |  |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 |  |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 |  |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 |  |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 |  | 4.5 | 4.5 |  |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| Walk Time (s) |  |  |  |  |  |  | 4.0 | 4.0 |  | 4.0 | 4.0 |  |
| Flash Dont Walk (s) |  |  |  |  |  |  | 33.0 | 33.0 |  | 33.0 | 33.0 |  |
| Pedestrian Calls (\#/hr) |  |  |  |  |  |  | 0 | 0 |  | 0 | 0 |  |
| Act Effct Green (s) | 5.0 | 44.5 | 44.5 | 5.0 | 44.5 | 44.5 |  | 37.0 |  | 37.0 | 37.0 |  |
| Actuated g/C Ratio | 0.05 | 0.44 | 0.44 | 0.05 | 0.44 | 0.44 |  | 0.37 |  | 0.37 | 0.37 |  |
| v/c Ratio | 0.18 | 0.29 | 0.02 | 0.19 | 0.83 | 0.09 |  | 0.16 |  | 0.22 | 0.25 |  |


|  | 4 |  |  | 7 |  |  | 4 | $\uparrow$ |  |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Control Delay | 50.5 | 18.3 | 0.1 | 50.9 | 30.1 | 4.4 |  | 18.6 |  | 23.1 | 10.1 |  |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 |  |
| Total Delay | 50.5 | 18.3 | 0.1 | 50.9 | 30.1 | 4.4 |  | 18.6 |  | 23.1 | 10.1 |  |
| LOS | D | B | A | D | C | A |  | B |  | C | B |  |
| Approach Delay |  | 18.8 |  |  | 29.2 |  |  | 18.6 |  |  | 15.0 |  |
| Approach LOS |  | B |  |  | C |  |  | B |  |  | B |  |
| Stops (vph) | 16 | 244 | 0 | 17 | 978 | 7 |  | 44 |  | 62 | 45 |  |
| Fuel Used(gal) | 0 | 6 | 0 | 0 | 24 | 0 |  | 1 |  | 1 | 1 |  |
| CO Emissions (g/hr) | 29 | 450 | 4 | 30 | 1658 | 25 |  | 54 |  | 79 | 80 |  |
| NOX Emissions (g/hr) | 6 | 88 | 1 | 6 | 323 | 5 |  | 10 |  | 15 | 16 |  |
| VOC Emissions (g/hr) | 7 | 104 | 1 | 7 | 384 | 6 |  | 12 |  | 18 | 18 |  |
| Dilemma Vehicles (\#) | 0 | 20 | 0 | 0 | 57 | 0 |  | 0 |  | 0 | 0 |  |
| Queue Length 50th (ft) | 10 | 94 | 0 | 11 | 374 | 0 |  | 33 |  | 46 | 28 |  |
| Queue Length 95th (ft) | 31 | 127 | 0 | 32 | 452 | 21 |  | 66 |  | 85 | 71 |  |
| Internal Link Dist (ft) |  | 654 |  |  | 522 |  |  | 253 |  |  | 399 |  |
| Turn Bay Length (ft) | 200 |  | 200 | 120 |  | 120 |  |  |  |  |  |  |
| Base Capacity (vph) | 88 | 1574 | 740 | 88 | 1574 | 740 |  | 570 |  | 493 | 689 |  |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Reduced v/c Ratio | 0.18 | 0.29 | 0.02 | 0.19 | 0.83 | 0.09 |  | 0.16 |  | 0.22 | 0.25 |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: Other |  |  |  |  |  |  |  |  |  |  |  |  |
| Cycle Length: 100 |  |  |  |  |  |  |  |  |  |  |  |  |
| Actuated Cycle Length: 100 |  |  |  |  |  |  |  |  |  |  |  |  |
| Offset: 0 (0\%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green |  |  |  |  |  |  |  |  |  |  |  |  |
| Natural Cycle: 90 |  |  |  |  |  |  |  |  |  |  |  |  |
| Control Type: Pretimed |  |  |  |  |  |  |  |  |  |  |  |  |
| Maximum v/c Ratio: 0.83 |  |  |  |  |  |  |  |  |  |  |  |  |
| Intersection Signal Delay: 24.8 |  |  |  | Intersection LOS: C |  |  |  |  |  |  |  |  |
| Intersection Capacity Utilization 56.6\% |  |  |  | ICU Level of Service B |  |  |  |  |  |  |  |  |

Analysis Period (min) 15
Splits and Phases: 4: 56th St \& Crestwood Blvd


|  | 4 |  | $\cdots$ |  |  |  | 4 | $\dagger$ | \% | $V$ | $\dagger$ | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{*}$ | 44 | 「 | ${ }^{1}$ | 44 | 「 |  | \& |  |  | * |  |
| Traffic Volume (vph) | 0 | 589 | 83 | 133 | 1218 | 2 | 54 | 0 | 38 | 0 | 0 | 1 |
| Future Volume (vph) | 0 | 589 | 83 | 133 | 1218 | 2 | 54 | 0 | 38 | 0 | 0 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 175 |  | 150 | 150 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 1 |  | 1 | 0 |  | 0 | 0 |  | 0 |
| Taper Length (ft) | 100 |  |  | 100 |  |  | 25 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.944 |  |  | 0.865 |  |
| Flt Protected |  |  |  | 0.950 |  |  |  | 0.971 |  |  |  |  |
| Satd. Flow (prot) | 1863 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1707 | 0 | 0 | 1611 | 0 |
| Flt Permitted |  |  |  | 0.311 |  |  |  | 0.856 |  |  |  |  |
| Satd. Flow (perm) | 1863 | 3539 | 1583 | 579 | 3539 | 1583 | 0 | 1505 | 0 | 0 | 1611 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  |  | 92 |  |  | 77 |  | 77 |  |  | 150 |  |
| Link Speed (mph) |  | 30 |  |  | 45 |  |  | 25 |  |  | 30 |  |
| Link Distance (ft) |  | 378 |  |  | 357 |  |  | 169 |  |  | 148 |  |
| Travel Time (s) |  | 8.6 |  |  | 5.4 |  |  | 4.6 |  |  | 3.4 |  |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Adj. Flow (vph) | 0 | 654 | 92 | 148 | 1353 | 2 | 60 | 0 | 42 | 0 | 0 | 1 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow (vph) | 0 | 654 | 92 | 148 | 1353 | 2 | 0 | 102 | 0 | 0 | 1 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 36 |  |  | 36 |  |  | 0 |  |  | 0 |  |
| Link Offset(ft) |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Perm | NA |  |  | NA |  |
| Protected Phases | 7 | 4 |  | 3 | 8 |  |  | 2 |  |  | 6 |  |
| Permitted Phases | 4 |  | 4 | 8 |  | 8 | 2 |  |  | 6 |  |  |
| Minimum Split (s) | 9.5 | 37.5 | 37.5 | 9.5 | 22.5 | 22.5 | 37.5 | 37.5 |  | 22.5 | 22.5 |  |
| Total Split (s) | 9.5 | 38.0 | 38.0 | 9.5 | 38.0 | 38.0 | 37.5 | 37.5 |  | 37.5 | 37.5 |  |
| Total Split (\%) | 11.2\% | 44.7\% | 44.7\% | 11.2\% | 44.7\% | 44.7\% | 44.1\% | 44.1\% |  | 44.1\% | 44.1\% |  |
| Maximum Green (s) | 5.0 | 33.5 | 33.5 | 5.0 | 33.5 | 33.5 | 33.0 | 33.0 |  | 33.0 | 33.0 |  |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 |  |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 |  |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  |  | 0.0 |  |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 |  |  | 4.5 |  |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| Walk Time (s) |  | 4.0 | 4.0 |  | 4.0 | 4.0 | 4.0 | 4.0 |  | 4.0 | 4.0 |  |
| Flash Dont Walk (s) |  | 29.0 | 29.0 |  | 10.0 | 10.0 | 29.0 | 29.0 |  | 10.0 | 10.0 |  |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 | 0 | 0 | 0 |  | 0 | 0 |  |
| Act Effct Green (s) |  | 33.5 | 33.5 | 38.5 | 33.5 | 33.5 |  | 33.0 |  |  | 33.0 |  |
| Actuated g/C Ratio |  | 0.39 | 0.39 | 0.45 | 0.39 | 0.39 |  | 0.39 |  |  | 0.39 |  |
| v/c Ratio |  | 0.47 | 0.14 | 0.45 | 0.97 | 0.00 |  | 0.16 |  |  | 0.00 |  |


| 4 |  |  |  |  |  |  | 4 |  |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Control Delay | 20.5 | 4.4 | 16.5 | 44.5 | 0.0 |  | 7.0 |  |  | 0.0 |  |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  |  | 0.0 |  |
| Total Delay | 20.5 | 4.4 | 16.5 | 44.5 | 0.0 |  | 7.0 |  |  | 0.0 |  |
| LOS | C | A | B | D | A |  | A |  |  | A |  |
| Approach Delay | 18.5 |  |  | 41.7 |  |  | 7.0 |  |  |  |  |
| Approach LOS | B |  |  | D |  |  | A |  |  |  |  |
| Stops (vph) | 419 | 13 | 76 | 1057 | 0 |  | 22 |  |  | 0 |  |
| Fuel Used(gal) | 7 | 0 | 2 | 27 | 0 |  | 0 |  |  | 0 |  |
| CO Emissions (g/hr) | 455 | 27 | 119 | 1888 | 0 |  | 24 |  |  | 0 |  |
| NOx Emissions (g/hr) | 89 | 5 | 23 | 367 | 0 |  | 5 |  |  | 0 |  |
| VOC Emissions (g/hr) | 106 | 6 | 28 | 438 | 0 |  | 6 |  |  | 0 |  |
| Dilemma Vehicles (\#) | 0 | 0 | 0 | 68 | 0 |  | 0 |  |  | 0 |  |
| Queue Length 50th (ft) | 133 | 0 | 40 | 364 | 0 |  | 8 |  |  | 0 |  |
| Queue Length 95th ( t ) | 182 | 28 | 73 | \#518 | 0 |  | 39 |  |  | 0 |  |
| Internal Link Dist (ft) | 298 |  |  | 277 |  |  | 89 |  |  | 68 |  |
| Turn Bay Length (t) |  | 150 | 150 |  |  |  |  |  |  |  |  |
| Base Capacity (vph) | 1394 | 679 | 332 | 1394 | 670 |  | 631 |  |  | 717 |  |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |  | 0 |  |  | 0 |  |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |  | 0 |  |  | 0 |  |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |  | 0 |  |  | 0 |  |
| Reduced v/c Ratio | 0.47 | 0.14 | 0.45 | 0.97 | 0.00 |  | 0.16 |  |  | 0.00 |  |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: Other |  |  |  |  |  |  |  |  |  |  |  |
| Cycle Length: 85 |  |  |  |  |  |  |  |  |  |  |  |
| Actuated Cycle Length: 85 |  |  |  |  |  |  |  |  |  |  |  |
| Offset: 0 (0\%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green |  |  |  |  |  |  |  |  |  |  |  |
| Natural Cycle: 85 |  |  |  |  |  |  |  |  |  |  |  |
| Control Type: Pretimed |  |  |  |  |  |  |  |  |  |  |  |
| Maximum v/c Ratio: 0.97 |  |  |  |  |  |  |  |  |  |  |  |
| Intersection Signal Delay: 32.9 |  |  |  | Intersection LOS: C |  |  |  |  |  |  |  |
| Intersection Capacity Utilization 61.1\% |  |  |  | ICU Level of Service B |  |  |  |  |  |  |  |
| Analysis Period (min) 15 |  |  |  |  |  |  |  |  |  |  |  |
| \# 95th percentile volume exceeds capacity, queue may be longer. |  |  |  |  |  |  |  |  |  |  |  |

Queue shown is maximum after two cycles.
Splits and Phases: 5: Crestwood Blvd


|  | $\rangle$ | $\rightarrow$ | \％ | 7 | $\checkmark$ | 4 | 4 | $\dagger$ | $p$ | ＊ | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％${ }^{1 / 4}$ | ¢个 | F | ${ }^{*}$ | ¢ $\uparrow$ | 「 | ${ }^{*}{ }^{2}$ | 性 |  | ${ }^{*}{ }^{*}$ | 个4 | F |
| Traffic Volume（vph） | 155 | 370 | 116 | 48 | 813 | 87 | 130 | 186 | 15 | 140 | 395 | 426 |
| Future Volume（vph） | 155 | 370 | 116 | 48 | 813 | 87 | 130 | 186 | 15 | 140 | 395 | 426 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 400 |  | 0 | 160 |  | 0 | 200 |  | 0 | 400 |  | 400 |
| Storage Lanes | 2 |  | 1 | 1 |  | 1 | 2 |  | 0 | 2 |  | 1 |
| Taper Length（ft） | 25 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Utill．Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 0.95 | 0.97 | 0.95 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.989 |  |  |  | 0.850 |
| Flt Protected | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3500 | 0 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3500 | 0 | 3433 | 3539 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 127 |  |  | 104 |  | 8 |  |  |  | 211 |
| Link Speed（mph） |  | 45 |  |  | 45 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 793 |  |  | 766 |  |  | 673 |  |  | 547 |  |
| Travel Time（s） |  | 12.0 |  |  | 11.6 |  |  | 15.3 |  |  | 12.4 |  |
| Peak Hour Factor | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 |
| Adj．Flow（vph） | 170 | 407 | 127 | 53 | 893 | 96 | 143 | 204 | 16 | 154 | 434 | 468 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 170 | 407 | 127 | 53 | 893 | 96 | 143 | 220 | 0 | 154 | 434 | 468 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 32 |  |  | 32 |  |  | 30 |  |  | 30 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA |  | Prot | NA | Perm |
| Protected Phases | 7 | 4 |  | 3 | 8 |  | 5 | 2 |  | 1 | 6 |  |
| Permitted Phases |  |  | 4 |  |  | 8 |  |  |  |  |  | 6 |
| Minimum Split（s） | 9.5 | 39.5 | 39.5 | 9.5 | 39.5 | 39.5 | 9.5 | 36.5 |  | 9.5 | 36.5 | 36.5 |
| Total Split（s） | 14.0 | 41.7 | 41.7 | 13.3 | 41.0 | 41.0 | 12.0 | 40.9 |  | 14.1 | 43.0 | 43.0 |
| Total Split（\％） | 12．7\％ | 37．9\％ | 37．9\％ | 12．1\％ | 37．3\％ | 37．3\％ | 10．9\％ | 37．2\％ |  | 12．8\％ | 39．1\％ | 39．1\％ |
| Maximum Green（s） | 9.5 | 37.2 | 37.2 | 8.8 | 36.5 | 36.5 | 7.5 | 36.4 |  | 9.6 | 38.5 | 38.5 |
| Yellow Time（s） | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 | 3.5 |
| All－Red Time（s） | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust（s） | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 |
| Total Lost Time（s） | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 | 4.5 | 4.5 |
| Lead／Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag |  | Lead | Lag | Lag |
| Lead－Lag Optimize？ | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Walk Time（s） |  | 4.0 | 4.0 |  | 4.0 | 4.0 |  | 4.0 |  |  | 4.0 | 4.0 |
| Flash Dont Walk（s） |  | 31.0 | 31.0 |  | 31.0 | 31.0 |  | 28.0 |  |  | 28.0 | 28.0 |
| Pedestrian Calls（\＃／hr） |  | 0 | 0 |  | 0 | 0 |  | 0 |  |  | 0 | 0 |
| Act Effct Green（s） | 9.5 | 37.2 | 37.2 | 8.8 | 36.5 | 36.5 | 7.5 | 36.4 |  | 9.6 | 38.5 | 38.5 |
| Actuated g／C Ratio | 0.09 | 0.34 | 0.34 | 0.08 | 0.33 | 0.33 | 0.07 | 0.33 |  | 0.09 | 0.35 | 0.35 |
| v／c Ratio | 0.57 | 0.34 | 0.21 | 0.38 | 0.76 | 0.16 | 0.61 | 0.19 |  | 0.52 | 0.35 | 0.68 |


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## Intersection Summary

Area Type: Other

Cycle Length: 110
Actuated Cycle Length: 110
Offset: $0(0 \%)$, Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 32.9
Intersection LOS: C
Intersection Capacity Utilization 64.3\% ICU Level of Service C
Analysis Period (min) 15
Splits and Phases: 6: Oporto Madrid Blvd \& Crestwood Blvd


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| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |



|  | $\rightarrow$ | 2 | $\cdots$ |  | - | + |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBT | EBR | WBL | WBT | NEL | NER |
| Lane Configurations | 中 ${ }^{\text {a }}$ |  | ${ }^{*}$ | 44 |  | 「 |
| Traffic Volume (vph) | 1603 | 0 | 219 | 604 | 0 | 1064 |
| Future Volume (vph) | 1603 | 0 | 219 | 604 | 0 | 1064 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) |  | 0 | 225 |  | 0 | 0 |
| Storage Lanes |  | 0 | 1 |  | 0 | 1 |
| Taper Length (ft) |  |  | 25 |  | 25 |  |
| Lane Util. Factor | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 |
| Frt |  |  |  |  |  | 0.865 |
| Flt Protected |  |  | 0.950 |  |  |  |
| Satd. Flow (prot) | 3539 | 0 | 1770 | 3539 | 0 | 1611 |
| Flt Permitted |  |  | 0.099 |  |  |  |
| Satd. Flow (perm) | 3539 | 0 | 184 | 3539 | 0 | 1611 |
| Right Turn on Red |  | Yes |  |  |  | Yes |
| Satd. Flow (RTOR) |  |  |  |  |  |  |
| Link Speed (mph) | 40 |  |  | 40 | 30 |  |
| Link Distance (ft) | 516 |  |  | 353 | 435 |  |
| Travel Time (s) | 8.8 |  |  | 6.0 | 9.9 |  |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Adj. Flow (vph) | 1687 | 0 | 231 | 636 | 0 | 1120 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |
| Lane Group Flow (vph) | 1687 | 0 | 231 | 636 | 0 | 1120 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 |  |  | 12 | 0 |  |
| Link Offset(ft) | 0 |  |  | 0 | 0 |  |
| Crosswalk Width(ft) | 16 |  |  | 16 | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) |  | 9 | 15 |  | 15 | 9 |
| Turn Type | NA |  | pm+pt | NA |  | Perm |
| Protected Phases | 4 |  | 3 | 8 |  |  |
| Permitted Phases |  |  | 8 |  |  | 34 |
| Minimum Split (s) | 22.5 |  | 29.5 | 22.5 |  |  |
| Total Split (s) | 40.4 |  | 29.6 | 70.0 |  |  |
| Total Split (\%) | 57.7\% |  | 42.3\% | 100.0\% |  |  |
| Maximum Green (s) | 35.9 |  | 25.1 | 65.5 |  |  |
| Yellow Time (s) | 3.5 |  | 3.5 | 3.5 |  |  |
| All-Red Time (s) | 1.0 |  | 1.0 | 1.0 |  |  |
| Lost Time Adjust (s) | 0.0 |  | 0.0 | 0.0 |  |  |
| Total Lost Time (s) | 4.5 |  | 4.5 | 4.5 |  |  |
| Lead/Lag | Lag |  | Lead |  |  |  |
| Lead-Lag Optimize? | Yes |  | Yes |  |  |  |
| Walk Time (s) |  |  | 4.0 |  |  |  |
| Flash Dont Walk (s) |  |  | 21.0 |  |  |  |
| Pedestrian Calls (\#/hr) |  |  | 0 |  |  |  |
| Act Effct Green (s) | 35.9 |  | 65.5 | 70.0 |  | 70.0 |
| Actuated g/C Ratio | 0.51 |  | 0.94 | 1.00 |  | 1.00 |
| v/c Ratio | 0.93 |  | 0.31 | 0.18 |  | 0.70 |


|  | $\rightarrow$ | 7 | $\cdots$ |  |  | $p$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBT | EBR | WBL | WBT | NEL | NER |
| Control Delay | 27.1 |  | 5.9 | 0.1 |  | 2.5 |
| Queue Delay | 0.0 |  | 0.0 | 0.0 |  | 0.0 |
| Total Delay | 27.1 |  | 5.9 | 0.1 |  | 2.5 |
| LOS | C |  | A | A |  | A |
| Approach Delay | 27.1 |  |  | 1.7 | 2.5 |  |
| Approach LOS | C |  |  | A | A |  |
| Stops (vph) | 1319 |  | 52 | 0 |  | 2 |
| Fuel Used(gal) | 27 |  | 1 | 1 |  | 4 |
| CO Emissions (g/hr) | 1917 |  | 91 | 102 |  | 291 |
| NOx Emissions (g/hr) | 373 |  | 18 | 20 |  | 57 |
| VOC Emissions (g/hr) | 444 |  | 21 | 24 |  | 67 |
| Dilemma Vehicles (\#) | 111 |  | 0 | 0 |  | 0 |
| Queue Length 50th (tt) | 331 |  | 13 | 0 |  | 0 |
| Queue Length 95th ( t ) | \#505 |  | 61 | 0 |  | 0 |
| Internal Link Dist (tt) | 436 |  |  | 273 | 355 |  |
| Turn Bay Length (ft) |  |  | 225 |  |  |  |
| Base Capacity (vph) | 1815 |  | 740 | 3539 |  | 1611 |
| Starvation Cap Reductn | 0 |  | 0 | 0 |  | 0 |
| Spillback Cap Reductn | 0 |  | 0 | 0 |  | 0 |
| Storage Cap Reductn | 0 |  | 0 | 0 |  | 0 |
| Reduced v/c Ratio | 0.93 |  | 0.31 | 0.18 |  | 0.70 |
| Intersection Summary |  |  |  |  |  |  |
| Area Type: Other |  |  |  |  |  |  |
| Cycle Length: 70 |  |  |  |  |  |  |
| Actuated Cycle Length: 70 |  |  |  |  |  |  |
| Offset: 0 (0\%), Referenced to phase 2: and 6:, Start of Green |  |  |  |  |  |  |
| Natural Cycle: 70 |  |  |  |  |  |  |
| Control Type: Pretimed |  |  |  |  |  |  |
| Maximum v/c Ratio: 0.93 |  |  |  |  |  |  |
| Intersection Signal Delay: 13.6 |  |  |  | Intersection LOS: B |  |  |
| Intersection Capacity Utilization 117.7\% |  |  |  | ICU Level of Service |  |  |
| Analysis Period (min) 15 |  |  |  |  |  |  |
| \# 95th percentile volume exceeds capacity, queue may be longer. |  |  |  |  |  |  |
| Queue shown is maximum after two cycles. |  |  |  |  |  |  |

Splits and Phases: 2: 5th Ave S \& Crestwood Blvd




Splits and Phases: 3: Crestwood Blvd \& 5th Ave S


|  | 4 | $\rightarrow$ | 7 | $\checkmark$ | 4 | 4 | 4 | 4 | 7 | （ | $\frac{1}{1}$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 | 「 | ${ }^{7}$ | 44 | 「 |  | \＄ |  | ${ }^{1}$ | 个 |  |
| Traffic Volume（vph） | 98 | 1455 | 52 | 24 | 488 | 119 | 19 | 65 | 44 | 85 | 47 | 40 |
| Future Volume（vph） | 98 | 1455 | 52 | 24 | 488 | 119 | 19 | 65 | 44 | 85 | 47 | 40 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 200 |  | 200 | 120 |  | 120 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 1 |  | 1 | 0 |  | 0 | 1 |  | 0 |
| Taper Length（ft） | 25 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.954 |  |  | 0.931 |  |
| Flt Protected | 0.950 |  |  | 0.950 |  |  |  | 0.993 |  | 0.950 |  |  |
| Satd．Flow（prot） | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1765 | 0 | 1770 | 1734 | 0 |
| Flt Permitted | 0.950 |  |  | 0.950 |  |  |  | 0.962 |  | 0.686 |  |  |
| Satd．Flow（perm） | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1710 | 0 | 1278 | 1734 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 73 |  |  | 127 |  | 35 |  |  | 40 |  |
| Link Speed（mph） |  | 45 |  |  | 45 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 734 |  |  | 602 |  |  | 333 |  |  | 479 |  |
| Travel Time（s） |  | 11.1 |  |  | 9.1 |  |  | 7.6 |  |  | 10.9 |  |
| Peak Hour Factor | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 |
| Adj．Flow（vph） | 99 | 1470 | 53 | 24 | 493 | 120 | 19 | 66 | 44 | 86 | 47 | 40 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 99 | 1470 | 53 | 24 | 493 | 120 | 0 | 129 | 0 | 86 | 87 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 32 |  |  | 32 |  |  | 0 |  |  | 12 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Perm | NA |  | Perm | NA |  |
| Protected Phases | 7 | 4 |  | 3 | 8 |  |  | 2 |  |  | 6 |  |
| Permitted Phases |  |  | 4 |  |  | 8 | 2 |  |  | 6 |  |  |
| Minimum Split（s） | 9.5 | 22.5 | 22.5 | 9.5 | 22.5 | 22.5 | 41.5 | 41.5 |  | 41.5 | 41.5 |  |
| Total Split（s） | 15.1 | 39.0 | 39.0 | 9.5 | 33.4 | 33.4 | 41.5 | 41.5 |  | 41.5 | 41.5 |  |
| Total Split（\％） | 16．8\％ | 43．3\％ | 43．3\％ | 10．6\％ | 37．1\％ | 37．1\％ | 46．1\％ | 46．1\％ |  | 46．1\％ | 46．1\％ |  |
| Maximum Green（s） | 10.6 | 34.5 | 34.5 | 5.0 | 28.9 | 28.9 | 37.0 | 37.0 |  | 37.0 | 37.0 |  |
| Yellow Time（s） | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 |  |
| All－Red Time（s） | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 |  |
| Lost Time Adjust（s） | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 |  |
| Total Lost Time（s） | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 |  | 4.5 | 4.5 |  |
| Lead／Lag | Lead | Lag | Lag | Lead | Lag | Lag |  |  |  |  |  |  |
| Lead－Lag Optimize？ | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| Walk Time（s） |  |  |  |  |  |  | 4.0 | 4.0 |  | 4.0 | 4.0 |  |
| Flash Dont Walk（s） |  |  |  |  |  |  | 33.0 | 33.0 |  | 33.0 | 33.0 |  |
| Pedestrian Calls（\＃／hr） |  |  |  |  |  |  | 0 | 0 |  | 0 | 0 |  |
| Act Effct Green（s） | 10.6 | 34.5 | 34.5 | 5.0 | 28.9 | 28.9 |  | 37.0 |  | 37.0 | 37.0 |  |
| Actuated g／C Ratio | 0.12 | 0.38 | 0.38 | 0.06 | 0.32 | 0.32 |  | 0.41 |  | 0.41 | 0.41 |  |
| v／c Ratio | 0.48 | 1.08 | 0.08 | 0.24 | 0.43 | 0.20 |  | 0.18 |  | 0.16 | 0.12 |  |


|  | $\stackrel{ }{*}$ | $\rightarrow$ |  | $\dagger$ |  |  |  | 4 | $p$ | * | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Control Delay | 45.4 | 79.0 | 3.0 | 47.0 | 25.6 | 4.8 |  | 12.9 |  | 17.8 | 10.3 |  |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 |  |
| Total Delay | 45.4 | 79.0 | 3.0 | 47.0 | 25.6 | 4.8 |  | 12.9 |  | 17.8 | 10.3 |  |
| LOS | D | E | A | D | C | A |  | B |  | B | B |  |
| Approach Delay |  | 74.5 |  |  | 22.5 |  |  | 12.9 |  |  | 14.1 |  |
| Approach LOS |  | E |  |  | C |  |  | B |  |  | B |  |
| Stops (vph) | 90 | 1250 | 5 | 24 | 369 | 16 |  | 57 |  | 50 | 31 |  |
| Fuel Used(gal) | 2 | 46 | 0 | 1 | 9 | 1 |  | 1 |  | 1 | 1 |  |
| CO Emissions (g/hr) | 174 | 3207 | 24 | 43 | 632 | 55 |  | 69 |  | 63 | 47 |  |
| NOX Emissions (g/hr) | 34 | 624 | 5 | 8 | 123 | 11 |  | 13 |  | 12 | 9 |  |
| VOC Emissions (g/hr) | 40 | 743 | 6 | 10 | 146 | 13 |  | 16 |  | 15 | 11 |  |
| Dilemma Vehicles (\#) | 0 | 72 | 0 | 0 | 27 | 0 |  | 0 |  | 0 | 0 |  |
| Queue Length 50th (ft) | 54 | $\sim 497$ | 0 | 13 | 115 | 0 |  | 33 |  | 30 | 16 |  |
| Queue Length 95th (ft) | 104 | \#631 | 15 | 39 | 161 | 34 |  | 69 |  | 61 | 44 |  |
| Internal Link Dist (tt) |  | 654 |  |  | 522 |  |  | 253 |  |  | 399 |  |
| Turn Bay Length (tt) | 200 |  | 200 | 120 |  | 120 |  |  |  |  |  |  |
| Base Capacity (vph) | 208 | 1356 | 651 | 98 | 1136 | 594 |  | 723 |  | 525 | 736 |  |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 |  |
| Reduced v/c Ratio | 0.48 | 1.08 | 0.08 | 0.24 | 0.43 | 0.20 |  | 0.18 |  | 0.16 | 0.12 |  |

## Intersection Summary

Area Type: Other

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0\%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 1.08
Intersection Signal Delay: $54.3 \quad$ Intersection LOS: D
Intersection Capacity Utilization 69.5\% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
Splits and Phases: 4: 56th St \& Crestwood Blvd


|  | 4 | $\rightarrow$ | 7 | $\checkmark$ |  | 4 | 4 | $\dagger$ | $p$ | , | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 | 「 | ${ }^{7}$ | 44 | 「 |  | \& |  |  | \$ |  |
| Traffic Volume (vph) | 46 | 1351 | 127 | 43 | 719 | 41 | 73 | 11 | 51 | 53 | 29 | 34 |
| Future Volume (vph) | 46 | 1351 | 127 | 43 | 719 | 41 | 73 | 11 | 51 | 53 | 29 | 34 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 175 |  | 150 | 150 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 1 |  | 1 | 0 |  | 0 | 0 |  | 0 |
| Taper Length (ft) | 100 |  |  | 100 |  |  | 25 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.949 |  |  | 0.961 |  |
| Flt Protected | 0.950 |  |  | 0.950 |  |  |  | 0.974 |  |  | 0.978 |  |
| Satd. Flow (prot) | 1770 | 3539 | 1583 | 1770 | 3539 | 1583 | 0 | 1722 | 0 | 0 | 1751 | 0 |
| Flt Permitted | 0.261 |  |  | 0.120 |  |  |  | 0.803 |  |  | 0.835 |  |
| Satd. Flow (perm) | 486 | 3539 | 1583 | 224 | 3539 | 1583 | 0 | 1419 | 0 | 0 | 1495 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  |  | 87 |  |  | 77 |  | 43 |  |  | 29 |  |
| Link Speed (mph) |  | 30 |  |  | 45 |  |  | 25 |  |  | 30 |  |
| Link Distance (ft) |  | 378 |  |  | 357 |  |  | 169 |  |  | 148 |  |
| Travel Time (s) |  | 8.6 |  |  | 5.4 |  |  | 4.6 |  |  | 3.4 |  |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 47 | 1393 | 131 | 44 | 741 | 42 | 75 | 11 | 53 | 55 | 30 | 35 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow (vph) | 47 | 1393 | 131 | 44 | 741 | 42 | 0 | 139 | 0 | 0 | 120 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 36 |  |  | 36 |  |  | 0 |  |  | 0 |  |
| Link Offset(ft) |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Perm | NA |  | Perm | NA |  |
| Protected Phases | 7 | 4 |  | 3 | 8 |  |  | 2 |  |  | 6 |  |
| Permitted Phases | 4 |  | 4 | 8 |  | 8 | 2 |  |  | 6 |  |  |
| Minimum Split (s) | 9.5 | 37.5 | 37.5 | 9.5 | 22.5 | 22.5 | 37.5 | 37.5 |  | 22.5 | 22.5 |  |
| Total Split (s) | 9.6 | 38.0 | 38.0 | 9.5 | 37.9 | 37.9 | 37.5 | 37.5 |  | 37.5 | 37.5 |  |
| Total Split (\%) | 11.3\% | 44.7\% | 44.7\% | 11.2\% | 44.6\% | 44.6\% | 44.1\% | 44.1\% |  | 44.1\% | 44.1\% |  |
| Maximum Green (s) | 5.1 | 33.5 | 33.5 | 5.0 | 33.4 | 33.4 | 33.0 | 33.0 |  | 33.0 | 33.0 |  |
| Yellow Time (s) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 |  |
| All-Red Time (s) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 |  |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  |  | 0.0 |  |
| Total Lost Time (s) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 |  |  | 4.5 |  |
| Lead/Lag | Lead | Lag | Lag | Lead | Lag | Lag |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes | Yes | Yes | Yes | Yes | Yes |  |  |  |  |  |  |
| Walk Time (s) |  | 4.0 | 4.0 |  | 4.0 | 4.0 | 4.0 | 4.0 |  | 4.0 | 4.0 |  |
| Flash Dont Walk (s) |  | 29.0 | 29.0 |  | 10.0 | 10.0 | 29.0 | 29.0 |  | 10.0 | 10.0 |  |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 | 0 | 0 | 0 |  | 0 | 0 |  |
| Act Effct Green (s) | 38.6 | 33.5 | 33.5 | 38.4 | 33.4 | 33.4 |  | 33.0 |  |  | 33.0 |  |
| Actuated g/C Ratio | 0.45 | 0.39 | 0.39 | 0.45 | 0.39 | 0.39 |  | 0.39 |  |  | 0.39 |  |
| v/c Ratio | 0.16 | 1.00 | 0.19 | 0.23 | 0.53 | 0.06 |  | 0.24 |  |  | 0.20 |  |


|  |  |  |  |  |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |

Splits and Phases: 5: Crestwood Blvd


|  | $\rangle$ | $\rightarrow$ |  | $\checkmark$ |  | 4 | 4 | $\dagger$ | $p$ |  | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％${ }^{*}$ | 个4 | F | ${ }^{7}$ | 个4 | 「 | \％${ }^{*}$ | 中 ${ }^{\text {a }}$ |  | \％${ }^{*}$ | 个个 | F |
| Trafic Volume（vph） | 316 | 858 | 287 | 67 | 437 | 192 | 160 | 493 | 90 | 179 | 412 | 246 |
| Future Volume（vph） | 316 | 858 | 287 | 67 | 437 | 192 | 160 | 493 | 90 | 179 | 412 | 246 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 400 |  | 0 | 160 |  | 0 | 200 |  | 0 | 400 |  | 400 |
| Storage Lanes | 2 |  | 1 | 1 |  | 1 | 2 |  | 0 | 2 |  | 1 |
| Taper Length（ft） | 25 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 0.97 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 0.95 | 0.95 | 0.97 | 0.95 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  | 0.977 |  |  |  | 0.850 |
| Flt Protected | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3458 | 0 | 3433 | 3539 | 1583 |
| Flt Permitted | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 3433 | 3539 | 1583 | 1770 | 3539 | 1583 | 3433 | 3458 | 0 | 3433 | 3539 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 296 |  |  | 198 |  | 19 |  |  |  | 254 |
| Link Speed（mph） |  | 45 |  |  | 45 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 793 |  |  | 766 |  |  | 673 |  |  | 547 |  |
| Travel Time（s） |  | 12.0 |  |  | 11.6 |  |  | 15.3 |  |  | 12.4 |  |
| Peak Hour Factor | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj．Flow（vph） | 326 | 885 | 296 | 69 | 451 | 198 | 165 | 508 | 93 | 185 | 425 | 254 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 326 | 885 | 296 | 69 | 451 | 198 | 165 | 601 | 0 | 185 | 425 | 254 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 32 |  |  | 32 |  |  | 30 |  |  | 30 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Turn Type | Prot | NA | Perm | Prot | NA | Perm | Prot | NA |  | Prot | NA | Perm |
| Protected Phases | 7 | 4 |  | 3 | 8 |  | 5 | 2 |  | 1 | 6 |  |
| Permitted Phases |  |  | 4 |  |  | 8 |  |  |  |  |  | 6 |
| Minimum Split（s） | 9.5 | 39.5 | 39.5 | 9.5 | 39.5 | 39.5 | 9.5 | 36.5 |  | 9.5 | 36.5 | 36.5 |
| Total Split（s） | 19.0 | 44.2 | 44.2 | 14.3 | 39.5 | 39.5 | 13.0 | 37.5 |  | 14.0 | 38.5 | 38.5 |
| Total Split（\％） | 17．3\％ | 40．2\％ | 40．2\％ | 13．0\％ | 35．9\％ | 35．9\％ | 11．8\％ | 34．1\％ |  | 12．7\％ | 35．0\％ | 35．0\％ |
| Maximum Green（s） | 14.5 | 39.7 | 39.7 | 9.8 | 35.0 | 35.0 | 8.5 | 33.0 |  | 9.5 | 34.0 | 34.0 |
| Yellow Time（s） | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |  | 3.5 | 3.5 | 3.5 |
| All－Red Time（s） | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |  | 1.0 | 1.0 | 1.0 |
| Lost Time Adjust（s） | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 |
| Total Lost Time（s） | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |  | 4.5 | 4.5 | 4.5 |
| Lead／Lag | Lead | Lag | Lag | Lead | Lag | Lag | Lead | Lag |  | Lead | Lag | Lag |
| Lead－Lag Optimize？ | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |  | Yes | Yes | Yes |
| Walk Time（s） |  | 4.0 | 4.0 |  | 4.0 | 4.0 |  | 4.0 |  |  | 4.0 | 4.0 |
| Flash Dont Walk（s） |  | 31.0 | 31.0 |  | 31.0 | 31.0 |  | 28.0 |  |  | 28.0 | 28.0 |
| Pedestrian Calls（\＃hr） |  | 0 | 0 |  | 0 | 0 |  | 0 |  |  | 0 | 0 |
| Act Effct Green（s） | 14.5 | 39.7 | 39.7 | 9.8 | 35.0 | 35.0 | 8.5 | 33.0 |  | 9.5 | 34.0 | 34.0 |
| Actuated g／C Ratio | 0.13 | 0.36 | 0.36 | 0.09 | 0.32 | 0.32 | 0.08 | 0.30 |  | 0.09 | 0.31 | 0.31 |
| v／c Ratio | 0.72 | 0.69 | 0.39 | 0.44 | 0.40 | 0.31 | 0.62 | 0.57 |  | 0.62 | 0.39 | 0.38 |


|  | $\stackrel{ }{*}$ | $\rightarrow$ |  | 7 |  |  | 4 | $\uparrow$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Control Delay | 55.8 | 33.4 | 4.4 | 56.9 | 30.6 | 5.3 | 60.1 | 34.0 |  | 58.5 | 31.1 | 5.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 |
| Total Delay | 55.8 | 33.4 | 4.4 | 56.9 | 30.6 | 5.3 | 60.1 | 34.0 |  | 58.5 | 31.1 | 5.3 |
| LOS | E | C | A | E | C | A | E | C |  | E | C | A |
| Approach Delay |  | 32.6 |  |  | 26.2 |  |  | 39.6 |  |  | 29.4 |  |
| Approach LOS |  | C |  |  | C |  |  | D |  |  | C |  |
| Stops (vph) | 298 | 712 | 25 | 63 | 331 | 21 | 152 | 466 |  | 170 | 313 | 25 |
| Fuel Used(gal) | 9 | 19 | 2 | 2 | 9 | 1 | 4 | 10 |  | 4 | 6 | 1 |
| CO Emissions (g/hr) | 624 | 1336 | 143 | 132 | 630 | 99 | 254 | 676 |  | 268 | 426 | 102 |
| NOx Emissions (g/hr) | 121 | 260 | 28 | 26 | 123 | 19 | 49 | 132 |  | 52 | 83 | 20 |
| VOC Emissions (g/hr) | 145 | 310 | 33 | 31 | 146 | 23 | 59 | 157 |  | 62 | 99 | 24 |
| Dilemma Vehicles (\#) | 0 | 39 | 0 | 0 | 20 | 0 | 0 | 0 |  | 0 | 0 | 0 |
| Queue Length 50th (tt) | 115 | 277 | 0 | 47 | 130 | 0 | 59 | 182 |  | 65 | 123 | 0 |
| Queue Length 95th (ft) | 164 | 350 | 56 | 93 | 176 | 51 | 94 | 241 |  | 104 | 168 | 58 |
| Internal Link Dist (ft) |  | 713 |  |  | 686 |  |  | 593 |  |  | 467 |  |
| Turn Bay Length (ft) | 400 |  |  | 160 |  |  | 200 |  |  | 400 |  | 400 |
| Base Capacity (vph) | 452 | 1277 | 760 | 157 | 1126 | 638 | 265 | 1050 |  | 296 | 1093 | 664 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.72 | 0.69 | 0.39 | 0.44 | 0.40 | 0.31 | 0.62 | 0.57 |  | 0.63 | 0.39 | 0.38 |

## Intersection Summary

## Area Type: Other

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0\%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 32.1
Intersection LOS: C
Intersection Capacity Utilization 64.5\% ICU Level of Service C
Analysis Period (min) 15
Splits and Phases: 6: Oporto Madrid Blvd \& Crestwood Blvd


## Appendix E - Multimodal Inventory Map



## Appendix F - USFWS Threatened and Endangered Species Summary

## IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional sitespecific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.
Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Jefferson County, Alabama


## Local office

Alabama Ecological Services Field Office
6 (251) 441-5181
目 (251) 441-6222
1208 B Main Street

## Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.
The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species ${ }^{1}$ and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Mammals

Gray Bat Myotis grisescens
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6329

Indiana Bat Myotis sodalis
There is final critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/5949

Northern Long-eared Bat Myotis septentrionalis
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

## Reptiles

NAME
Flattened Musk Turtle Sternotherus depressus
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6961

## Amphibians

NAME
Black Warrior (=sipsey Fork) Waterdog Necturus alabamensis
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5426

## Fishes

NAME
Rush Darter Etheostoma phytophilum
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2779

## Watercress Darter Etheostoma nuchale

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1838

Endangered

Threatened

STATUS
Endangered

Threatened

STATUS
Endangered

STATUS
Endangered

Endangered

Alabama Moccasinshell Medionidus acutissimus
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7287

Finelined Pocketbook Lampsilis altilis
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1393

Orangenacre Mucket Lampsilis perovalis
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1980

Ovate Clubshell Pleurobema perovatum
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5430

Southern Clubshell Pleurobema decisum
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6113

Triangular Kidneyshell Ptychobranchus greenii
There is final critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/4396
Upland Combshell Epioblasma metastriata
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/317

## Flowering Plants

NAME
Georgia Rockcress Arabis georgiana
There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4535

Threatened

Threatened

Threatened

Endangered

Endangered

Endangered

Endangered

STATUS
Threatened

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act ${ }^{1}$ and the Bald and Golden Eagle Protection Act ${ }^{2}$.
Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/ birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/ conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available, Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

Bald Eagle Haliaeetus leucocephalus
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black-billed Cuckoo Coccyzus erythropthalmus
This is a Bird of Conservation Concern ( BCC ) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399

## Bobolink Dolichonyx oryzivorus

This is a Bird of Conservation Concern ( BCC ) throughout its range in the continental USA and Alaska.

## Canada Warbler Cardellina canadensis

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Dendroica cerulea
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974

Golden-winged Warbler Vermivora chrysoptera
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8745

## Kentucky Warbler Oporornis formosus

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
BREEDING SEASON (IF A BREEDING SEASON IS
INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY
BREED IN YOUR PROJECT AREA SOMETIME WITHIN
THE TIMEFRAME SPECIFIED, WHICH IS A VERY
LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE
BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS
ELSEWHERE" INDICATES THAT THE BIRD DOES NOT
LIKELY BREED IN YOUR PROJECT AREA.)

Breeds Sep 1 to Aug 31

Breeds May 15 to Oct 10

Breeds May 20 to Jul 31

Breeds May 20 to Aug 10

Breeds Apr 27 to Jul 20

Breeds May 1 to Jul 20

Breeds Apr 20 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus
Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush Hylocichia mustelina
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow-bellied Sapsucker sphyrapicus varius
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/8792

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report

## Probability of Presence ( ${ }^{(1)}$

Each green bar represents the bird's relative probability of presence in the 10 km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 124 -week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25 .
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05 , and that the probability of presence at week $12(0.25)$ is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25 / 0.25=1$; at week 20 it is $0.05 / 0.25=0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10 , inclusive. This is the probability of presence score.
https://ecos.fws.gov/ipac/location/4ZEGNFEHCVACRBZNTR4NN5PXJM/resources

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

## Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

## Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.
No Data (-)
A week is marked as having no data if there were no survey events for that week.

## Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.


IPaC: Explore Location
BCC Rangewide (CON) (This is a $\quad t+t+\quad+t+t \quad t+t+$
Bird of Conservation Concern
(BCC) throughout its range in the
continental USA and Alaska.)

Bird of Conservation Concern
(BCC) throughout its range in the
continental USA and Alaska.)
Kentucky Warbler $\quad++++\quad++++\quad+1+$
BCC Rangewide (CON) (This is a
Bird of Conservation Concern
$B C C$ ) throughout its range in the
continental USA and Alaska.)
Prairie Warbler
BCC Rangewide (CON) (This is a
Bird of Conservation Concern
$B C C)$ throughout its range in the
continental USA and Alaska.)
Red-headed Woodpecker
BCC Rangewide (CON) (This is a
Bird of Conservation Concern
BCC) throughout its range in the
continental USA and Alaska.)
Rusty Blackbird
BCC Rangewide (CON) (This is a
Bird of Conservation Concern
(BCC) throughout its range in the
continental USA and Alaska.)
Wood Thrush
BCC Rangewide (CON) (This is a
Bird of Conservation Concern
BCC) throughout is range in

Yellow-bellied Sapsucker BCC - BCR (This is a Bird of Conservation Concern ( BCC ) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?



 species that has a particular vulnerability to offshore activities or development.
 area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

## What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

 growing collection of survey, banding, and citizen science datasets.
 are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

## What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

## Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.
https://ecos.fws.gov/ipac/location/4ZEGNFEHCVACRBZNTR4NN5PXJM/resources

## What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur,

## Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

## National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION,

Fish hatcheries

## Wetlands in the National Wetlands Inventory

Impacts to NWI Wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

## Appendix G - EPA Environmental Justice Screening Tool Report

. 2 miles Ring around the Area, ALABAMA, EPA Region 4
Approximate Population: 15,330
Input Area (sq. miles): 5.92
Crestwood/Avondale

| Selected Variables | State <br> Percentile |  | EPA Region <br> Percentile |
| :--- | :---: | :---: | :---: |
| EJ Indexes | 59 | 55 | USA <br> Percentile |
| EJ Index for PM2.5 | 59 | 55 | 59 |
| EJ Index for Ozone | 64 | 59 | 59 |
| EJ Index for NATA* Diesel PM | 59 | 56 | 62 |
| EJ Index for NATA* Air Toxics Cancer Risk | 59 | 55 | 60 |
| EJ Index for NATA* Respiratory Hazard Index | 89 | 82 | 59 |
| EJ Index for Traffic Proximity and Volume | 13 | 12 | 78 |
| EJ Index for Lead Paint Indicator | 68 | 62 | 27 |
| EJ Index for Superfund Proximity | 69 | 62 | 64 |
| EJ Index for RMP Proximity | 29 | 31 | 63 |
| EJ Index for Hazardous Waste Proximity | 91 | 96 | 40 |
| EJ Index for Wastewater Discharge Indicator |  | 92 |  |



[^0]EJSCREEN Report (Version 2019)
. 2 miles Ring around the Area, ALABAMA, EPA Region 4
Approximate Population: 15,330
Input Area (sq. miles): 5.92
Crestwood/Avondale


| Sites reporting to EPA |  |  |
| :--- | :--- | :---: |
| Superfund NPL | 0 |  |
| Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) | 1 |  |

## EJSCREEN Report (Version 2019)

## .2 miles Ring around the Area, ALABAMA, EPA Region 4

Approximate Population: 15,330
Input Area (sq. miles): 5.92
Crestwood/Avondale

| Selected Variables | Value | State <br> Avg. | \%ile in <br> State | EPA Region Avg. | \%ile in EPA Region | USA <br> Avg. | \%ile in USA |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Environmental Indicators |  |  |  |  |  |  |  |
| Particulate Matter (PM 2.5 in $\mathrm{mg} / \mathrm{m}^{3}$ ) | 11.2 | 9.75 | 97 | 8.59 | 99 | 8.3 | 95 |
| Ozone (ppb) | 44.5 | 41.2 | 91 | 40 | 74 | 43 | 58 |
| NATA* Diesel PM ( $\mu \mathrm{g} / \mathrm{m}^{3}$ ) | 0.771 | 0.346 | 95 | 0.417 | 90-95th | 0.479 | 80-90th |
| NATA* Cancer Risk (lifetime risk per million) | 53 | 43 | 98 | 36 | 95-100th | 32 | 95-100th |
| NATA* Respiratory Hazard Index | 0.73 | 0.65 | 76 | 0.52 | 95-100th | 0.44 | 95-100th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 550 | 220 | 90 | 350 | 82 | 750 | 70 |
| Lead Paint Indicator (\% Pre-1960 Housing) | 0.56 | 0.18 | 93 | 0.15 | 94 | 0.28 | 80 |
| Superfund Proximity (site count/km distance) | 0.18 | 0.054 | 96 | 0.083 | 90 | 0.13 | 83 |
| RMP Proximity (facility count/km distance) | 0.51 | 0.41 | 77 | 0.6 | 66 | 0.74 | 60 |
| Hazardous Waste Proximity (facility count/km distance) | 1.8 | 0.39 | 96 | 0.52 | 93 | 4 | 75 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0.051 | 2.5 | 87 | 0.45 | 93 | 14 | 87 |
| Demographic Indicators |  |  |  |  |  |  |  |
| Demographic Index | 41\% | 36\% | 66 | 38\% | 61 | 36\% | 64 |
| Minority Population | 42\% | 34\% | 69 | 38\% | 61 | 39\% | 61 |
| Low Income Population | 39\% | 39\% | 53 | 37\% | 56 | 33\% | 65 |
| Linguistically Isolated Population | 1\% | 1\% | 76 | 3\% | 56 | 4\% | 49 |
| Population With Less Than High School Education | 9\% | 15\% | 34 | 13\% | 40 | 13\% | 48 |
| Population Under 5 years of age | 7\% | 6\% | 60 | 6\% | 60 | 6\% | 58 |
| Population over 64 years of age | 15\% | 16\% | 49 | 16\% | 54 | 15\% | 57 |

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to
 over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

[^1]
## Appendix H $-41^{\text {st }}$ Street South Streetscape Project Plans








## Appendix I - Proposed 4th Avenue South Typical Section

## 4th Ave S PR1

 (Southwest of US-78)

## 5th Ave S PR



Made with Streetmix

Appendix K - Preliminary Parallel Multimodal Routes along the Study Corridor


## Appendix L - Opinions of Probable Cost

Improvement Recommendations Opinion of Probable Cost


Notes:

1. Unclassified excavation will involve median removal and other island removal.
2. In conjunction with crosswalk improvements, ensure pedestrian phase timings and countdown displays are programmed according to standards and functioning correctly.
3. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
4. Right-of-Way and Utility Relocation were not included in this estimate since it appears the improvements can be performed within the existing ROW and will not require utility relocation.
5. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

Improvement Recommendations Opinion of Probable Cost


Notes:

1. Unclassified excavation will involve median removal and other island removal.
2. In conjunction with crosswalk improvements, ensure pedestrian phase timings and countdown displays are programmed correctly.
3. In conjuction with restriping the existing dual-right turn lanes to one right turn lane, remove the outer signal head for the eastbound right turn phase at the 4th Avenue South approach to 3rd Avenue South and 44th Street South intersection.
4. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
5. A cost for utility relocation is included for the relocation of poles located in the in-place island on 4th Avenue South
6. Right-of-Way costs are not included in this estimate since it appears the improvements can be performed within the existing ROW
7. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

Improvement Recommendations Opinion of Probable Cost

| Short Term Improvement: 56th Street Road Diet - Restriping Only (\#15) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Traffic Stripe Removal | MILE | 0.5 | \$1,600 | \$800 |
| Traffic Stripe | MILE | 0.5 | \$3,200 | \$1,600 |
| Traffic Markings \& Legends | SF | 250 | \$4 | \$1,000 |
| Milling ${ }^{1}$ | SY | 35 | \$5 | \$175 |
| Unclassified Excavation ${ }^{1}$ | CY | 50 | \$15 | \$750 |
| Borrow Excavation | CY | 50 | \$15 | \$750 |
| Curb \& Gutter Removal | LF | 20 | \$20 | \$400 |
| Curb \& Gutter | LF | 60 | \$20 | \$1,200 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Subtotal | \$34,675 |
| Contigency ${ }^{2}$ |  |  | 25\% | \$9,000 |
| Construction Costs |  |  |  | \$44,000 |
| Engineering Controls |  |  | 1.3\% | \$1,000 |
| Mobilization |  |  | 9.7\% | \$5,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$8,000 |
| Construction Subtotal |  |  |  | \$58,000 |
| Preliminary Engineering |  |  | 20\% | \$12,000 |
| Utility Relocation and Right-of-Way Cost $^{3}$ |  |  |  | NOT INCLUDED |
|  |  |  | Subtotal | \$70,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$10,000 |
| Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 80,000$ |  |  |  |  |

Notes:

1. Milling and unclassified excavation is required to close one driveway at the Crestwood Shopping Center. Additional costs may be incurred if an agreement is reached between the City and the property owner to restripe or reconfigure the adjacent parking lot in any way.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation are not expected for improvements and therefore were not included in this estimate.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

Improvement Recommendations Opinion of Probable Cost

| Short Term Improvement: Crestwood Blvd from 53rd St S to Crest Green Rd (\#14 \& \#17) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Clearing \& Grubbing ${ }^{1}$ | LS | 1 | \$12,000 | \$12,000 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Subto | \$40,000 |
| Contigency ${ }^{2}$ |  |  | 25\% | \$10,000 |
| Construction Costs |  |  |  | \$50,000 |
| Engineering Controls |  |  | 1.3\% | \$1,000 |
| Mobilization |  |  | 9.7\% | \$5,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$9,000 |
| Construction Subtotal |  |  |  | \$65,000 |
| Preliminary Engineering |  |  | 20\% | \$13,000 |
| Utility Relocation and Right-of-Way Cost ${ }^{3}$ |  |  |  | NOT INCLUDED |
|  |  |  | Subto | \$78,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$10,631 |
| Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 90,000$ |  |  |  |  |

Notes:

1. Clearing and Grubbing includes removal of concrete bollards in the median and five trees in the median between 58th Street South and Crest Green Road.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation are not expected for improvements and therefore were not included in this estimate.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

Improvement Recommendations Opinion of Probable Cost

| Short Term Improvement: Crestwood Festival Intersection Pedestrian Improvements (\#18) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Clearing \& Grubbing | LS | 1 | \$4,000 | \$4,000 |
| Unclassified Excavation | CY | 100 | \$15 | \$1,500 |
| Borrow Excavation | CY | 100 | \$15 | \$1,500 |
| Curb and Gutter | LF | 100 | \$20 | \$2,000 |
| Storm Pipe | LF | 100 | \$80 | \$8,000 |
| Storm Inlet | EACH | 1 | \$2,500 | \$2,500 |
| Concrete Sidewalk (4") | SY | 70 | \$70 | \$4,900 |
| Structure Excavation | CY | 20 | \$15 | \$300 |
| Foundation Backfill | CY | 20 | \$30 | \$600 |
| Topsoil | CY | 100 | \$15 | \$1,500 |
| Seeding and Mulching | AC | 1 | \$2,400 | \$2,400 |
| Solid Sod | SY | 100 | \$8 | \$800 |
| Traffic Stripe | MILE | 0.25 | \$3,200 | \$800 |
| Traffic Markings, \& Legends | SF | 2000 | \$4 | \$8,000 |
| Roadway Signs | SF | 10 | \$30 | \$300 |
| Sign Posts | LF | 80 | \$15 | \$1,200 |
| Signal Timing Adjustment ${ }^{1}$ | LS | 1 | \$5,000 | \$5,000 |
| Pedestrian Signal Head Pedestals w/ Countdown Display | LS | 2 | \$21,000 | \$42,000 |
| Pedestrian Signal Heads w/ Countdown Display | LS | 2 | \$15,000 | \$30,000 |
| Erosion Control | LS | 1 | \$15,000 | \$15,000 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Sub | \$160,300 |
| Contigency ${ }^{2}$ |  |  | 25\% | \$41,000 |
|  |  |  | truction C | \$202,000 |
| Engineering Controls |  |  | 1.3\% | \$3,000 |
| Mobilization |  |  | 9.7\% | \$20,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$34,000 |
|  |  | Con | ction Subt | \$259,000 |
| Preliminary Engineering |  |  | 20\% | \$52,000 |
| Utility Relocation and Right-of-Way Cost ${ }^{3}$ |  |  |  | NOT INCLUDED |
|  |  |  | Sub | \$311,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$43,000 |

Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 360,000$

Notes:

1. Add pedestrian phase within existing signal timings. This is less straightforward adjustment that other intersections in the study and may require a signal retiming project for the intersection.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation are not expected for improvements and therefore were not included in this estimate.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

Improvement Recommendations Opinion of Probable Cost


Notes:

1. Sidewalk connections on both sides of Crestwood Boulevard may require an agreement or right-of-way purchase.
2. Implement pedestrian signal timings per MUTCD standards, and ensure they are functioning correctly. This may require more green time for the side street to accommodate pedestrian timings.
3. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
4. Utility Relocation is not expected for the installation of improvments and is therefore not included
5. Right-of-Way acquistion may be required to install sidewalk connections to commercial properties.
6. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

Improvement Recommendations Opinion of Probable Cost


Notes:

1. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
2. Right-of-Way and Utility Relocation are not expected for improvements and therefore were not included in this estimate.
3. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

Improvement Recommendations Opinion of Probable Cost

| Long Term Improvement: 3rd Ave S PHB between 42nd St S \& 43rd St S (\#1) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Pedestrian Hybrid Beacon Install \& Equipment ${ }^{1}$ | EA | 1 | \$60,000 | \$60,000 |
| Signal Timing Adjustments ${ }^{2}$ | LS | 1 | \$5,000 | \$5,000 |
| Luminaire ${ }^{3}$ | EA | 2 | \$1,000 | \$2,000 |
| Traffic Stripe Removal | MILE | 1 | \$1,600 | \$1,600 |
| Traffic Stripe | MILE | 1 | \$3,200 | \$3,200 |
| Traffic Markings \& Legends | SF | 500 | \$4 | \$2,000 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Subtotal | \$101,800 |
| Contigency ${ }^{4}$ |  |  | 25\% | \$26,000 |
| Construction Costs |  |  |  | \$128,000 |
| Engineering Controls |  |  | 1.3\% | \$2,000 |
| Mobilization |  |  | 9.7\% | \$13,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$22,000 |
| Construction Subtotal |  |  |  | \$165,000 |
| Preliminary Engineering $20 \%$ <br> Utility Relocation and Right-of-Way Cost $^{5}$  |  |  |  | \$33,000 |
|  |  |  |  | NOT INCLUDED |
|  |  |  | Subtotal | \$198,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$27,000 |
| Total Estimated Project Cost (2020) ${ }^{\mathbf{6}} \quad \mathbf{\$ 2 3 0 , 0 0 0}$ |  |  |  |  |

Notes:

1. Pedestrian Hybrid Beacon cost is based on an estimated average cost of installation per FHWA.
2. Coordinate Pedestrian Hybrid Beacon signal timings with adjacent signalized intersections.
3. Install additional luminaires at the crosswalk to improve intersection visibility during nighttime conditions.
4. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
5. Right-of-Way and Utility Relocation are not expected for improvements and therefore were not included in this estimate.
6. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

| Improvement Recommendations Opinion of Probable Cost |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Long Term Improvement: 4th Ave S at 5th Ave S (\#4) |  |  |  |  |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Traffic Markings, \& Legends | SF | 1000 | \$4 | \$4,000 |
| Traffic Stripe | MILE | 1 | \$3,200 | \$3,200 |
| Pavement Removal | SY | 215 | \$25 | \$5,375 |
| Unclassified Excavation | CY | 325 | \$15 | \$4,875 |
| Borrow Excavation | CY | 325 | \$15 | \$4,875 |
| Curb \& Gutter Removal | LF | 300 | \$20 | \$6,000 |
| Curb \& Gutter | LF | 500 | \$20 | \$10,000 |
| Storm Pipe | LF | 100 | \$80 | \$8,000 |
| Storm Inlet | EACH | 2 | \$2,500 | \$5,000 |
| Structure Excavation | CY | 100 | \$15 | \$1,500 |
| Foundation Backfill | CY | 30 | \$30 | \$900 |
| Concrete Sidewalk (4") | SY | 40 | \$70 | \$2,800 |
| Topsoil | CY | 100 | \$15 | \$1,500 |
| Seeding and Mulching | AC | 1 | \$2,400 | \$2,400 |
| Solid Sod | SY | 450 | \$8 | \$3,600 |
| Signal Timing Adjustment ${ }^{1}$ | LS | 1 | \$10,000 | \$10,000 |
| Signal Phase and Signal Head Installation ${ }^{2}$ | LS | 1 | \$20,000 | \$20,000 |
| Roadway Signs | EA | 20 | \$30 | \$600 |
| Sign Post | LF | 160 | \$15 | \$2,400 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
| Erosion Control | LS | 1 | \$12,000 | \$12,000 |
|  |  |  | Subt | \$137,025 |
| Contigency ${ }^{3}$ |  |  | 25\% | \$35,000 |
| Construction Costs |  |  |  | \$173,000 |
| Engineering Controls |  |  | 1.3\% | \$3,000 |
| Mobilization |  |  | 9.7\% | \$17,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$29,000 |
| Construction Subtotal |  |  |  | \$222,000 |
| Preliminary Engineering |  |  | 20\% | \$45,000 |
| Utility Relocation ${ }^{4}$ |  |  |  | \$15,000 |
| Right-of-Way Cost ${ }^{5}$ |  |  |  | \$10,000 |
|  |  |  | Subt | \$292,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$40,000 |
|  | tal Es | mated Pro | Cost (202 | \$340,000 |

Notes:

1. Adjust signal timings to utilize an overlap phase with the westbound left (US-78 to 5th Avenue South) and new northeastbound right turn phase (5th Avenue South to US-78).
2. Install new signal head for the right turn overlap phase.
3. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
4. A cost for utility relocation is included for the relocation of poles located on the corner of 5th Avenue South.
5. The installation of sidewalk between 5th Avenue South and 45th Street South will require right-of-way acquistion.
6. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

Improvement Recommendations Opinion of Probable Cost Long Term Improvement: 5th Ave S at Crestwood Blvd (\#5)

| Long Term Improvement: 5th Ave S at Crestwood Blvd (\#5) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Clearing \& Grubbing | LS | 1 | \$12,000 | \$12,000 |
| Unclassified Excavation | CY | 2000 | \$25 | \$50,000 |
| Borrow Excavation | CY | 2000 | \$15 | \$30,000 |
| Pavement Removal | SY | 1100 | \$25 | \$27,500 |
| Curb \& Gutter Removal | LF | 2000 | \$20 | \$40,000 |
| Storm Pipe Remove | LF | 50 | \$15 | \$750 |
| Storm Inlet Remove | EACH | 4 | \$500 | \$2,000 |
| Wearing Surface (1.5") | TON | 150 | \$90 | \$13,500 |
| Binder (2-2" layers) | TON | 75 | \$100 | \$7,500 |
| Aggregate Base (6") | SY | 610 | \$25 | \$15,250 |
| Tack Coat | GALLON | 50 | \$2 | \$100 |
| Curb \& Gutter | LF | 500 | \$20 | \$10,000 |
| Storm Pipe | LF | 200 | \$50 | \$10,000 |
| Storm Inlets | EACH | 4 | \$2,500 | \$10,000 |
| Concrete Apron and Islands | SY | 100 | \$250 | \$25,000 |
| Structure Excavation | CY | 190 | \$15 | \$2,850 |
| Foundation Backfill | CY | 60 | \$30 | \$1,800 |
| Topsoil | CY | 1000 | \$15 | \$15,000 |
| Seeding and Mulching | AC | 1 | \$2,400 | \$2,400 |
| Solid Sod | SY | 3000 | \$8 | \$24,000 |
| Traffic Stripe | MILE | 2 | \$3,200 | \$6,400 |
| Traffic Markings, \& Legends | SF | 1500 | \$4 | \$6,000 |
| Roadway Signs | SF | 20 | \$30 | \$600 |
| Sign Posts | LF | 160 | \$15 | \$2,400 |
| Erosion Control | LS | 1 | \$40,000 | \$40,000 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Subt | \$383,050 |
| Contigency ${ }^{2}$ |  |  | 25\% | \$96,000 |
|  |  |  | truction Co | \$480,000 |
| Engineering Controls |  |  | 1.3\% | \$7,000 |
| Mobilization |  |  | 9.7\% | \$47,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$81,000 |
|  |  | Con | ction Subt | \$615,000 |
| Preliminary Engineering |  |  | 20\% | \$123,000 |
| Utility Relocation and Right-of-Way Cost $^{3}$ |  |  |  | NOT INCLUDED |
|  |  |  | Subt | \$738,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$101,000 |

Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 840,000$
Notes:

1. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
2. Right-of-Way and Utility Relocation were not included in this estimate since it appears the improvements can be performed within the existing ROW and will not require utility relocation.
3. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

| Improvement Recommendations Opinion of Probable Cost |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Long Term Improvement: Crestwood PHB at 54th Street South with Sidewalks (\#8) |  |  |  |  |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Clearing \& Grubbing (\$4000/Acre) | LS | 1 | \$4,000 | \$4,000 |
| Unclassified Excavation ${ }^{1}$ | CY | 1000 | \$25 | \$25,000 |
| Borrow Excavation | CY | 1500 | \$15 | \$22,500 |
| Storm Pipe Remove | LF | 75 | \$15 | \$1,125 |
| Storm Pipe | LF | 325 | \$50 | \$16,250 |
| Structure Excavation | CY | 300 | \$15 | \$4,500 |
| Foundation Backfill | CY | 100 | \$30 | \$3,000 |
| Timber-Framed Pedestrian Bridge | LS | 1 | \$20,000 | \$20,000 |
| Concrete Sidewalk (4") | SY | 500 | \$70 | \$35,000 |
| Topsoil | CY | 175 | \$15 | \$2,625 |
| Seeding and Mulching | AC | 1 | \$2,400 | \$2,400 |
| Solid Sod | SY | 500 | \$8 | \$4,000 |
| Pedestrian Hybrid Beacon Install \& Equipment | EA | 1 | \$60,000 | \$60,000 |
| Signal Timing Adjustments ${ }^{1}$ | LS | 1 | \$5,000 | \$5,000 |
| Luminaires | EA | 2 | \$1,000 | \$2,000 |
| Traffic Stripe | MILE | 1 | \$3,200 | \$3,200 |
| Traffic Markings \& Legends | SF | 500 | \$4 | \$2,000 |
| Mailbox Reset | EA | 3 | \$350 | \$1,050 |
| Erosion Control | LS | 1 | \$40,000 | \$40,000 |
| Traffic Control | LS | 1 | \$28,000 | \$28,000 |
|  |  |  | Subt | \$281,650 |
| Contigency ${ }^{2}$ |  |  | 35\% | \$99,000 |
| Construction Costs |  |  |  | \$381,000 |
| Engineering Controls |  |  | 1.3\% | \$5,000 |
| Mobilization |  |  | 9.7\% | \$37,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$64,000 |
| Construction Subtotal |  |  |  | \$487,000 |
| Preliminary Engineering |  |  | 20\% | \$98,000 |
| Utility Relocation and Right-of-Way Cost $^{3}$ |  |  |  | NOT INCLUDED |
|  |  |  | Subt | \$585,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$80,000 |
| Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 670,000$ |  |  |  |  |

Notes:
1.Coordinate Pedestrian Hybrid Beacon with adjacent signalized intersection at 56th Street South.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation were not included in this estimate since it appears the improvements can be performed within the existing ROW and will not require utility relocation.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

Improvement Recommendations Opinion of Probable Cost

| Long Term Improvement: 56th Street Sidewalks (\#9) and Mini Roundabout (\#10) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Item Description | Unit | Quantity | Unit Price | Amount |
| Clearing \& Grubbing | LS | 1 | \$4,000 | \$4,000 |
| Unclassified Excavation | CY | 600 | \$25 | \$15,000 |
| Pavement Removal | SY | 800 | \$25 | \$20,000 |
| Borrow Excavation | CY | 600 | \$15 | \$9,000 |
| Remove Curb \& Gutter | LF | 500 | \$20 | \$10,000 |
| Remove Existing Signs | LS | 1 | \$500 | \$500 |
| Structure Excavation | CY | 50 | \$15 | \$750 |
| Foundation Backfill | CY | 20 | \$30 | \$600 |
| Storm Pipe ${ }^{1}$ | LF | 50 | \$50 | \$2,500 |
| Storm Inlets | EACH | 2 | \$2,500 | \$5,000 |
| Curb \& Gutter | LF | 500 | \$20 | \$10,000 |
| Milling | SY | 5000 | \$5 | \$25,000 |
| Wearing Surface (1.5") | TON | 415 | \$90 | \$37,350 |
| Binder (2-2" layers) | TON | 525 | \$100 | \$52,500 |
| Tack Coat | GALLON | 100 | \$2 | \$200 |
| Concrete Apron and Islands | SY | 200 | \$250 | \$50,000 |
| Concrete Sidewalk (4") | SY | 550 | \$70 | \$38,500 |
| Topsoil | CY | 250 | \$15 | \$3,750 |
| Solid Sod | SY | 350 | \$8 | \$2,800 |
| Traffic Stripe | MILE | 1 | \$3,200 | \$3,200 |
| Traffic Markings, \& Legends | SF | 5000 | \$4 | \$20,000 |
| Traffic Signs | EACH | 20 | \$30 | \$600 |
| Sign Posts | LF | 200 | \$15 | \$3,000 |
| Erosion Control | LS | 1 | \$36,000 | \$36,000 |
| Traffic Control | LS | 1 | \$40,000 | \$40,000 |
|  |  |  | Subtotal | \$390,250 |
| Contigency ${ }^{2}$ |  |  | 25\% | \$98,000 |
|  |  |  | truction Costs | \$489,000 |
| Engineering Controls |  |  | 1.3\% | \$7,000 |
| Mobilization |  |  | 9.7\% | \$48,000 |
| Construction Engineering and Inspection |  |  | 15\% | \$82,000 |
|  |  | Con | ction Subtotal | \$626,000 |
| Preliminary Engineering |  |  | 20\% | \$126,000 |
| Utility Relocation ${ }^{3}$ |  |  |  | \$170,000 |
| Right-of-Way Cost ${ }^{4}$ |  |  |  | \$70,000 |
|  |  |  | Subtotal | \$992,000 |
| ALDOT Indirect Costs |  |  | 13.63\% | \$136,000 |
|  | Total Esti | mated Pro | Cost (2020) ${ }^{5}$ | \$1,130,000 |

Notes:

1. Assume extension of existing pipe to proposed inlets along new curb and gutter location.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation were not included in this estimate; however, some improvements will require right-of-way acquisition and/or utility relocations.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

## Improvement Recommendations Opinion of Probable Cost



Notes:

1. A cost per linear foot of sidewalk based on industry trends was uitlized to estimate base construction cost.
2. Contingency cost includes miscellaneous and/or unknown items that can not be quantified at the time this study was conducted.
3. Right-of-Way and Utility Relocation were not included in this estimate; however, some improvements will require right-of-way acquisition and/or utility relocations.
4. The total estimated project cost was prepared for the 2020 planning year. This number should be increased to account for rising costs due to inflation should the improvements not be implemented in 2020.

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

## Estimate Form

Project \#:
Roadway:
County:
Limits:

Sain \#180201
Crestwood Blvd
Jefferson
Typical Section 1-41st Street to 5th Ave.

## Letting:

Estimate:
\% Design Complete:
The below is a cost estimate for Section 1 of the Visionary Improvements from the Cretwood APPLE Study.

Date:
5/8/20

| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 201B-002 | Clearing \& Grubbing | Acre | \$ | 4,000.00 | 9.0 | \$ | 36,000.00 |
| 210A-000 | Unclassified Excavation | Cy | \$ | 10.00 | 3400 | \$ | 34,000.00 |
| 210D-000 | Borrow Excavation | Cy | \$ | 15.00 | 500 | \$ | 7,500.00 |
| 214A-000 | Structure Excavation | Cy | \$ | 10.00 | 9000 | \$ | 90,000.00 |
| 214B-001 | Foundation Backfill Commercial | Cy | \$ | 23.85 | 2300 | \$ | 54,855.00 |
| 301A-012 | Crushed Aggregate Base, Typ B, 6" Compacted Thickness | Sy | \$ | 12.00 | 13500 | \$ | 162,000.00 |
| 305B-071 | Coarse Aggregate, Section 801, For Misc Use | Ton | \$ | 90.00 | 100 | \$ | 9,000.00 |
| 405A-000 | Tack Coat | Gal | \$ | 4.45 | 2100 | \$ | 9,345.00 |
| 407B-000 | Joint Sealant for Hot Mix Asph Pav | Mile | \$ | 205.00 | 2 | \$ | 410.00 |
| 408A-057 | Planing Existing Pavement 1-2" | Sy | \$ | 5.50 | 20500 | \$ | 112,750.00 |
| 424A-360 | Superpave Wearing Surf, 1/2", $165 \mathrm{lb} / \mathrm{sy}$ | Ton | \$ | 90.00 | 1700 | \$ | 153,000.00 |
| 530A-001 | 18" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 50.00 | 4600 | \$ | 230,000.00 |
| 530A-003 | 30" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 65.00 | 400 | \$ | 26,000.00 |
| 610C-001 | Loose Riprap, Class 2 | Ton | \$ | 35.00 | 650 | \$ | 22,750.00 |
| 610D-003 | Filter Blanket Geotextile | Sy | \$ | 10.00 | 4500 | \$ | 45,000.00 |
| 618A-000 | Concrete Sidewalk, 4" Thick | SY | \$ | 120.00 | 6200 | \$ | 744,000.00 |
| 618B-002 | Concrete Driveway, 6" Thick | SY | \$ | 150.00 | 550 | \$ | 82,500.00 |
| 619A-004 | 30" Pipe End Treatment, Cl 1 | Ea | \$ | 1,600.00 | 8 | \$ | 12,800.00 |
| 621C-015 | Inlets, Type S1 or S3 (1 wing) | Ea | \$ | 2,500.00 | 20 | \$ | 50,000.00 |
| 623B-000 | Type N Curb | Lf | \$ | 20.00 | 18400 | \$ | 368,000.00 |
| 623C-000 | Combination curb and gutter | Lf | \$ | 25.00 | 9200 | \$ | 230,000.00 |
| 650A-000 | Topsoil | Cy | \$ | 20.00 | 1700 | \$ | 34,000.00 |
| 652A-100 | Seeding | Acre | \$ | 765.00 | 3 | \$ | 2,295.00 |
| 654A-000 | Solid Sodding | Sy | \$ | 15.00 | 6000 | \$ | 90,000.00 |
| 656A-010 | Mulching | Acre | \$ | 800.00 | 3 | \$ | 2,400.00 |
| 665A-000 | Temporary Seeding | Acre | \$ | 600.00 | 6 | \$ | 3,600.00 |
| 665B-001 | Temporary Mulching | Acre | \$ | 800.00 | 6 | \$ | 4,800.00 |
| 665J-002 | Silt Fence | Lf | \$ | 3.25 | 9200 | \$ | 29,900.00 |
| 6650-001 | Silt Fence Removal | Lf | \$ | 1.00 | 9200 | \$ | 9,200.00 |
| 665P-005 | Inlet Protection, Stage 3 or 4 | Ea | \$ | 500.00 | 20 | \$ | 10,000.00 |
| 665Q-002 | Wattle | Lf | \$ | 6.00 | 1000 | \$ | 6,000.00 |
| 701A-227 | Solid White, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701A-230 | Solid Yellow, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701C-003 | Solid Temporary Traffic Stripe | Mile | \$ | 700.00 | 8 | \$ | 5,600.00 |
| 703A-002 | Traffic Control Markings, Class 2, Ty A | Sf | \$ | 5.00 | 1500 | \$ | 7,500.00 |


| Item \# | Description |  |  |  |
| :---: | :--- | ---: | ---: | ---: | :---: |

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. CONSTRUCTION ENGINEERING \& INSPECTION (CE\&I) IS INCLUDED, HOWEVER ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

## Notes:

1. FOR THE PURPOSE OF THIS ESTIMATED PROJECT COST, THERE WAS ESTIMATED TO BE FULL UTILIZATION OF EXISTING PAVEMENT THOUGH THE CORRIDOR. THE EXISTING PAVEMENT WAS ESTIMATED TO BE MILLED AND OVERLAYED. DUE TO THE LIMITATIONS AND RECONFIGURATION OUTSIDE THE TRAVEL LANES, NEW CURB AND GUTTER AND DRAINAGE FEATURES WERE ESTIMATED THROUGHOUT THE CORRIDOR.
2. CONTINGENCY COST INCLUDES MISCELLANEOUS AND/OR UNKNOWN ITEMS THAT CAN NOT BE QUANTIFIED AT THE TIME THIS study was conducted.
3. DUE TO LIMITED INFORMATION, RIGHT-OF-WAY ACQUISITION AND UTILITY RELOCATION WERE NOT INCLUDED IN THIS ESTIMATE; HOWEVER, SOME IMPROVEMENTS WILL REQUIRE RIGHT-OF-WAY ACQUISITION AND/OR UTILITY RELOCATIONS.
4. THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2020 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2019.

## Estimate Form

Project \#:
Roadway:
County: Limits:

Sain \#180201
Crestwood Blvd
Jefferson
Typical Section 3 - 5th Avenu to 53rd Street

Letting:
Estimate:
\% Design Complete:
The below is a cost estimate for Section 2 of the Visionary Improvements from the Cretwood APPLE Study.

Date:
5/8/20

| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 201B-002 | Clearing \& Grubbing | Acre | \$ | 4,000.00 | 5.0 | \$ | 20,000.00 |
| 210A-000 | Unclassified Excavation | Cy | \$ | 10.00 | 14000 | \$ | 140,000.00 |
| 210D-000 | Borrow Excavation | Cy | \$ | 15.00 | 11500 | \$ | 172,500.00 |
| 214A-000 | Structure Excavation | Cy | \$ | 10.00 | 5000 | \$ | 50,000.00 |
| 214B-001 | Foundation Backfill Commercial | Cy | \$ | 23.85 | 1300 | \$ | 31,005.00 |
| 301A-012 | Crushed Aggregate Base, Typ B, 6" Compacted Thickness | Sy | \$ | 12.00 | 4500 | \$ | 54,000.00 |
| 305B-071 | Coarse Aggregate, Section 801, For Misc Use | Ton | \$ | 90.00 | 65 | \$ | 5,850.00 |
| 405A-000 | Tack Coat | Gal | \$ | 4.45 | 1700 | \$ | 7,565.00 |
| 407B-000 | Joint Sealant for Hot Mix Asph Pav | Mile | \$ | 205.00 | 2 | \$ | 410.00 |
| 408A-057 | Planing Existing Pavement 1-2" | Sy | \$ | 5.50 | 17000 | \$ | 93,500.00 |
| 424A-360 | Superpave Wearing Surf, 1/2", $165 \mathrm{lb} / \mathrm{sy}$ | Ton | \$ | 90.00 | 1400 | \$ | 126,000.00 |
| 529A-012 | Retaining Wall (MSE) | SF | \$ | 90.00 | 6250 | \$ | 562,500.00 |
| 530A-001 | 18" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 50.00 | 2500 | \$ | 125,000.00 |
| 530A-003 | 30" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 65.00 | 300 | \$ | 19,500.00 |
| 610C-001 | Loose Riprap, Class 2 | Ton | \$ | 35.00 | 400 | \$ | 14,000.00 |
| 610D-003 | Filter Blanket Geotextile | Sy | \$ | 10.00 | 3500 | \$ | 35,000.00 |
| 618A-000 | Concrete Sidewalk, 4" Thick | SY | \$ | 120.00 | 2800 | \$ | 336,000.00 |
| 619A-004 | 30" Pipe End Treatment, CI 1 | Ea | \$ | 1,600.00 | 8 | \$ | 12,800.00 |
| 621C-015 | Inlets, Type S1 or S3 (1 wing) | Ea | \$ | 2,500.00 | 10 | \$ | 25,000.00 |
| 623C-000 | Combination curb and gutter | Lf | \$ | 15.00 | 5000 | \$ | 75,000.00 |
| 650A-000 | Topsoil | Су | \$ | 20.00 | 470 | \$ | 9,400.00 |
| 652A-100 | Seeding | Acre | \$ | 765.00 | 1 | \$ | 765.00 |
| 654A-000 | Solid Sodding | Sy | \$ | 15.00 | 1200 | \$ | 18,000.00 |
| 656A-010 | Mulching | Acre | \$ | 800.00 | 2 | \$ | 1,600.00 |
| 665A-000 | Temporary Seeding | Acre | \$ | 600.00 | 4 | \$ | 2,400.00 |
| 665B-001 | Temporary Mulching | Acre | \$ | 800.00 | 4 | \$ | 3,200.00 |
| 665J-002 | Silt Fence | Lf | \$ | 3.25 | 5000 | \$ | 16,250.00 |
| 6650-001 | Silt Fence Removal | Lf | \$ | 1.00 | 5000 | \$ | 5,000.00 |
| 665Q-002 | Wattle | Lf | \$ | 6.00 | 500 | \$ | 3,000.00 |
| 701A-227 | Solid White, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701A-230 | Solid Yellow, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701C-003 | Solid Temporary Traffic Stripe | Mile | \$ | 700.00 | 8 | \$ | 5,600.00 |
| 703A-002 | Traffic Control Markings, Class 2, Ty A | Sf | \$ | 5.00 | 1500 | \$ | 7,500.00 |
| 703B-002 | Traffic Control Legends, Class 2, Ty A | Sf | \$ | 5.00 | 500 | \$ | 2,500.00 |
| 703D-002 | Temporary Traffic Control Markings, Paint | Sf | \$ | 1.00 | 1500 | \$ | 1,500.00 |



NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. CONSTRUCTION ENGINEERING \& INSPECTION (CE\&I) IS INCLUDED, HOWEVER ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

## Notes:

> 1. FOR THE PURPOSE OF THIS ESTIMATED PROJECT COST, THERE WAS ESTIMATED TO BE FULL UTILIZATION OF EXISTING PAVEMENT THOUGH THE CORRIDOR. THE EXISTING PAVEMENT WAS ESTIMATED TO BE MILLED AND OVERLAYED. DUE TO THE LIMITATIONS AND RECONFIGURATION OUTSIDE THE TRAVEL LANES, NEW CURB AND GUTTER AND DRAINAGE FEATURES WERE ESTIMATED THROUGHOUT THE CORRIDOR. A RETAINING WALL EAS ESTIMATED TO BE NEEDED FOR $25 \%$ OF THE CORRIDOR.
2. CONTINGENCY COST INCLUDES MISCELLANEOUS AND/OR UNKNOWN ITEMS THAT CAN NOT BE QUANTIFIED AT THE TIME THIS STUDY WAS CONDUCTED.
3. DUE TO LIMITED INFORMATION, RIGHT-OF-WAY ACQUISITION AND UTILITY RELOCATION WERE NOT INCLUDED IN THIS ESTIMATE; HOWEVER, SOME IMPROVEMENTS WILL REQUIRE RIGHT-OF-WAY ACQUISITION AND/OR UTILITY RELOCATIONS.
4. THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2019 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2019.

## Estimate Form

Project \#:
Roadway:
County: Limits:

Sain \#180201
Crestwood Blvd
Jefferson
Typical Section 2-53rd Street to Crest Green

## Letting:

Estimate:
\% Design Complete:

Unknown
See below 1\%

The below is a cost estimate for Section 3 of the Visionary
Improvements from the Cretwood APPLE Study.

Date:
5/8/20

| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 201B-002 | Clearing \& Grubbing | Acre | \$ | 4,000.00 | 8.0 | \$ | 32,000.00 |
| 209A-000 | Mailbox Reset | Ea | \$ | 350.00 | 25 | \$ | 8,750.00 |
| 210A-000 | Unclassified Excavation | Cy | \$ | 10.00 | 1900 | \$ | 19,000.00 |
| 210D-000 | Borrow Excavation | Cy | \$ | 15.00 | 1100 | \$ | 16,500.00 |
| 214A-000 | Structure Excavation | Cy | \$ | 10.00 | 8200 | \$ | 82,000.00 |
| 214B-001 | Foundation Backfill Commercial | Cy | \$ | 23.85 | 2100 | \$ | 50,085.00 |
| 301A-012 | Crushed Aggregate Base, Typ B, 6" Compacted Thickness | Sy | \$ | 12.00 | 7500 | \$ | 90,000.00 |
| 305B-071 | Coarse Aggregate, Section 801, For Misc Use | Ton | \$ | 90.00 | 100 | \$ | 9,000.00 |
| 405A-000 | Tack Coat | Gal | \$ | 4.45 | 2800 | \$ | 12,460.00 |
| 407B-000 | Joint Sealant for Hot Mix Asph Pav | Mile | \$ | 205.00 | 4 | \$ | 820.00 |
| 408A-057 | Planing Existing Pavement 1-2" | Sy | \$ | 5.50 | 28000 | \$ | 154,000.00 |
| 424A-360 | Superpave Wearing Surf, 1/2", $165 \mathrm{lb} /$ sy | Ton | \$ | 90.00 | 2310 | \$ | 207,900.00 |
| 530A-001 | 18" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 50.00 | 4200 | \$ | 210,000.00 |
| 530A-003 | 30" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 65.00 | 400 | \$ | 26,000.00 |
| 610C-001 | Loose Riprap, Class 2 | Ton | \$ | 35.00 | 650 | \$ | 22,750.00 |
| 610D-003 | Filter Blanket Geotextile | Sy | \$ | 10.00 | 5500 | \$ | 55,000.00 |
| 618A-000 | Concrete Sidewalk, 4" Thick | SY | \$ | 120.00 | 4700 | \$ | 564,000.00 |
| 618B-002 | Concrete Driveway, 6" Thick | SY | \$ | 150.00 | 890 | \$ | 133,500.00 |
| 619A-004 | 30" Pipe End Treatment, CI 1 | Ea | \$ | 1,600.00 | 8 | \$ | 12,800.00 |
| 621C-015 | Inlets, Type S1 or S3 (1 wing) | Ea | \$ | 2,500.00 | 18 | \$ | 45,000.00 |
| 623C-000 | Combination curb and gutter | Lf | \$ | 15.00 | 8400 | \$ | 126,000.00 |
| 650A-000 | Topsoil | Cy | \$ | 20.00 | 780 | \$ | 15,600.00 |
| 652A-100 | Seeding | Acre | \$ | 765.00 | 1 | \$ | 765.00 |
| 654A-000 | Solid Sodding | Sy | \$ | 15.00 | 2000 | \$ | 30,000.00 |
| 656A-010 | Mulching | Acre | \$ | 800.00 | 2 | \$ | 1,600.00 |
| 665A-000 | Temporary Seeding | Acre | \$ | 600.00 | 4 | \$ | 2,400.00 |
| 665B-001 | Temporary Mulching | Acre | \$ | 800.00 | 4 | \$ | 3,200.00 |
| 665J-002 | Silt Fence | Lf | \$ | 3.25 | 8400 | \$ | 27,300.00 |
| 6650-001 | Silt Fence Removal | Lf | \$ | 1.00 | 8400 | \$ | 8,400.00 |
| 665Q-002 | Wattle | Lf | \$ | 6.00 | 840 | \$ | 5,040.00 |
| 701A-227 | Solid White, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 4 | \$ | 12,800.00 |
| 701A-230 | Solid Yellow, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701C-003 | Solid Temporary Traffic Stripe | Mile | \$ | 700.00 | 12 | \$ | 8,400.00 |
| 703A-002 | Traffic Control Markings, Class 2, Ty A | Sf | \$ | 5.00 | 1500 | \$ | 7,500.00 |
| 703B-002 | Traffic Control Legends, Class 2, Ty A | Sf | \$ | 5.00 | 500 | \$ | 2,500.00 |


| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 703D-002 | Temporary Traffic Control Markings, Paint | Sf | \$ | 1.00 | 1500 | \$ | 1,500.00 |
| 705A-031 | Pavement Markers, Class A-H, Ty 1A | Ea | \$ | 5.00 | 300 | \$ | 1,500.00 |
| 740B-000 | Construction Signs | Sf | \$ | 9.00 | 360 | \$ | 3,240.00 |
| 740D-000 | Channelizing Drums | Ea | \$ | 50.00 | 170 | \$ | 8,500.00 |
| 740E-000 | Cones (36 inch high) | Ea | \$ | 15.00 | 50 | \$ | 750.00 |
| 740F-002 | Barricades, Ty III | Ea | \$ | 200.00 | 16 | \$ | 3,200.00 |
| 7401-005 | Warning Lights, Ty B (Detachable) | Ea | \$ | 100.00 | 8 | \$ | 800.00 |
| 740M-001 | Ballast for Cone | Ea | \$ | 10.00 | 50 | \$ | 500.00 |
| 741C-010 | Port Arrow Board | Ea | \$ | 4,000.00 | 4 | \$ | 16,000.00 |
| 742-001 | Port Changeable Message Sign, Ty 2 | Ea | \$ | 8,000.00 | 4 | \$ | 32,000.00 |
| 600A-000 | Mobilization at 9.7\% | LS |  | 9.7\% | 1 | \$ | 201,513.62 |
| 680A-000 | Geometric Controls at 1.3\% | LS |  | 1.3\% | 1 | \$ | 27,006.98 |
| Subtotal |  |  |  |  |  |  | 305,981 |
| Contigency ${ }^{2}$ |  |  |  |  | 25\% |  | 77,000 |
|  |  | Construction Costs |  |  |  |  | 883,000 |
| Construction Engineering and Inspection |  |  |  |  | 15\% |  | 33,000 |
|  |  | Construction Subtotal |  |  |  |  | 316,000 |
| Preliminary Engineering (Environmental, Survey, Geotech, Design, Bidding) |  |  |  |  | 15\% |  | ,000.00 |
| Utility Relocation |  |  |  |  |  |  | 30,000 |
| Right-of-Way Cost ${ }^{3}$ |  |  |  |  |  |  | 40,000 |

Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 4,690,000$
NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. CONSTRUCTION ENGINEERING \& INSPECTION (CE\&I) IS INCLUDED, HOWEVER ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

## Notes:

1. FOR THE PURPOSE OF THIS ESTIMATED PROJECT COST, THERE WAS ESTIMATED TO BE FULL UTILIZATION OF EXISTING PAVEMENT THOUGH THE CORRIDOR. THE EXISTING PAVEMENT WAS ESTIMATED TO BE MILLED AND OVERLAYED. DUE TO THE LIMITATIONS AND RECONFIGURATION OUTSIDE THE TRAVEL LANES, NEW CURB AND GUTTER AND DRAINAGE FEATURES WERE ESTIMATED THROUGHOUT THE CORRIDOR.
2. CONTINGENCY COST INCLUDES MISCELLANEOUS AND/OR UNKNOWN ITEMS THAT CAN NOT BE QUANTIFIED AT THE TIME THIS study was conducted.
3. DUE TO LIMITED INFORMATION, RIGHT-OF-WAY ACQUISITION AND UTILITY RELOCATION WERE NOT INCLUDED IN THIS ESTIMATE; HOWEVER, SOME IMPROVEMENTS WILL REQUIRE RIGHT-OF-WAY ACQUIIITION AND/OR UTILITY RELOCATIONS.
4. THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2019 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2019.

## Estimate Form

Project \#:
Roadway:
County:
Limits:

Sain \#180201
Crestwood Blvd
Jefferson
Typical Section 3 - 5th Avenu to 53rd Street

Letting:
Estimate:
\% Design Complete:

Date:
Improvements from the Cretwood APPLE Study.

Unknown
See below
1\%

| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 201B-002 | Clearing \& Grubbing | Acre | \$ | 4,000.00 | 5.0 | \$ | 20,000.00 |
| 210A-000 | Unclassified Excavation | Cy | \$ | 10.00 | 11000 | \$ | 110,000.00 |
| 210D-000 | Borrow Excavation | Cy | \$ | 15.00 | 6500 | \$ | 97,500.00 |
| 214A-000 | Structure Excavation | Cy | \$ | 10.00 | 8200 | \$ | 82,000.00 |
| 214B-001 | Foundation Backfill Commercial | Cy | \$ | 23.85 | 2100 | \$ | 50,085.00 |
| 301A-012 | Crushed Aggregate Base, Typ B, 6" Compacted Thickness | Sy | \$ | 12.00 | 4200 | \$ | 50,400.00 |
| 305B-071 | Coarse Aggregate, Section 801, For Misc Use | Ton | \$ | 90.00 | 65 | \$ | 5,850.00 |
| 405A-000 | Tack Coat | Gal | \$ | 4.45 | 1600 | \$ | 7,120.00 |
| 407B-000 | Joint Sealant for Hot Mix Asph Pav | Mile | \$ | 205.00 | 1 | \$ | 205.00 |
| 408A-057 | Planing Existing Pavement 1-2" | Sy | \$ | 5.50 | 16000 | \$ | 88,000.00 |
| 424A-360 | Superpave Wearing Surf, 1/2", $165 \mathrm{lb} / \mathrm{sy}$ | Ton | \$ | 90.00 | 1300 | \$ | 117,000.00 |
| 529A-012 | Retaining Wall (MSE) | SF | \$ | 90.00 | 5900 | \$ | 531,000.00 |
| 530A-001 | 18" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 50.00 | 2350 | \$ | 117,500.00 |
| 530A-003 | 30" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 65.00 | 300 | \$ | 19,500.00 |
| 610C-001 | Loose Riprap, Class 2 | Ton | \$ | 35.00 | 400 | \$ | 14,000.00 |
| 610D-003 | Filter Blanket Geotextile | Sy | \$ | 10.00 | 3500 | \$ | 35,000.00 |
| 618A-000 | Concrete Sidewalk, 4" Thick | SY | \$ | 120.00 | 2650 | \$ | 318,000.00 |
| 619A-004 | 30" Pipe End Treatment, Cl 1 | Ea | \$ | 1,600.00 | 8 | \$ | 12,800.00 |
| 621C-015 | Inlets, Type S1 or S3 (1 wing) | Ea | \$ | 2,500.00 | 10 | \$ | 25,000.00 |
| 623B-000 | Type N Curb | Lf | \$ | 20.00 | 4700 | \$ | 94,000.00 |
| 623C-000 | Combination curb and gutter | Lf | \$ | 25.00 | 4700 | \$ | 117,500.00 |
| 650A-000 | Topsoil | Cy | \$ | 20.00 | 450 | \$ | 9,000.00 |
| 652A-100 | Seeding | Acre | \$ | 765.00 | 1 | \$ | 765.00 |
| 654A-000 | Solid Sodding | Sy | \$ | 15.00 | 2100 | \$ | 31,500.00 |
| 656A-010 | Mulching | Acre | \$ | 800.00 | 2 | \$ | 1,600.00 |
| 665A-000 | Temporary Seeding | Acre | \$ | 600.00 | 4 | \$ | 2,400.00 |
| 665B-001 | Temporary Mulching | Acre | \$ | 800.00 | 4 | \$ | 3,200.00 |
| $665 \mathrm{~J}-002$ | Silt Fence | Lf | \$ | 3.25 | 4700 | \$ | 15,275.00 |
| 6650-001 | Silt Fence Removal | Lf | \$ | 1.00 | 4700 | \$ | 4,700.00 |
| 665Q-002 | Wattle | Lf | \$ | 6.00 | 470 | \$ | 2,820.00 |
| 701A-227 | Solid White, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 1 | \$ | 3,200.00 |
| 701A-230 | Solid Yellow, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 1 | \$ | 3,200.00 |
| 701C-003 | Solid Temporary Traffic Stripe | Mile | \$ | 700.00 | 4 | \$ | 2,800.00 |
| 703A-002 | Traffic Control Markings, Class 2, Ty A | Sf | \$ | 5.00 | 1500 | \$ | 7,500.00 |
| 703B-002 | Traffic Control Legends, Class 2, Ty A | Sf | \$ | 5.00 | 500 | \$ | 2,500.00 |


| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 703D-002 | Temporary Traffic Control Markings, Paint | Sf | \$ | 1.00 | 1500 | \$ | 1,500.00 |
| 705A-031 | Pavement Markers, Class A-H, Ty 1A | Ea | \$ | 5.00 | 215 | \$ | 1,075.00 |
| 740B-000 | Construction Signs | Sf | \$ | 9.00 | 360 | \$ | 3,240.00 |
| 740D-000 | Channelizing Drums | Ea | \$ | 50.00 | 100 | \$ | 5,000.00 |
| 740E-000 | Cones (36 inch high) | Ea | \$ | 15.00 | 50 | \$ | 750.00 |
| 740F-002 | Barricades, Ty III | Ea | \$ | 200.00 | 16 | \$ | 3,200.00 |
| 7401-005 | Warning Lights, Ty B (Detachable) | Ea | \$ | 100.00 | 8 | \$ | 800.00 |
| 740M-001 | Ballast for Cone | Ea | \$ | 10.00 | 50 | \$ | 500.00 |
| $741 \mathrm{C}-010$ | Port Arrow Board | Ea | \$ | 4,000.00 | 4 | \$ | 16,000.00 |
| 742-001 | Port Changeable Message Sign, Ty 2 | Ea | \$ | 8,000.00 | 4 | \$ | 32,000.00 |
| 600A-000 | Mobilization at 9.7\% | LS |  | 9.7\% | 1 | \$ | 200,497.55 |
| 680A-000 | Geometric Controls at 1.3\% | LS |  | 1.3\% | 1 | \$ | 26,870.81 |
|  |  |  |  |  | Subtotal |  | 294,353 |
| $\text { Contigency }{ }^{2}$ |  |  |  |  | 25\% |  | 74,000 |
|  |  |  | Construction Costs |  |  |  | 869,000 |
| Construction Engineering and Inspection |  |  |  |  | 15\% |  | 31,000 |
|  |  |  |  | Construction Subtotal |  |  | 300,000 |
| Preliminary Engineering (Environmental, Survey, Geotech, Design, Bidding) |  |  |  |  | 15\% |  | 5,000.00 |
| Utility Relocation |  |  |  |  |  |  | 50,000 |
| Right-of-Way Cost ${ }^{3}$ |  |  |  |  |  |  | 30,000 |

Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 4,280,000$
NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. CONSTRUCTION ENGINEERING \& INSPECTION (CE\&I) IS INCLUDED, HOWEVER ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

## Notes:

1. FOR THE PURPOSE OF THIS ESTIMATED PROJECT COST, THERE WAS ESTIMATED TO BE FULL UTILIZATION OF EXISTING PAVEMENT THOUGH THE CORRIDOR. THE EXISTING PAVEMENT WAS ESTIMATED TO BE MILLED AND OVERLAYED. DUE TO THE LIMITATIONS AND RECONFIGURATION OUTSIDE THE TRAVEL LANES, NEW CURB AND GUTTER AND DRAINAGE FEATURES WERE ESTIMATED THROUGHOUT THE CORRIDOR. A RETAINING WALL EAS ESTIMATED TO BE NEEDED FOR 25\% OF THE CORRIDOR.
2. CONTINGENCY COST INCLUDES MISCELLANEOUS AND/OR UNKNOWN ITEMS THAT CAN NOT BE QUANTIFIED AT THE TIME THIS STUDY WAS CONDUCTED.
3. DUE TO LIMITED INFORMATION, RIGHT-OF-WAY ACQUISITION AND UTILITY RELOCATION WERE NOT INCLUDED IN THIS ESTIMATE; HOWEVER, SOME IMPROVEMENTS WILL REQUIRE RIGHT-OF-WAY ACQUISITION AND/OR UTILITY RELOCATIONS.
4. THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2019 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2019.

## Estimate Form

Project \#:
Roadway:
County: Limits:

Sain \#180201
Crestwood Blvd
Jefferson
Typical Section 2 - Crestway Baptist to Oporto Madrid
The below is a cost estimate for Section 4 of the Visionary Improvements from the Cretwood APPLE Study.

| Letting: | Unknown |
| :--- | :---: |
| Estimate: | See below |
| \% Design Complete: | $1 \%$ |

Date:
5/8/20

| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 201B-002 | Clearing \& Grubbing | Acre | \$ | 4,000.00 | 8.0 | \$ | 32,000.00 |
| 209A-000 | Mailbox Reset | Ea | \$ | 350.00 | 25 | \$ | 8,750.00 |
| 210A-000 | Unclassified Excavation | Cy | \$ | 10.00 | 3800 | \$ | 38,000.00 |
| 210D-000 | Borrow Excavation | Cy | \$ | 15.00 | 2500 | \$ | 37,500.00 |
| 214A-000 | Structure Excavation | Cy | \$ | 10.00 | 8200 | \$ | 82,000.00 |
| 214B-001 | Foundation Backfill Commercial | Cy | \$ | 23.85 | 2100 | \$ | 50,085.00 |
| 301A-012 | Crushed Aggregate Base, Typ B, 6" Compacted Thickness | Sy | \$ | 12.00 | 6100 | \$ | 73,200.00 |
| 305B-071 | Coarse Aggregate, Section 801, For Misc Use | Ton | \$ | 90.00 | 100 | \$ | 9,000.00 |
| 405A-000 | Tack Coat | Gal | \$ | 4.45 | 2300 | \$ | 10,235.00 |
| 407B-000 | Joint Sealant for Hot Mix Asph Pav | Mile | \$ | 205.00 | 3 | \$ | 615.00 |
| 408A-057 | Planing Existing Pavement 1-2" | Sy | \$ | 5.50 | 23000 | \$ | 126,500.00 |
| 424A-360 | Superpave Wearing Surf, 1/2", $165 \mathrm{lb} /$ sy | Ton | \$ | 90.00 | 1870 | \$ | 168,300.00 |
| 530A-001 | 18" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 50.00 | 3400 | \$ | 170,000.00 |
| 530A-003 | 30" Roadway Pipe (Class 3 R.C.) | Lf | \$ | 65.00 | 300 | \$ | 19,500.00 |
| 610C-001 | Loose Riprap, Class 2 | Ton | \$ | 35.00 | 580 | \$ | 20,300.00 |
| 610D-003 | Filter Blanket Geotextile | Sy | \$ | 10.00 | 5000 | \$ | 50,000.00 |
| 618A-000 | Concrete Sidewalk, 4" Thick | SY | \$ | 120.00 | 3800 | \$ | 456,000.00 |
| 618B-002 | Concrete Driveway, 6" Thick | SY | \$ | 150.00 | 200 | \$ | 30,000.00 |
| 619A-004 | 30" Pipe End Treatment, Cl 1 | Ea | \$ | 1,600.00 | 6 | \$ | 9,600.00 |
| 621C-015 | Inlets, Type S1 or S3 (1 wing) | Ea | \$ | 2,500.00 | 14 | \$ | 35,000.00 |
| 623C-000 | Combination curb and gutter | Lf | \$ | 15.00 | 6800 | \$ | 102,000.00 |
| 650A-000 | Topsoil | Cy | \$ | 20.00 | 630 | \$ | 12,600.00 |
| 652A-100 | Seeding | Acre | \$ | 765.00 | 1 | \$ | 765.00 |
| 654A-000 | Solid Sodding | Sy | \$ | 15.00 | 1500 | \$ | 22,500.00 |
| 656A-010 | Mulching | Acre | \$ | 800.00 | 2 | \$ | 1,600.00 |
| 665A-000 | Temporary Seeding | Acre | \$ | 600.00 | 4 | \$ | 2,400.00 |
| 665B-001 | Temporary Mulching | Acre | \$ | 800.00 | 4 | \$ | 3,200.00 |
| $665 \mathrm{~J}-002$ | Silt Fence | Lf | \$ | 3.25 | 6800 | \$ | 22,100.00 |
| 6650-001 | Silt Fence Removal | Lf | \$ | 1.00 | 6800 | \$ | 6,800.00 |
| 665Q-002 | Wattle | Lf | \$ | 6.00 | 680 | \$ | 4,080.00 |
| 701A-227 | Solid White, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 3 | \$ | 9,600.00 |
| 701A-230 | Solid Yellow, Class 2, Ty A Traffic Stripe (5" Wide) | Mile | \$ | 3,200.00 | 2 | \$ | 6,400.00 |
| 701C-003 | Solid Temporary Traffic Stripe | Mile | \$ | 700.00 | 10 | \$ | 7,000.00 |
| 703A-002 | Traffic Control Markings, Class 2, Ty A | Sf | \$ | 5.00 | 1500 | \$ | 7,500.00 |
| 703B-002 | Traffic Control Legends, Class 2, Ty A | Sf | \$ | 5.00 | 500 | \$ | 2,500.00 |


| Item \# | Description | Unit |  | Unit Price | Quantity | Total |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 703D-002 | Temporary Traffic Control Markings, Paint | Sf | \$ | 1.00 | 1500 | \$ | 1,500.00 |
| 705A-031 | Pavement Markers, Class A-H, Ty 1A | Ea | \$ | 5.00 | 300 | \$ | 1,500.00 |
| 740B-000 | Construction Signs | Sf | \$ | 9.00 | 360 | \$ | 3,240.00 |
| 740D-000 | Channelizing Drums | Ea | \$ | 50.00 | 170 | \$ | 8,500.00 |
| 740E-000 | Cones (36 inch high) | Ea | \$ | 15.00 | 50 | \$ | 750.00 |
| 740F-002 | Barricades, Ty III | Ea | \$ | 200.00 | 16 | \$ | 3,200.00 |
| 7401-005 | Warning Lights, Ty B (Detachable) | Ea | \$ | 100.00 | 8 | \$ | 800.00 |
| 740M-001 | Ballast for Cone | Ea | \$ | 10.00 | 50 | \$ | 500.00 |
| 741C-010 | Port Arrow Board | Ea | \$ | 4,000.00 | 4 | \$ | 16,000.00 |
| 742-001 | Port Changeable Message Sign, Ty 2 | Ea | \$ | 8,000.00 | 4 | \$ | 32,000.00 |
| 600A-000 | Mobilization at 9.7\% | LS |  | 9.7\% | 1 | \$ | 165,445.14 |
| 680A-000 | Geometric Controls at 1.3\% | LS |  | 1.3\% | 1 | \$ | 22,173.06 |
| Subtotal |  |  |  |  |  |  | 393,238 |
| Contigency ${ }^{2}$ |  |  |  |  | 25\% |  | 74,000 |
|  |  | Construction Costs |  |  |  |  | 368,000 |
| Construction Engineering and Inspection |  |  |  |  | 15\% |  | 56,000 |
|  |  | Construction Subtotal |  |  |  |  | 24,000 |
| Preliminary Engineering (Environmental, Survey, Geotech, Design, Bidding) |  |  |  |  | 15\% |  | 9,000.00 |
| Utility Relocation |  |  |  |  |  |  | 10,000 |
| Right-of-Way Cost ${ }^{3}$ |  |  |  |  |  |  | 90,000 |

Total Estimated Project Cost (2020) ${ }^{4} \quad \$ 3,840,000$
NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST. CONSTRUCTION ENGINEERING \& INSPECTION (CE\&I) IS INCLUDED, HOWEVER ALDOT'S INDIRECT COSTS ARE NOT INCLUDED IN THE ESTIMATED PROJECT COSTS.

## Notes:

1. FOR THE PURPOSE OF THIS ESTIMATED PROJECT COST, THERE WAS ESTIMATED TO BE FULL UTILIZATION OF EXISTING PAVEMENT THOUGH THE CORRIDOR. THE EXISTING PAVEMENT WAS ESTIMATED TO BE MILLED AND OVERLAYED. DUE TO THE LIMITATIONS AND RECONFIGURATION OUTSIDE THE TRAVEL LANES, NEW CURB AND GUTTER AND DRAINAGE FEATURES WERE ESTIMATED THROUGHOUT THE CORRIDOR.
2. CONTINGENCY COST INCLUDES MISCELLANEOUS AND/OR UNKNOWN ITEMS THAT CAN NOT BE QUANTIFIED AT THE TIME THIS study was conducted.
3. DUE TO LIMITED INFORMATION, RIGHT-OF-WAY ACQUISITION AND UTILITY RELOCATION WERE NOT INCLUDED IN THIS ESTIMATE; HOWEVER, SOME IMPROVEMENTS WILL REQUIRE RIGHT-OF-WAY ACQUIIITION AND/OR UTILITY RELOCATIONS.
4. THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2019 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2019.

## Appendix M - TAP Application

## ALABAMA DEPARTMENT OF TRANSPORTATION



## FY 2021 Transportation Alternatives Set-Aside Program Application

This document provides the format in which the required information is to be included in all applications seeking consideration for the TA Set-Aside Program. Applicants may develop and prepare their own applications; however, the headings (A through L) shall be listed with supporting narratives/attachments included. Prospective project sponsors are encouraged to review the FY 2021 Transportation Alternatives Set-Aside Guidelines when considering the development of applications. Sponsors will be required to submit one (1) original and three (3) color copies of their application to the ALDOT Local Transportation Bureau by the FY 2021 deadline of May 15, 2020.
A. Provide the Sponsoring Agency

C. Describe in detail the proposed project improvements and list all eligible TAP activities included in the project. Identify the point(s) of origin, important intermediate destinations, and point(s) of termination. Indicate if the project is/was part of a phased construction plan, or part of a larger comprehensive master plan.
D. Describe how the proposed project improvements meet the intent of the Transportation Alternatives Set-Aside Program; (Refer to the Competitive Selection criteria of the TAP Guidance).
E. Provide a detailed preliminary pay item estimate of the total project cost, the amount of Federal funds requested, and the amount of the local match that will be provided by the sponsor.
F. Identify ownership of all properties located inside the project footprint. If the acquisition of minor right-of way or property is necessary, please include a detailed description, an estimate of any associated cost that may be incurred, and letters of support from the affected property owners. Please include photos of these locations and locate these photos on a map.
G. Identify the location of existing utilities in conflict with the project. If any utilities or service connections will need to be relocated, please include a detailed description, an estimate of any associated cost that may be incurred, and letters of support from the affected utility owners.
H. Identify any cultural or environmental resources potentially impacted by the project. Please include detailed time frames and costs associated with coordinating through the State Historic Preservation Office, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, or any other effected resource agency. If there are any historic buildings, homes, or structures that will be impacted by the project, please include photos of these locations and locate these photos on a map.
I. List any clearances or permits that will be required and include letters of support if possible.
J. Describe the life expectancy of the project. Identify the agency responsible for maintenance, the anticipated maintenance activities, and the funding source for maintenance efforts.
K. Provide any additional comments the sponsor wishes to be considered.
L. Attach any supporting photographs, maps, drawings, or plans necessary to support the project application (all in Color). Attachments should be limited in size to 11" by 17" (folded to 8-1/2" by 11 ").

The original application and 3 color copies, including all pertinent attachments, should be postmarked no later than May 15th, 2020 and mailed to:

Mr. D.E. (Ed) Phillips, Jr., P.E.<br>Local Transportation Bureau Chief Alabama Department of Transportation<br>1409 Coliseum Boulevard<br>Room 110<br>Montgomery, AL 36110

## ALABAMA DEPARTMENT OF TRANSPORTATION



FY 2021 Transportation Alternatives Set-Aside Program Guidelines

This document contains information regarding the Transportation Alternatives Set-Aside Program (TAP). Prospective project sponsors are encouraged to thoroughly review this document, as well as the FY 2021 TA Set Aside Program Application.

## A. ELIGIBLE ENTITIES:

1. Local governments
2. Regional transportation authorities
3. Transit agencies
4. Natural resource or public land agencies
5. School districts
6. Tribal governments
7. Nonprofit entities responsible for the administration of local transportation safety programs
8. Other local or regional governmental entities with the responsibility for, or oversight of, transportation or recreational trails

Eligibility of applicants will be determined by ALDOT with the concurrence of the Federal Highway Administration (FHWA).

## B. PROJECT ELIGIBILITY:

1. Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, senior adults, and individuals with disabilities.
2. Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation. These can include sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting, safety-related infrastructure, as well as projects to achieve compliance with the Americans with Disabilities Act of 1990.
3. Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users.
4. Construction of turnouts, overlooks, and viewing areas.
5. Community improvement activities, which include:
a. The inventory/control/removal of outdoor advertising.
b. Historic preservation and rehabilitation of historic transportation facilities.
c. Vegetation management practices in transportation rights-of-way to improve safety, prevent against invasive species, and provide erosion control.
d. Archaeological activities relating to impacts from implementation of a transportation project.
6. Environmental mitigation activities, which include:
a. Storm water management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff.
b. Reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats.

Eligibility of proposed project activities will be determined by ALDOT with the concurrence of the Federal Highway Administration (FHWA).

## C. COMPETITIVE SELECTION

TA Set-aside funds are awarded through an ALDOT administered competitive selection process. It should be noted that while certain types of projects are technically eligible, not all types of projects have the same level of priority in the competitive selection process.

The purpose and intent of this program is to provide new "Transportation Alternatives" to communities, as well as enhance existing non-motorized transportation infrastructure. All eligible applications will be evaluated on how the proposed project improvements advance the intent of the program.

The following areas are considered in the competitive selection process.

- Promotes Safety
- Reduces/Improves Conflict Points
- Provides Separation for Non-Motorized Travel
- Increases Local Transportation Options
- Improves Public Travel Experience
- Promotes Mobility
- Encourages Multimodal Options
- Meets the Needs of Non-Motorized Users
- Provides Community Enhancements
- Improves Usability of Existing Facilities
- Improves Access to Quality of Life Enhancements
- Provides Access to Community Amenities
- Connects Activity Centers
- Connectivity to Essential Services
- Improves Public Health/Physical Activity
- Local Commitment
- Sponsor and/or MPO Resolution
- Public Involvement and Community Support
- Part of a Larger Comprehensive Plan
- Project Manager Identified with Qualifications
- Readiness and Deliverability of Project
- Addresses Challenges and Obstacles
- TAP Project Delivery History
- Environmental Justice
- ADA Compliance
- Provides and/or Enhances Services for Individuals with Disabilities
- Improves Transportation Options in Underserved Communities
- Mitigates Transportation Environmental Effects


## D. PROJECT FUNDING:

TA Set-Aside funds are allocated into two separate categories.

1. Fifty percent of the TA Set-aside funds are sub allocated to areas based on their relative share of the total State 2010 Census. They are awarded to sponsors based on the geographical funding limitations described below.
a. Funds sub allocated to areas with populations over 200,000 (awarded and administered by the respective MPOs).

The policies and procedures described in this memorandum only apply to those sub allocations awarded and administered by ALDOT. The MPOs may establish their own respective policies, procedures, and competitive selection criteria for funds sub allocated to areas with populations over 200,000. Sponsors located within the metropolitan planning jurisdictions of the Birmingham, Huntsville, Mobile or Montgomery MPOs should contact their respective MPO for specific program details.
b. Funds sub allocated to areas with populations of 5,001 to 200,000 (awarded and administered by ALDOT).
c. Funds sub allocated to areas with populations of 5,000 or fewer (awarded and administered by ALDOT)

Fifty percent of the TA Set-aside funds are sub allocated to any area of the state. Any sponsor located in the State, regardless of population (including MPOs), may submit applications for consideration in this sub allocation. Any area of the State funds are awarded and administered by ALDOT
2. The Federal share for TA Set-Aside projects is generally $80 \%$, with the sponsor providing the remaining $20 \%$ in matching funds.
3. The TA set-aside Program is a "cost reimbursement program", not a "grant". After the sponsor is issued a notice to proceed, the sponsor must pay $100 \%$ of the project expenses and request reimbursement for $80 \%$ of eligible expenditures from ALDOT. Therefore, the project sponsor must have the fiscal, managerial, and engineering capabilities to manage a project consistent with federal and state requirements. Furthermore, the Sponsor is responsible for any environmental assessments and permitting which may be required. Invoices may not be submitted more often than monthly.
3. Due to the limited amount of funding available, only one application can be submitted by an eligible sponsor per fiscal year. If the submitted application is part of a past or future phased construction, please indicate that within the application and include a master plan of all the anticipated phases.
4. Sponsors that currently have an active TAP project will not be eligible to submit another application for funding consideration until the awarded project has been authorized and let to contract.
5. The total amount of Federal participating funding for a particular project (or project phase if part of a large multi-phased project) application is limited to $\$ 800,000$; ( $\$ 640,000$ Federal and $\$ 160,000$ sponsor match). The total project estimated costs may exceed the $\$ 800,000$ limit, but any amounts in excess of the limit will be the responsibility of the sponsor and should be shown as such.
6. TA funds are federal funds administered through the Federal Highway Administration. All applicable Federal regulations apply. Failure to follow Federal regulations may result in the rescission of Federal funds from the Sponsor.
7. The sponsor is responsible for compliance with all Federal and State design regulations applicable for the project type (i.e. AASHTO Guide for Bicycle Facilities, Americans with Disabilities Act of 1990, USDOT regulations, Architectural Guidelines, etc.).
8. Any cost incurred relating to this project which is determined to not be an eligible activity will be borne and paid for by the sponsor.

## E. PROJECT PROGRESS:

1. Federal TA Set-Aside funds are available to States for obligation for a period of 3 years after the last day of the fiscal year for which the funds are authorized. Any funds not authorized for a specific project may be rescinded by FHWA for redistribution to other States. Therefore, project funding awarded to sponsors, but not authorized for contract letting within two years of the notice of award, are subject to rescission by ALDOT. The purpose of this time limit is to allow for reallocation to another project in order to prevent the loss of funds to the State.
2. To further encourage timely project delivery and facilitate the reallocation of funds to other projects as necessary, the following target deadlines are established:
a. Funding Agreement Execution by Sponsor: Three (3) months from ALDOT making the funding agreement available.
b. Obtain Environmental Clearances/Permits/Right-of-Way: One (1) year from project award.

If minor right-of-way acquisition is required, or there are historic structures more than 50 years old, additional studies may be needed in order to meet FHWA requirements. These additional requirements will be discussed / determined during a Project Kick-Off Meeting that will be scheduled shortly after the notice of award.
c. Project/Specification/Estimate (PS\&E) Review to Region: Eighteen (18) months from project award
d. Final Plans/Certifications/Estimate (Ready for FHWA authorization) to Region: Two (2) years from project award.

Failure to meet a target deadline may result in the rescission and reallocation of awarded project funds. Extension requests will be evaluated on the merits of the request and the extenuating circumstances involved.
3. Sponsors who are awarded funding for projects are expected to actively pursue the project to completion and final close-out. If, in the opinion of ALDOT, a sponsor fails to actively pursue the project to completion and final close-out, the result could be the suspension or disqualification of future TAP project funding consideration.

## F. ALLOWABLE WORK PHASES:

1. The sponsor will be responsible for the cost of required preliminary engineering. This shall include costs associated with preparing the application, project development, environmental clearances, plan development, and contract letting. The sponsor shall be responsible to ensure that all preliminary engineering activities (developing plans, specifications, cost estimates, etc.) are in accordance with ALDOT requirements.
2. Applications involving right-of-way acquisition will generally not be considered. Under special circumstances, right-of-way acquisition may be considered eligible, but only for minor, non-adverse acquisitions that are incidental (not a significant item or cost) to the proposed project activities. Any such consideration will be on a case-by-case basis.
a. Projects including right-of-way acquisition will be held to the project deadlines established in previous sections of this document. Proof of support and intent should be provided with the application in the form of letters from the affected property owners.
b. Applications for desired project improvements that require obtaining significant and/or adverse right-of-way acquisition should be delayed until the subject right-of-way has been obtained.

Applicants should be aware that Federal Funds expended on right-of-way acquisition shall be reimbursed by the applicant to the Federal government should the project not be advanced to construction within twenty (20) years.
3. Applications involving easements/permitted work on property owned by another entity will generally not be considered. Under special circumstances, easements/permitted work on property owned by others may be considered eligible. Any such consideration will be on a case-by-case basis.
4. Applications involving the relocation of utilities in conflict will generally not be considered. Under special circumstances, utility relocations may be considered eligible, but only for minor utility relocations and service relocations that are incidental (not a significant item or cost) to the proposed project activities. Any such consideration will be on a case-by-case basis.
a. Projects including both utility/service relocations will be held to the project deadlines established in previous sections of this document. Proof of project support should be provided with the application in the form of letters of support from the affected utility owners.
b. Applications for desired project improvements that require significant utility relocations should be delayed until the subject utilities have been relocated and are no longer in conflict.
5. The sponsor will be responsible for the administration and professional oversight (construction engineering and inspection). However, eligible Construction Engineering \& Inspection (up to a total of $15 \%$ of total project construction cost) is an eligible item and may be reimbursed as part of the project invoicing. If the sponsor intends to seek reimbursement for Construction Engineering \& Inspection, it must be included in the application and supporting cost estimate (and subject to the limiting funding cap). Sponsors who utilize the services of a consulting engineering firm to perform Construction Engineering \& Inspection services, and intend to seek reimbursement for those services, must follow the ALDOT consultant selection procedures.

## G. MISCELLANEOUS PROVISIONS:

1. Due to the limited availability of funds, only one project application may be submitted by an eligible sponsor per year. Larger, more comprehensive projects are encouraged. However, such projects may need to be separated into manageable and logical phases for multi-year application and funding. Such project applications should be accompanied with an overall master plan, including a narrative explaining the entire scope of the project, and how the entire project is to be separated into logical phases.
2. Significant changes in project scope after project selection will normally not be permitted. Under special circumstances, minor scope reductions due to funding restrictions may be allowed, but only with prior ALDOT approval and will be evaluated on a case-by-case basis.
3. Eligible projects must be for public use and the benefit of the community at large. Admission or usage fees are discouraged but may be considered if such fees are dedicated to use for maintenance of the facility. These aspects should be clearly identified and explained in the project application. Projects cannot result in the private gain of individuals or groups.
4. Projects must be let to competitive bid unless prior approval is obtained from ALDOT in coordination with the FHWA to use another method of construction, such as force account.
5. Any costs incurred prior to issuance of a written Notice to Proceed from ALDOT is not eligible for reimbursement. Sponsors must receive written approval from ALDOT prior to advertising for bids. Sponsor must also receive written approval from ALDOT prior to awarding the contract.
6. Change of use or ownership during the expected life of the project is strongly discouraged. No change in use or ownership is permitted without written justification, and written concurrence from ALDOT in coordination with FHWA. In the event of a change of ownership, the sponsor may be required to reimburse an appropriate share of the Federal funds expended on the project.
7. TA Set-aside funds have Federal reporting requirements. Recipients will be required to furnish any and all requested data to ALDOT to satisfy these reporting requirements.

## H. PROJECT IMPROVEMENT SPECIFICS:

1. Eligible sidewalks shall be designated for exclusive use by pedestrians and comply with ADA guidelines.
2. Eligible bike/pedestrian facilities shall be shared-use or multi-use paths. They must be offroad facilities and developed for use by non-motorized vehicular users such as bicyclists, pedestrians, skaters, wheelchairs, runners, etc. Such facilities are commonly designed for two-way travel. Bike/pedestrian facility paths must comply with ADA guidelines.
3. Priority will be given to projects whose primary purpose is transportation (traveling from point $A$ to $B)$ rather than recreation.

The Alabama Department of Economic Development (ADECA) administers funds for the Recreational Trails Program, which is specifically intended to fund recreational trails. Sponsors are encouraged to contact ADECA for program eligibility.
4. Streetscape improvements are eligible and can include items such as sidewalk replacement to meet ADA requirements, landscaping, pedestrian lighting, etc. These enhancements must be located in a downtown area and are generally the only instance where these items, as a major activity, are eligible.
5. Existing sidewalk facilities that are in acceptable condition, will generally not be considered for replacement, except when that replacement is necessary to achieve ADA compliance. Under special circumstances, the replacement of sidewalks in acceptable condition may be considered eligible, but only when incidental (not a significant item or cost) to the proposed project activities. Any such consideration will be on a case-by-case basis.
6. Hardscapes (e.g. signs at entrances to cities and towns, fencing, waterfalls, towers, flag poles, statues, etc.) are not eligible.
7. Landscaping and scenic enhancements as independent projects are not eligible.
8. Street lighting, traffic signals, and flashers are not eligible, except when traffic control devices for non-motorized traffic are in conjunction with other eligible project activities.
9. Roadway items, such as curb \& gutter, roadway paving, or drainage structures are only eligible when incidental and necessary for the construction of the eligible project activities.

## I. APPLICATION SUBMISSION \& SELECTION

1. Sponsors should thoroughly consider the project scoping process prior to submitting an application. Important considerations include:

- Right-of-way acquisition or easement/permitting
- Utility / service relocations
- Phased construction
- Fiscal capability
- Sponsors ability to provide the required matching funds
- Feasibility and costs associated with meeting ADA compliance

2. Applications should follow the format provided in the FY 2021 Transportation Alternatives Set-Aside Application. Attachments should be limited in size to 11 " by 17 " (folded to $8-1 / 2^{\prime \prime}$ by $11^{\prime \prime}$ ).
3. Eligibility of applications will be determined by ALDOT with the concurrence of the Federal Highway Administration (FHWA). Sponsors of applications deemed ineligible will be notified in writing.
4. Eligible applications will be reviewed by ALDOT Local Transportation Bureau and ALDOT Region staff in accordance with the ALDOT competitive selection process.
5. Projects selected for funding will be approved by the Transportation Director. Sponsors of selected projects will be notified in writing by the Governor.
6. Once notified of award, sponsors should contact the ALDOT Region in order to set up an initial "kick-off" meeting prior to initiating any work.

The original application and 3 color copies, including all pertinent attachments, should be postmarked no later than May 15th, 2020 and mailed to:

Mr. D.E. (Ed) Phillips, Jr., P.E.<br>Local Transportation Bureau Chief Alabama Department of Transportation 1409 Coliseum Boulevard Room 110<br>Montgomery, AL 36110


[^0]:    This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

[^1]:    
    
    
    
    
     before taking any action to address potential EJ concerns

