CR 19 (Slate Quarry Rd/Bulls Head Rd) Safety Assessment

Eighmyville Rd – Milan Hollow Rd, Town of Clinton
August 2019

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Acknowledgment

The preparation of this document has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this document do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

1. Introduction

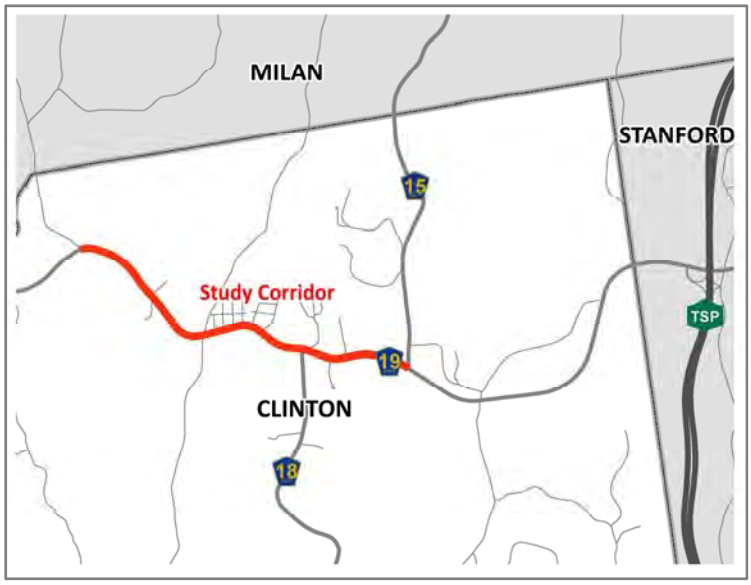
The Dutchess County Transportation Council (DCTC) conducted a Safety Assessment (SA) of CR 19 (Slate Quarry Rd/Bulls Head Rd) from Eighmyville Rd to CR 15 (Milan Hollow Rd) in support of its goal to improve transportation safety in Dutchess County. The SA is intended to provide the facility owner, Dutchess County, with a list of opportunities for low-cost, short-range safety improvements, and if warranted, more expensive long-range improvements. The DCTC selected the assessment location based on local resident concerns and a request from the Town of Clinton, as well as after a review of countywide crash data. This location also complements DCTC's 2014 SA of CR 19 (Slate Quarry Rd) in the Town of Rhinebeck (Route 9G to White Schoolhouse Rd).

The key issues identified for this segment included vehicle speeds unreasonable for conditions, horizontal and vertical curves, wet-road crashes, and deer/animal collisions. The SA team strove to identify low-cost, high-impact improvements to address these issues.

2. Road Characteristics

CR 19 runs west to east between NYS Route 9G in the Town of Rhinebeck and the Taconic State Parkway (TSP) in the Town of Clinton, and then continues southeast to NYS Route 82 in the Town of Stanford. The 11.3-mile road changes its name to Bulls Head Rd at the intersection of CR 18 (Centre Rd) in Clinton. The road is maintained by the Dutchess County Department of Public Works (DCDPW). This SA focused on a 1.7-mile portion of CR 19 in the Town of Clinton (see Fig. 1).

Fig. 1. Study Corridor



Within the study area, CR 19 is a two-way, two-lane rural major collector with asphalt shoulders. The posted speed limit is 45 miles per hour (mph) between Eighmyville and Centre Rd, and 55 mph between Centre Rd and Milan Hollow Rd. There are substantial horizontal and vertical curves, particularly near Eighmyville Rd and Lake Dr. Based on measurements made during the assessment, travel lanes are approximately 11 feet wide from the shoulder/fog line to the centerline with shoulder widths of 1-4 feet. The pavement condition was assessed in 2017 and was rated good with a Pavement Condition Index (PCI) of 90-92. There are 15 intersecting roads in the study corridor; most are

Town owned, while two are private. Most of the roads are also in fair to good condition, though several are unpaved. Five are stop-controlled; the others have no traffic control signage.

CR 19 serves as a popular connection between Route 9G and the TSP. Based on traffic count data, heavy trucks do not appear to be a major issue, though school buses travel on CR 19 and trucks and campers use the road to access the Omega Institute and the Interlake Campground/RV park. See Fig. 2 and 3 for representative images of the road.

The DCTC routinely collects traffic volume and speed data on County and local roads throughout Dutchess County. For this section of CR 19, station #828359, located between Stissing View Dr and Lake Dr, provided the relevant data for this assessment. Counts at this station have been collected seven times over an 18-year period: 2003, 2007, 2010, 2013, 2014, 2017 and 2018. Based on these counts, the Annual Average Daily Traffic (AADT) volume is about 3,850 vehicles per day, with a peak hourly volume of about 400 vehicles in the evening (typically 5-6 p.m.). The Town Supervisor noted that traffic increases substantially when there is an event at the County Fairgrounds. Traffic is evenly split westbound and eastbound. Heavy vehicles accounted for between 4.5 and 6 percent of traffic, which is typical for most of our County roads. At the station location, the most recent 85th percentile speeds (2017) were 58 mph eastbound and 50 mph westbound, which is significantly higher than the 45-mph limit, though lower than speeds recorded in 2014, prior to the limit being reduced from 55 to 45 mph west of Centre Rd.

Fig. 2. CR 19 looking west from across Fourth Ave.

The lack of substantial shoulders and the relatively high volume of traffic and high operating speeds discourage walking and bicycling on the road, though several bicyclists were observed during the assessment. Throughout the corridor, a variety of warning signs are used, including curve warning signs with speed advisory plaques, chevrons, arrow (sharp turn) warning signs, intersection warning signs,

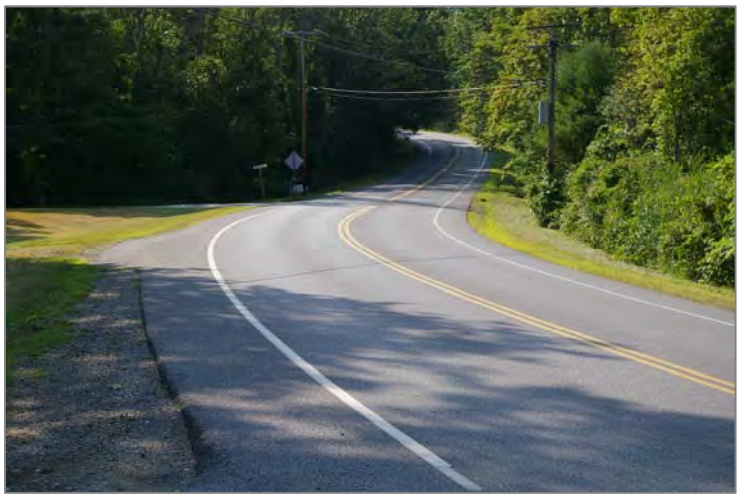


Fig. 3. CR 19 looking east towards Bartles Landing.

and one slippery when wet sign. Guiderails are also present along some sections of the road.

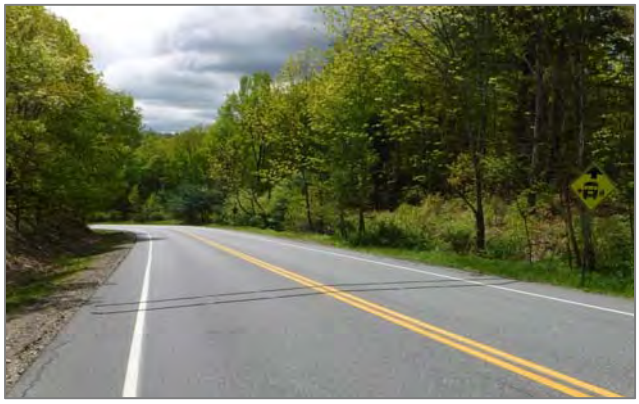


Fig. 4. Traffic count station #828359 on CR 19 west of Lake Dr.

Table 1 below shows AADT and speed data for the count station; Fig. 4 shows the traffic counter placement in the field.

Table 1. CR 19 Traffic Count Data (Station #828359).

Year	AADT	Month	Peak Hour Data		85% speed		% heavy vehicles
			Hour	Volume	EB	WB	
2018	3,855	November	4-5 pm	378	n/a	n/a	n/a
2017	4,155	May	5-6 pm	416	57.6	50.3	4.4%
2014	3,843	May	5-6 pm	388	59.3	55.8	6.1%
2013	3,600	April	5-6 pm	357	n/a	n/a	n/a
2010	3,673	June	5-6 pm	355	n/a	n/a	n/a
2007	4,042	October	5-6 pm	425	n/a	n/a	n/a
2003	3,801	July	5-6 pm	345	n/a	n/a	n/a

3. Safety Assessment Process

This assessment was the sixth application of the SA process in Dutchess County, building on assessments completed by the DCTC since 2012, including an assessment on CR 19 (Slate Quarry Rd) in the Town of Rhinebeck in 2014. As in previous assessments, the DCTC conducted this SA based on Road Safety Audit (RSA) guidance from the Federal Highway Administration (FHWA) and Safety Assessment Guidelines from the New York State Association of Metropolitan Planning Associations (NYSAMPO). The SA relied on the participation of an interdisciplinary team from partner agencies, which included the following individuals:

- Steve Gill, Dutchess County Department of Public Works – Engineering
- Emmanuel Mfon, Dutchess County Department of Public Works– Engineering
- Rob Zahorsky, Dutchess County Department of Public Works – Highway Maintenance
- Ray Oberly, Town of Clinton Supervisor
- Brian Dingee, Town of Clinton Fire Department/Highway Department
- Lt. Mike Dampf, Dutchess County Sherriff's Office
- Trooper Lisa Butenhoff, NYS Police
- Mark Debald, DCTC
- Ashley Curtis, DCTC
- Emily Dozier, DCTC
- Dylan Tuttle, DCTC

Fig. 5. The SA team included representatives from the Town, State Police, and county law enforcement, highway, engineering, and planning agencies.

The SA took place on July 24-25, 2019 starting with a pre-assessment meeting on July 24th followed by site visits that afternoon and the morning of July 25th. A post-assessment meeting was held on July 25th to discuss the team's observations and explore possible safety improvements. The post-assessment followed a prompt list that the DCTC created based on the FHWA RSA software program and other checklists. The team used a variety of information to complete the SA, including crash and traffic data, field work, and input from team members based on their years of experience with the corridor.

4. Crash Analysis

The DCTC analyzed five years of crash data (2014-2018) from the NYS Accident Location Information System (ALIS) database, which is a multi-agency reporting system operated by the NYS Office of Cyber Security & Critical Infrastructure Coordination, the NYS Department of Motor Vehicles and the NYS Department of Transportation. ALIS data originates from the Traffic and Criminal Software (TraCS) system used by police agencies and submitted via DMV accident report forms (Form MV-104).

This 1.7-mile stretch of CR 19 experienced 92 crashes over the five-year period, which resulted in one fatality and 26 reported injuries. The crash analysis indicated that only 11 percent of crashes involved another motor vehicle; 24 percent involved an animal or deer (almost double the county average of 13 percent); and 65 percent were collisions with earth/ditches, various fixed objects, or simply running off the road. Wet or snowy/icy road surface conditions were

Fig. 6. Evidence of a previous crash at a utility pole along the study corridor.

present during 53 percent of the crashes (more than double the county average of 24 percent), and 38 percent of crashes occurred during dark conditions (higher than the county average of 26 percent). The most common apparent crash factor cited was unsafe speed (41 percent) followed by animal's action (26 percent) and slippery pavement (10 percent).

Of the 92 crashes, 30 occurred near the Eighmyville Rd intersection, with most of these just east of the intersection. All but two were single-vehicle crashes; 90 percent were collisions with various fixed objects, ditches, or simply running off the road. Unsafe speed was cited for 63 percent of these crashes, and wet or snowy/icy pavement was present in 67 percent of the crashes. More than 60 percent of these crashes were eastbound, with most eastbound crashes occurring east of the intersection and most westbound crashes occurring west of it. Forty percent of crashes in this area occurred at night. See Fig. 7 for a view of the Eighmyville Rd intersection.

Another 33 crashes were spread between the Fifth Ave intersection and west of the Lake Dr/Silver Lake Rd intersection; the largest cluster of these was just west of Lake Dr/Silver Lake Rd. More than 70 percent were collisions with various fixed objects, ditches, or simply running off the road. Unsafe speed was cited for 48 percent of these crashes, and wet or snowy/icy pavement was present in 76 percent of the crashes. Almost 60 percent of these crashes were eastbound.

Fig. 7. CR 19 looking west at the Eighmyville Rd intersection. This area experienced the highest concentration of crashes on the corridor from 2014-2018.

Finally, 11 crashes were located around Milan Hollow Rd. At this location, five (45 percent) were collisions with guiderail, sign posts, or overturning, while four (36 percent) were collisions with deer. Unsafe speed was cited for two of the crashes (18 percent), and wet or snowy/icy pavement was present in three of the crashes (27 percent). Most of these crashes were westbound (82 percent), likely due to the downhill slope and curve.

Table 2 below summarizes crash data for the study corridor, while Fig. 8 shows the locations of crashes on the study corridor.

Fig. 8 - CR 19 (Slate Quarry Rd/Bulls Head Rd): Eighmyville Rd - CR15 (Milan Hollow Rd)
Reported Crashes (2014-2018)

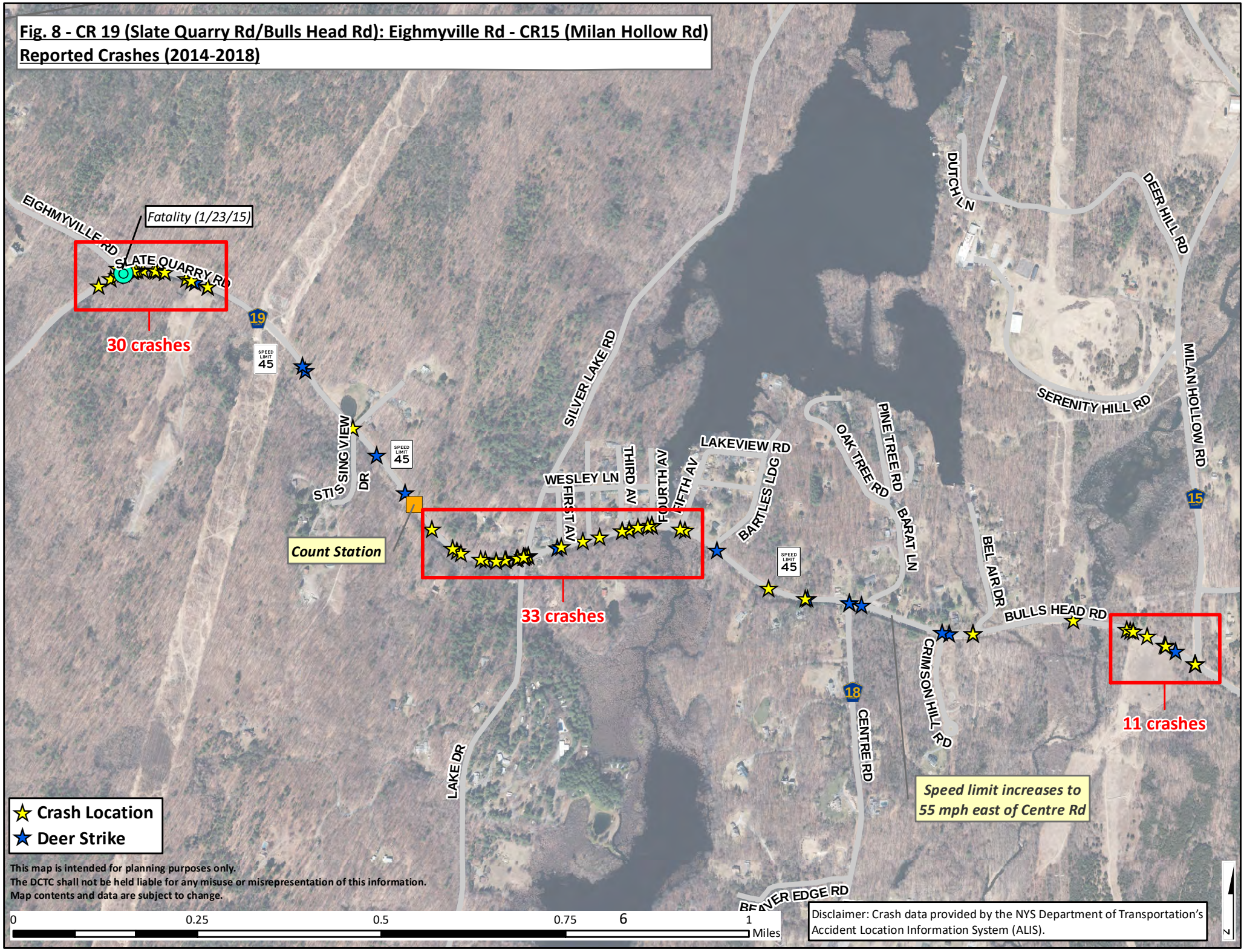


Table 2. CR 19 Crash Data Summary (2014-2018)

Year	Number of Crashes	Number of Injuries	Number of Fatalities	Animal Involved	Light Condition		Road Surface Condition		
					Daylight	Dark	Dry	Wet	Snow
2014	19	7	0	5	13	6	10	6	3
2015	23	6	1	6	11	12	12	7	4
2016*	18	7	0	4	11	6	7	8	2
2017	16	2	0	6	9	7	10	6	0
2018	16	4	0	1	12	4	3	13	0
Total	**92**	**26**	**1**	**22**	**56**	**35**	**42**	**40**	**9**

*2016: One 'unknown' for Light & Road Surface Conditions.

5. Findings

This assessment describes the issues identified by the SA team as opportunities to improve overall safety along the corridor. For each safety issue, an assessment of the safety risk and suggestions for improvements are included. These suggestions should not be viewed as design-level recommendations; rather, they are intended to be illustrative of potential solutions to the identified safety issues and are presented for consideration by the facility owner. The findings are organized by first addressing overall safety issues and then specific issues related to four locations along the corridor:

- CR 19 (Slate Quarry Rd)/Eighmyville Rd intersection
- CR 19 (Slate Quarry Rd)/Lake Dr intersection
- CR 19 (Slate Quarry Rd/Bulls Head Rd)/CR 18 (Centre Rd) intersection
- CR 19 (Bulls Head Rd)/CR 15 (Milan Hollow Rd) intersection

Many of the suggested improvements relate to the use of traffic control signs; therefore, where possible, the sign number from the 2009 Manual on Uniform Traffic Control Devices (MUTCD) is included with the sign name. In making recommendations, the SA team attempted to balance the need to inform drivers about conditions without over-saturating the corridor with signs. As per the MUTCD, regulatory and warning signs should be used conservatively because these signs tend to lose their effectiveness if used to excess. Unless otherwise noted, suggested improvements fall under the responsibility of DCDPW. Table 3 (at the end of the report) summarizes the recommendations and responsible parties.

Overall Safety Issues

The SA team identified several corridor-wide safety issues: operating speeds, wet weather crashes, sign characteristics, road departures and shoulders, and deer/animal strikes.

Issue #1: Vehicle operating speeds

Safety Concern: Vehicle operating speeds appear too high in some locations or during poor road conditions.

Observations: The regulatory speed limit of 45 mph west of Centre Rd appears to be generally acceptable for this corridor under most road conditions. However, operating speeds appear higher than desired in some locations, especially for vehicles traveling downhill approaching Lake Dr. As noted above, 85th percentile speeds near Lake Dr were close to 58 mph for eastbound vehicles, and more than 51 mph for westbound vehicles. These high operating speeds indicate that drivers feel comfortable driving above the posted speed limit; this perception may be reinforced by the 55 mph zone east of Centre Rd and also the downhill approach to Milan Hollow Rd for westbound vehicles.

The high operating speeds on the corridor pose a safety issue for vehicles negotiating the more challenging horizontal and vertical alignments on CR 19, especially during wet or snowy road conditions. They also limit reaction times to deer and animal incursions along the road. Unsafe speed was cited in more than 40 percent of crash reports on the corridor.

The speed limit increases to 55 mph east of Centre Rd; based on discussions with the SA team, this may be because the road name changes here from Slate Quarry to Bulls Head Rd and the 2014 speed limit reduction was only applied to Slate Quarry Rd.

Risk Analysis: Elevated operating speeds increase the probability of a severe crash. The vertical geometry near the Lake Dr intersection and the 55 mph speed limit east of Centre Rd may contribute to higher than desired speeds, which may substantially increase the risk of a collision.

Suggestions:

1. Evaluate the posted advisory speeds on CR 19 and update as needed (all are 35 mph).
2. Consider reducing the speed limit east of Centre Rd to 45 mph, consistent with the limit between Route 9G and Centre Rd. The reduction could extend to the Taconic State Parkway. This would require a speed study. The SA team noted that simply reducing the speed limit will not effectively reduce speeds without enforcement and engineering changes to the roadway. The SA Team also noted that some of the downhill sections of CR 19, especially east of Milan Hollow Rd, may make a 45 mph speed limit impractical.
3. If possible, set up speed enforcement details on this corridor (County Sheriff). If not feasible, the Sheriff could instead deploy its radar speed awareness trailer to alert drivers to their operating speeds. This would be a temporary measure but could still influence behavior. A permanent radar speed awareness sign could also be installed.
4. Consider narrowing travel lanes from 11 feet to 10 feet (with wider shoulders) in order to calm traffic. This was discussed but rejected as it could increase the potential for sideswipe crashes, particularly along curves.

5. Consider realigning sections of CR 19, both horizontally and vertically. Due to the cost of such work, this was rejected.

Priority for Consideration:
Suggestion 1: High
Suggestion 2: Moderate
Suggestion 3: High
Suggestion 4: Rejected
Suggestion 5: Rejected

Issue #2: Wet weather crashes

Safety Concern: More than half of the reported crashes occurred during wet pavement conditions.

Observations: The SA team agreed that wet or snowy/icy conditions exacerbate the risk of crashes along the corridor. As detailed above, wet pavement was an issue for 66 percent of the crashes near Eighmyville Rd and 76 percent of the crashes near Lake Dr, though only 27 percent of the crashes at Milan Hollow Rd.

The SA team also noted a 'cold spot,' where the pavement stays wet or icy due to tree cover, just west of the Eighmyville intersection (on the south side of the curve).

Based on information from DPW-Maintenance, the study corridor was paved in 2014 using standard pavement, but as of 2016, DPW uses higher-friction 'F2' pavement on all paving jobs. While the road isn't scheduled for re-paving for many years, a high-friction micro-seal overlay could be applied sooner. The SA team agreed that the high-friction overlay applied to CR 19 in the Town of Rhinebeck has been very successful at reducing wet-weather related crashes.

Risk Analysis: Wet pavement conditions and the resulting loss in friction increase the probability of a severe crash, particularly on curves near the Eighmyville Rd and Lake Dr intersections.

Suggestions:
1. Apply a high-friction overlay to the pavement from west of Eighmyville Rd to at least Centre Rd, or to Milan Hollow Rd.
2. During snow events, allow DPW-Maintenance to use a 70/30 salt/sand mix, particularly for cold spots. This could be changed to a 50/50 salt/sand mix for icy conditions.
3. Trim or remove trees on the south side of CR 19 west of Eighmyville Rd to reduce the cold spot condition.

Priority for Consideration:

Suggestion 1: High
Suggestion 2: High
Suggestion 3: High

Issue #3: Sign characteristics (placement, condition, and visibility)

Safety Concern: Some warning signs on CR 19 have lost their retro-reflectivity, are damaged or obscured, or may not be optimally located to adequately warn drivers of road hazards. In some locations, additional or upgraded signs could help warn drivers. In other locations, there are excess signs.

Observations: During the field visit, SA team members noted several issues related to sign location, including that curve warning signs may need to be relocated closer to curves; the chevron spacing west of Lake Drive may need to be updated; the 45 mph speed limit ahead sign east of Crimson Hill Rd may need to be relocated further back (near the gas line); and the bus stop ahead sign on CR 19 westbound near Milan Hollow Rd may be too far in advance of the stop.

Other sign issues included that the stop sign on Milan Hollow Rd was too tall (this was addressed by DPW-Maintenance the following day); the 45 mph speed limit sign approaching Centre Rd westbound was partially obscured by vegetation; an arrow curve warning sign east of Eighmyville Rd was damaged; and several signs were 20 years old and may have lost their retro-reflectivity and/or be outdated.

The SA team discussed the value of arrow (sharp curve) warning signs compared to chevrons (see Fig. 9), and suggested using chevrons instead, such as near Fifth Ave for the long curve between Lake Dr and Fifth Ave (see Fig. 10) and near Eighmyville Rd.

Fig. 10. DCDPW should consider replacing these curve warning signs between Fourth and Fifth Avenues with chevrons.

The SA team discussed new signs, including an 'Intersection Ahead' sign or a flashing beacon on the hill above Lake Drive and possibly an 'Intersection Ahead' sign approaching Eighmyville Rd. The SA team also suggested chevrons for the uphill (eastbound) direction west of Lake Dr (see Fig. 11) and potentially chevrons near Milan Hill Rd.

Fig. 11. DCDPW should explore installing chevrons on the uphill curve west of Lake Dr to warn westbound drivers of the approaching curve.

Fig. 12. Several locations on CR 19 would benefit from relocating or removing various destination signs and County Route markers, such as these at Centre Rd.

At some locations, removing excess signs could help reduce driver distraction. In particular, the green directional signs near Centre Rd could be simplified (such as to include only Route 9G and the TSP), updated to include route shields, combined with CR 19 signs, or removed. The directional signs near Milan Hollow Rd could be treated similarly. At intersections, the team noted that the CR 19 signs are on CR 19 itself, rather than on the approach; these could be relocated to the approach to reduce distraction at the intersection (see Fig. 12).

Finally, as noted above, most of the intersecting streets have no traffic control signs. The team discussed adding stop or yield signs on these approaches if warranted. The team also noted that the Town's street name signs do not comply with the latest MUTCD standards, which call for mixed case (upper/lower) lettering, require the sign to be retroreflective, and require either a green, blue, or brown background with white text, or black text on a white background (see Fig. 13). The FHWA has determined that mixed case lettering is better suited for older drivers. Although there is no deadline for adherence, the new standard should be used when replacing street signs in the future.

The team agreed on the need to review all signs for retro-reflectivity, location/spacing, potential consolidation, height (7 feet from pavement surface to bottom of sign), and

advisory speeds (as noted above). The SA team also observed that the warning signs on CR 19 did not have vertical sign post reflectors, as DCDPW has used on other County highways.

Risk Analysis: Less-effective warning signs, whether due to poor retro-reflectivity, placement, or condition, reduce driver reaction times, increasing the risk of a crash. Sign clutter can also distract drivers.

Figure 13. The street name signs in the study area (top) use a local design; the current national standard is mixed-case text with white lettering (bottom).

Suggestions:

1. Evaluate all signs on CR 19 for location/spacing, potential consolidation, retro-reflectivity, visibility and height. Upgrade, relocate, or consolidate signs as appropriate, and trim vegetation where needed.
2. Consider replacing arrow (sharp curve) warning signs (W1-1) with chevrons (W1-8) near Fifth Ave (for the long curve between Lake Dr and Fifth Ave) and near Eighmyville Rd.
3. Consider an 'Intersection Ahead' sign (W2 series) or a warning beacon (see MUTCD section 4L.03) on the hill above Lake Drive, and chevrons (W1-8) for the uphill (eastbound) direction west of Lake Dr.
4. Consider an 'Intersection Ahead' sign (W2 series) approaching Eighmyville Rd.
5. Consider chevrons (W1-8) on the curve west of Milan Hill Rd for westbound drivers.
6. Simplify or consolidate the green destination signs (D1 series; see MUTCD section 2D) at Centre Rd and at Milan Hollow Rd.
7. Relocate CR 19 route signs (M1-6; see MUTCD section 2D) from CR 19 to the intersection approach.
8. Conduct warrants for Stop (R1-1) or Yield (R1-2) signs on intersecting streets and install if warranted (see MUTCD sections 2B.05 and 2B.09). Consider painting stop bars on stop-controlled approaches (Town).
9. Upgrade Town street name signs (D3-1) to comply with 2009 MUTCD standards (see MUTCD section 2D.43) (Town).
10. Add vertical sign post reflectors to warning signs on CR 19.
11. Develop a county-wide sign reflectivity monitoring program to enforce retro-reflectivity standards.

Priority for Consideration:

Suggestion 1: High
Suggestion 2: Moderate
Suggestion 3: Moderate

Suggestion 4: Moderate
Suggestion 5: Moderate
Suggestion 6: Moderate
Suggestion 7: Moderate
Suggestion 8: Low
Suggestion 9: Low
Suggestion 10: Moderate
Suggestion 11: Moderate

Issue #4: Road departures and shoulders

Safety Concern: Most of the crashes in the study area are road departures. The road edge, shoulders, and zone adjacent to the roadway should be as forgiving as possible.

Observations: As detailed above, 65 percent of the crashes on the corridor were with earth/ditches, various fixed objects, or simply running off the road.

The SA team noted that shoulders were narrow and in poor condition in some areas, including on the northwest corner of Eighmyville Rd and the northern edge of CR 19 west of Milan Hollow Rd. There were also significant shoulder drop-offs in some locations, such as near Fifth Ave on the south side, at Centre Rd, and adjacent to the Milan Hollow Rd intersection (see Fig. 14).

Fig. 14. The shoulders on sections of CR 19 and intersection roads are in poor condition or have steep drop-offs, which can pose a safety hazard to vehicles including bicyclists.

While the team did not observe significant pedestrian activity, we did see eight bicyclists during our morning fieldwork on July 25th (see Fig. 15). The team agreed that wider shoulders would improve safety for all vehicles and particularly for larger vehicles and bicycles.

Fig. 15. The SA Team observed several bicyclists using CR 19 during the field visit.

Shoulder lines were visible but appeared to have lost their reflectivity, which is especially important in dark conditions. DPW-Maintenance noted that where paint is used, shoulders are re-striped annually with reflective material. If epoxy is used, it is re-applied every five years, but the reflective material can decline after about three years.

The SA team suggested checking the road's superelevation and adjusting if needed to help drivers stay on the road.

The team discussed guiderail and suggested extending it in three locations to help keep vehicles on the road. These included on the north side of CR 19 west of Eighmyville Rd, extending the rail closer to the intersection (see Fig. 16); on the south side west of Lake Dr, extending the rail to the intersection and around the corner (see Fig. 17); and on the north side west of Milan Hollow Rd, extending the rail along the curve (see Fig. 18).

The guiderail near Eighmyville Rd appeared damaged, and all guiderail along the corridor was the older W style, rather than the current box beam design. The team discussed

Fig. 16. This guiderail west of Eighmyville Rd could be extended closer to the intersection to prevent vehicles from departing the roadway at the curve.

Fig. 18. CR 19 looking west from Milan Hollow Rd. The existing guiderail (red circle) could be extended further east to prevent road departures.

reflectors on guiderail; per DPW-Maintenance, these often don't last long; the team then suggested using a reflective tape instead.

Fig. 17. The guiderail (red circle) located on the south edge of CR 19 could be extended further east towards Lake Dr to prevent errant vehicles from landing in the culvert that runs along the road (bottom photos).

Risk Analysis: Poor shoulder conditions can increase the possibility of a driver losing control of their vehicle as they drift towards the shoulder. If a driver attempts a sudden correction to regain control, the vehicle can become destabilized resulting in a crash. Narrow and poor-condition shoulders can also create hazards for bicycles and larger vehicles.

Suggestions:

1. Reduce shoulder drop-offs by backfilling along shoulders, especially on the northwest corner of Eighmyville Rd, at Centre Rd, on the south side at Fifth Ave, and at the northwest corner of Milan Hollow Rd. The material should be compacted and designed

to limit future erosion.

2. Consider adding a safety edge, which allows drivers who drift off the road to return to the road safely. Instead of a vertical drop-off, the safety edge shapes the edge of the pavement to 30 degrees. FHWA-supported research has shown that this is the optimal angle to allow drivers to re-enter the roadway safely. This could be done as part of a future repaving project.
3. Repaint shoulder lines with reflective material.
4. Check superelevation, particularly between Centre Rd and Fifth Ave.
5. Widen shoulders to a four-foot minimum (as feasible), particularly east of Centre Rd.
6. Extend guiderail on the north side of CR 19 near Eighmyville Rd to the intersection; on the south side down the hill near Lake Dr to the intersection and around the corner; and on the north side near Milan Hollow along the curve.
7. Repair guiderail where needed, especially near Eighmyville Rd.
8. Upgrade guiderail to box beam style.
9. Consider adding reflective tape on guiderails.

Priority for Consideration:
Suggestion 1: High
Suggestion 2: Moderate
Suggestion 3: High
Suggestion 4: Moderate
Suggestion 5: Moderate
Suggestion 6: High
Suggestion 7: High
Suggestion 8: Moderate
Suggestion 9: Moderate

Issue #5: Deer/animal collisions

Safety Concern: About one-quarter of crashes involved a deer or other animal. This is almost double the county average.

Observations: Based on our crash analysis, the deer/animal collisions on this section of CR 19 are distributed throughout the corridor, with half between Fourth Ave and Bel Air Dr, and smaller clusters near Milan Hollow Rd and approaching Eighmyville Rd (see Fig. 8 at the end of the document). About half of the deer/animal crashes occurred during dark conditions.

Risk Analysis: Deer and other animal collisions can cause serious property damage and injury. The presence of wildlife in the study area adds another level of risk on a road that already demands full driver attention.

Suggestions:

1. Determine if the number of deer collisions warrants the need for one or more Deer warning signs (W11-3; see Fig. 19) along CR 19. The installation of signs should be balanced with the need to avoid sign clutter along the corridor.

Fig. 19. Deer warning sign (W11-3).

Priority for Consideration:
Suggestion 1: Moderate

CR 19 (Slate Quarry Rd)/Eighmyville Rd Intersection

This intersection had more crashes than any other individual intersection along the corridor (see Fig. 8 at the end of the document). Many involved wet pavement and unsafe speeds. This section of the corridor also witnessed the lone traffic fatality for 2014-2018. In addition to the overall recommendations above, the team noted one location-specific issue.

Issue #1: Visibility

Safety Concern: Based on our crash analysis, 40 percent of the crashes at this intersection were in dark conditions.

Observations: The SA team noted that this area is very dark at night. DPW-Engineering advised that locations with more than 30 percent of crashes in dark conditions may warrant treatment. The team also noted that sight distance was somewhat limited at the intersection. Finally, the team noted that shoulders on the Eighmyville Rd approach were in poor condition with steep drop-offs, especially on the eastern edge of Eighmyville Rd.

Risk Analysis: Darkness and limited sight distance make it harder for drivers to see upcoming geometric changes or hazards and react in time, increasing the risk of a crash.

Suggestions:

1. Consider the installation of a streetlight at this intersection (Town). This would require Central Hudson to provide power and the Town to pay for the electricity. It would also require a permit from DCDPW. The light could be co-located on existing utility poles.
2. Trim trees as needed to preserve sight distance.

Priority for Consideration:
Suggestion 1: Moderate
Suggestion 2: High

CR 19 (Slate Quarry Rd)/Lake Dr Intersection

This intersection has a steep hill to the west and a tight corner with a ditch and Town-owned culvert at Lake Dr (see Fig. 20; also Figs. 11 and 17). These geometric issues are compounded by high speeds and wet pavement. Also, Lake Dr provides access to an RV park and the Omega Institute, which draw visitors from outside the area as well as delivery trucks, campers and other large vehicles. In addition to the overall issues above, the team discussed several issues specific to this intersection.

Fig. 20. CR 19 looking west towards Lake Dr to the left (red circle).

Issue #1: Lake Dr geometry

Safety Concern: Drivers attempting to turn onto Lake Dr or from Lake Dr onto CR 19 may have difficulty due to the tight intersection and hill on CR 19.

Observation: The SA team noted several larger vehicles turn onto Lake Dr or from Lake Dr onto CR 19. These movements were difficult due to the adjacent ditch and culvert, poor pavement conditions at the intersection, and narrow intersection width. Lake Dr is a one-lane road, which makes turning in and out more challenging. At times, a vehicle on CR 19 could not turn onto Lake Dr until a vehicle on Lake Dr completed their turn onto CR 19, causing backups in the CR 19 travel lane. The SA Team felt that drivers leaving Lake Dr could have trouble judging the speed of eastbound vehicles travelling down the hill west of Lake Dr, and at the same time, eastbound drivers may not be able to adequately react to other vehicles or changing road conditions as they drive out of the downhill curve. The SA Team also noted that the only three-vehicle crash on the study corridor occurred in this area, approximately 200 feet west of Lake Dr.

Risk Analysis: Drivers having difficulty making turns at the intersection are at higher risk for a crash, especially due to the high speeds in this area.

Suggestions:

1. Repave the Lake Dr approach to improve pavement conditions and widen the road slightly by paving the gravel portions along the road edge (Town).
2. Consider extending the culvert on the southwest corner of the intersection and further widening the intersection to improve turning movements (Town).

Priority for Consideration:
Suggestion 1: High

Suggestion 2: Moderate

Issue #2: Visibility

Safety Concern: Sight distance is somewhat limited at this intersection; it is also dark at night.

Observations: The SA team discussed adding a streetlight at this intersection. Based on our crash analysis, 30 percent of crashes occurred in darkness. The team also discussed tree trimming, though it appeared that tree branches were not a significant obstruction.

Risk Analysis: Limited visibility increases the risk for a crash, particularly given the high speeds in this area.

Suggestions:
1. Consider the installation of a streetlight at this intersection (Town). This would require Central Hudson to provide power and the Town to pay for the electricity. It would also require a permit from DCDPW.
2. Trim trees on the north side of the hill on CR 19, west of the intersection, to maintain full visibility.

Priority for Consideration:
Suggestion 1: Low
Suggestion 2: Low

Issue #3: School bus stop location

Safety Concern: There is a bus stop at Lake Dr, which stops traffic during pick up/drop off times.

Observations: Members of the SA team stated that the bus stop at Lake Dr can lead to safety issues, particularly for eastbound traffic coming down the hill, since drivers may not be aware that there is a line of stopped vehicles until it is too late to stop. The team also discussed that this may not be the best location for children to be getting on/off a bus, given the concentration of crashes and high speeds coming down the hill. There are School Bus Stop Ahead signs (S3-1) in both directions approaching Lake Dr.

Risk Analysis: The school bus stop could contribute to crashes if drivers are not aware of stopped traffic in enough time to stop, and children may be at risk due to high speeds in this area.

Suggestions:
1. Discuss the possibility of moving the bus stop further east or consolidating it with other

stops with the transportation office of Rhinebeck Central School District (Town/County/School District).

Priority for Consideration:
Suggestion 1: Moderate

CR 19 (Slate Quarry Rd/Bulls Head Rd)/Centre Rd Intersection

This intersection (see Fig. 21) only had two crashes over the five-year period, both with deer. However, the team noted one location-specific issue in the field, in addition to the overall recommendations covered above.

Fig. 21. View of the CR 19/Centre Rd intersection looking west from Slate Quarry Rd. This intersection only experienced two crashes from 2014-2018, both deer related.

Issue #1: Mailbox location

Safety Concern: The location of the mailboxes on the north side of CR 19 just east of Centre Rd contributes to hazardous driving behavior.

Observations: The SA team observed a driver turn around in the middle of CR 19 and stop their vehicle partially in the westbound travel lane, but facing eastbound traffic, so that they could access a mailbox from the drivers-side window without having to park off the road. The team discussed various options for the mailbox location and noted that the mail carrier also must be able to access the mailboxes, including when there is snow (see Fig. 22).

Fig. 22. These mailboxes on CR 19, east of Centre Rd, could be relocated further away from the road to make irregular turning movements less needed or desirable.

Risk Analysis: Vehicles turning around in the middle of CR 19 and stopping facing oncoming traffic violates traffic laws and creates an unexpected situation that could lead to a crash.

Suggestions:

1. Relocate the mailboxes to the far side of the unpaved shoulder area, or at least further from the roadway, to prevent drivers from stopping on the road to access their mail (Town, in coordination with Post Office and residents).

Priority for Consideration:
Suggestion 1: Moderate

CR 19 (Bulls Head Rd)/CR 15 (Milan Hollow Rd) Intersection

This intersection (see Fig. 23) experienced 11 crashes, with the majority involving westbound vehicles. Besides the issues covered earlier under the overall recommendations, the SA team noted one location-specific issue in the field.

Fig. 23. View of the CR 19/Milan Hollow Rd intersection from Milan Hollow Rd. Many of the crashes in this area involved westbound vehicles (approaching from photo's left).

Issue #1: Roadside Debris

Safety Concern: Pavement debris located along the east shoulder of Milan Hollow Rd, just north of the intersection, creates a safety hazard for vehicles and forces bicyclists into the travel lane.

Observations: The SA Team noted that mounds of excess asphalt had been deposited on the shoulder of Milan Hollow Rd. These hardened obstacles pose a risk to errant vehicles, especially during dark conditions or drivers who are unfamiliar with the area (see Fig. 24).

Fig. 24. These mounds of leftover asphalt on Milan Hollow Rd pose a safety hazard to errant vehicles, especially in dark conditions.

Risk Analysis: Vehicles turning onto Milan Hollow Rd may strike one of the asphalt mounds.

Suggestions: Remove the debris on the shoulder.

Priority for Consideration:
Suggestion 1: Moderate

6. Next Steps

The DCTC, through the work of the SA team, has prepared this report to assist DCDPW and the Town of Clinton with prioritizing opportunities to improve safety on this section of CR 19. The suggestions are for consideration only. The SA team believes it has been thorough and diligent in its work, given the information available and its field reviews. This report does not preclude the identification of additional issues pertaining to safety or the emergence of new issues over time. It is recommended that DCDPW review this report, document its responses to the suggestions in a formal response, and track progress towards the implementation of safety improvements prompted by this assessment.

Table 3. Suggested Actions and Priority by Location

Issue	Suggested Action	Priority
Vehicle Operating Speeds		
1-1	Evaluate the posted advisory speeds on CR 19 and update as needed.	High
1-2	Consider reducing the speed limit east of Centre Rd to 45 mph.	Moderate
1-3	Set up speed enforcement details or deploy a speed awareness trailer (County Sheriff).	High
1-4	Consider narrowing travel lanes to 10 feet.	Rejected
1-5	Consider realigning sections of CR 19, both horizontally and vertically.	Rejected
Wet Weather Crashes		
2-1	Apply a high-friction overlay to the pavement from west of Eighmyville Rd to at least Centre Rd, or to Milan Hollow Rd.	High
2-2	During snow events, use a 70/30 salt/sand mix, particularly for cold spots. This could be increased to a 50/50 salt/sand mix for icy conditions.	High
2-3	Trim or remove trees on the south side of CR 19 west of Eighmyville Rd to reduce the cold spot condition.	High
Sign Characteristics		
3-1	Evaluate all signs on CR 19 for location/spacing, potential consolidation, retro-reflectivity, visibility and height.	High
3-2	Consider replacing arrow (sharp curve) warning signs (W1-1) with chevrons (W1-8) near Fifth Ave and near Eighmyville Rd.	Moderate
3-3	Consider an 'Intersection Ahead' sign (W2 series) or a warning beacon (MUTCD section 4L.03) on the hill above Lake Drive, and chevrons (W1-8) for the uphill (eastbound) direction west of Lake Dr.	Moderate
3-4	Consider an 'Intersection Ahead' sign (W2 series) approaching Eighmyville Rd.	Moderate
3-5	Consider chevrons (W1-8) on the curve west of Milan Hill Rd for westbound drivers.	Moderate
3-6	Simplify or consolidate the green destination signs (D1 series; see MUTCD section 2D) at Centre Rd and at Milan Hollow Rd.	Moderate
3-7	Relocate CR 19 route signs (M1-6; see MUTCD section 2D) from CR 19 to the intersection approach.	Moderate
3-8	Conduct warrants for Stop (R1-1) or Yield (R1-2) signs on intersecting streets and install if warranted (see MUTCD sections 2B.05 and 2B.09). Consider painting stop bars on stop-controlled approaches (Town).	Low

3-9	Upgrade Town street name signs (D3-1) to comply with 2009 MUTCD standards (see MUTCD section 2D.43) (Town).	Low
3-10	Add vertical sign post reflectors to warning signs on CR 19.	Moderate
3-11	Develop a county-wide sign reflectivity monitoring program to enforce retro-reflectivity standards,	Moderate
Road Departures and Shoulders		
4-1	Reduce shoulder drop-offs by backfilling along shoulders, especially on the northwest corner of Eighmyville Rd, at Centre Rd, on the south side at Fifth Ave, and at the northwest corner of Milan Hollow Rd.	High
4-2	Consider adding a safety edge.	Moderate
4-3	Repaint shoulder lines with reflective material.	High
4-4	Check superelevation, particularly between Centre Rd and Fifth Ave.	Moderate
4-5	Widen shoulders to a four-foot minimum (as feasible).	Moderate
4-6	Extend guiderail on the north side of CR 19 near Eighmyville Rd closer to the intersection; on the south side near Lake Dr to the intersection and around the corner; and on the north side near Milan Hollow along the curve.	High
4-7	Repair guiderail where needed, especially near Eighmyville Rd.	High
4-8	Upgrade guiderail to box beam style.	Moderate
4-9	Consider adding reflective tape on guiderails.	Moderate
Deer/Animal Collisions		
5-1	Determine if the number of deer collisions warrants the need for one or more Deer warning signs (W11-3).	Moderate
CR 19 (Slate Quarry Rd)/Eighmyville Rd Intersection		
1-1	Consider the installation of a streetlight (Town).	Moderate
1-2	Trim trees as needed to preserve sight distance.	High
CR 19 (Slate Quarry Rd)/Lake Dr Intersection		
1-1	Repave the Lake Dr approach and widen the road slightly by paving the gravel portions along the road edge (Town).	High
1-2	Consider extending the culvert and further widening the intersection to improve turning movements (Town).	Moderate
2-1	Consider the installation of a streetlight (Town).	Low
2-2	Trim trees on the north side of the hill on CR 19, west of the intersection, to maintain full visibility.	Low
3-1	Discuss moving the bus stop further east or consolidating it with other stops (Town/County/School District).	Moderate

CR 19 (Slate Quarry Rd/Bulls Head Rd)/Centre Rd Intersection

1-1	Relocate the mailboxes to the far side of the unpaved shoulder area, or at least further from the roadway, to prevent drivers from stopping on the road to access their mail (Town, in coordination with Post Office and residents).	Moderate

CR 19 (Bulls Head Rd)/Milan Hollow Rd Intersection

1-1	Remove the debris on the shoulder.	Moderate

Appendix A:

Traffic Count Data (2017)

STATION: **828359**

Poughkeepsie-Dutchess County Transportation Council

Traffic Count Hourly Report

ROAD #: **CR CR19** ROAD NAME: **SLATE QUARRY RD** FROM: **KANSAS RD** TO: **CR 18 CENTRE RD** COUNTY: **Dutchess**
DIRECTION: Eastbound FACTOR GROUP: 30 REC. SERIAL #: CM67 FUNC. CLASS: 07 TOWN:
STATE DIR CODE: 6 WK OF YR: 20 PLACEMENT: 875' N of Lake Dr NHS: no LION#:
DATE OF COUNT: 05/15/2017 @ REF MARKER: JURIS: Village BIN:
NOTES LANE 1: EB Travel Lane ADDL DATA: CC Stn: RR CROSSING:
COUNT TYPE: VEHICLES BATCH ID: MPD-CountsToProcess HPMS SAMPLE:
COUNT TAKEN BY: ORG CODE: TST INITIALS: BEK PROCESSED BY: ORG CODE: MPD INITIALS: ST

DATE	DAY	12 TO 1	1 TO 2	2 TO 3	3 TO 4	4 TO 5	5 TO 6	6 TO 7	7 TO 8	8 TO 9	9 TO 10	10 TO 11	11 TO 12	12 TO 1	1 TO 2	2 TO 3	3 TO 4	4 TO 5	5 TO 6	6 TO 7	7 TO 8	8 TO 9	9 TO 10	10 TO 11	11 TO 12	DAILY TOTAL	DAILY HIGH COUNT	DAILY HIGH HOUR
		AM												PM														
1	M																											
2	T																											
3	W																											
4	T																											
5	F																											
6	S																											
7	S																											
8	M																											
9	T																											
10	W																											
11	T																											
12	F																											
13	S																											
14	S																											
15	M												**116**	**122**	**125**	**142**	**189**	**209**	**224**	**135**	**118**	**94**	**65**	**32**	**13**			
16	T	**8**	**1**	**3**	**1**	**9**	**22**	**87**	**138**	**163**	**126**	**103**	**101**	**105**	**124**	**160**	**182**	**207**	**239**	**147**	**124**	**102**	**71**	**39**	**13**	2275	239	17
17	W	**7**	**3**	**3**	**4**	**5**	**24**	**74**	**133**	**176**	**108**	**109**	**103**	**114**	**139**	**168**	**198**	**199**	**209**	**174**	**111**	**107**	**82**	**34**	**16**	2300	209	17
18	T	**4**	**2**	**4**	**2**	**5**	**31**	**76**	**124**	**188**	**129**	**109**	**100**	**108**	**141**	**140**	**188**	**225**	**191**	**147**	**130**	**97**	**67**	**50**	**19**	2277	225	16
19	F	**8**	**3**	**5**	**3**	**3**	**28**	**78**	**124**																			
20	S																											
21	S																											
22	M																											
23	T																											
24	W																											
25	T																											
26	F																											
27	S																											
28	S																											
29	M																											
30	T																											
31	W																											

AVERAGE WEEKDAY HOURS (Axle Factored, Mon 6AM to Fri Noon)

7	2	4	2	6	26	79	130	176	121	107	105	112	132	152	189	210	216	151	121	100	71	39	15	**ADT** 2273

DAYS Counted	HOURS Counted	WEEKDAYS Counted	WEEKDAY Hours	AVERAGE WEEKDAY High Hour	AVERAGE WEEKDAY % of day	Axle Adj. Factor	Seasonal/Weekday Adjustment Factor	ESTIMATED
5	93	5	93	216	10%	1.000	1.089	**AADT 2087**

ROAD #: **CR19** ROAD NAME: **SLATE QUARRY RD** FROM: **KANSAS RD** TO: **CR 18 CENTRE RD** COUNTY: **Dutchess**
STATION: **828359** STATE DIR CODE: **6** PLACEMENT: **875' N of Lake Dr** **DATE OF COUNT: 05/15/2017**

Poughkeepsie-Dutchess County Transportation Council

Traffic Count Hourly Report

ROAD #: **CR CR19** ROAD NAME: **SLATE QUARRY RD** FROM: **KANSAS RD** TO: **CR 18 CENTRE RD** COUNTY: **Dutchess**
DIRECTION: Westbound FACTOR GROUP: 30 REC. SERIAL #: CM67 FUNC. CLASS: 07 TOWN:
STATE DIR CODE: 7 WK OF YR: 20 PLACEMENT: 875' N of Lake Dr NHS: no LION#:
DATE OF COUNT: 05/15/2017 @ REF MARKER: JURIS: Village BIN:
NOTES LANE 1: WB Travel Lane ADDL DATA: CC Stn: RR CROSSING:
COUNT TYPE: VEHICLES BATCH ID: MPD-CountsToProcess HPMS SAMPLE:
COUNT TAKEN BY: ORG CODE: TST INITIALS: BEK PROCESSED BY: ORG CODE: MPD INITIALS: ST

DATE	DAY	12 TO 1	1 TO 2	2 TO 3	3 TO 4	4 TO 5	5 TO 6	6 TO 7	7 TO 8	8 TO 9	9 TO 10	10 TO 11	11 TO 12	12 TO 1	1 TO 2	2 TO 3	3 TO 4	4 TO 5	5 TO 6	6 TO 7	7 TO 8	8 TO 9	9 TO 10	10 TO 11	11 TO 12	DAILY TOTAL	DAILY HIGH COUNT	DAILY HIGH HOUR
		AM												PM														
1	M																											
2	T																											
3	W																											
4	T																											
5	F																											
6	S																											
7	S																											
8	M																											
9	T																											
10	W																											
11	T																											
12	F																											
13	S																											
14	S																											
15	M												**120**	**112**	**117**	**143**	**175**	**188**	**200**	**137**	**83**	**49**	**32**	**23**	**12**			
16	T	**8**	**0**	**5**	**5**	**15**	**28**	**99**	**195**	**184**	**150**	**127**	**110**	**126**	**134**	**118**	**177**	**184**	**189**	**141**	**64**	**63**	**30**	**35**	**12**	2199	195	7
17	W	**4**	**1**	**1**	**3**	**13**	**27**	**94**	**204**	**202**	**144**	**127**	**134**	**129**	**118**	**162**	**189**	**177**	**189**	**144**	**82**	**69**	**35**	**32**	**13**	2293	204	7
18	T	**6**	**1**	**2**	**4**	**13**	**28**	**104**	**194**	**185**	**152**	**130**	**145**	**114**	**132**	**115**	**183**	**181**	**224**	**144**	**94**	**66**	**39**	**31**	**18**	2305	224	17
19	F	**7**	**4**	**2**	**2**	**12**	**28**	**81**	**223**																			
20	S																											
21	S																											
22	M																											
23	T																											
24	W																											
25	T																											
26	F																											
27	S																											
28	S																											
29	M																											
30	T																											
31	W																											

AVERAGE WEEKDAY HOURS (Axle Factored, Mon 6AM to Fri Noon)

6	2	2	4	13	28	94	204	190	149	128	127	120	125	134	181	182	200	142	81	62	34	30	14	ADT 2252

DAYS Counted	HOURS Counted	WEEKDAYS Counted	WEEKDAY Hours	AVERAGE WEEKDAY High Hour	AVERAGE WEEKDAY % of day	Axle Adj. Factor	Seasonal/Weekday Adjustment Factor	ESTIMATED
5	93	5	93	204	9%	1.000	1.089	**AADT 2068**

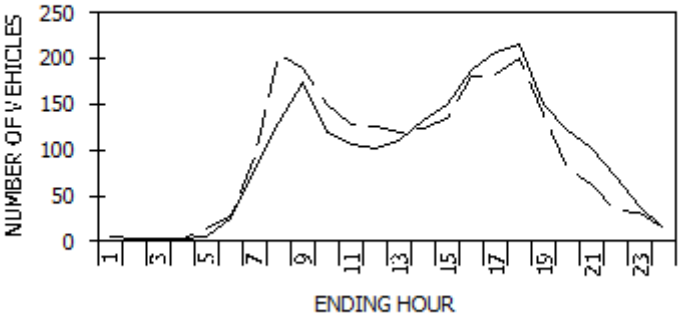
Poughkeepsie-Dutchess County Transportation Council
Classification Count Average Weekday Data Report

ROAD #: CR CR19 ROAD NAME: SLATE QUARRY RD YEAR: 2017 STATION: 828359
COUNTY NAME: Dutchess MONTH: May
REGION CODE: 8
FROM: KANSAS RD
TO: CR 18 CENTRE RD
REF-MARKER:
END MILEPOINT: 0402 NO. OF LANES: 2
FUNC-CLASS: 07 HPMS NO:
STATION NO: 8359 LION#:
COUNT TAKEN BY: ORG CODE: TST INITIALS: BEK
PROCESSED BY: ORG CODE: MPD INITIALS: ST BATCH ID: MPD-CountsToProcess

DIRECTION	East	West	TOTAL
NUMBER OF VEHICLES	2260	2247	4507
NUMBER OF AXLES	4564	4540	9104
% HEAVY VEHICLES (F4-F13)	5.27%	3.56%	4.42%
% TRUCKS AND BUSES (F3-F13)	24.38%	17.94%	21.17%
AXLE CORRECTION FACTOR	0.99	0.99	0.99

VEHICLE CLASS		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	TOTAL
NO. OF AXLES		2	2	2	2.5	2	3	4	3.5	5	6	5	6	8.75	
ENDING HOUR	1:00	0	5	0	1	0	0	0	0	0	0	0	0	0	**6**
	2:00	0	2	1	0	0	0	0	0	0	0	0	0	0	**3**
	3:00	0	2	0	0	1	0	0	0	0	0	0	0	0	**3**
	4:00	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
	5:00	0	4	1	0	0	0	0	0	0	0	0	0	0	**5**
	6:00	0	19	5	0	2	0	0	0	0	0	0	0	0	**26**
	7:00	0	55	20	0	2	0	0	1	0	0	0	0	0	**78**
	8:00	0	86	29	4	8	1	1	1	0	0	0	0	0	**130**
	9:00	1	124	37	3	8	0	0	2	0	0	0	0	0	**175**
	10:00	0	86	26	1	5	1	0	1	0	0	0	0	0	**120**
DIRECTION	11:00	1	76	23	1	3	0	0	3	0	0	0	0	0	**107**
East	12:00	0	74	24	0	4	0	0	0	0	0	0	0	0	**102**
	13:00	0	83	20	1	4	1	0	2	0	0	0	0	0	**111**
	14:00	2	94	26	1	7	0	0	2	0	0	0	0	0	**132**
	15:00	2	110	30	2	5	0	0	2	0	0	0	0	0	**151**
	16:00	1	137	38	4	6	0	0	1	0	0	0	0	0	**187**
	17:00	0	164	36	0	7	0	0	1	0	0	0	0	0	**208**
	18:00	1	171	38	0	5	0	0	1	0	0	0	0	0	**216**
	19:00	2	118	26	0	4	0	0	1	0	0	0	0	0	**151**
	20:00	2	99	18	0	2	0	0	0	0	0	0	0	0	**121**
	21:00	2	80	16	0	2	0	0	1	0	0	0	0	0	**101**
	22:00	0	59	10	0	2	0	0	1	0	0	0	0	0	**72**
	23:00	0	32	6	0	0	0	0	0	0	0	0	0	0	**38**
	24:00	0	13	2	0	0	0	0	0	0	0	0	0	0	**15**
TOTAL VEHICLES		**14**	**1695**	**432**	**18**	**77**	**3**	**1**	**20**	**0**	**0**	**0**	**0**	**0**	**2260**
TOTAL AXLES		28	3390	864	45	154	9	4	70	0	0	0	0	0	4564
ENDING HOUR	1:00	0	6	0	0	0	0	0	0	0	0	0	0	0	**6**
	2:00	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
	3:00	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
	4:00	0	4	0	0	0	0	0	0	0	0	0	0	0	**4**
	5:00	0	10	4	0	0	0	0	0	0	0	0	0	0	**14**
	6:00	0	20	5	0	1	2	0	0	0	0	0	0	0	**28**
	7:00	0	74	17	0	2	0	0	1	0	0	0	0	0	**94**
	8:00	2	167	29	3	2	1	0	0	0	0	0	0	0	**204**
	9:00	0	162	19	2	4	1	1	1	0	0	0	0	0	**190**
	10:00	1	115	27	1	3	1	0	1	1	0	0	0	0	**150**
	11:00	1	103	18	0	3	0	0	1	1	0	0	0	0	**127**
DIRECTION	12:00	1	98	22	0	2	1	1	1	0	0	0	0	0	**126**
West	13:00	1	94	19	1	3	1	0	0	0	0	0	0	0	**119**
	14:00	0	96	20	1	4	1	0	2	0	0	0	0	0	**124**
	15:00	2	105	20	1	4	0	0	2	0	0	0	0	0	**134**
	16:00	1	137	32	4	4	0	0	1	1	0	0	0	0	**180**
	17:00	1	142	33	1	4	0	0	1	0	0	0	0	0	**182**
	18:00	2	174	22	0	2	0	0	1	0	0	0	0	0	**201**
	19:00	0	124	14	0	2	0	0	0	0	0	0	0	0	**140**
	20:00	1	70	8	0	0	0	0	0	0	0	0	0	0	**79**
	21:00	0	52	9	0	1	0	0	0	0	0	0	0	0	**62**
	22:00	0	32	2	0	0	0	0	0	0	0	0	0	0	**34**
	23:00	0	28	3	0	0	0	0	0	0	0	0	0	0	**31**
	24:00	0	14	0	0	0	0	0	0	0	0	0	0	0	**14**
TOTAL VEHICLES		**13**	**1831**	**323**	**14**	**41**	**8**	**2**	**12**	**3**	**0**	**0**	**0**	**0**	**2247**
TOTAL AXLES		26	3662	646	35	82	24	8	42	15	0	0	0	0	4540
GRAND TOTAL VEHICLES		**27**	**3526**	**755**	**32**	**118**	**11**	**3**	**32**	**3**	**0**	**0**	**0**	**0**	**4507**
GRAND TOTAL AXLES		54	7052	1510	80	236	33	12	112	15	0	0	0	0	9104

TRAFFIC FLOW BY DIRECTION



--- East - -West

PEAK HOUR DATA

DIRECTION	HOUR	COUNT	2-WAY	HOUR	COUNT
East	**18**	**216**	**A.M.**	**9**	**365**
West	**8**	**204**	**P.M.**	**18**	**417**

VEHICLE CLASSIFICATION CODES:

F1. Motorcycles
F2. Autos*
F3. 2 Axle, 4-Tire Pickups, Vans, Motorhomes*
F4. Buses
F5. 2 Axle, 6-Tire Single Unit Trucks
F6. 3 Axle Single Unit Trucks
F7. 4 or More Axle Single Unit Trucks
F8. 4 or Less Axle Vehicles, One Unit is a Truck
F9. 5 Axle Double Unit Vehicles, One Unit is a Truck
F10. 6 or More Double Unit Vehicles, One Unit is a Truck
F11. 5 or Less Axle Multi-Unit Trucks
F12. 6 Axle Multi-Unit Trucks
F13. 7 or More Axle Multi-Unit Trucks

* INCLUDING THOSE HAULING TRAILERS

FUNCTIONAL CLASS CODES:

RURAL	URBAN	SYSTEM
01	11	PRINCIPAL ARTERIAL-INTERSTATE
02	12	PRINCIPAL ARTERIAL-EXPRESSWAY
02	14	PRINCIPAL ARTERIAL-OTHER
06	16	MINOR ARTERIAL
07	17	MAJOR COLLECTOR
08	17	MINOR COLLECTOR
09	19	LOCAL SYSTEM

SOURCE: NYSDOT DATA SERVICES BUREAU

Poughkeepsie-Dutchess County Transportation Council
Speed Count Average Weekday Report

Date: 08/14/2017

Station:	828359	Start date:	Mon 05/15/2017 11:00	Count duration:	94 hours
Road #:	CR CR19 Road name: SLATE QUARRY RD	End date:	Fri 05/19/2017 08:45	Functional class:	7
From:	KANSAS RD	County:	Dutchess	Factor group:	30
To:	CR 18 CENTRE RD	Town:		Batch ID:	MPD-CountsToProcess
Direction:	East	Speed limit:	55	Count taken by:	Org: TST Init: BEK
		LION#:		Processed by:	Org: MPD Init: ST

Speeds, mph

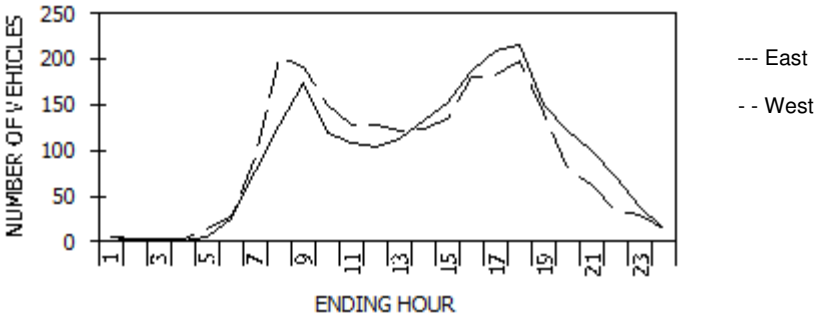
Hour	0.0-30.0	30.1-35.0	35.1-40.0	40.1-45.0	45.1-50.0	50.1-55.0	55.1-60.0	60.1-65.0	65.1-70.0	70.1-75.0	75.1-80.0	80.1-85.0	85.1-115.0	% Exc 55.0	% Exc 60.0	% Exc 65.0	% Exc 70.0	% Exc 75.0	Avg	50th%	85th%	Total
1:00	0	0	0	1	2	2	1	0	0	0	0	0	0	16.7	0.0	0.0	0.0	0.0	49.5	50.0	55.6	6
2:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	52.5	52.6	54.3	1
3:00	0	0	0	0	0	2	1	0	0	0	0	0	0	33.3	0.0	0.0	0.0	0.0	54.1	53.8	57.8	3
4:00	0	0	0	0	0	0	0	1	0	0	0	0	0	100.0	100.0	0.0	0.0	0.0	62.5	62.6	64.3	1
5:00	0	0	0	0	1	1	2	1	0	0	0	0	0	60.0	20.0	0.0	0.0	0.0	55.0	56.3	61.3	5
6:00	0	0	0	1	4	8	9	3	1	0	0	0	0	50.0	15.4	3.8	0.0	0.0	54.2	55.0	60.2	26
7:00	0	0	0	4	14	22	24	12	2	0	0	0	0	48.7	17.9	2.6	0.0	0.0	53.9	54.8	61.0	78
8:00	0	1	3	16	40	43	21	5	0	0	0	0	0	20.2	3.9	0.0	0.0	0.0	49.7	50.6	56.6	129
9:00	0	0	2	13	53	71	30	6	0	0	0	0	0	20.6	3.4	0.0	0.0	0.0	50.8	51.4	56.7	175
10:00	0	0	2	5	31	45	29	7	1	0	0	0	0	30.8	6.7	0.8	0.0	0.0	51.9	52.5	58.3	120
11:00	0	1	2	6	34	33	27	4	1	0	0	0	0	29.6	4.6	0.9	0.0	0.0	51.0	51.7	58.0	108
12:00	0	2	1	8	26	38	20	8	0	0	0	0	0	27.2	7.8	0.0	0.0	0.0	50.9	52.0	58.2	103
13:00	0	1	2	8	26	46	24	4	1	0	0	0	0	25.9	4.5	0.9	0.0	0.0	51.1	52.1	57.6	112
14:00	0	0	4	13	38	49	21	6	1	0	0	0	0	21.2	5.3	0.8	0.0	0.0	50.3	51.2	57.0	132
15:00	0	2	2	12	40	58	31	6	1	0	0	0	0	25.0	4.6	0.7	0.0	0.0	50.8	51.8	57.5	152
16:00	0	0	5	21	58	70	29	4	1	0	0	0	0	18.1	2.7	0.5	0.0	0.0	49.9	50.8	56.0	188
17:00	0	1	2	16	66	78	36	8	2	0	0	0	0	22.0	4.8	1.0	0.0	0.0	50.7	51.3	57.1	209
18:00	0	0	1	16	57	86	43	12	0	0	0	0	0	25.6	5.6	0.0	0.0	0.0	51.4	52.0	57.7	215
19:00	2	0	3	11	38	57	31	8	1	0	0	0	0	26.5	6.0	0.7	0.0	0.0	50.2	51.9	57.8	151
20:00	0	0	2	14	36	42	19	7	1	0	0	0	0	22.3	6.6	0.8	0.0	0.0	50.5	51.1	57.4	121
21:00	0	0	1	11	33	36	15	3	1	0	0	0	0	19.0	4.0	1.0	0.0	0.0	50.3	50.7	56.4	100
22:00	0	0	2	8	23	25	10	3	1	0	0	0	0	19.4	5.6	1.4	0.0	0.0	50.0	50.6	56.6	72
23:00	0	0	0	6	9	12	9	2	0	0	0	0	0	28.9	5.3	0.0	0.0	0.0	50.8	51.7	58.0	38
24:00	0	0	1	1	4	6	2	1	0	0	0	0	0	20.0	6.7	0.0	0.0	0.0	50.1	51.3	56.9	15
Avg. Daily Total	2	8	35	191	633	831	434	111	15	0	0	0	0	24.8	5.6	0.7	0.0	0.0	50.8	51.6	57.6	2260
Percent	0.1%	0.4%	1.5%	8.5%	28.0%	36.8%	19.2%	4.9%	0.7%	0.0%	0.0%	0.0%	0.0%									
Cum. Percent	0.1%	0.4%	2.0%	10.4%	38.5%	75.2%	94.4%	99.3%	100.0%	100.0%	100.0%	100.0%	100.0%									
Average hour	0	0	1	8	26	35	18	5	1	0	0	0	0									94

	Avg. Speed	50th% Speed	85th% Speed
East	50.8	51.6	57.6
West	43.7	45.3	50.3

Peak Hour Data

Direction	Hour	Count	2-way	Hour	Count
East	18	215	A.M.	9	366
West	8	203	P.M.	18	414

TRAFFIC FLOW BY DIRECTION



Poughkeepsie-Dutchess County Transportation Council
Speed Count Average Weekday Report

Station:	828359	Start date:	Mon 05/15/2017 11:00	Count duration:	94 hours
Road #:	CR CR19 Road name: SLATE QUARRY RD	End date:	Fri 05/19/2017 08:45	Functional class:	7
From:	KANSAS RD	County:	Dutchess	Factor group:	30
To:	CR 18 CENTRE RD	Town:		Batch ID:	MPD-CountsToProcess
Direction:	West	Speed limit:	55	Count taken by:	Org: TST Init: BEK
		LION#:		Processed by:	Org: MPD Init: ST

Speeds, mph

Hour	0.0-30.0	30.1-35.0	35.1-40.0	40.1-45.0	45.1-50.0	50.1-55.0	55.1-60.0	60.1-65.0	65.1-70.0	70.1-75.0	75.1-80.0	80.1-85.0	85.1-115.0	% Exc 55.0	% Exc 60.0	% Exc 65.0	% Exc 70.0	% Exc 75.0	Avg	50th%	85th%	Total
1:00	0	0	1	2	1	2	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	45.2	45.0	52.8	6
2:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	44.9	45.0	48.6	2
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
4:00	0	0	0	1	1	1	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	47.1	47.6	52.8	3
5:00	0	1	2	2	6	2	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	44.0	46.3	50.2	13
6:00	0	1	2	8	12	2	2	0	0	0	0	0	0	7.4	0.0	0.0	0.0	0.0	45.2	46.1	50.0	27
7:00	1	1	7	23	37	21	4	0	0	0	0	0	0	4.3	0.0	0.0	0.0	0.0	45.7	47.1	52.6	94
8:00	4	6	18	49	77	43	6	0	0	0	0	0	0	3.0	0.0	0.0	0.0	0.0	44.5	46.6	52.2	203
9:00	4	5	24	49	74	27	7	1	0	0	0	0	0	4.2	0.5	0.0	0.0	0.0	43.8	46.0	51.2	191
10:00	1	4	19	50	52	19	4	0	0	0	0	0	0	2.7	0.0	0.0	0.0	0.0	44.1	45.1	50.2	149
11:00	2	3	13	47	47	14	2	0	0	0	0	0	0	1.6	0.0	0.0	0.0	0.0	43.6	44.9	49.7	128
12:00	2	4	18	38	48	15	2	0	0	0	0	0	0	1.6	0.0	0.0	0.0	0.0	43.4	45.2	49.8	127
13:00	2	4	17	42	42	14	1	0	0	0	0	0	0	0.8	0.0	0.0	0.0	0.0	43.1	44.6	49.7	122
14:00	1	4	14	51	37	14	3	0	0	0	0	0	0	2.4	0.0	0.0	0.0	0.0	43.6	44.3	49.8	124
15:00	2	4	15	49	50	13	2	0	0	0	0	0	0	1.5	0.0	0.0	0.0	0.0	43.4	44.8	49.5	135
16:00	5	9	24	61	56	20	4	1	0	0	0	0	0	2.8	0.6	0.0	0.0	0.0	42.4	44.3	49.9	180
17:00	7	4	19	58	65	24	5	0	0	0	0	0	0	2.7	0.0	0.0	0.0	0.0	42.8	45.3	50.4	182
18:00	1	3	24	70	73	25	3	0	0	0	0	0	0	1.5	0.0	0.0	0.0	0.0	44.3	45.2	49.9	199
19:00	0	2	15	49	52	18	4	1	0	0	0	0	0	3.5	0.7	0.0	0.0	0.0	44.9	45.5	50.6	141
20:00	1	2	10	24	33	7	2	1	0	0	0	0	0	3.8	1.3	0.0	0.0	0.0	43.9	45.5	49.7	80
21:00	1	1	7	22	23	6	2	0	0	0	0	0	0	3.2	0.0	0.0	0.0	0.0	43.7	45.0	49.8	62
22:00	0	2	6	9	11	3	2	0	0	0	0	0	0	6.1	0.0	0.0	0.0	0.0	43.6	44.8	50.1	33
23:00	0	2	8	10	7	2	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	41.7	42.3	48.4	29
24:00	0	1	4	4	4	1	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	41.8	42.6	48.7	14
Avg. Daily Total	34	63	267	719	809	293	55	4	0	0	0	0	0	2.6	0.2	0.0	0.0	0.0	43.7	45.3	50.3	2244
Percent	1.5%	2.8%	11.9%	32.0%	36.1%	13.1%	2.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%									
Cum. Percent	1.5%	4.3%	16.2%	48.3%	84.3%	97.4%	99.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%									
Average hour	1	3	11	30	34	12	2	0	0	0	0	0	0									94

	Avg. Speed	50th% Speed	85th% Speed
East	50.8	51.6	57.6
West	43.7	45.3	50.3

Peak Hour Data

Direction	Hour	Count	2-way	Hour	Count
East	18	215	A.M.	9	366
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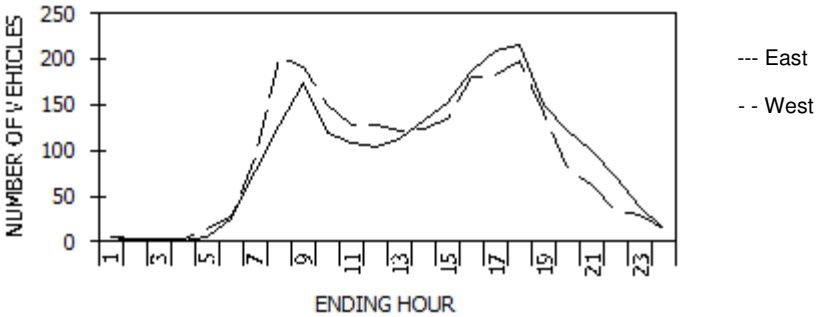
TRAFFIC FLOW BY DIRECTION



Appendix B:

Crash Data Summary

CR 19 (Slate Quarry/Bulls Head Rd) Safety Assessment: Traffic and Crash Data

Crash Summary: Slate Quarry Rd, Eighmyville-Milan Hollow Rd (2014-2018)

Year	Number of Crashes	Number of Injuries	Number of Fatalities	Animal Involved	Light Condition		Road Surface Condition		
					Daylight	Dark	Dry	Wet	Snow
2014	19	7	0	5	13	6	10	6	3
2015	23	6	1	6	11	12	12	7	4
2016	18	7	0	4	11	6	7	8	2
2017	16	2	0	6	9	7	10	6	0
2018	16	4	0	1	12	4	3	13	0
Total	**92**	**26**	**1**	**22**	**56**	**35**	**42**	**40**	**9**

*2016: One 'unknown' for Light & Road Surface Conditions

Traffic Volumes: Slate Quarry Rd near Lake Drive (2003-2018)

Year	AADT	Month	Peak Hour Data		85% speed		% heavy vehicles
			Hour	Volume	EB	WB	
2018	3,855	November	4-5 pm	378	n/a	n/a	n/a
2017	4,155	May	5-6 pm	416	57.6	50.3	4.4%
2014	3,843	May	5-6 pm	388	59.3	55.8	6.1%
2013	3,600	April	5-6 pm	357	n/a	n/a	n/a
2010	3,673	June	5-6 pm	355	n/a	n/a	n/a
2007	4,042	October	5-6 pm	425	n/a	n/a	n/a
2003	3,801	July	5-6 pm	345	n/a	n/a	n/a

AADT: Annual Average Daily Traffic

Crash Types: Slate Quarry Rd, Eighmyville-Milan Hollow Rd (2014-2018)

Collision with Earth, Rock-cut, or Ditch	27	29%
Collision with Deer	18	20%
Collision with Motor Vehicle	10	11%
Collision with Tree	9	10%
Collision with Guiderail	5	5%
Collision with Animal	4	4%
Collision with Sign Post	4	4%
Collision with Guiderail End	3	3%
Collision with Building/Wall or Curbing	2	2%
Collision with Light Support/Utility Pole or Culvert	2	2%
Ran off road	2	2%
Overturned	1	1%
Misc. other (e.g. fence, other object)	5	5%
Total	**92**	**100%**

Apparent Factors: Slate Quarry Rd, Eighmyville Rd-Milan Hollow Rd (2014-2018)

Unsafe Speed	38	41%
Animal's Action	24	26%
Pavement Slippery	9	10%
Driver Inattention	3	3%
Failure to Yield Right of Way	2	2%
Not Entered/NA	6	7%
Alcohol Involvement	2	2%
Tire Failure/Inadequate	2	2%
Reaction to Other Uninvolved Vehicle	2	2%
Following too Closely	1	1%
Failure to Keep right	1	1%
Fell Asleep	1	1%
Obstruction/Debris	1	1%
Total	**92**	**100%**