Stantec

IMPLEMENTATION PLAN

Clough Pike Corridor Study

September 30, 2020

Prepared for:

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1.0 INTRODUCTION

This report provides an Implementation Plan for 96 recommended transportation projects developed for the Clough Pike Corridor, a critical transportation component of Anderson Township and Greater Cincinnati's east side. From its early days as a private turnpike, to Clough Pike's role for the past century as a county-owned/maintained roadway, it has been a key factor in the growth and development of the area.

Development activity, particularly during the 1970s and 1980s, added new opportunities, but also brought about issues and concerns. Public and private improvements have enhanced safety, traffic flow and non-vehicular transportation options. However, unlike other corridors in the area, there has not been a comprehensive assessment of the Clough Pike Corridor. The Clough Pike Corridor study area includes approximately six (6) miles of roadway from SR 32 to Mt. Carmel Tobasco Road, traversing Anderson Township and unincorporated Clermont County. The extent of the corridor study area is shown in **Figure 1**.

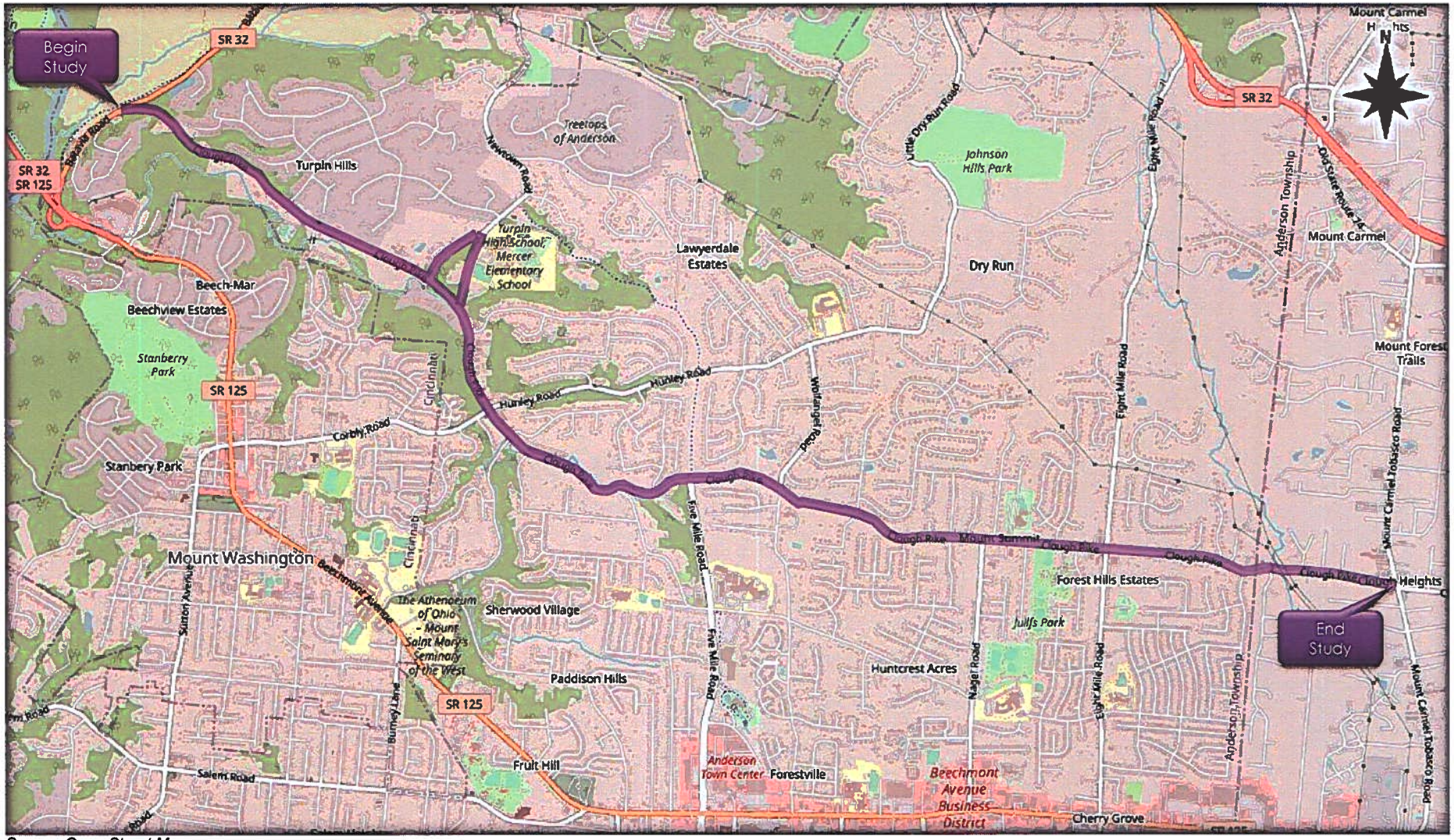
The transportation projects recommended for implementation were developed with extensive input from Anderson Township and the Hamilton County Engineer's Office, as well as public input provided through comprehensive online surveys. In addition, these concepts were evaluated based on engineering studies and found to best meet the transportation needs of the traveling public and the local and regional community. These projects range from low-cost, easy to implement projects such as traffic signal timing adjustments, to intersection reconfiguration projects, requiring detailed engineering, additional right-of-way and environmental studies. While each recommended project is considered to be a "stand alone" project, which will have independent utility when constructed, the projects also have additive benefits and will improve traffic flow with Anderson Township and east-west connectivity for the Greater Cincinnati region.

This Implementation Plan summarizes the engineering studies and public involvement activities undertaken to develop the proposed transportation projects. In addition, the plan provides a direction for moving each project forward. This Implementation Plan will serve as a roadmap for Anderson Township, Hamilton County, and Clermont County as they prioritize future transportation projects.

Transportation needs were identified through technical engineering studies and confirmed and refined through community and stakeholder input. Technical studies conducted included:

- Collection of intersection turning movement count data
- Analysis of the existing 2020 traffic conditions and 2040 future horizon year traffic conditions
- Turn lane warrant analysis at unsignalized intersections
- Signal warrant analysis at unsignalized intersections
- Evaluation of crash data
- Assessment of origin-destination patterns for vehicles traversing the corridor
- Evaluation of bicycle and pedestrian safety and connectivity
- Roadway geometry assessment (curves, elevation, sightlines)

In addition to technical studies, public outreach was conducted to learn how the community prioritized transportation needs. Public involvement included an online survey in late June 2019 to obtain feedback on current transportation concerns and opportunities, as well as a virtual open house in late June / early July 2020 to solicit comments on the conceptual alternatives and ask respondents to provide additional recommendations for potential safety projects and traffic flow improvements.



Source: Open Street Map

Figure 1: Corridor Study Limits

2.0 PUBLIC INVOLVEMENT PROCESS

Public involvement was an important component of the development of transportation projects to improve travel and safety throughout the Clough Pike Corridor. Public input provided invaluable insight into the existing and future traffic issues. The public not only drives the corridor every day, but they also have a vested interest in decisions made regarding transportation projects along the corridor. To ensure that the public had the opportunity to provide input, an initial survey was sent out to residents prior to starting the study to identify existing transportation issues and concerns and a virtual public open house was held at the conclusion of the development and refinement of the transportation concepts. For both efforts, Anderson Township mailed information to all Clough Pike property owners, included information about the project in the community newsletter, *Anderson Insights*, and posted information on both the Township's website and Facebook page.

2.1 CLOUGH PIKE TRAFFIC SURVEY

In late June 2019, Anderson Township prepared an online survey for any interested party to provide feedback regarding issues on Clough Pike. The Clough Pike Traffic Survey drew nearly 800 responses, with hundreds of suggestions provided for ways to improve traffic flow, turn lane movement, signal timing, sidewalks, speed limits, pedestrian access and more. The results of the survey helped to shape the areas along the corridor where data was collected, improvements were evaluated, and concept plans were developed. The results of the Clough Pike Traffic Survey are provided in **Appendix B**.

2.2 VIRTUAL OPEN HOUSE

When the study started in February 2020, a public involvement meeting was planned to share the recommendations from the traffic analysis, concept plan development, and solicit feedback to assist in determining the projects to be selected for further study. Due to the COVID-19 pandemic, an in-person public involvement meeting was not feasible. Instead, a Virtual Open House was held which allowed the public to review and give feedback on the various concept plans that were developed. The Virtual Open House was available for comment from June 16, 2020 through July 6, 2020. It produced almost 400 responses as well as numerous comments regarding the concept plans. The results of the Virtual Open House are provided in **Appendix C**.

3.0 TRAFFIC ANALYSES

In order to help guide the concept development process, a traffic analysis was performed to evaluate the existing 2020 traffic conditions and 2040 future horizon year traffic conditions. A capacity analysis, turn lane warrant analysis at unsignalized intersections, signal warrant analysis at unsignalized intersections, crash data evaluation, and assessment of origin-destination patterns for vehicles traversing the corridor were all performed. This section provides an overview of the analysis, the results of which are included in detail in **Appendix D**.

It should be noted that the traffic analysis was based on data collected in February 2020, prior to the COVID-19 pandemic, and forecast to the year 2040 based on typical growth rates and travel trends. For the short-term, the pandemic has decreased the AM and PM peak-hour traffic volumes. At this time, it is unknown what the long-term impacts of the pandemic will be to AM and PM peak-hour trips and overall travel patterns. Because of potential long-term changes to traffic patterns, additional traffic data should be collected prior to the implementation of any improvement to confirm the future traffic volumes.

3.1 CAPACITY ANALYSIS

The capacity analysis at intersections was conducted using the Synchro Software. This analysis utilizes a deterministic methodology to estimate unsignalized and signalized intersection level-of-service (LOS). As defined by the *Highway Capacity Manual,* 6th Edition (TRB 2016), LOS is classified into six different levels, ranging from A to F. LOS A denotes free flow conditions with average delays of less than ten seconds while LOS F indicates congested conditions with average delays over fifty seconds (unsignalized) and eighty seconds (signalized).

It was determined that all unsignalized intersections are currently operating at acceptable level-of-service except the southbound left turn movement at the Royalgreen Drive intersection during the AM peak-hour. The v/c ratio is only 0.24, indicating that sufficient capacity is available for the movement. All signalized intersections are currently operating at acceptable level-of-service except the westbound movement at the SR 32 intersection during the AM peak-hour. At the Bartels Road intersection, the westbound approach is close to capacity during the AM peak-hour. At the Corbly Road intersection, the westbound through/right turn movement and northbound through/right turn movement are close to capacity during the AM peak-hour while the eastbound through/right turn movement is close to capacity during the PM peak-hour. Depending on traffic fluctuations, these movements may be over capacity.

Existing traffic volumes were projected to the design year of 2040 using growth rates projected by the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) travel demand model, historic growth from ODOT short term count stations long Clough Pike, and a review of approved developments along and adjacent to the corridor. Based on this information a 1.5% annual growth rate was used to grow the existing traffic volumes to 2040 traffic volumes.

Using the 1.5% annual growth rate, seven of the 12 unsignalized intersections will have a minor street movement that is operating at level-of-service F and have a v/c ratio greater than 1.0 by 2040. Additionally, nine of the 10 signalized intersections will have a minor street movement that is operating at level-of-service F and with a v/c ratio greater than 1.0 indicating that they are over capacity and improvements are required by the design year of 2040.

3.2 TURN LANE WARRANT ANALYSIS

Right and left turn lane warrants were performed at each of the 12 unsignalized intersections to determine if right or left turn lanes on Clough Pike onto the side streets were warranted. The right turn lane warrant was performed based on Figure 401-6b of the ODOT *Location and Design Manual, Volume 1* and the left turn lane warrant was performed based on Figure 401-5b of the ODOT *Location and Design Manual, Volume 1.* There are no right turn lanes at any of the 12 unsignalized locations. The current 2020 traffic volumes warrant right turn lanes at seven intersections. The future 2040 traffic volumes warrant right turn

lanes at the remaining five intersections. There are left turn lanes at four of the 12 unsignalized locations and the left turn lane warrant was performed at the remaining eight unsignalized intersections. The current 2020 traffic volumes warrant left turn lanes at six intersections. The future 2040 traffic volumes warrant left turn lanes at the remaining two intersections.

3.3 TRAFFIC SIGNAL WARRANT ANALYSIS

In addition to the Synchro Software analysis of the AM and PM peak-hour conditions at the unsignalized intersections, a preliminary review of the signal warrant criteria was completed. The signal warrant analysis was completed in accordance with the procedures and guidelines outlined in the Ohio *Manual on Uniform Traffic Control Devices*. The 2020 traffic volumes collected at the intersections during the AM and PM peak-hour were initially reviewed. If the peak-hour warrant (Warrant 3) was met, the four-hour warrant (Warrant 2) was evaluated using the six hours of data processed at each intersection.

The results of the initial signal warrant review indicate that the Royalgreen Drive and Endovalley Drive intersections with Clough Pike satisfy the peak-hour warrant (Warrant 3) during the 2020 AM peak-hour. None of the other 10 intersections satisfy the peak-hour warrant (Warrant 3) during either the 2020 AM or PM peak-hour. The results of the four-hour warrant (Warrant 2) at the Royalgreen Drive and Endovalley Drive intersection with Clough Pike indicate that neither intersection will satisfy Warrant 2 for the 2020 traffic conditions. Therefore, it is not anticipated that any of the unsignalized intersections will meet traffic signal warrants.

3.4 CRASH DATA ANALYSIS

Crash data for the Clough Pike Corridor was obtained from January 1, 2017 to December 31, 2019 from ODOT's *Geographic Information Systems Crash Analysis Tool (GCAT)*. There were 507 crashes over the three-year period. None were fatal and 6 resulted in serious injuries. The most common crash type was rear end crashes accounting for half of all the crashes. Angle crashes (17%) and fixed object crashes (13%) were the next two most prevalent crash types. Most crashes occurred during the day in dry conditions. Based on the review of the data, 11 'hot spots' were identified where a clustering of crashes and crash types occurred. These 11 locations represent approximately 60% of the total crashes and are listed below. The list of recommended projects includes projects which address the safety issues at these hot spots along the corridor.

1. Clough Pike at SR 32
2. Clough Pike at Newtown Rd
3. Clough Business District
4. Clough Pike S curves (State to Candlemaker)
5. Clough Pike at Five Mile Road
6. Clough Pike at Wolfangel Road
7. Clough Pike S curve east of Bruns Lane
8. Clough Pike at Foxhollow Drive
9. Clough Pike at Nagel Road
10. Clough Pike at Eight Mile Road
11. Clough Pike at Mt. Carmel Tobasco Road

3.5 ORIGIN-DESTINATION ANALYSIS

To understand travel patterns along the corridor, StreetLight InSight® Origin-Destination (O-D) data was used to identify the home county of Clough Pike travelers and the major intersections used to access the corridor. StreetLight is a transportation analytics platform, which utilizes the massive volume of geospatial data created by mobile phones, GPS devices, connected cars and commercial trucks, etc. When these devices ping cell towers and satellites, they create location records. StreetLight then utilizes their proprietary algorithmic processing engine to transform these anonymized records into useful transportation data.

Using this process, vehicles using the Clough Pike Corridor were filtered based on US Census Blocks to identify their interaction with the corridor. As expected, census blocks adjacent to the corridor have the highest interaction with it. In addition to serving adjacent land uses, the corridor has regional significance by helping to connect Clermont County to downtown Cincinnati and the Greater Cincinnati area. Users of the corridor were broken down by their county of origin and destination. This was conducted for the daily, AM peak period and PM peak period. Approximately 83% of the users of the Clough Pike Corridor are Hamilton County residents, 16% are Clermont County residents, and 1% are from other counties. To understand where vehicles access the Clough Pike Corridor, an analysis of the major intersections feeding the corridor was conducted. Five Mile Road, SR 32 south of Clough Pike and Corbly Road have the highest percentage of traffic accessing the corridor while Wolfangel Road north of Clough Pike, Hunley Road and SR 32 north of Clough Pike have the lowest percentage of traffic accessing the corridor.

4.0 TRANSIT ANALYSIS

Currently, Metro only provides limited routing on the Clough Pike Corridor. Route 30X runs between Eight Mile Road and Nagel Road with stops at Endovalley Drive and Forestlake Drive. With the recent passage of the SORTA levy, the Reinventing Metro Plan should be moving forward. This plan includes a new crosstown bus route between Anderson Township and Madeira. This route will travel on Clough Pike between Newtown Road and Five Mile Road. Stops have yet to be determined.

As part of the study, intersections on both the existing and proposed route segments were reviewed for improvements that would enhance the corridor for transit riders. In several locations pavement markings to help delineate crosswalks were missing on intersection roads and some truncated domes on curb ramps were also missing. At several of the signalized intersections, deficiencies were identified with pedestrian pushbuttons which would make access difficult for people in wheelchairs, such as buttons being located on the back side of poles or on poles that could not be reached from the sidewalk. The list of recommended projects includes fixes for these items. Once stops have been determined in the Newtown to Five Mile stretch of Clough, consideration should be given to possible bus pull-offs or concrete pads for bus stops.

5.0 RECOMMENDATIONS

Based on the recommendations of Anderson Township and Hamilton County Engineer's Office, as well as input received from the public, a total of 102 transportation project concepts were reviewed, and of those 96 transportation projects are recommended for implementation. These projects will help Anderson Township plan for and accommodate the future growth along and feeding into the Clough Pike corridor. The Action Plan, which is presented in **Appendix A**, summarizes these projects. It should be noted that some improvements may in fact attract additional traffic from other more congested corridors. The Action Plan also provides information that will be useful in programming these projects including estimated project costs, project prioritization, expected implementation timing, and possible bundling opportunities for each project. The development of this information is described in the following sections. The Action Plan lists projects along the corridor starting at the western terminus (SR 32) and proceeds east to the eastern terminus (Mt. Carmel-Tobasco, in Clermont County).

5.1 ESTIMATED PROJECT COSTS

Estimated project construction cost ranges were developed for the project concepts. These estimates were calibrated using historical bid data available for ODOT projects. The estimates reflect the current conceptual level of project design. These costs are the estimated construction costs only. Estimates do not take into account costs for design, right of way, utility relocations, or inflation.

5.2 ANTICIPATED LEVEL OF ENVIRONMENTAL DOCUMENTATION REQUIRED

The anticipated level of environmental documentation will be different for each project based on size, environmental impacts, and project funding sources. For projects that receive Federal funding or require Federal approvals, environmental documentation must be completed in compliance with the National Environmental Policy Act (NEPA) before projects can proceed to final design, right-of-way purchase, or construction. For projects that will seek a federal funding source or that will impact streams or wetlands, it is recommended that individual NEPA documentation and associated environmental base studies be completed for that proposed project concept. For projects being completed with state and/or local funds NEPA compliance is not required, however, certain aspects may still be prudent to investigate such as permits for stream and/or wetland impacts or Regulated Materials Screenings to clear right-of-way that would need to be purchased if there was a threat of hazardous contamination (i.e. near current or former gas station, dry cleaner, etc.). Some projects may not require any environmental documentation.

5.3 PROJECT PRIORITIZATION

Projects have been identified as high, medium, and low priority based on potential ability to address capacity and/or safety concerns in the corridor and the potential cost to benefit ratio anticipated for that project. This identification also considered public input gathered, so that those projects with greater public support generally ranked higher than others. High priority projects are those that should be implemented

first when funding becomes available, followed by medium priority projects and then low priority projects. Projects receiving lower priority may be those that are more cost prohibitive and/or received a lower level of public support.

Projects were further listed as short-, mid-, and long-term improvements based on the anticipated timing to implement the project. These timings are provided to further refine the project list and to aid in developing funding plans. For instance, high priority, short-term projects are typically lower cost and would result in an immediate improvement of a specific transportation need. These projects typically have very favorable benefit to cost ratios and provide significant improvements to traffic operations and/or safety throughout the transportation network.

Although the timeline of specific projects is dependent on available funding, the short-, mid-, and long-term categories provide insight into the potential timing of projects. Short-term projects can typically be accomplished with local funding, limited design resources, and no right of way impacts. Short-term projects could be accomplished within one year. Mid-term projects are more expensive, will require detailed design plans, and may require purchasing right of way. Mid-term projects could be built between two and five years. Long-term projects, if they are built, are anticipated to be constructed more than five years from the date of this implementation plan.

There are 34 projects identified as high priority as shown in Table 1 below. These projects all had either short- or mid-term timing.

Table 1: High Priority Projects

Identifier	High Priority Conceptual Project Description	Implementation Timing
1-A	SR-32 & Clough Pike: Increase Max Split for westbound approach from 60 sec to 70 sec	Short Term
5-B	Copperleaf Drive to Newtown Road: Add guardrail or concrete barrier to protect Clough Pike traffic from eroding drop-off in bend of Clough Creek just east of Newtown Road.	Short Term
7-A	Bartels Road & Clough Pike: Optimize signal timing	Short Term
10-A	Corbly / Hunley & Clough Pike: Optimize signal timing	Short Term
11-A	Berkshire / Goldengate & Clough Pike: Optimize signal timing	Short Term
14-C	State Road & Clough Pike: Adjust location of stop bar on State	Short Term
15	S Curves between State and Candlemaker: Friction pavement for curves, longitudinal rumble (mumble) strips and stripes	Short Term
16-A	Five Mile Road & Clough Pike: Update clearance intervals	Short Term
16-B	Five Mile Road & Clough Pike: Optimize signal timing and coordinate with Wolfangel, Bruns, Nagel, and Eight Mile intersections	Short Term
17-A	Wolfangel Road & Clough Pike: Update clearance intervals	Short Term
17-B	Wolfangel Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Bruns, Nagel, and Eight Mile intersections	Short Term

Identifier	High Priority Conceptual Project Description	Implementation Timing
17-C	Wolfangel Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Short Term
18-A	Bruns Lane & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangel, Nagel, and Eight Mile intersections	Short Term
18-B	Bruns Lane & Clough Pike: Add backplates with retroreflective boarders to signal heads	Short Term
24-A	Nagel Road & Clough Pike: Update clearance intervals	Short Term
24-B	Nagel Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangel, Bruns, and Eight Mile intersections. Add NBR overlap	Short Term
24-C	Nagel Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Short Term
24-F	Nagel Road & Clough Pike: Revise striping between Nagel Road and Forestlake Drive by changing dedicated left turn lane into Forestlake Drive to a TWLT lane.	Short Term
26-E	Endovalley Drive & Clough Pike: Stripe crosswalk on Julifs Entrance Drive. Move stop line and stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Short Term
26-F	Endovalley Drive & Clough Pike: Replace LED crosswalk signs with RRFB and locate pushbuttons for ADA compliance	Short Term
28-A	Eight Mile Road & Clough Pike: Update clearance intervals	Short Term
28-B	Eight Mile Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangel, Bruns, and Nagel intersections	Short Term
34-A	Mt. Carmel Tobasco Road & Clough Pike: Update clearance intervals	Short Term
34-B	Mt. Carmel Tobasco Road & Clough Pike: Optimize signal timing	Short Term
34-C	Mt. Carmel Tobasco Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Short Term
3-A	Turpin Hills Drive & Clough Pike: Add EBL	Mid Term
5-C	Copperleaf Drive to Newtown Road: Address erosion issues with bend in Clough Creek just east of Newtown Road. Solution could be armoring bend with dump rock or natural stream restoration methods.	Mid Term
6-A	Newtown Road & Clough Pike: Add EBL	Mid Term
10-B	Corbly / Hunley & Clough Pike: Add right turn lane on Hunley	Mid Term
20-A	Foxhollow Drive & Clough Pike: Add WBL	Mid Term
26-H	YMCA Drive to just west of Eight Mile Road: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections.	Mid Term
26-I	Endovalley Drive & Clough Pike: Relocate crosswalk west of the intersection and provide pedestrian refuge island for pedestrian safety and traffic calming.	Mid Term
28-C	Eight Mile Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Mid Term
28-D	Eight Mile Road & Clough Pike: Add SBR	Mid Term

41 projects were identified as medium priority as shown in Table 2. These projects had short-, mid- and long-term timing.

Table 2: Medium Priority Projects

Identifier	Medium Priority Conceptual Project Description	Implementation Timing
2	SR 32 to Turpin Hills Drive: On curves use enhanced delineation, friction pavement, longitudinal rumble (mumble) strips and stripes	Short Term
4-B	Copperleaf Drive & Clough Pike: Reduce intersection radii and stripe crosswalk on Copperleaf	Short Term
7-C	Bartels Road & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Short Term
7-D	Bartels Road & Clough Pike: Improve illumination of crosswalks	Short Term
10-D	Corbly / Hunley & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Short Term
11-B	Berkshire / Goldengate & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Short Term
16-D	Five Mile Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Short Term
18-C	Bruns Lane & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Short Term
18-D	Bruns Lane & Clough Pike: Improve illumination of crosswalks and intersection	Short Term
20-B	Foxhollow Drive & Clough Pike: Add stop line before crosswalk on Foxhollow Drive	Short Term
21-A	Gilchrest Court & Clough Pike: Add crosswalk signage (consider RRFB). Trim trees overhanging sidewalk to improve visibility of pedestrians. Improve illumination of crosswalk.	Short Term
21-B	Gilchrest Court & Clough Pike: Add stop line and stripe crosswalk on Gilchrest	Short Term
22-D	Evanor Lane & Clough Pike: Add stop line before crosswalk on Sandcliff Drive	Short Term
23	Forestcrest Way & Clough Pike: Add stop line and stripe crosswalk on Forestcrest Way	Short Term
24-D	Nagel Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Short Term
24-E	Nagel Road & Clough Pike: Improve illumination of crosswalks and intersection	Short Term
25	Wanninger Lane & Clough Pike: Add stop line and stripe crosswalk on Wanninger Lane	Short Term
26-D	Endovalley Drive & Clough Pike: Add stop line and stripe crosswalk on Endovalley Drive. Move stop sign to match. Add truncated domes on east sidewalk curb ramp for ADA compliance.	Short Term
26-G	Endovalley Drive & Clough Pike: Improve illumination of crosswalk across Clough Pike	Short Term
27-B	Fireside Drive & Clough Pike: Add stop line and stripe crosswalk on Fireside Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Short Term

Identifier	Medium Priority Conceptual Project Description	Implementation Timing
28-F	Eight Mile Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Short Term
28-G	Eight Mile Road & Clough Pike: Add illumination of crosswalks and intersection	Short Term
30	Anderson Cove Lane & Clough Pike: Add truncated domes on sidewalk for ADA compliance.	Short Term
31	Harcourt Estates Drive & Clough Pike: Add stop line and stripe crosswalk on Harcourt Estates Drive. Move stop sign to match.	Short Term
32	Tall Pines Lane & Clough Pike: Add stop line and stripe crosswalk on Tall Pines Lane. Add midblock crosswalk to connect sidewalk networks on either side of Clough Pike.	Short Term
33-B	Muskegon Drive & Clough Pike: Add stop line and stripe crosswalk on Muskegon Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Short Term
5-A	Copperleaf Drive to Newtown Road: Add sidewalk on south side of Clough Pike to close existing gap in sidewalk connections.	Mid Term
6-B	Newtown Road & Clough Pike: Add SBR	Mid Term
16-E	Five Mile Road & Clough Pike: Reduce pavement radii for increased pedestrian safety	Mid Term
16-F	Five Mile Road & Clough Pike: Add median island to reduce pedestrian crossing distance/time.	Mid Term
17-F	Wolfangel Road & Clough Pike: Add sidewalk along the north side of Clough from Clough Chase development to Wolfangel. Add sidewalk along the east side of Wolfangel from Clough to Delas Cove. Add sidewalk along the west side of Wolfangel from Clough to Towerview Lane.	Mid Term
28-E	Eight Mile Road & Clough Pike: Add NBR	Mid Term
29	Eight Mile Road to Anderson Cove Lane: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections. At Anderson Cove Lane realign sidewalk to the east, stripe crosswalk and add stop line.	Mid Term
33-A	Muskegon Drive & Clough Pike: Add WBL	Mid Term
1-B	SR-32 & Clough Pike: Continuous Green Tee Intersection	Long Term
6-D	Newtown Road & Clough Pike: Convert to signalized intersection and add EBL, WBL, WBR & SBL	Long Term
7-E	Bartels Road & Clough Pike: Convert to unsignalized intersection and add RRFB for Clough crosswalk.	Long Term
NB-A	Newtown Road & Bartels Road: Convert to roundabout intersection	Long Term
8-B	Clough Business District: Apply access management by reducing drive widths	Long term
10-C	Corbly / Hunley & Clough Pike: Add right turn lane on Corbly	Long Term
17-E	Wolfangel Road & Clough Pike: Convert to roundabout intersection	Long Term

Finally, 21 projects were identified as low priority as shown in Table 3. These projects also had short-, mid- and long-term timing.

Table 3: Low Priority Projects

Identifier	Low Priority Conceptual Project Description	Implementation Timing
26-A	Endovalley Drive & Clough Pike: Add SBR by restriping existing roadway	Short Term
3-B	Turpin Hills Drive & Clough Pike: Add SBR	Mid Term
4-A	Copperleaf Drive & Clough Pike: Add EBR	Mid Term
6-C	Newtown Road & Clough Pike: Add WBR	Mid Term
9-A	Royalgreen Drive & Clough Pike: Reduce pavement radii for increased pedestrian safety	Mid Term
14-B	State Road & Clough Pike: Add WBL	Mid Term
17-D	Wolfangel Road & Clough Pike: Add WBR and SBR	Mid Term
19	S Curves between Bruns and Foxhollow: Enhanced delineation, improved drainage, friction pavement for curves, longitudinal rumble (mumble) strips and stripes	Mid Term
22-A	Evanor Lane & Clough Pike: Add SBL	Mid Term
22-B	Evanor Lane & Clough Pike: Add EBL & WBL	Mid Term
22-C	Evanor Lane & Clough Pike: Add WBR	Mid Term
22-E	Gilchrest Court to Forestcrest Way: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections.	Mid Term
26-B	Endovalley Drive & Clough Pike: Add EBR	Mid Term
26-C	Endovalley Drive & Clough Pike: Add WBR	Mid Term
27-A	Fireside Drive & Clough Pike: Add EBR	Mid Term
8-C	Clough Business District: Increase lighting illumination level and uniformity	Long Term
8-D	Clough Business District: Add Two-Way Left Turn Lane	Long Term
11-C	Berkshire / Goldengate & Clough Pike: Add left turn lane on Berkshire Road	Long Term
12	Bridges Road & Clough Pike: Add EBR	Long Term
16-C	Five Mile Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Long Term
16-G	Five Mile Road & Clough Pike: Convert to roundabout intersection	Long Term

It should be noted that there were two additional projects given a prioritization of "As Needed" related to slope stabilization along Clough Creek. As conditions change along the creek these areas may require immediate action or may be afforded long term planning, but no specific areas were identified as part of this study.

As an opportunity to consolidate projects there were two possible bundles of projects that should be considered together. The first is a signal timing study bundle for the five existing signalized intersections between Five Mile Road and Eight Mile Road. The study could provide short term improvements at a relatively low cost and would look to coordinate this grouping of traffic signals. The other bundle that should be considered would be a grouping of pavement marking projects that implemented together might provide cost savings if done through a contract. If completed by Township or County crews this bundle may not be necessary. The pavement marking projects for this bundle are shown in Table 4.

Table 4: Pavement Marking Bundle

Identifier	Pavement Marking Bundle Conceptual Project Description	Implementation Priority
14-C	State Road & Clough Pike: Adjust location of stop bar on State	High
24-F	Nagel Road & Clough Pike: Revise striping between Nagel Road and Forestlake Drive by changing dedicated left turn lane into Forestlake Drive to a TWLT lane.	High
26-E	Endovalley Drive & Clough Pike: Stripe crosswalk on Julifs Entrance Drive. Move stop line and stop sign to match. Add truncated domes on sidewalk for ADA compliance.	High
4-B	Copperleaf Drive & Clough Pike: Reduce intersection radii and stripe crosswalk on Copperleaf	Medium
20-B	Foxhollow Drive & Clough Pike: Add stop line before crosswalk on Foxhollow Drive	Medium
21-B	Gilchrest Court & Clough Pike: Add stop line and stripe crosswalk on Gilchrest	Medium
22-D	Evanor Lane & Clough Pike: Add stop line before crosswalk on Sandcliff Drive	Medium
23	Forestcrest Way & Clough Pike: Add stop line and stripe crosswalk on Forestcrest Way	Medium
25	Wanninger Lane & Clough Pike: Add stop line and stripe crosswalk on Wanninger Lane	Medium
26-D	Endovalley Drive & Clough Pike: Add stop line and stripe crosswalk on Endovalley Drive. Move stop sign to match. Add truncated domes on east sidewalk curb ramp for ADA compliance.	Medium
27-B	Fireside Drive & Clough Pike: Add stop line and stripe crosswalk on Fireside Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Medium
31	Harcourt Estates Drive & Clough Pike: Add stop line and stripe crosswalk on Harcourt Estates Drive. Move stop sign to match.	Medium
33-B	Muskegon Drive & Clough Pike: Add stop line and stripe crosswalk on Muskegon Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Medium
26-A	Endovalley Drive & Clough Pike: Add SBR by restriping existing roadway	Low

5.4 POSSIBLE FUNDING SOURCES

Funding each of the recommended transportation projects presents the biggest challenge to project implementation. There are four sources of transportation project funding: federal, state, local, and private. Federal, state, and local transportation programs are facing revenue shortfalls, making funding very competitive. Most transportation projects receive funds from several sources. There are several potential sources of funding for recommended projects, which are identified below.

Federal Funding Programs

- Highway Safety Improvement Program (HSIP); managed by ODOT and County Engineers Association of Ohio (CEAO)
- Surface Transportation Block Grant Program (STBG), formerly Surface Transportation Program (STP); managed by OKI and CEAO
- Transportation Alternatives (TA), which includes Safe Routes to School (SRTS); managed by OKI and ODOT
- Congestion Mitigation Air Quality (CMAQ); managed by OKI

State, Local, and Other Programs

- Recreational Trails Program (RTP) and Clean Ohio Trails Fund (COTF); managed by Ohio Department of Natural Resources (ODNR)
- State Capital Improvement Program (SCIP) and Local Transportation Improvement Program (LTIP); managed by Ohio Public Works Commission (OPWC)
- Southwest Ohio Regional Transit Authority (SORTA) Sales Tax Funding; this is a new program created by the passage of the Hamilton County Sales Tax Levy for SORTA in March 2020. The details of this funding program are still being finalized but are intended to assist with needed transportation projects on or adjacent to Metro bus routes.
- Tax Increment Financing (TIF); this would allow for additional property tax to be collected from new development for capital improvements; managed by Anderson Township

6.0 NEXT STEPS

The next steps for the recommended transportation projects will depend, in part, on the types of funding that are pursued. As previously mentioned, projects that receive federal funding or require a Federal action such as a permit, must comply with the National Environmental Policy Act (NEPA). If a project is funded through state, local or other funds and does not require any permits, there is no NEPA compliance requirement. In general, the steps that will be followed for implementation of the recommended projects are as follows:

1. Selection, allocation of resources towards, and construction of any short-term projects by the Township.
2. Identification of possible funding sources; preparation and submittal of funding applications for larger projects.
3. Development and refinement of project plans.
4. Performance of environmental studies and preparation of NEPA documents, as required. Any project requiring a federal approval (i.e. permit), will require NEPA compliance.
5. Completion of final design, utility relocation, and right-of-way acquisition.
6. Project construction.

APPENDIX A

ACTION PLAN

CLOUGH PIKE CORRIDOR STUDY

ACTION PLAN

CLOUGH PIKE CORRIDOR STUDY

Identifier	Conceptual Project Description	Concept Purpose & Need	Percent Reduction in Average Overall Intersection Delay	Safety Analysis	Public Online Survey Priority	Recommendation	Implementation Timing	Implementation Priority	Phasing Recommendations	Construction Cost Range	Right-of-Way Cost Range	NOTES
1-A	SR-32 & Clough Pike: Increase Max Split for westbound approach from 60 sec to 70 sec	Westbound approach capacity	2020 AM: 5% 2020 PM: 1%		N/A		Short Term	High		N/A	N/A	
1-B	SR-32 & Clough Pike: Continuous Green Tee Intersection	Overall intersection capacity	2040 AM: 73% 2040 PM: 25%		Medium*	Coordinate with ODOT	Long Term	Medium		$1,600,000 to $2,400,000	$150,000 to $300,000	ODOT shows this project as a Medium priority project in the Eastern Corridor Segments II-III Implementation Plan (2019) * Public feedback was received as a part of the development of the Eastern Corridor Segments II-III Implementation Plan (2019)
2	SR 32 to Turpin Hills Drive: On curves use enhanced delineation, friction pavement, longitudinal rumble (mumble) strips and stripes	Safety	N/A		N/A	Current crash history does not indicate issue at this time, however with the upcoming Clough Creek subdivision development in this area these countermeasures should be considered at that time.	Short Term	Medium		<$100,000	N/A	
3-A	Turpin Hills Drive & Clough Pike: Add EBL	Volume warrants turn lane. Secondary safety and capacity benefits	2040 AM: 72% 2040 PM: 46% *Delay reduction for southbound approach*		High		Mid Term	High	Could be bundled with 3-B	$125,000 to $275,000	Strip Take	Could add WBL into private drive?
3-B	Turpin Hills Drive & Clough Pike: Add SBR	Southbound approach capacity			High		Mid Term	Low	Could be bundled with 3-A	$75,000 to $125,000	Strip Take	
4-A	Copperleaf Drive & Clough Pike: Add EBR	Volume warrants turn lane	2040 AM: 3% 2040 PM: 7% *Delay reduction for northbound approach*		Low		Mid Term	Low		$75,000 to $150,000	Strip Take	
4-B	Copperleaf Drive & Clough Pike: Reduce intersection radii and stripe crosswalk on Copperleaf	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$100,000	N/A	Radii adjustment could be considered with 4-A.
5-A	Copperleaf Drive to Newtown Road: Add sidewalk on south side of Clough Pike to close exisitng gap in sidewalk connections.	Pedestrian connectivity	N/A		Medium		Mid Term	Medium		$350,000 to $500,000	Strip Take	Could be done in conjunction with new development.
5-B	Copperleaf Drive to Newtown Road: Add guardrail or concrete barrier to protect Clough Pike traffic from eroding drop-off in bend of Clough Creek just east of Newtown Road.	Safety	N/A		N/A		Short Term	High		<$50,000	N/A	HCEO is currently conducting geotechnical exploration at this location for the purpose of designing and constructing a retaining wall to prevent continued erosion. A sidewalk connection in this area could be added to the project when it is constructed.
5-C	Copperleaf Drive to Newtown Road: Address erosion issues with bend in Clough Creek just east of Newtown Road. Solution could be armoring bend with dump rock or natural stream restoration methods.	Roadway Preservation	N/A		N/A		Mid Term	High		$100,000 to $500,000	TBD	

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6-A	Newtown Road & Clough Pike: Add EBL	Volume warrants turn lane. Secondary safety and capacity benefits	2040 AM: 75% 2040 PM: 55% **Delay reduction for southbound approach*		High		Mid Term	High		$200,000 to $500,000	Strip Take	Would also create WBL into apartment complex
6-B	Newtown Road & Clough Pike: Add SBR	Southbound approach capacity			High		Mid Term	Medium		$100,000 to $500,000	Strip Take	
6-C	Newtown Road & Clough Pike: Add WBR	Volume warrants turn lane			N/A		Mid Term	Low	Not needed if 6-D is planned.	$100,000 to $500,000	Strip Take	
6-D	Newtown Road & Clough Pike: Convert to signalized intersection and add EBL, WBL, WBR & SBL	Capacity	N/A		Medium		Long Term	Medium	Concurrent with 7-E	$750,000 to $1,250,000	Strip Take	
7-A	Bartels Road & Clough Pike: Optimize signal timing	Capacity	2020 AM: 22% 2020 PM: 28%		N/A	Perform a signal timing study, see Note 1.	Short Term	High		N/A	N/A	
7-B	Bartels Road & Clough Pike: Add WBR	Capacity	2040 AM: 86% 2040 PM: 34%		N/A	Not feasible due to impacts to historic property	N/A	N/A	--	--	--	
7-C	Bartels Road & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Pedestrian safety	N/A		N/A	Not required if Concept 7-E is selected.	Short Term	Medium		<$50,000	N/A	
7-D	Bartels Road & Clough Pike: Improve illumination of crosswalks	Pedestrian safety	N/A		N/A		Short Term	Medium	Concurrent with 7-E	<$100,000	N/A	
7-E	Bartels Road & Clough Pike: Convert to unsignalized intersection and add RRFB for Clough crosswalk.	Capacity and pedestrian safety	N/A		Low	Bartels to be made right in/right-out only. Do not recommend converting to one-way up the hill and right-in only.	Long Term	Medium	Concurrent with 6-D & NB-A	<$100,000	N/A	
NB-A	Newtown Road & Bartels Road: Convert to roundabout intersection	Capacity	N/A		Low	Recommended alternative over NB-B	Long Term	Medium	Concurrent with 6-D & 7-E	$1,000,000 to $1,500,000		
NB-B	Newtown Road & Bartels Road: Close Bartels Road between Newtown Road and Turpin HS. Extend school entrance drive west to Newtown Road with new roundabout intersection at Mercers Pointe Drive. Remove Bartels Road connection between Turpin HS and Newtown Road.	Capacity	N/A		N/A	Not recommended over NB-A based on cost and need for additional R/W	N/A	N/A		$1,500,000 to $2,000,000	$300,000 to $500,000	
8-A	Bartels Road to Berkshire Road: Monitor and stabilize slope adjacent to Clough Creek.	Roadway Preservation	N/A		N/A		TBD	As Needed		TBD	TBD	
9-A	Royalgreen Drive & Clough Pike: Reduce pavement radii for increased pedestrian safety	Pedestrian safety	N/A		N/A		Mid Term	Low		<$100,000	N/A	
9-B	Royalgreen Drive & Clough Pike: Convert to roundabout intersection	Capacity and safety	N/A		N/A	Not feasible due to proximity of Clough Creek	N/A	N/A	--	--	--	
8-B	Clough Business District: Apply access management by reducing drive widths	Safety	N/A	24 total crashes over a 3-year period, 4 angle, 1 fixed object, 17 rear-end, and 2 right turn	N/A	Should be considered with redevelopment per the Clough Business District Redevelopment Plan (May 2007)	Long term	Medium		TBD	TBD	

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8-C	Clough Business District: Increase lighting illumination level and uniformity	Safety	N/A		N/A	Should be considered with redevelopment per the Clough Business District Redevelopment Plan (May 2007)	Long Term	Low		TBD	TBD	
8-D	Clough Business District: Add Two-Way Left Turn Lane	Capacity and safety	N/A	TWLTL will help correct the 13 EB rear-end crashes	N/A	Should be considered with redevelopment per the Clough Business District Redevelopment Plan (May 2007)	Long term	Low		TBD	TBD	
10-A	Corbly / Hunley & Clough Pike: Optimize signal timing	Capacity	2020 AM: 8% 2020 PM: 9%		N/A	Perform a signal timing study, see Note 1.	Short Term	High		N/A	N/A	
10-B	Corbly / Hunley & Clough Pike: Add right turn lane on Hunley	Capacity	2040 AM: 62% 2040 PM: 10%		Medium		Mid Term	High		$100,000 to $300,000	N/A	
10-C	Corbly / Hunley & Clough Pike: Add right turn lane on Corbly	Capacity	2040 AM: 62% 2040 PM: 49%		Medium	Recommend consideration when structure needs replacement	Long Term	Medium		$500,000 to $1,000,000	Strip Take	
10-D	Corbly / Hunley & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
11-A	Berkshire / Goldengate & Clough Pike: Optimize signal timing	Capacity	2020 AM: 28% 2020 PM: 2%		N/A	Perform a signal timing study, see Note 1.	Short Term	High		N/A	N/A	
11-B	Berkshire / Goldengate & Clough Pike: Upgrade signalized crosswalk pushbuttons for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
11-C	Berkshire / Goldengate & Clough Pike: Add left turn lane on Berkshire Road	Capacity	2040 AM: 0% 2040 PM: 48%		N/A	Recommend consideration when structure needs replacement	Long Term	Low		$500,000 to $1,000,000	Strip Take	
12	Bridges Road & Clough Pike: Add EBR	Volume warrants turn lane	2040 AM: 7% 2040 PM: 7% **Delay reduction for northbound approach*		N/A	Recommend consideration when structure needs replacement.	Long Term	Low		$500,000 to $1,000,000	Strip Take	Would also improve sight distance issues for vehicles on Bridges.
13	Bridges Road to State Road: Monitor and stabilize slope adjacent to Clough Creek.	Roadway Preservation	N/A		N/A		TBD	As Needed		TBD	TBD	
14-A	State Road & Clough Pike: Add EBR	Volume warrants turn lane	2040 AM: 39% 2040 PM: 34% **Delay reduction for northbound approach*		N/A	Not recommended. Due to geometric layout of intersection benefit of EBR is expected to be minimal.	N/A	N/A	--	--	--	
14-B	State Road & Clough Pike: Add WBL	Volume warrants turn lane. Secondary safety and capacity benefits			N/A		Mid Term	Low		$100,000 to $500,000	Strip Take	
14-C	State Road & Clough Pike: Adjust location of stop bar on State	Sight Distance	N/A		N/A		Short Term	High	Marking Project Bundle	<$100,000	N/A	

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15	S Curves between State and Candlemaker: Friction pavement for curves, longitudinal rumble (mumble) strips and stripes	Safety	N/A	34 total crashes over a 3-year period. The majority were fixed object crashes (17). Road geometry was the cause of 24 of the crashes. The majority occurred in wet conditions (26).	N/A		Short Term	High		<$100,000	N/A	
16-A	Five Mile Road & Clough Pike: Update clearance intervals	Safety	N/A	16 total crashes over a 3-year period.	N/A		Short Term	High		N/A	N/A	
16-B	Five Mile Road & Clough Pike: Optimize signal timing and coordinate with Wolfangle, Bruns, Nagel, and Eight Mile intersections	Capacity	2020 AM: 16% 2020 PM: 1%		N/A	Perform a signal timing study, see Note 1.	Short Term	High	Signal Timing Study Bundle	<$50,000 for study and modifications	N/A	
16-C	Five Mile Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A	16 total crashes over a 3-year period.	N/A		Long Term	Low		$100,000 to $200,000	N/A	This project is listed as a low priority project because adding backplates will likely require the replacement of strain poles.
16-D	Five Mile Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$100,000	N/A	
16-E	Five Mile Road & Clough Pike: Reduce pavement radii for increased pedestrian safety	Pedestrian safety	N/A		N/A		Mid Term	Medium		<$100,000	N/A	
16-F	Five Mile Road & Clough Pike: Add median island to reduce pedestrian crossing distance/time.	Pedestrian safety	N/A		N/A		Mid Term	Medium		<$100,000	N/A	
16-G	Five Mile Road & Clough Pike: Convert to roundabout intersection	Capacity and safety	2040 AM: 60% 2040 PM: 73%	16 total crashes over a 3-year period.	Medium		Long Term	Low		$1,750,000 to $2,500,000	Strip Take	
17-A	Wolfangel Road & Clough Pike: Update clearance intervals	Safety	N/A	18 total crashes over a 3-year period.	N/A		Short Term	High		N/A	N/A	
17-B	Wolfangel Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Bruns, Nagel, and Eight Mile intersections	Capacity	2020 AM: 14% 2020 PM: 17%		N/A	Perform a signal timing study, see Note 1.	Short Term	High	Signal Timing Study Bundle	<$50,000 for study and modifications	N/A	
17-C	Wolfangel Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A	18 total crashes over a 3-year period.	N/A		Short Term	High		<$50,000	N/A	
17-D	Wolfangel Road & Clough Pike: Add WBR and SBR	Capacity	2040 AM: 62% 2040 PM: 27%		Medium	Focus on 17-E as solution for this intersection.	Mid Term	Low		$300,000 to $700,000	Strip Take	
17-E	Wolfangel Road & Clough Pike: Convert to roundabout intersection	Capacity and safety	2040 AM: 84% 2040 PM: 76%	18 total crashes over a 3-year period.	Medium		Long Term	Medium		$1,500,000 to $2,000,000	Strip Take	
17-F	Wolfangel Road & Clough Pike: Add sidewalk along the north side of Clough from Clough Chase development to Wolfangle. Add sidewalk along the east side of Wolfangle from Clough to Delas Cove. Add sidewalk along the west side of Wolfangle from Clough to Towerview Lane.	Pedestrian connectivity	N/A		Medium		Mid Term	Medium		$200,000 to $400,000	Strip Take	

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18-A	Bruns Lane & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangle, Nagel, and Eight Mile intersections	Capacity	2020 AM: 30% 2020 PM: 41%		N/A	Perform a signal timing study, see Note 1.	Short Term	High	Signal Timing Study Bundle	<$50,000 for study and modifications	N/A	
18-B	Bruns Lane & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A		N/A		Short Term	High		<$50,000	N/A	
18-C	Bruns Lane & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
18-D	Bruns Lane & Clough Pike: Improve illumination of crosswalks and intersection	Pedestrian safety	N/A		N/A		Short Term	Medium		<$100,000	N/A	
19	S Curves between Bruns and Foxhollow: Enhanced delineation, improved drainage, friction pavement for curves, longitudinal rumble (mumble) strips and stripes	Safety	N/A	18 total crashes over a 3-year period. The majority were fixed object crashes (7). Road geometry was the cause of 10 of the crashes. The majority occurred in wet conditions (13).	N/A	Re-examine after micromilling to see if additional countermeasures are required.	Mid Term	Low		<$100,000	Possible Strip Take	Pavement Microgrinding is scheduled to be performed in 2020 by HCEO to increase pavement friction in the curves.
20-A	Foxhollow Drive & Clough Pike: Add WBL	Safety	2040 AM: 3% 2040 PM: 6% *Delay reduction for northbound approach	22 EB rear-end crashes over a 3-year period.	Medium		Mid Term	High		$100,000 to $250,000	Strip Take	
20-B	Foxhollow Drive & Clough Pike: Add stop line before crosswalk on Foxhollow Drive	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
21-A	Gilchrest Court & Clough Pike: Add crosswalk signage. Trim trees overhanging sidewalk to improve visibility of pedestrians. Improve illumination of crosswalk.	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
21-B	Gilchrest Court & Clough Pike: Add stop line and stripe crosswalk on Gilchrest	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
22-A	Evanor Lane & Clough Pike: Add SBL	Southbound approach capacity	2040 AM: 33% 2040 PM: 58% *Delay reduction for southbound approach		Medium		Mid Term	Low		<$100,000	Strip Take	
22-B	Evanor Lane & Clough Pike: Add EBL & WBL	Volume warrants turn lane. Secondary safety and capacity benefits			Medium		Mid Term	Low		$100,000 to $500,000	Strip Take	
22-C	Evanor Lane & Clough Pike: Add WBR	Volume warrants turn lane			Medium		Mid Term	Low		$75,000 to $125,000	Strip Take	
22-D	Evanor Lane & Clough Pike: Add stop line before crosswalk on Sandcliff Drive	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
22-E	Gilchrest Court to Forestcrest Way: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections.	Pedestrian safety	N/A		Low		Mid Term	Low		$75,000 to $150,000	Strip Take	

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23	Forestcrest Way & Clough Pike: Add stop line and stripe crosswalk on Forestcrest Way	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
24-A	Nagel Road & Clough Pike: Update clearance intervals	Safety	N/A	13 total crashes over a 3-year period.	N/A		Short Term	High		N/A	N/A	
24-B	Nagel Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangle, Bruns, and Eight Mile intersections. Add NBR overlap	Capacity	2020 AM: 29% 2020 PM: 19%		N/A	Perform a signal timing study, see Note 1.	Short Term	High	Signal Timing Study Bundle	<$50,000 for study and modifications	N/A	
24-C	Nagel Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A	13 total crashes over a 3-year period.	N/A		Short Term	High		<$50,000	N/A	
24-D	Nagel Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
24-E	Nagel Road & Clough Pike: Improve illumination of crosswalks and intersection	Pedestrian safety	N/A		N/A		Short Term	Medium		<$100,000	N/A	
24-F	Nagel Road & Clough Pike: Revise striping between Nagel Road and Forestlake Drive by changing dedicated left turn lane into Forestlake Drive to a TWLT lane.	.Safety	N/A		N/A		Short Term	High	Marking Project Bundle	<$50,000		
25	Wanninger Lane & Clough Pike: Add stop line and stripe crosswalk on Wanninger Lane	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
26-A	Endovalley Drive & Clough Pike: Add SBR by restriping existing roadway	Southbound approach capacity	2040 AM: 65% 2040 PM: 44% *Delay reduction for southbound approach		Medium		Short Term	Low	Marking Project Bundle	<$50,000	N/A	
26-B	Endovalley Drive & Clough Pike: Add EBR	Volume warrants turn lane			Medium		Mid Term	Low		$75,000 to $125,000	Strip Take	
26-C	Endovalley Drive & Clough Pike: Add WBR	Volume warrants turn lane			Medium		Mid Term	Low		$75,000 to $125,000	Strip Take	
26-D	Endovalley Drive & Clough Pike: Add stop line and stripe crosswalk on Endovalley Drive. Move stop sign to match. Add truncated domes on east sidewalk curb ramp for ADA compliance.	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
26-E	Endovalley Drive & Clough Pike: Stripe crosswalk on Julifs Entrance Drive. Move stop line and stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Pedestrian safety	N/A		N/A		Short Term	High	Marking Project Bundle	<$50,000	N/A	
26-F	Endovalley Drive & Clough Pike: Replace LED crosswalk signs with RRFB and locate pushbuttons for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	High		<$50,000	N/A	Not required if 26-I is being advanced.
26-G	Endovalley Drive & Clough Pike: Improve illumination of crosswalk across Clough Pike	Pedestrian safety	N/A		N/A		Short Term	Medium		<$100,000	N/A	
26-H	YMCA Drive to just west of Eight Mile Road: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections.	Pedestrian safety	N/A		High		Mid Term	High	Bundle with 26-I	$200,000 to $300,000	Strip Take	
26-I	Endovalley Drive & Clough Pike: Relocate crosswalk west of the intersection and provide pedestrian refuge island for pedestrian safety and traffic calming.	Pedestrian safety	N/A		N/A		Mid Term	High	Bundle with 26-H	<$50,000	N/A	

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27-A	Fireside Drive & Clough Pike: Add EBR	Volume warrants turn lane	2040 AM: 0% 2040 PM: 3% **Delay reduction for northbound approach*		N/A		Mid Term	Low		$100,000 to $250,000	Strip Take	
27-B	Fireside Drive & Clough Pike: Add stop line and stripe crosswalk on Fireside Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
28-A	Eight Mile Road & Clough Pike: Update clearance intervals	Safety	N/A	27 total crashes over a 3-year period.	N/A		Short Term	High		N/A	N/A	
28-B	Eight Mile Road & Clough Pike: Optimize signal timing and coordinate with Five Mile, Wolfangle, Bruns, and Nagel intersections	Capacity	2020 AM: -8% 2020 PM: 1%		N/A	Perform a signal timing study, see Note 1.	Short Term	High	Signal Timing Study Bundle	<$50,000 for study and modifications	N/A	
28-C	Eight Mile Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A	27 total crashes over a 3-year period.	N/A	Adding backplates will likely require replacement of strain pole in NW corner. Plan with other signal work or addition of SBR.	Mid Term	High	Bundle with 28-D	<$50,000	N/A	
28-D	Eight Mile Road & Clough Pike: Add SBR	Capacity	2040 AM: 52% 2040 PM: 36%		Medium		Mid Term	High	Bundle with 28-C	$150,000 to $300,000	Strip Take	
28-E	Eight Mile Road & Clough Pike: Add NBR	Capacity	2040 AM: 26% 2040 PM: 16%		Medium		Mid Term	Medium		$150,000 to $400,000	Strip Take	
28-F	Eight Mile Road & Clough Pike: Upgrade signalized crosswalk pushbuttons and curb ramps for ADA compliance	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	
28-G	Eight Mile Road & Clough Pike: Add illumination of crosswalks and intersection	Pedestrian safety	N/A		N/A		Short Term	Medium		<$100,000	N/A	
29	Eight Mile Road to Anderson Cove Lane: Add sidewalk on north side of Clough Pike to close existing gap in sidewalk connections. At Anderson Cove Lane realign sidewalk to the east, stripe crosswalk and add stop line.	Pedestrian connectivity	N/A		Medium		Mid Term	Medium	Bundle with 30	$250,000 to $400,000	Strip Take	
30	Anderson Cove Lane & Clough Pike: Add truncated domes on sidewalk for ADA compliance.	Pedestrian safety	N/A		N/A		Short Term	Medium	Bundle with 29	<$50,000	N/A	
31	Harcourt Estates Drive & Clough Pike: Add stop line and stripe crosswalk on Harcourt Estates Drive.	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
32	Tall Pines Lane & Clough Pike: Add stop line and stripe crosswalk on Tall Pines Lane. Add midblock crosswalk to connect sidewalk networks on either side of Clough Pike.	Pedestrian safety	N/A		N/A		Short Term	Medium		<$50,000	N/A	

ACTION PLAN

CLOUGH PIKE CORRIDOR STUDY

Identifier	Conceptual Project Description	Concept Purpose & Need	Percent Reduction in Average Overall Intersection Delay	Safety Analysis	Public Online Survey Priority	Recommendation	Implementation Timing	Implementation Priority	Phasing Recommendations	Construction Cost Range	Right-of-Way Cost Range	NOTES
33-A	Muskegon Drive & Clough Pike: Add WBL	Volume warrants turn lane. Secondary safety and capacity benefits	2040 AM: 6% 2040 PM: 24% **Delay reduction for northbound approach*		Medium		Mid Term	Medium		$100,000 to $250,000	Strip Take	
33-B	Muskegon Drive & Clough Pike: Add stop line and stripe crosswalk on Muskegon Drive. Move stop sign to match. Add truncated domes on sidewalk for ADA compliance.	Pedestrian safety	N/A		N/A		Short Term	Medium	Marking Project Bundle	<$50,000	N/A	
34-A	Mt. Carmel Tobasco Road & Clough Pike: Update clearance intervals	Safety	N/A	97 total crashes over a 3-year period.	N/A		Short Term	High		N/A	N/A	
34-B	Mt. Carmel Tobasco Road & Clough Pike: Optimize signal timing	Capacity	2020 AM: 5% 2020 PM: 20%		N/A		Short Term	High		N/A	N/A	
34-C	Mt. Carmel Tobasco Road & Clough Pike: Add backplates with retroreflective boarders to signal heads	Safety	N/A	97 total crashes over a 3-year period.	N/A		Short Term	High		<$50,000	N/A	

1. The signal timing study shall follow ODOT's Signal Timing Scope and at a minimum include equipment inspection, travel time studies of the existing conditions, development of new timing plans, installation of new timing plans, travel time studies of the optimized conditions, and a report documenting the operational improvements.