

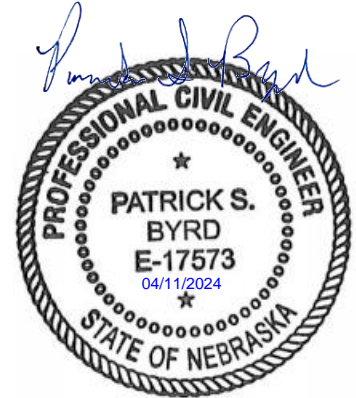
# TECHNICAL MEMORANDUM

## Fort Calhoun Citywide Speed Control & Pedestrian Crossing Study



JEO Project No. 231524.00

Date: April 11, 2024  
To: City of Fort Calhoun  
Attn: Mayor and City Council  
  
CC: NDOT  
Washington County  
From: Pat Byrd, PE, PTOE  
JEO Consulting Group, Inc.



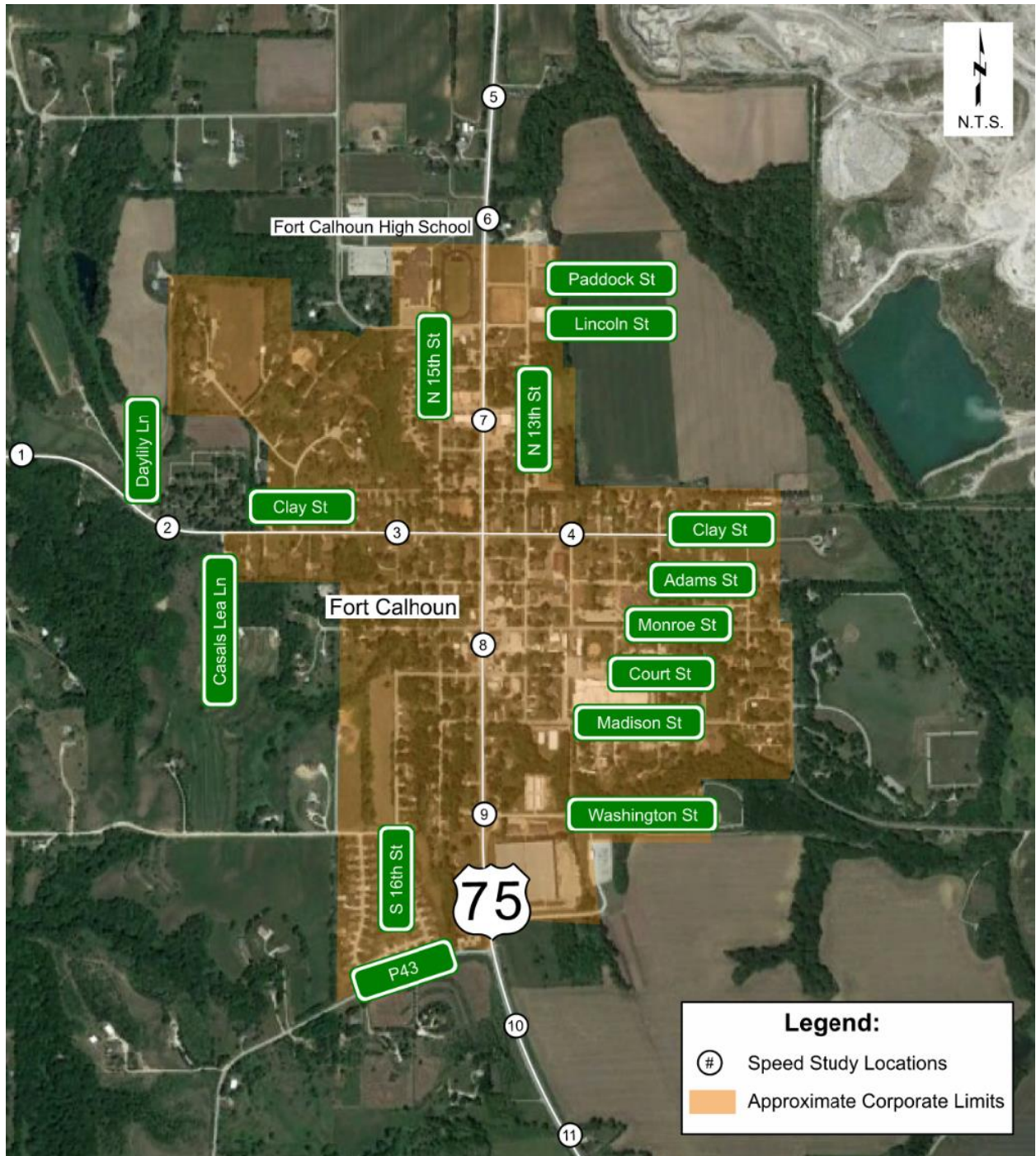
### 1.0 Introduction

The City has expressed concern with driver compliance with speed limits entering and exiting the City and within the city limits. The main north-south arterial of US-75 and the east-west collector of Clay Street are of greatest concern. Both streets are the major entry and exit points to/from the City. Because of this, both corridors have rural/urban transitions, and thus, speed compliance becomes challenging, especially in transition areas at the edge of the urban areas. Additionally, there are multiple locations along US-75 where pedestrians may cross, whether within the city center or at Fort Calhoun High School/Middle School at the City's north edge. The City is also interested in providing a marked crosswalk on the City's south side, specifically near the Fort Calhoun Baseball Fields. Therefore, the City is also looking for strategies to improve crossing safety and calm traffic through these high-risk areas.

The primary objective of this technical memorandum is to complete a speed study for locations on Clay Street and US-75 in Fort Calhoun, Nebraska. The study addressed speed control within the City corporate limits of Fort Calhoun. This report includes a summary of existing conditions, a discussion of data collection, speed data analysis, traffic calming methods, pedestrian crossing strategies, and a summary of conclusions. The study area is depicted in the Vicinity Map in Figure 1.

The remainder of this memo is organized into the following sections:

- Section 2.0: Existing Conditions
- Section 3.0: Data Collection and Findings
- Section 4.0: Traffic Calming and Pedestrian Crossing Strategies
- Section 5.0: Conclusions and Recommendations



**Figure 1: Vicinity Map and Study Intersections**

## 2.0 Existing Conditions

The following section summarizes the existing conditions within the study area, including adjacent land use, current lane geometry, and field observations.

### 2.1 Adjacent Land Uses

Land uses along Clay Street consist of residential neighborhoods north and south of the study area. The study area has multi-family residential areas, including the Washington Heights Apartment complex northeast of Clay Street and 13<sup>th</sup> Street. Land use along US-75 consists of agricultural use on

the northeast and southeast sides of the study area just outside the city limits. Fort Calhoun High School is adjacent to US-75, near the north boundary of Fort Calhoun. US-75 becomes more of a residential area with a few commercial spots in the middle of the City.

## 2.2 Existing Lane Geometry and Field Observations

### 2.2.1 Clay Street

Clay Street is an undivided two-lane local street with no curbs & gutters. The posted speed limit for this street can be found in Figure 2.

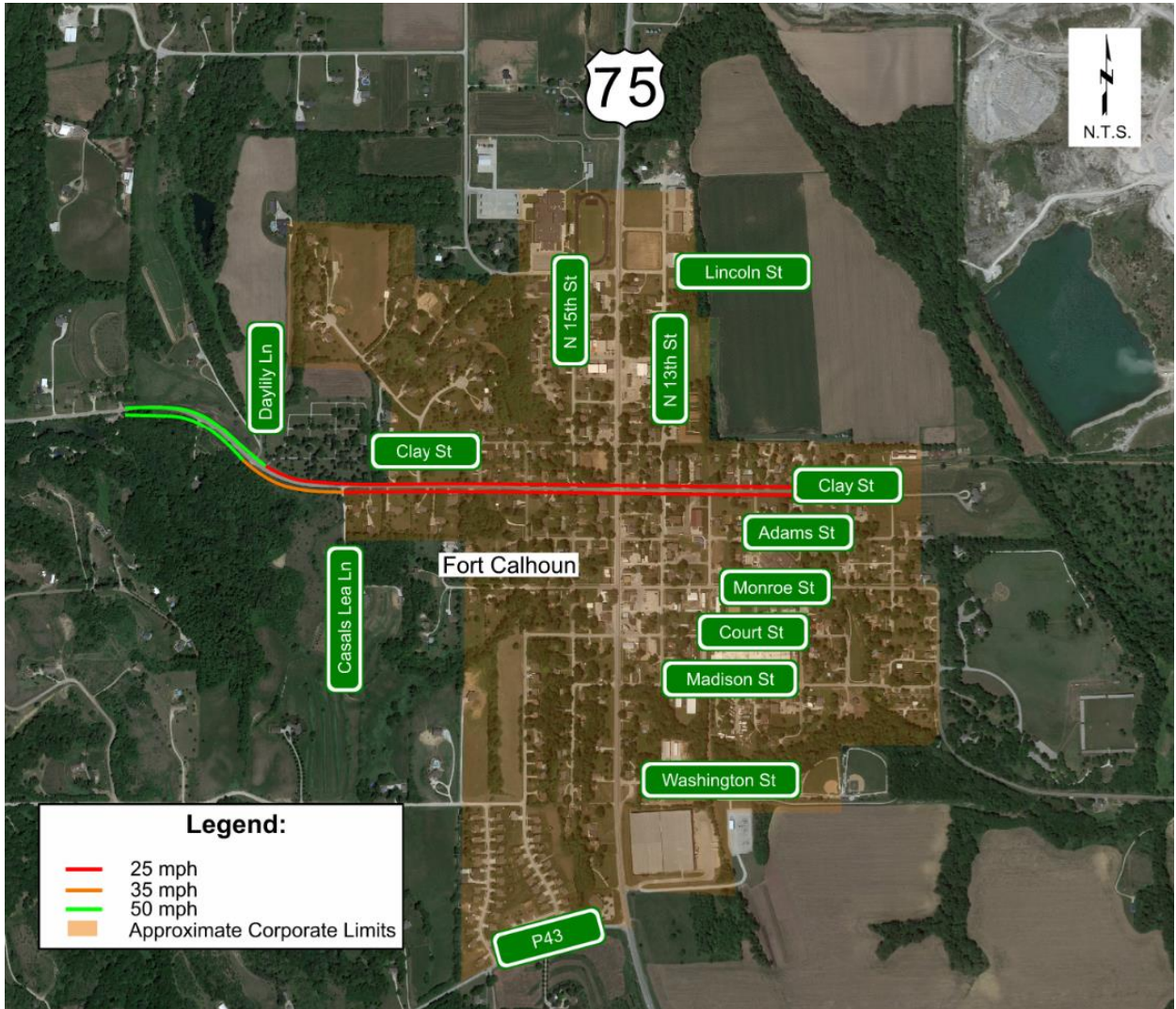


Figure 2. Existing Speed Zones on Clay Street (Fort Calhoun)

Based on Figure 2 and field visits, the following observations are noted:

1. The speed limit is 50 MPH before entering an S-curve just west of Casals Lea Lane.

2. A westbound 35 MPH speed zone is then introduced approximately at the center of this S-curve.
3. The current placement of the advanced "Reduced Speed Ahead" and 35 MPH speed limit sign obscures advanced visibility due to the horizontal alignment and adjacent vegetation.
4. The 35 MPH speed zone is then transitioned into a 25 MPH speed zone at Casals Lea Hills.
5. It is also noted that speed zones are not consistent eastbound vs westbound, with westbound speeds transitioning from 25 MPH to 50 MPH within the S-curve described above.
6. There is an outdated "Reduce Speed Ahead" sign traveling eastbound before the 35 MPH speed zone. The current MUTCD "Reduce Speed Ahead" is shown in Figure 4.
7. There are outdated "Stop Ahead" signs in both directions along Clay Street before the stop control at 16<sup>th</sup> Street to US-75.
8. There are "Your Speed Is" radar speed signs present for both eastbound (Casals Lea Lane) and westbound (Cherry Hills Lane) directions.
9. A steady amber flashing beacon accompanies multiple 25 MPH speed signs.
10. Pavement markings stating "Slow 25 MPH" are present for both directions of travel within the 25 MPH speed zone.



**Figure 3. 35 MPH Speed Zone Sign within S-Curve (Clay Street)**



**Figure 4. Current MUTCD Reduced Speed Limit Signs**

### 2.2.2 US-75

US-75 is an undivided two-lane principal arterial street with no curb and gutters on the north side of city limits. This part of US-75 has no sidewalk, giving it a rural feel. US-75 becomes a three-lane, undivided roadway with curbs and gutters from Lincoln Street to Washington Street. Within the city limits, there is on-street parking on the east side of the US-75 from Lincoln Street to Washington Street on the City's south side. On-street parking is also available on the west side of US-75 from just south of Adams Street to just north of Court Street. US-75 returns to a rural-style two-lane undivided roadway with no curb or gutter south of the city limits with rumble strips at the center line and edges of roadways south of P43. The posted speed limits on this segment can be found in Figure 5.



Figure 5. Existing Speed Zones on US-75

Based on Figure 5. and field visits, the following observations are noted:

1. Rural speed zones are 65 MPH and transition to 45 MPH as drivers approach Fort Calhoun from the north and south. Based on FHWA's Methods and Practices for Setting Speed Limits: An Informational Report, 15 MPH drops are more typical to step drivers down from rural to urban speeds.
2. Speed zones are then dropped in 10 MPH intervals to 25 MPH within the city center.
3. Two pedestrian crossing locations have been identified as concerns for the City. These include:

- a. There is an existing pedestrian signal located just south of Adams Street. The signal includes span wire-mounted signal heads, a pole-mounted signal controller, pedestrian signal heads, and push buttons. The signal appears to have been in place since at least the 1990s, although signal heads have been replaced with



**Figure 6. Pedestrian Signal on Southbound US-75**

newer-style pedestrian and vehicle signal heads. Pedestrian button placement and pedestrian landing areas do not appear consistent with current PROWAG/ADA standards, as button placement must be within a 5'X4' flat area and satisfy a 10" reach requirement. School crossing and advanced school crossing sign assemblies are present northbound and southbound on US-75. Discussions with the Nebraska (NDOT) indicate that the City maintains this pedestrian signal.

- b. An uncontrolled school crossing is on the south leg of US-75 and Lincoln Street near Fort Calhoun High School. Current pedestrian ramps do not appear to be PROWAG compliant as there are no tactile surfaces present, ramp slopes appear (not field verified) to be steeper than current standards, there is no receiving ramp on the west side of US-75, and the sidewalk on the west side appears narrower than current standards. School crossing and advanced school crossing sign assemblies are present on both northbound and southbound approaches. Recently, a Family Dollar store was constructed on the east side of US-75 north of Lincoln Street, which may attract more school-aged children crossing the highway.



**Figure 7. Uncontrolled School Crossing on Northbound US-75**

School crossing and advanced school crossing sign assemblies are present on both northbound and southbound approaches. Recently, a Family Dollar store was constructed on the east side of US-75 north of Lincoln Street, which may attract more school-aged children crossing the highway.

It should be noted that an existing multi-use trail is located on the east side of US-75 along the south side of Washington Street and 12<sup>th</sup> Streets, leading to the Fort Calhoun Baseball Fields and eventually nearly reaching Jefferson Street across from Fort Atkinson State Historical Park.

Like Clay Street, multiple 25 MPH speed limit signs accompany a steady amber flashing beacon for northbound and southbound directions. It should be noted that steady amber flashing beacons are not NDOT-approved.

### 3.0 Data Collection and Findings

The speed data was collected on Thursday, September 7, and Monday, September 11, 2023. JEO deployed one Laser Speed Gun to collect speeds at four locations on Clay Street and seven locations on US-75. Locations were selected to correlate with existing speed zones. Based on the Manual of Transportation Engineering Studies Second Edition, the sample size required is 108 vehicles (54 for each approach) per location for rural two-lane highways with 95 percent confidence. Thus, Data collection included at least 54 data points per direction at each location to obtain a 95% confidence level for speed analysis. The resulting speed data and statistical results are summarized in the following sections, and data collection sheets are provided in Attachment A. Speed study calculation sheets are also provided in Attachment B.

#### 3.1 Clay Street Speed Study Results

Speed analysis results for Clay Street are summarized in Table 1.

**Table 1. Speed Data on Clay Street**

Location <sup>1</sup>	Description	Direction	Date	10 MPH Pace	Average Speed (mph)	50 <sup>th</sup> Percentile Speed (mph)	85 <sup>th</sup> Percentile Speed (mph)	Existing Posted Speed (mph)
1	Clay Street, 0.25 Miles West of Daylily Lane, West of City Limits	EB	9/7/2023	43-52	49	48.0	<b>55.2</b>	50
		WB	9/7/2023	49-58	51	50.3	<b>56.7</b>	50
		Combined	9/7/2023	46-55	50	48.9	<b>56.0</b>	50
2	Clay Street, Middle of 25/35 MPH Zone West of City Limits	EB	9/7/2023	27-36	34	33.3	40.0	35
		WB	9/7/2023	34-43	38	<b>37.0</b>	<b>42.0</b>	25
		Combined	9/7/2023	31-40	36	35.2	<b>41.0</b>	25/35
3	Clay Street, Between 16 <sup>th</sup> Street and 15 <sup>th</sup> Street	EB	9/11/2023	21-30	27	26.5	29.7	25
		WB	9/11/2023	18-27	23	22.3	24.9	25
		Combined	9/11/2023	21-30	25	23.9	28.9	25
4	Clay Street at 12 <sup>th</sup> Street	EB	9/11/2023	21-30	26	24.5	28.9	25
		WB	9/11/2023	18-27	24	23.0	27.8	25
		Combined	9/11/2023	19-28	25	24.0	28.0	25

<sup>1</sup> Speed data locations are shown in Figure 1.

Based on speed analysis results, the following observations and conclusions are provided:

- Westbound 50<sup>th</sup> and 85<sup>th</sup> percentile speeds within the 50 MPH and 35 MPH speed zones exceeded posted speed limits by at least 5 MPH and as much as 17 MPH, especially within the westbound 25 MPH speed zone. The data suggests poor compliance on Clay Street west of 16<sup>th</sup> Street.
- Once vehicles are between 15<sup>th</sup> and 16<sup>th</sup> Street, drivers generally comply with posted speed limits.
- Driver compliance may be less evident for eastbound drivers due to the placement of the advanced warning and the 35 MPH speed zone sign, as both are placed within horizontal curvature and potentially obscured by adjacent plant vegetation.
- Westbound drivers are the least compliant, likely because familiar drivers anticipate the next 50 MPH speed zone as they head out of town. Additionally, the street characteristics of this zone appear more rural, with no curb, gutter, or sidewalk within part of this section.
- Consideration should be given to shifting the 35 MPH speed zone west of the S-Curve to improve advanced sight visibility (See Attachment C for concept).

### 3.2 US-75 Speed Study Results

Speed analysis results for US-75 are summarized in Table 2.

**Table 2. Speed Data on US-75**

Location <sup>1</sup>	Description	Direction	Date	10 MPH Pace	Average Speed (mph)	50 <sup>th</sup> Percentile Speed (mph)	85 <sup>th</sup> Percentile Speed (mph)	Existing Posted Speed (mph)
5	US-75, 0.32 Miles North of Paddock Street, North of NCL <sup>2</sup>	NB	9/7/2023	48-57	54	52.5	<b>58.3</b>	65
		SB	9/7/2023	45-54	52	51.0	<b>58.5</b>	65
		Combined	9/7/2023	48-57	52	51.9	<b>58.4</b>	65
6	US-75, Middle of 45 MPH North of Paddock Street	NB	9/7/2023	40-49	46	45.7	<b>51.5</b>	45
		SB	9/7/2023	39-48	43	41.2	48.6	45
		Combined	9/7/2023	40-49	45	42.9	<b>50.5</b>	45
7	US-75, Middle of 35 MPH Zone South of Stevenson Street	NB	9/11/2023	27-36	32	32.0	36.0	35
		SB	9/11/2023	25-34	29	28.5	31.0	35
		Combined	9/11/2023	25-34	31	29.5	34.0	35
8	US-75, Middle of 25 MPH Zone South of Monroe	NB	9/11/2023	18-27	23	22.6	25.0	25
		SB	9/11/2023	23-32	27	26.0	29.3	25
		Combined	9/11/2023	21-30	25	24.4	28.3	25
9	US-75, Middle of 35 MPH Zone South of Washington Street	NB	9/11/2023	28-37	33	32.3	36.6	35
		SB	9/11/2023	30-39	34	33.3	36.8	35
		Combined	9/11/2023	28-37	34	32.9	36.8	35
10	US-75, Middle of 45 MPH Zone South of SCL <sup>2</sup>	NB	9/7/2023	41-50	46	44.7	49.5	45
		SB	9/7/2023	46-55	49	49.3	<b>54.8</b>	45
		Combined	9/7/2023	42-51	47	46.7	<b>52.9</b>	45
11	US-75, 0.32 Miles South of P43 South of SCL <sup>2</sup>	NB	9/7/2023	46-55	52	50.2	<b>57.9</b>	65
		SB	9/7/2023	51-60	55	54.2	60.5	65
		Combined	9/7/2023	46-55	54	52.8	<b>59.6</b>	65

<sup>1</sup>Speed data locations are shown in Figure 1.

<sup>2</sup>NCL=North of City Limits, SCL=South of City Limits



Based on speed analysis results, the following observations and conclusions are provided:

- The 85<sup>th</sup> percentile speeds at US-75, Middle of 45 MPH North of Paddock Street, and US-75, Middle of 45 MPH Zone South of SCL, exceed posted speed limits greater than 5 MPH.
- Speed data collected within the 65 MPH Zone at locations US-75, 0.32 Miles North of Paddock Street, and US-75, 0.32 Miles South of P43, are under the posted speed limit by more than 5 MPH for both the 50<sup>th</sup> and 85<sup>th</sup> percentile speeds. This could be due to the speed transition going from 45 MPH to 65 MPH. An intermediate speed zone is recommended to encourage better compliance within the 45 MPH speed zone and allow drivers to react and adjust their speeds as they move into and out of town (See Attachment C for concept).
- The City of Fort Calhoun was interested in extending the current 25 MPH speed zone north to Lincoln Street; however, based on discussions with the NDOT, past data sources, and data collected as part of this study, the NDOT expressed that they would not support the extension of the 25 MPH speed zone to Lincoln Street at this time. Further coordination indicated that the NDOT might support a school speed zone within the vicinity of Fort Calhoun High School near Lincoln Street.

#### 4.0 Traffic Calming and Pedestrian Crossing Strategies

Traffic calming is a traffic management approach through varying methods to reduce vehicle speeds, creating safer conditions for all transportation modes. Proactively incorporating traffic calming design features can aid in creating a safer environment for traffic operations surrounding schools. The following section identifies some options for encouraging slower vehicle speeds and enhancing multi-modal safety. It should be noted that any of the below strategies will require coordination and concurrence from the NDOT and Washington County. Options have been identified as low (less than \$20,000), medium (\$20,000 to \$75,000) or high cost (greater than \$75,000)

##### 4.1 Longitudinal and Lateral Lane Striping

Maintaining centerline and shoulder line striping defines lane width and boundaries that can have a calming effect on drivers. Research has also shown that transverse pavement striping (optical speed bars) can increase drivers' perception of their speed and cause them to temper their operating speeds. An example of this striping is shown in Figure 8. It should be noted that this treatment should only be allowed where longitudinal striping (center and edge lane) is present and maintained. A good location for this application could be the eastbound approach to the S-Curve as vehicles approach the city limits. Maintaining visible striping year-round will be critical to the effectiveness of these traffic calming measures. (Cost: Low)



**Figure 8. Optical Speed Bars**  
(Source KLS Engineering and FHWA)

## 4.2 Urban Streetscape Enhancements

Some amount of traffic calming can be attained by adding curvature to street alignments and minimizing tangential lengths or roadways. The current plan features a location on Clay Street with a reverse curve alignment. Currently, there is no curb, gutter, or sidewalks along the entire length of Clay Street, thus conveying a rural feel to the facility even well within the city limits. Adding curbs, gutters, sidewalks, and auxiliary lanes to Clay Street, where warranted, can help reduce vehicle speeds and queue drivers within an urban environment, making a safer space for pedestrians and bikers. **(Cost: Medium to High)**

## 4.3 Options Reliant or More Effective with Curb and Gutter

The following options would have greatly reduced effectiveness on streets without curbs and gutters. Therefore, they should only be considered on Clay Street if and when the curb and gutter are constructed and some sections of US-75 with concurrence from the NDOT.

### 4.3.1 Choker Traffic Calming



**Figure 9. Choker Example in Suburban Setting**  
(Source: FHWA ePrimer, Photo: Scott Wainwright)

Chokers are another method of traffic calming that narrows the section of the roadway and, in turn, encourages slower vehicle speeds. Typically, chokers are created with curb extensions and placed at midblock locations. An example of chokers is shown in Figure 9. Construction of chokers on rural sections is less common and tends to be done with striping rather than curbs; however, the effectiveness of speed reduction is lessened as drivers tend not to adhere to striped-out areas versus curb barriers. Chokers can also enhance mid-block pedestrian crossing, such as the pedestrian signal on US-75 just south of Adams, to minimize pedestrian crossing exposure and reduce vehicle speeds.

### 4.3.2 Speed Humps

Speed humps are another traffic-calming device that is relatively inexpensive to construct but has mixed results and can be perceived by local drivers as a nuisance. Research has shown that while speeds will be reduced at the speed hump, vehicle speeds were much greater before and after the speed hump as some drivers are making up for lost time traversing the speed hump. Speed humps are also most effective on urban sections of streets with curbs and gutters, as vehicles have been observed to minimize the speed hump effect by encroaching into the shoulder so one set of wheels will avoid the hump. Furthermore, there is a concern that speed humps on sections that appear rural will be hard to see and violate driver expectations, potentially leading a driver to traverse a speed hump at too great a speed and lose control. The areas where speed humps would be most effective would be well within the city boundaries, and based on the data, there is already compliance among drivers within these areas. It should also be noted that NDOT currently does not have any speed humps on state highways. **(Cost: Low)**

### 4.3.3 Chicane Traffic Calming

Chicanes are another traffic calming tool in which narrowing and curb extensions (or striping) alternate from one side of the street to the other at mid-block locations. This geometry requires a traveling vehicle to change trajectory left then right, thus reducing operating speeds along the roadway. Ideal chicanes, per the Institute of Transportation Engineers (ITE) Traffic Calming Measures, are recommended to provide shifts of one lane width, deflection angles of 45 degrees, and center islands to prevent drivers from taking a straight line through the traffic calming feature. An example of a chicane is shown in Figure 10. The proposed lack of outside curbs on the Clay Street network may temper the effectiveness of this strategy. **(Cost: Medium to High)**



**Figure 10. Chicane Example (Omaha, Nebraska)**  
Source: Google Earth

## 4.4 US-75 and Lincoln Street Pedestrian Crossing Strategies

### 4.4.1 Post-Mounted Speed Display Signs

Post-mounted speed displays or "Your Speed" signs are a relatively low-cost strategy to encourage drivers to comply with posted speed limits by drawing drivers' attention to their current speed. These signs are typically permanent installations; however, some communities also employ mobile radar signs temporarily at locations with low-speed limit compliance. This strategy can be effective in the short term, but effectiveness tends to wane over time as drivers become used to their presence and thus fall into the background. Therefore, this strategy would be considered a good, inexpensive short-term option but will likely require accompanying longer-term options to maintain speed limit compliance. **(Cost: Low)**



**Figure 11. Existing Your Radar Speed Sign on Westbound Clay Street**

#### 4.4.2 Raised Crosswalks

Raised crosswalks function as a speed hump but are wide enough to accommodate a pedestrian crosswalk. The raised crosswalk installation would include accompanying pedestrian crossing signs and crosswalk and chevron pavement striping, per the latest MUTCD. An example of a raised crosswalk is shown in Figure 12. It is recommended that a raised crosswalk be placed at an uncontrolled pedestrian crossing and should be at least 10 feet wide (flat portion of the raised crosswalk). Based on anticipated school pedestrian routes, a potential raised crosswalk could be identified at the uncontrolled pedestrian crossing of US-75 at Lincoln Street. Like speed humps, raised crosswalks are most effective when curb and gutter are present. However, it should be noted that NDOT currently does not have any raised crosswalks on state highways. **(Cost: Medium)**



**Figure 12. Raised Crosswalk Example**  
**(Source: Hawaii Department of Transportation)**

#### 4.4.3 Rapid Rectangular Flashing Beacon (RRFB)



**Figure 13. School Crossin with RRFB**  
**(Source: City of Tucker, Georgia)**

Installing Rapid Rectangular Flashing Beacons can further enhance uncontrolled school crossing locations. RRFBs are pedestrian-activated or passive detection-activated flashing LED beacons at uncontrolled pedestrian crosswalks. The beacon uses an irregular flash pattern to better draw a driver's attention to a crossing pedestrian. Per safety research presented on the Crash Modification Factor Clearinghouse, vehicle/pedestrian crashes are reduced by 47% with the installation of an RRFB. An

RRFB could be applied at Highway 75 and Lincoln Street. It should be noted that raised crosswalks can be paired with RRFB installations. An example of an RRFB installation is shown in Figure 13. **(Cost: Medium to High)**

## 4.5 US-75, just South of Adams Street Pedestrian Crossing

### 4.5.1 Traffic Signal Upgrades

The typical life cycle for traffic signal poles is around 25 to 30 years. The pedestrian signal just south of Adams Street appears to have been constructed in the 1990s. Traffic signal controllers and hardware tend to have even shorter life cycles. Therefore, traffic signal replacement could be required in the mid-term and, therefore, could be a candidate to be replaced with a new traffic signal or an RRFB discussed in Section 4.4.2. The advantage of replacing the signal with an RRFB is the lower construction and maintenance cost. Many RRFB installations can be so powered with less conductor and conduit requirements than a typical traffic signal. **(Cost: Medium to High)**

### 4.5.2 Raised Median and Pedestrian Refuge

Raised medians, narrower travel lanes, and street curbs can provide a traffic-calming effect. Raised central medians can also provide an opportunity for pedestrian refuge, allowing pedestrians to cross at uncontrolled locations one direction at a time and increase the visibility of pedestrians and bicyclists crossing the street. Raised medians should be constructed such that a minimum 6-foot-wide median refuge is provided to accommodate bicycle lengths without exposure to vehicle paths. An example of a raised median with a pedestrian refuge is shown in Figure 14. Based on the proposed on-site street characteristics, raised crosswalks would be preferable at locations where median refuges would provide benefits. Therefore, a raised median and pedestrian refuge should be considered at the signalized crosswalk on US-75, just South of Adams Street. **(Cost: Medium)**



Figure 14. Pedestrian Crossing Median Example  
(Source: [www.pedbikeimages.org/Dan Burden](http://www.pedbikeimages.org/Dan_Burden))

### 4.5.3 Curb Extensions/Bulb-out

A curb extension or "bulb-out" is an extension of the sidewalk area at a crossing that narrows the street section. The purpose of this extension is to shorten pedestrian crossing length, thereby reducing pedestrian exposure to vehicle traffic. Curb extensions also increase the visibility of waiting pedestrians and cue drivers to be aware of the potential for pedestrian crossings. Both of these factors increase the safety of pedestrians crossing streets. Curb extensions also tend to go hand in hand with on-street parking, provided there is a street width to accommodate. The provision for on-street parking also provides traffic calming effects to drivers. **(Cost: Medium)**



Figure 15. Curb Extension in Blackstone, Omaha  
(Source Keep Omaha Moving)

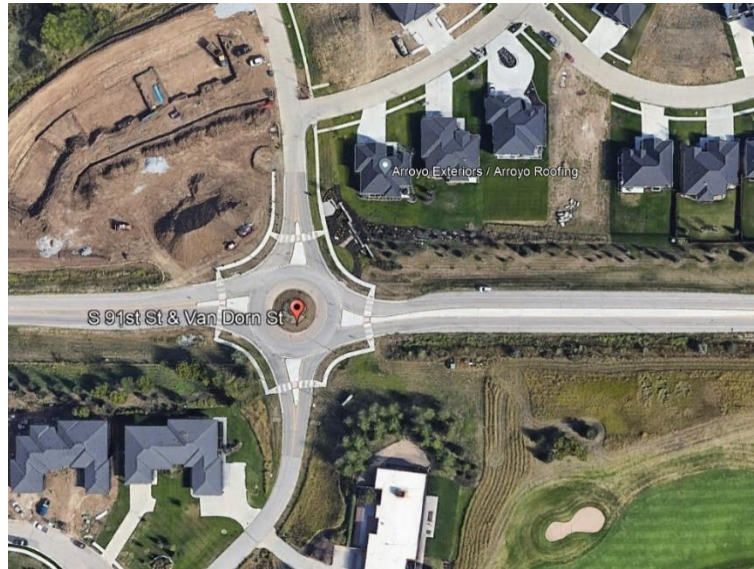
#### 4.6 South Pedestrian Crossing

As mentioned, the City of Fort Calhoun expressed interest in adding another marked crosswalk on the south side of town. A natural location for this crossing would be near Washington Street, which would provide access to the Fort Calhoun Baseball Fields complex, which is located to the east. Preliminary coordination with the NDOT indicated that the NDOT might be supportive of a marked crosswalk provided the existing multi-use trail previously identified on the east side of U-75 along the south sides of Washington and 12<sup>th</sup> Streets would be connected to the west of US-75 and the crossing was compliant with current ADA standards. Further coordination is recommended to determine the feasibility of providing trail connections across US-75.

#### 4.7 Roundabouts

Roundabouts not only can provide efficient operations for vehicles at intersections but also provide the following safety benefits:

1. Geometry slows vehicle speeds, reducing crashes' frequency and severity.
2. Provides better visibility for pedestrians.
3. Pedestrians can utilize the median refuge island provided on all approaches to cross the street one direction at a time rather than multiple directions at once.
4. Per the 2010 Highway Safety Manual and the Crash Modification Clearinghouse, overall crashes can be reduced by 29 to 39% and severe crashes by 78% to 81% with roundabout control versus two-way stop control at single-lane urban intersections.



**Figure 16. Rural to Urban Transition Roundabout**  
(Source: Google Earth - 91<sup>st</sup> St. and Van Dorn St. Lincoln, NE)

Therefore, if previously discussed lower-cost options do not address speed issues, roundabout control could be considered a long-term option and is especially effective in rural-to-urban transition zones. Long-term candidate locations for consideration might include the following intersections:

1. Clay Street at Daylily Lane or Casals Lea Lane
2. South US-75 at P-43, Washington Street, and Madison Street
3. North US-75 at Lincoln Street

While construction costs and adjacent property impacts can be greater than traditional intersection control over the facility's life, it can overcome costs by reducing crash occurrences, property damage, injuries, and fatalities. It should be noted that the cost is significantly higher than \$75,000 within the bracket cost. **(Costs: High)**

## 5.0 Conclusions and Recommendations

Based on the review of existing conditions and results from the speed analysis, the following recommendations are provided and summarized in Figure 17:

- In the short term, the following mitigation measures are recommended to curb speeding issues on Clay Street:
  - Shift the existing 35 MPH Speed just west of the S-Curve to increase visibility. (See Attachment C)
  - Match where eastbound and westbound speed limits begin and end, as variance between the two can confuse drivers.
  - Refresh longitudinal striping, including centerline and edge line striping, to define lanes and calm traffic. Speed bars could be tried and recommended on the eastbound approach to the S-curve west of the city limits.
  - Update "Reduce Speed Ahead" and "Stop Ahead" signs to current MUTCD standards.
- Longer-term speed control options on Clay Street could include the following:
  - Construct curb, gutter, and sidewalk where speed control is desired to project an urban cross-section to drivers.
  - Once the curb and gutter have been constructed, the following mitigation treatments could be considered:
    - Chokers
    - Speed humps
    - Chicanes
- Any mitigation outside the city limits on Clay Street will require coordination and concurrence with Washington County.
- It is recommended that a 55 MPH speed zone be added on US-75 between the existing 65 and 45 MPH speed zones per observed data. This will provide a more advanced and less abrupt rural-to-urban speed change. (See Attachment C).
- It is recommended that a school speed zone (25 MPH speed limit during school arrival and dismissal) be considered for Fort Calhoun High School's frontage, which should include the Lincoln Street intersection and pedestrian crossing.
- It is recommended that a rapid rectangular flashing beacon be constructed at the US-75 and Lincoln Street intersection and include the following:
  - ADA/PROWAG-compliant upgrades to the adjacent sidewalk and curb ramps include tactile surface treatments, appropriate ramp slopes, a minimum flat landing area (5'X4') for wheelchairs, and accessible pushbuttons.
  - Pedestrian crossing and advanced warning signs shall follow the current MUTCD.
  - Consideration could be given to providing a curb extension on the east side of US-75 where on-street parking is present.
- It is recommended that the existing pedestrian signal on US-75 just south of Adams Street be replaced with an RRFB and include the following:
  - ADA/PROWAG-compliant upgrades to the adjacent sidewalk and curb ramps include tactile surface treatments, appropriate ramp slopes, a minimum flat landing area (5'X4') for wheelchairs, and accessible pushbuttons.
  - Pedestrian crossing and advanced warning signs shall follow the current MUTCD.
  - Consideration could be given to providing curb extensions on both sides of US-75 where on-street parking is present.

- Consideration could be given to providing a pedestrian refuge median. However, collecting turning movement counts at Adams Street is recommended to determine northbound left-turn queue storage requirements to avoid backup into the northbound through lane.
  - Consideration could be given to providing a raised crosswalk for the school crossing at Lincoln Street to enhance crosswalk visibility and calm traffic further.
- At a minimum, the existing pedestrian signal should be upgraded with new equipment, signal indications, pedestrian buttons, signal poles, controller equipment, and ADA/PROWAG compliance upgrades if an RRFB is not opted for by the City.
- If the above lower impact options do not mitigate vehicle speeds, a long-term consideration could be introducing roundabout control at an intersection where rural-to-urban speed transitions occur. Potential locations could include:
  - Clay Street at Daily Lane or Casals Lea Lane
  - South US-75 at P-43, Washington Street, and Madison Street
  - North US-75 at Lincoln Street
  - It is recommended that a detailed traffic operations and safety study be completed to determine feasibility, operations impact, and safety benefits.
- Consideration could be given to providing an additional signed and marked pedestrian crossing on US-75 near Washington Street, especially if the existing multi-use trail on the east side of US-75 is expanded to connect west of US-75. The NDOT has indicated it might support an additional marked crossing with an ADA-compliant multi-use trail connection across US-75.
- Any mitigation occurring on US-75 will require coordination and concurrence with the NDOT.



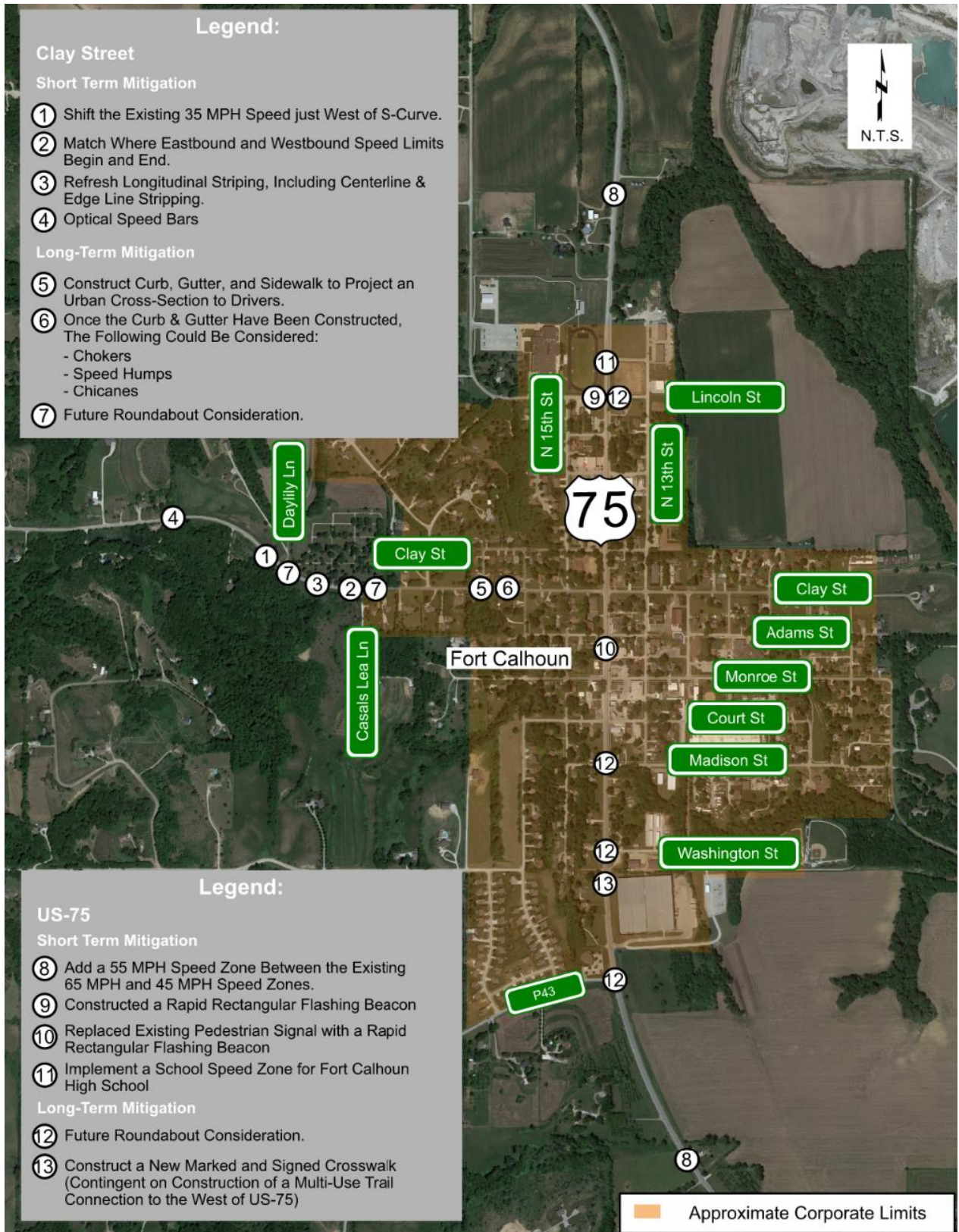


Figure 17. Recommendation Summary

**Attachments:**

Attachment A. Speed Study Data Collection Forms

Attachment B. Speed Study Calculation Sheets

Attachment C. Speed Zone Modification Exhibits

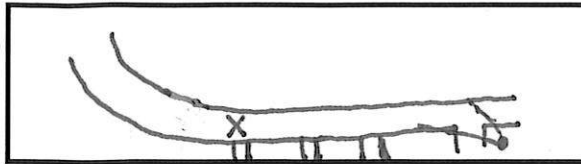
**Attachment A. Speed Study Data Collection Forms**

## Speed Study Data Collection Form

Start: 2:35 PM  
End: 3:28 PM

Name: Clay Street, 0.25 Sketch of Roadway/collection Point:

Location: Miles West of Daylily Ln  
West of WCL



### Eastbound

### Westbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	49	36	40	1	50	36	49
2	39	37	60	2	49	37	54
3	40	38	55	3	51	38	47
4	46	39	49	4	45	39	41
5	46	40	56	5	57	40	63
6	42	41	43	6	43	41	60
7	39	42	52	7	42	42	58
8	41	43	49	8	51	43	53
9	44	44	47	9	49	44	50
10	35	45	46	10	49	45	47
11	53	46	54	11	57	46	49
12	49	47	36	12	48	47	44
13	44	48	41	13	38	48	44
14	56	49	60	14	36	49	55
15	48	50	57	15	42	50	60
16	51	51	46	16	51	51	51
17	46	52	45	17	52	52	50
18	52	53	56	18	55	53	51
19	47	54	49	19	47	54	49
20	47	55		20	53	55	
21	47	56		21	58	56	
22	55	57		22	57	57	
23	52	58		23	57	58	
24	49	59		24	54	59	
25	52	60		25	53	60	
26	48	61		26	58	61	
27	49	62		27	46	62	
28	56	63		28	53	63	
29	48	64		29	52	64	
30	48	65		30	51	65	
31	51	66		31	45	66	
32	59	67		32	55	67	
33	45	68		33	51	68	
34	55	69		34	60	69	
35	58	70		35	50	70	

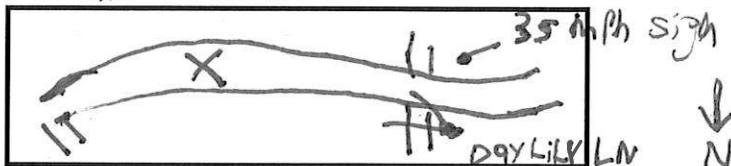
## Speed Study Data Collection Form

Start: 4:20 PM

End: 5:30 PM

Name: Clay Street, Middle of Sketch of Roadway/collection Point:

Location: 25/35 mph West of WCL



### Eastbound

### Westbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	35	36	30	1	40	36	34
2	29	37	35	2	44	37	35
3	33	38	31	3	37	38	41
4	43	39	29	4	43	39	32
5	40	40	32	5	35	40	34
6	31	41	26	6	41	41	30
7	20	42	32	7	35	42	43
8	34	43	31	8	32	43	31
9	39	44	34	9	39	44	31
10	26	45	33	10	32	45	42
11	36	46	36	11	31	46	25
12	22	47	36	12	41	47	43
13	32	48	30	13	26	48	42
14	53	49	35	14	38	49	32
15	33	50	42	15	38	50	36
16	27	51	44	16	40	51	43
17	34	52	35	17	42	52	41
18	35	53	32	18	32	53	49
19	30	54 -	31	19	34	54 -	32
20	33	55		20	35	55	
21	36	56		21	39	56	
22	37	57		22	37	57	
23	41	58		23	31	58	
24	41	59		24	44	59	
25	40	60		25	36	60	
26	27	61		26	41	61	
27	29	62		27	40	62	
28	24	63		28	37	63	
29	42	64		29	33	64	
30	26	65		30	37	65	
31	26	66		31	39	66	
32	41	67		32	39	67	
33	38	68		33	43	68	
34	28	69		34	36	69	
35	28	70		35	40	70	

## Speed Study Data Collection Form

Start: 12:04

End: 2:06

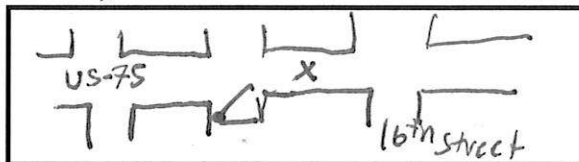
Name:

Clay Street

Sketch of Roadway/collection Point:

Location:

Between 16<sup>th</sup> Street  
& 15<sup>th</sup> Street



### Eastbound

### Westbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	24	36	30	1	29	36	23
2	25	37	30	2	20	37	20
3	25	38	26	3	23	38	26
4	20	39	27	4	25	39	23
5	28	40	26	5	24	40	22
6	29	41	31	6	23	41	19
7	28	42	28	7	22	42	22
8	22	43	23	8	25	43	23
9	25	44	30	9	24	44	25
10	21	45	33	10	20	45	20
11	21	46	24	11	21	46	19
12	20	47	26	12	21	47	23
13	30	48	19	13	18	48	17
14	24	49	29	14	27	49	22
15	22	50	29	15	20	50	22
16	30	51	30	16	25	51	21
17	29	52	32	17	18	52	23
18	24	53	26	18	22	53	24
19	25	54	28	19	25	54	27
20	25	55		20	29	55	
21	25	56		21	22	56	
22	29	57		22	23	57	
23	28	58		23	19	58	
24	26	59		24	26	59	
25	27	60		25	25	60	
26	22	61		26	25	61	
27	22	62		27	23	62	
28	23	63		28	27	63	
29	30	64		29	19	64	
30	29	65		30	24	65	
31	30	66		31	23	66	
32	30	67		32	22	67	
33	20	68		33	24	68	
34	23	69		34	22	69	
35	37	70		35	25	70	

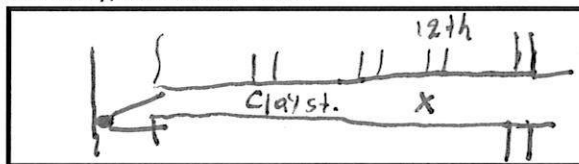
## Speed Study Data Collection Form

Start: 2:38 PM

End: 5:20 PM

Name: Clay Street @  
 Location: 12th Street

Sketch of Roadway/collection Point:



### Eastbound

### Westbound

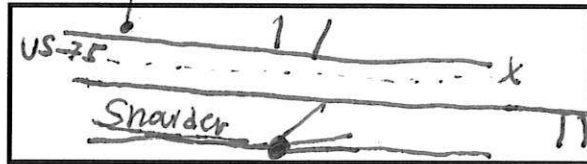
Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	20	36	25	1	24	36	22
2	23	37	28	2	22	37	15
3	22	38	23	3	18	38	18
4	22	39	24	4	35	39	19
5	22	40	30	5	25	40	22
6	32	41	23	6	19	41	27
7	24	42	27	7	20	42	30
8	24	43	27	8	27	43	28
9	24	44	22	9	17	44	27
10	25	45	18	10	18	45	21
11	24	46	26	11	21	46	28
12	26	47	25	12	23	47	24
13	24	48	25	13	15	48	32
14	26	49	27	14	16	49	30
15	25	50	29	15	22	50	25
16	23	51	22	16	28	51	29
17	25	52	34	17	19	52	26
18	21	53	21	18	18	53	22
19	26	54 →	24	19	28	54 ←	20
20	22	55		20	23	55	
21	27	56		21	18	56	
22	22	57		22	22	57	
23	21	58		23	21	58	
24	27	59		24	25	59	
25	30	60		25	26	60	
26	36	61		26	25	61	
27	27	62		27	28	62	
28	30	63		28	32	63	
29	26	64		29	19	64	
30	21	65		30	26	65	
31	27	66		31	27	66	
32	23	67		32	27	67	
33	24	68		33	24	68	
34	28	69		34	26	69	
35	22	70		35	23	70	

## Speed Study Data Collection Form

Name: US-75, 0.32 Miles Sketch of Roadway/collection Point:

Start: 12:40 PM  
End: 1:06 PM

Location: North of Paddock  
Street North of NCL



### Northbound

### Southbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	53	36	53	1	48	36	46
2	59	37	54	2	59	37	46
3	62	38	53	3	55	38	40
4	62	39	57	4	52	39	55
5	50	40	47	5	53	40	49
6	53	41	53	6	51	41	32
7	61	42	53	7	50	42	61
8	56	43	56	8	48	43	52
9	58	44	43	9	46	44	57
10	68	45	56	10	57	45	60
11	51	46	43	11	52	46	55
12	49	47	44	12	51	47	56
13	49	48	51	13	54	48	52
14	53	49	52	14	54	49	60
15	57	50	54	15	52	50	46
16	48	51	54	16	51	51	46
17	51	52	52	17	45	52	49
18	55	53	52	18	51	53	56
19	55	54 -	58	19	54	54 -	62
20	59	55		20	54	55	
21	60	56		21	45	56	
22	50	57		22	48	57	
23	48	58		23	65	58	
24	46	59		24	55	59	
25	52	60		25	52	60	
26	59	61		26	45	61	
27	49	62		27	44	62	
28	50	63		28	53	63	
29	51	64		29	49	64	
30	53	65		30	62	65	
31	57	66		31	62	66	
32	58	67		32	46	67	
33	60	68		33	43	68	
34	52	69		34	51	69	
35	48	70		35	45	70	



# US-75 Speed Study Data Collection Form

Start: 1:25 PM

End: 1:55 PM

Name: Middle of 45 mph

Sketch of Roadway/collection Point: 35 mph sign

Location: North of Paddock Street



## Northbound

## Southbound

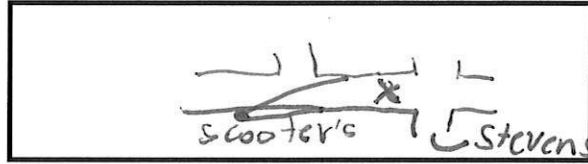
Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	45	36	43	1	40	36	49
2	51	37	51	2	42	37	42
3	54	38	49	3	36	38	30
4	49	39	36	4	33	39	29
5	41	40	37	5	35	40	46
6	43	41	42	6	40	41	39
7	43	42	50	7	43	42	40
8	46	43	49	8	39	43	39
9	53	44	51	9	39	44	40
10	60	45	54	10	40	45	41
11	42	46	55	11	47	46	42
12	49	47	49	12	41	47	40
13	52	48	49	13	50	48	43
14	49	49	43	14	49	49	41
15	46	50	38	15	40	50	36
16	40	51	35	16	44	51	49
17	47	52	40	17	47	52	39
18	39	53	41	18	41	53	52
19	42	54 -	44	19	45	54 -	41
20	37	55		20	41	55	
21	49	56		21	46	56	
22	40	57		22	48	57	
23	46	58		23	55	58	
24	55	59		24	55	59	
25	52	60		25	54	60	
26	43	61		26	44	61	
27	51	62		27	40	62	
28	52	63		28	44	63	
29	42	64		29	44	64	
30	44	65		30	53	65	
31	47	66		31	50	66	
32	38	67		32	42	67	
33	39	68		33	44	68	
34	40	69		34	59	69	
35	49	70		35	42	70	

## Speed Study Data Collection Form

Start: 11:18 AM  
End: 11:43 AM

Name: US-75, Middle of Sketch of Roadway/collection Point:

Location: 35 mph Zone South of  
Stevenson Street



### Northbound

### Southbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	41	36	26	1	28	36	31
2	34	37	34	2	30	37	30
3	37	38	33	3	28	38	28
4	26	39	32	4	29	39	29
5	30	40	34	5	32	40	25
6	35	41	28	6	30	41	31
7	30	42	32	7	28	42	27
8	36	43	37	8	29	43	30
9	36	44	31	9	29	44	31
10	36	45	29	10	27	45	30
11	42	46	28	11	33	46	31
12	41	47	33	12	29	47	27
13	35	48	34	13	29	48	29
14	34	49	35	14	30	49	22
15	28	50	36	15	28	50	26
16	30	51	34	16	33	51	27
17	30	52	35	17	30	52	28
18	29	53	32	18	27	53	29
19	30	54-	28	19	27	54-	29
20	25	55		20	25	55	
21	25	56		21	29	56	
22	33	57		22	31	57	
23	28	58		23	27	58	
24	27	59		24	23	59	
25	27	60		25	33	60	
26	32	61		26	28	61	
27	31	62		27	33	62	
28	25	63		28	32	63	
29	27	64		29	29	64	
30	28	65		30	34	65	
31	33	66		31	31	66	
32	31	67		32	33	67	
33	26	68		33	28	68	
34	31	69		34	27	69	
35	34	70		35	26	70	

# US-75, Speed Study Data Collection Form

Start: 10:42 AM

Name:

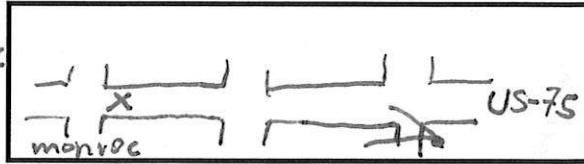
Middle of 25mph

Sketch of Roadway/collection Point:

End: 11:10 AM

Location:

Zone south of Monroe



## Northbound

## Southbound

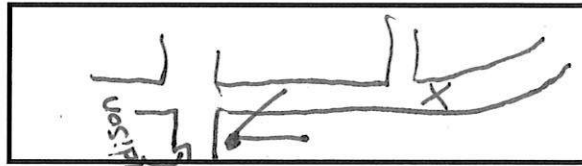
Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	23	36	19	1	30	36	29
2	23	37	25	2	25	37	16
3	20	38	25	3	26	38	28
4	19	39	22	4	24	39	29
5	16	40	20	5	23	40	26
6	24	41	20	6	25	41	28
7	25	42	17	7	26	42	25
8	19	43	22	8	28	43	25
9	29	44	26	9	25	44	23
10	23	45	32	10	30	45	26
11	20	46	24	11	30	46	28
12	24	47	24	12	30	47	25
13	22	48	24	13	28	48	32
14	19	49	31	14	28	49	24
15	20	50	29	15	28	50	26
16	22	51	22	16	25	51	33
17	20	52	23	17	23	52	30
18	21	53	23	18	29	53	27
19	25	54 -	23	19	30	54 -	26
20	27	55		20	27	55	
21	23	56		21	28	56	
22	24	57		22	26	57	
23	23	58		23	27	58	
24	21	59		24	25	59	
25	22	60		25	25	60	
26	27	61		26	26	61	
27	25	62		27	32	62	
28	24	63		28	26	63	
29	24	64		29	28	64	
30	23	65		30	30	65	
31	24	66		31	25	66	
32	21	67		32	28	67	
33	29	68		33	25	68	
34	19	69		34	23	69	
35	25	70		35	28	70	

## Speed Study Data Collection Form

Start: 10:14 AM  
End: 10:40 AM

Name: US-75, Middle of  
Location: 35 mph, South of  
Washington Street

Sketch of Roadway/collection Point:



### Northbound

### Southbound

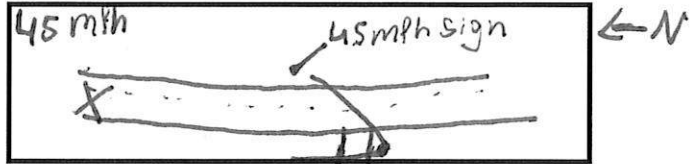
Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	37	36	32	1	34	36	36
2	38	37	31	2	37	37	35
3	35	38	36	3	36	38	32
4	35	39	39	4	32	39	32
5	26	40	36	5	32	40	34
6	31	41	34	6	30	41	44
7	30	42	31	7	32	42	34
8	28	43	31	8	28	43	38
9	32	44	33	9	33	44	39
10	32	45	32	10	32	45	32
11	32	46	38	11	31	46	34
12	31	47	39	12	30	47	36
13	28	48	29	13	32	48	40
14	29	49	35	14	32	49	32
15	31	50	34	15	33	50	32
16	32	51	36	16	39	51	30
17	34	52	28	17	33	52	31
18	30	53	29	18	35	53	26
19	33	54 -	29	19	36	54 -	34
20	41	55		20	32	55	
21	32	56		21	34	56	
22	35	57		22	34	57	
23	35	58		23	31	58	
24	26	59		24	32	59	
25	29	60		25	30	60	
26	31	61		26	33	61	
27	35	62		27	33	62	
28	34	63		28	32	63	
29	32	64		29	32	64	
30	31	65		30	32	65	
31	28	66		31	39	66	
32	33	67		32	40	67	
33	38	68		33	35	68	
34	33	69		34	34	69	
35	31	70		35	31	70	

# US-75 Speed Study Data Collection Form

Start: 11:55 AM  
End: 12:21 PM

Name: Middle of 45 mph Sketch of Roadway/collection Point:

Location: Zone south of SCL



## Northbound

## Southbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	40	36	44	1	53	36	50
2	51	37	39	2	52	37	55
3	50	38	44	3	44	38	47
4	41	39	42	4	50	39	56
5	43	40	48	5	51	40	48
6	44	41	48	6	55	41	55
7	43	42	48	7	49	42	38
8	47	43	67	8	42	43	44
9	44	44	52	9	46	44	52
10	35	45	56	10	56	45	54
11	41	46	47	11	59	46	57
12	42	47	45	12	51	47	57
13	42	48	38	13	45	48	53
14	44	49	47	14	50	49	51
15	49	50	45	15	51	50	46
16	50	51	46	16	47	51	49
17	46	52	48	17	43	52	37
18	39	53	49	18	41	53	46
19	40	54	49	19	52	54	49
20	36	55		20	51	55	
21	37	56		21	57	56	
22	39	57		22	37	57	
23	46	58		23	45	58	
24	48	59		24	45	59	
25	49	60		25	38	60	
26	43	61		26	46	61	
27	42	62		27	46	62	
28	40	63		28	55	63	
29	41	64		29	51	64	
30	49	65		30	55	65	
31	50	66		31	38	66	
32	50	67		32	46	67	
33	45	68		33	59	68	
34	55	69		34	51	69	
35	53	70		35	47	70	

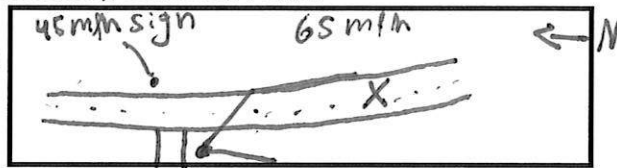
## Speed Study Data Collection Form

Name: US-75, 0.32 Miles Sketch of Roadway/collection Point:

Start: 11:25 AM

End: 11:55 AM

Location: South of P43 South  
of SCL



### Northbound

### Southbound

Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed	Vehicle #	Speed
1	47	36	57	1	54	36	51
2	46	37	45	2	51	37	47
3	57	38	49	3	52	38	59
4	49	39	51	4	55	39	54
5	67	40	58	5	50	40	54
6	47	41	49	6	53	41	63
7	51	42	51	7	55	42	56
8	62	43	50	8	51	43	60
9	60	44	53	9	49	44	55
10	55	45	52	10	58	45	44
11	46	46	59	11	52	46	54
12	50	47	47	12	51	47	55
13	51	48	50	13	47	48	60
14	51	49	64	14	49	49	43
15	55	50	57	15	62	50	64
16	48	51	52	16	56	51	61
17	43	52	46	17	54	52	64
18	46	53	51	18	60	53	65
19	48	54	49	19	53	54	58
20	55	55		20	56	55	
21	65	56		21	55	56	
22	55	57		22	59	57	
23	56	58		23	59	58	
24	47	59		24	61	59	
25	46	60		25	62	60	
26	45	61		26	60	61	
27	48	62		27	50	62	
28	65	63		28	55	63	
29	59	64		29	53	64	
30	46	65		30	64	65	
31	50	66		31	60	66	
32	54	67		32	68	67	
33	47	68		33	54	68	
34	47	69		34	53	69	
35	55	70		35	51	70	

**Attachment B. Speed Study Data Calculation Sheets**

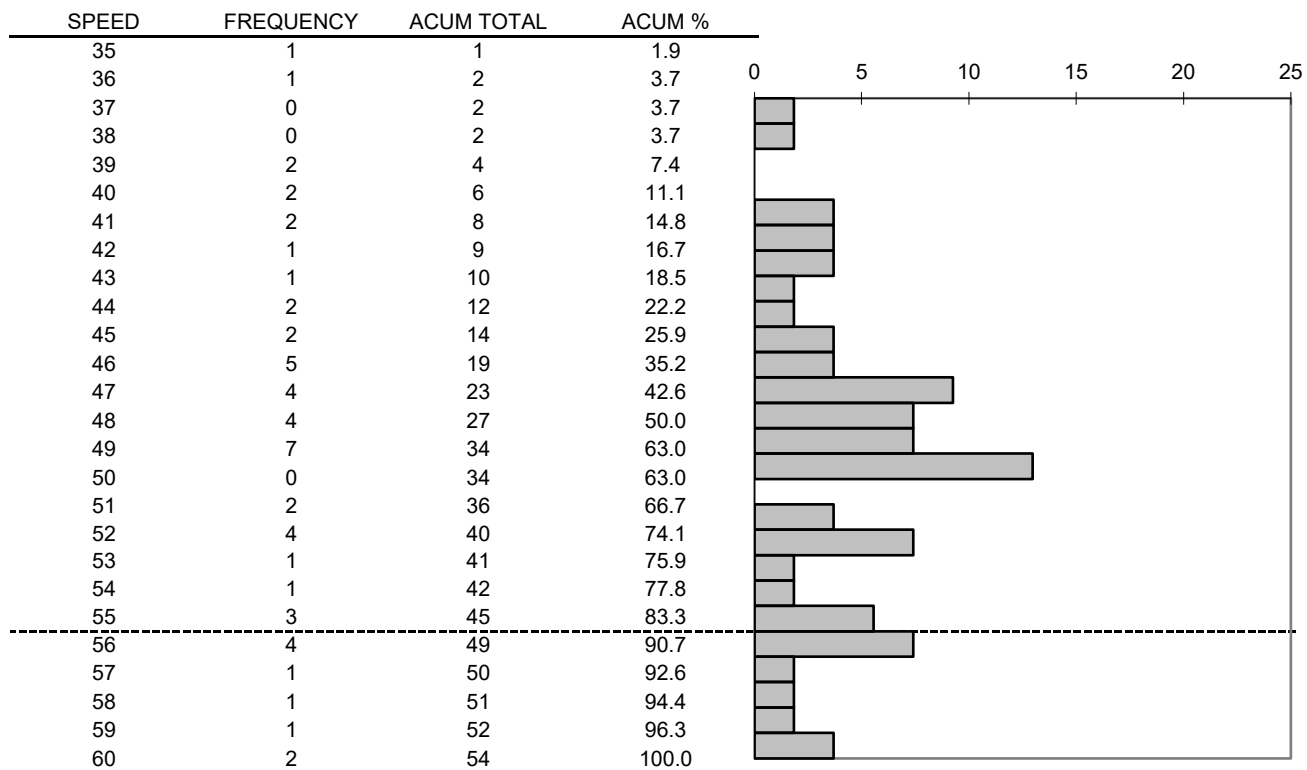
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 50 MPH  
 DIRECTION: EASTBOUND ONLY

LOCATION: Clay Street, 0.25 Miles West of Daylily Lane West of WCL  
 TIME START: 2:35 PM  
 TIME END: 3:28 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 48.6  
 50th PERCENTILE = 48.  
 85th PERCENTILE = 55.2  
 90th PERCENTILE = 55.9  
 95th PERCENTILE = 58.3

PACE = 43 - 52  
 VEHICLES IN PACE = 31  
 % IN PACE = 57.4  
 % BELOW PACE = 16.7  
 % ABOVE PACE = 25.9

SAMPLE VARIANCE = 36.9116003  
 STANDARD DEVIATION = 6.0754918  
 RANGE 1\*S = 61.11111  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 100.



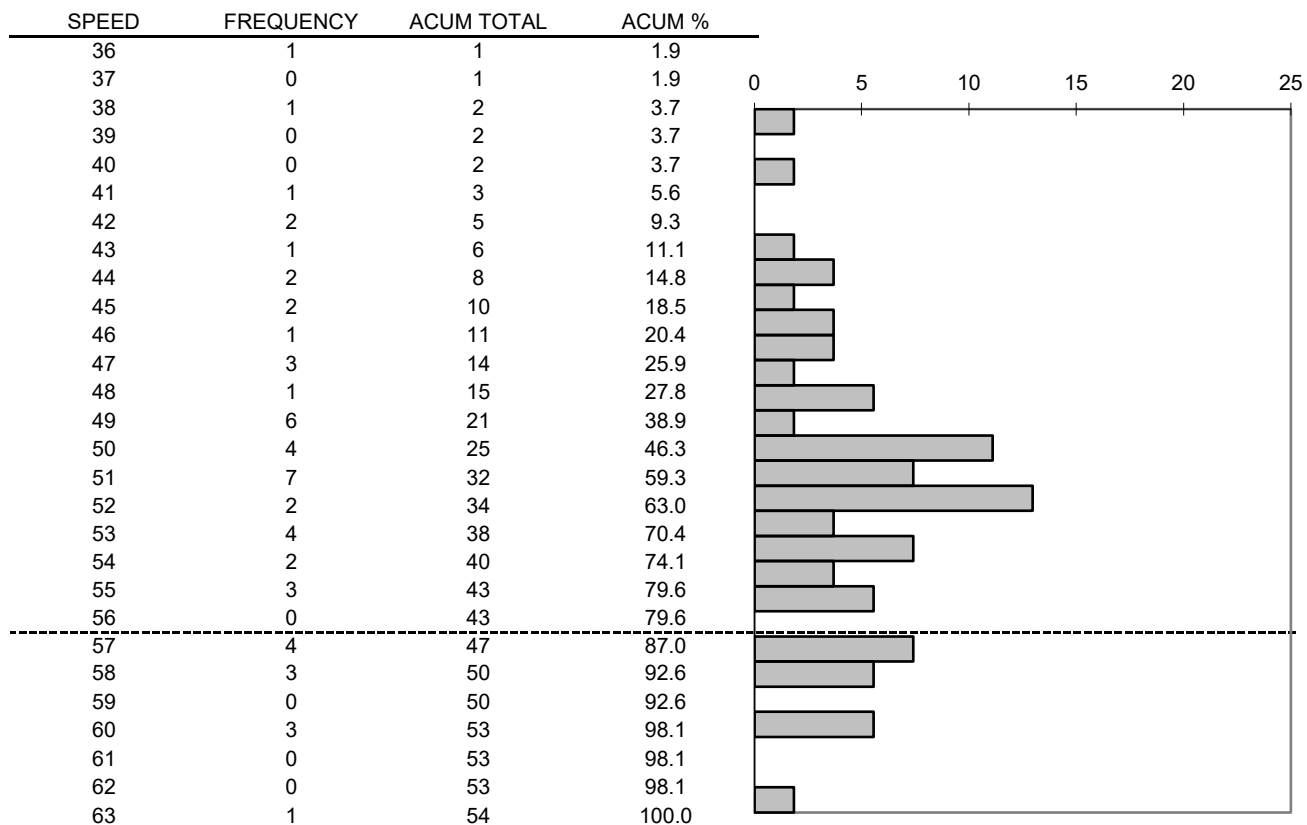
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 50 MPH  
 DIRECTION: WESTBOUND ONLY

LOCATION: Clay Street, 0.25 Miles West of Daylily Lane West of WCL  
 TIME START: 2:35 PM  
 TIME END: 3:28 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 50.7  
 50th PERCENTILE = 50.3  
 85th PERCENTILE = 56.7  
 90th PERCENTILE = 57.5  
 95th PERCENTILE = 59.4

PACE = 49 - 58  
 VEHICLES IN PACE = 35  
 % IN PACE = 64.8  
 % BELOW PACE = 27.8  
 % ABOVE PACE = 7.4

SAMPLE VARIANCE = 33.1767994  
 STANDARD DEVIATION = 5.7599305  
 RANGE 1\*S = 64.81481  
 RANGE 2\*S = 94.44444  
 RANGE 3\*S = 100.

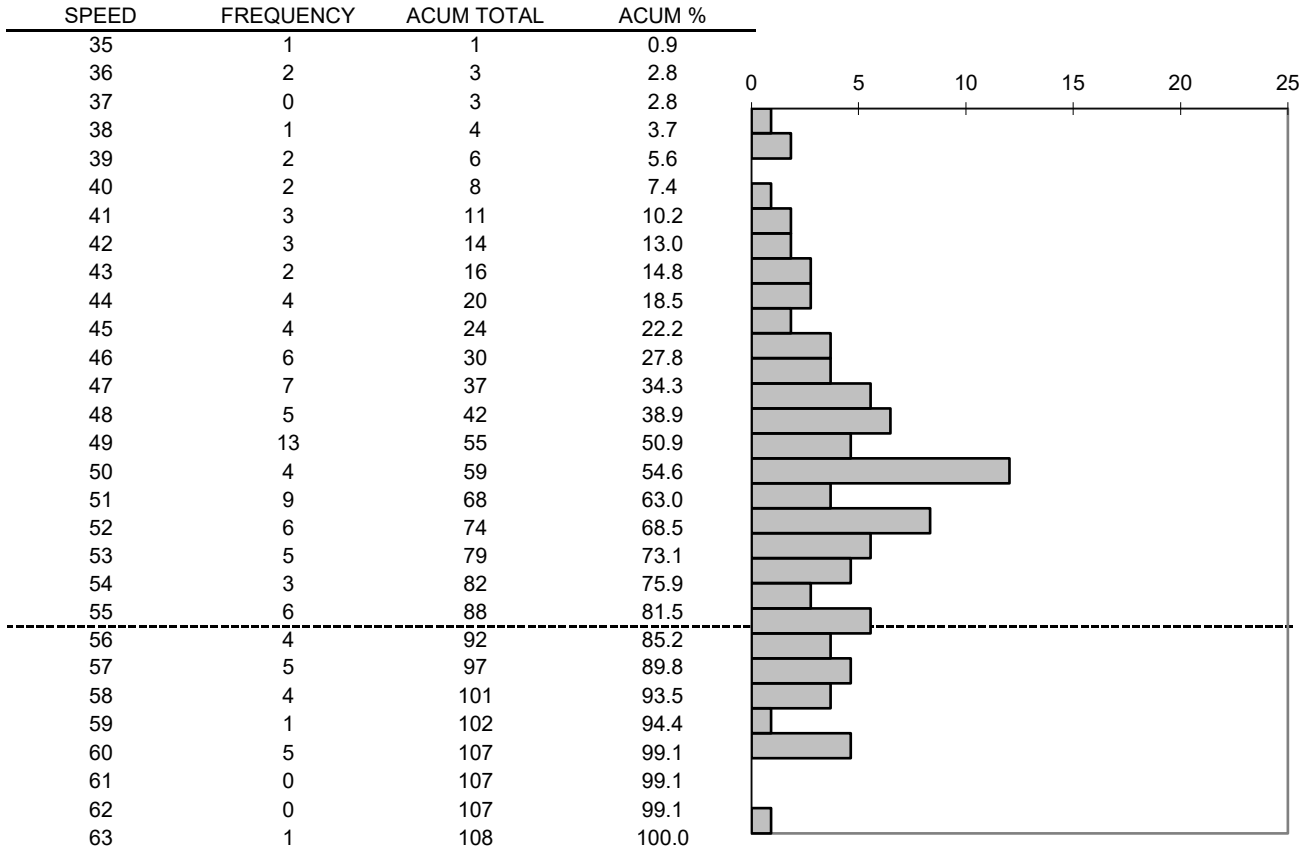
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 50 MPH  
 DIRECTION: COMBINED EB/WB

LOCATION: Clay Street, 0.25 Miles West of Daylily Lane West of WCL  
 TIME START: 2:35 PM  
 TIME END: 3:28 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 49.7  
 50th PERCENTILE = 48.9  
 85th PERCENTILE = 56.  
 90th PERCENTILE = 57.1  
 95th PERCENTILE = 59.1

PACE = 46 - 55  
 VEHICLES IN PACE = 64  
 % IN PACE = 59.3  
 % BELOW PACE = 22.2  
 % ABOVE PACE = 18.5

SAMPLE VARIANCE = 35.8216511  
 STANDARD DEVIATION = 5.9851191  
 RANGE 1\*S = 66.66667  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

**SPEED STUDY**

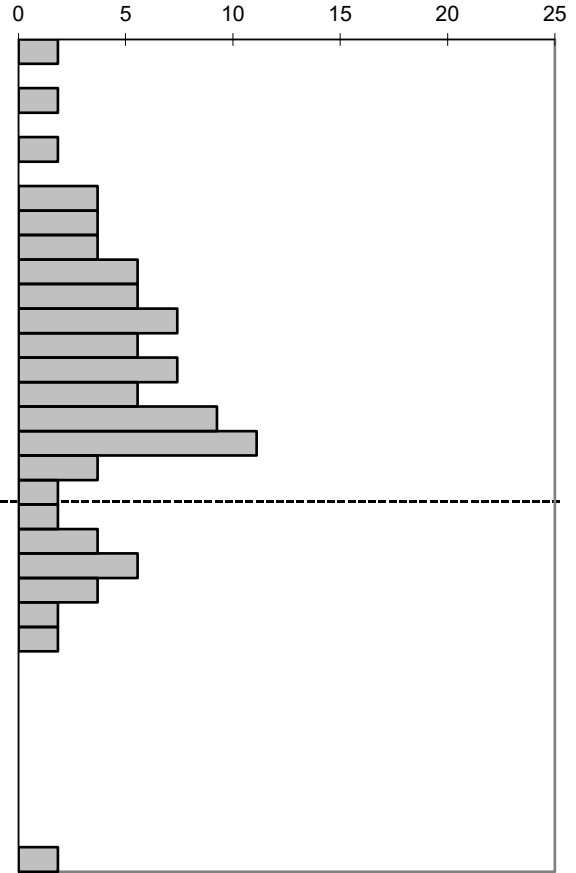
CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: EASTBOUND ONLY

LOCATION: Clay Street, Middle of 25/35 MPH West of WCL  
 TIME START: 4:20 PM  
 TIME END: 5:30 PM

PERCENTAGE BREAKDOWN

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
20	1	1	1.9
21	0	1	1.9
22	1	2	3.7
23	0	2	3.7
24	1	3	5.6
25	0	3	5.6
26	2	5	9.3
27	2	7	13.0
28	2	9	16.7
29	3	12	22.2
30	3	15	27.8
31	4	19	35.2
32	3	22	40.7
33	4	26	48.1
34	3	29	53.7
35	5	34	63.0
36	6	40	74.1
37	2	42	77.8
38	1	43	79.6
39	1	44	81.5
40	2	46	85.2
41	3	49	90.7
42	2	51	94.4
43	1	52	96.3
44	1	53	98.1
45	0	53	98.1
46	0	53	98.1
47	0	53	98.1
48	0	53	98.1
49	0	53	98.1
50	0	53	98.1
51	0	53	98.1
52	0	53	98.1
53	1	54	100.0



AVERAGE SPEED = 33.9  
 50th PERCENTILE = 33.3  
 85th PERCENTILE = 40.  
 90th PERCENTILE = 40.9  
 95th PERCENTILE = 42.3

PACE = 27 - 36  
 VEHICLES IN PACE = 35  
 % IN PACE = 64.8  
 % BELOW PACE = 9.3  
 % ABOVE PACE = 25.9

SAMPLE VARIANCE = 35.6380154  
 STANDARD DEVIATION = 5.9697584  
 RANGE 1\*S = 68.51852  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 98.14815

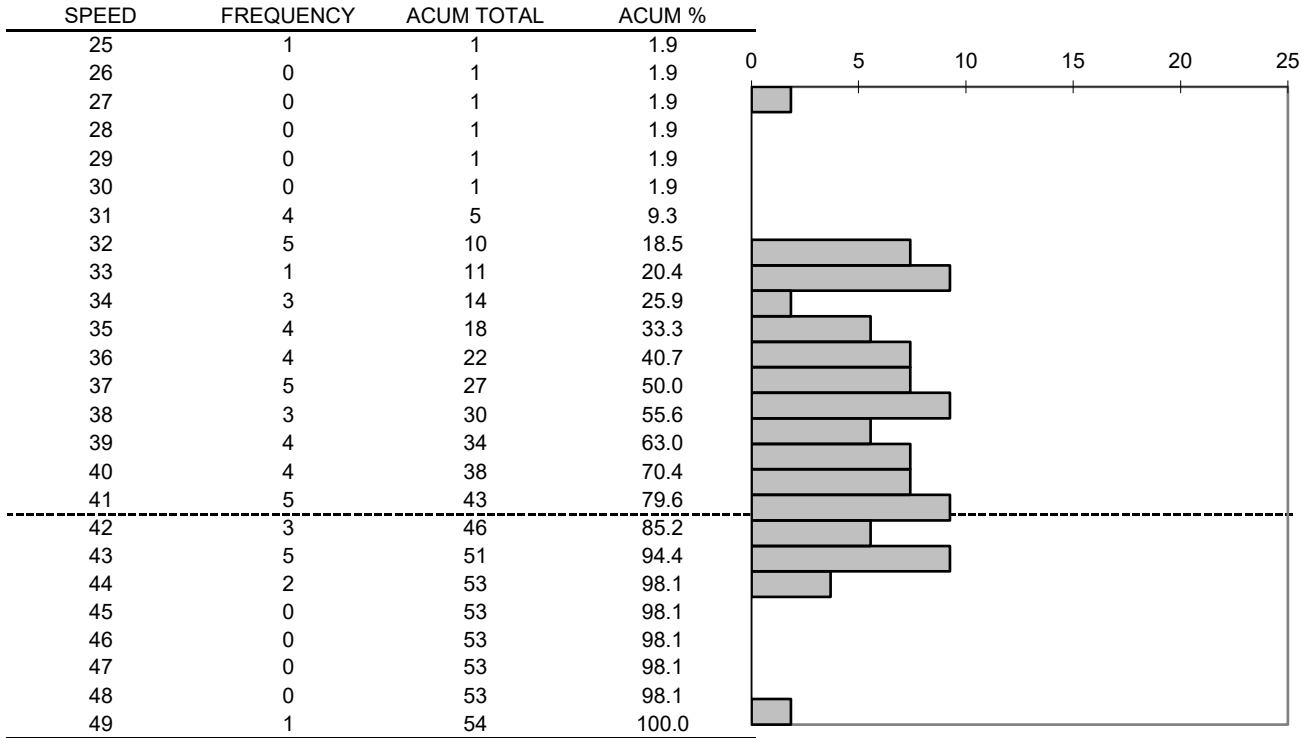
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: WESTBOUND ONLY

LOCATION: Clay Street, Middle of 25/35 MPH West of WCL  
 TIME START: 4:20 PM  
 TIME END: 5:30 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 37.5  
 50th PERCENTILE = 37.  
 85th PERCENTILE = 42.  
 90th PERCENTILE = 42.5  
 95th PERCENTILE = 43.2

PACE = 34 - 43  
 VEHICLES IN PACE = 40  
 % IN PACE = 74.1  
 % BELOW PACE = 20.4  
 % ABOVE PACE = 5.6

SAMPLE VARIANCE = 20.6317261  
 STANDARD DEVIATION = 4.542216  
 RANGE 1\*S = 66.66667  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

### SPEED STUDY

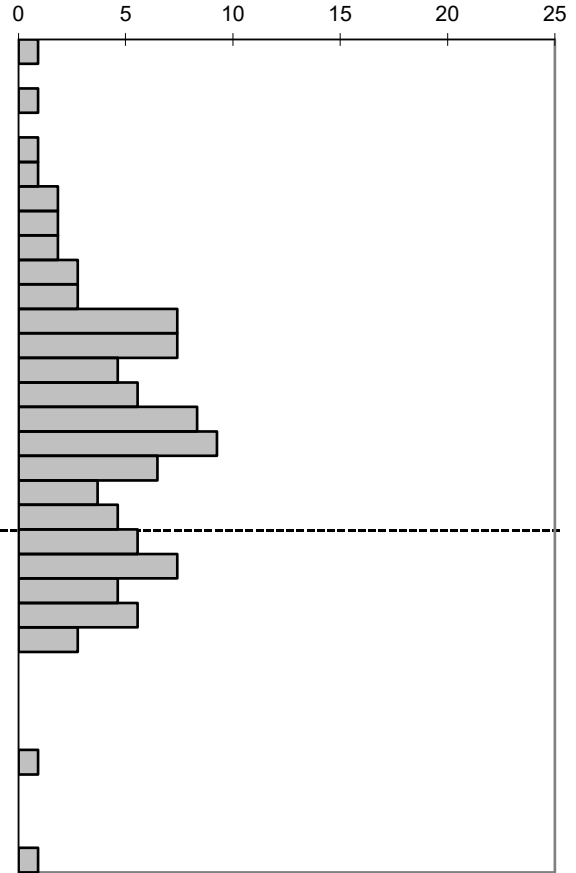
CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 25/35 MPH  
 DIRECTION: COMBINED EB/WB

LOCATION: Clay Street, Middle of 25/35 MPH West of WCL  
 TIME START: 4:20 PM  
 TIME END: 5:30 PM

PERCENTAGE BREAKDOWN

SPEED	FREQUENCY	ACUM TOTAL	ACUM %
20	1	1	0.9
21	0	1	0.9
22	1	2	1.9
23	0	2	1.9
24	1	3	2.8
25	1	4	3.7
26	2	6	5.6
27	2	8	7.4
28	2	10	9.3
29	3	13	12.0
30	3	16	14.8
31	8	24	22.2
32	8	32	29.6
33	5	37	34.3
34	6	43	39.8
35	9	52	48.1
36	10	62	57.4
37	7	69	63.9
38	4	73	67.6
39	5	78	72.2
40	6	84	77.8
41	8	92	85.2
42	5	97	89.8
43	6	103	95.4
44	3	106	98.1
45	0	106	98.1
46	0	106	98.1
47	0	106	98.1
48	0	106	98.1
49	1	107	99.1
50	0	107	99.1
51	0	107	99.1
52	0	107	99.1
53	1	108	100.0



AVERAGE SPEED = 35.7  
 50th PERCENTILE = 35.2  
 85th PERCENTILE = 41.  
 90th PERCENTILE = 42.  
 95th PERCENTILE = 42.9

PACE = 31 - 40  
 VEHICLES IN PACE = 68  
 % IN PACE = 63.  
 % BELOW PACE = 14.8  
 % ABOVE PACE = 22.2

SAMPLE VARIANCE = 31.2644514  
 STANDARD DEVIATION = 5.5914624  
 RANGE 1\*S = 73.14815  
 RANGE 2\*S = 95.37037  
 RANGE 3\*S = 99.07407

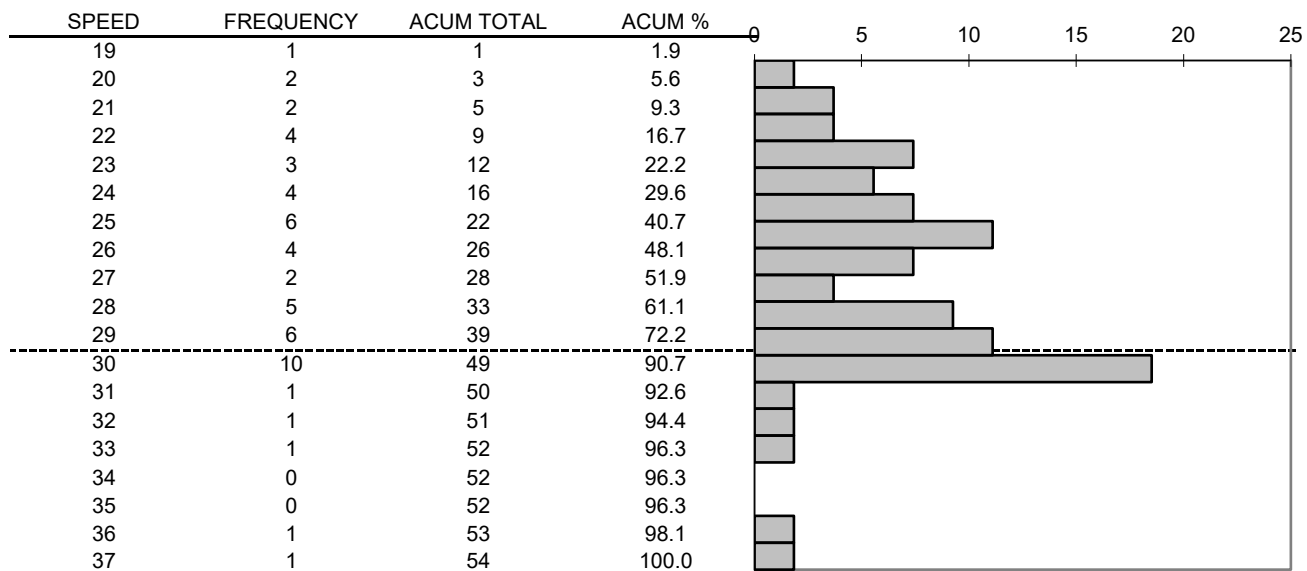
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: EASTBOUND ONLY

LOCATION: Clay Street, Between 16th Street & 15th Street  
 TIME START: 12:04 PM  
 TIME END: 2:06 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 26.8  
 50th PERCENTILE = 26.5  
 85th PERCENTILE = 29.7  
 90th PERCENTILE = 30.  
 95th PERCENTILE = 32.3

PACE = 21 - 30  
 VEHICLES IN PACE = 46  
 % IN PACE = 85.2  
 % BELOW PACE = 5.6  
 % ABOVE PACE = 9.3

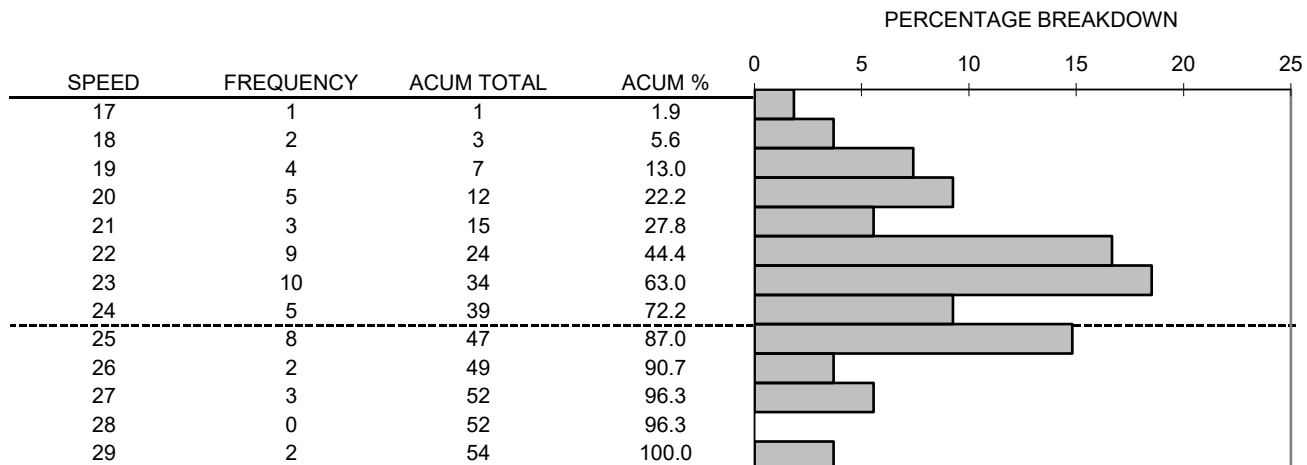
SAMPLE VARIANCE = 15.4692523  
 STANDARD DEVIATION = 3.933097  
 RANGE 1\*S = 74.07407  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: WESTBOUND ONLY

LOCATION: Clay Street, Between 16th Street & 15th Street  
 TIME START: 12:04 PM  
 TIME END: 2:06 PM



AVERAGE SPEED = 22.8  
 50th PERCENTILE = 22.3  
 85th PERCENTILE = 24.9  
 90th PERCENTILE = 25.8  
 95th PERCENTILE = 26.8

PACE = 18 - 27  
 VEHICLES IN PACE = 51  
 % IN PACE = 94.4  
 % BELOW PACE = 1.9  
 % ABOVE PACE = 3.7

SAMPLE VARIANCE = 7.3350804  
 STANDARD DEVIATION = 2.7083353  
 RANGE 1\*S = 74.07407  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

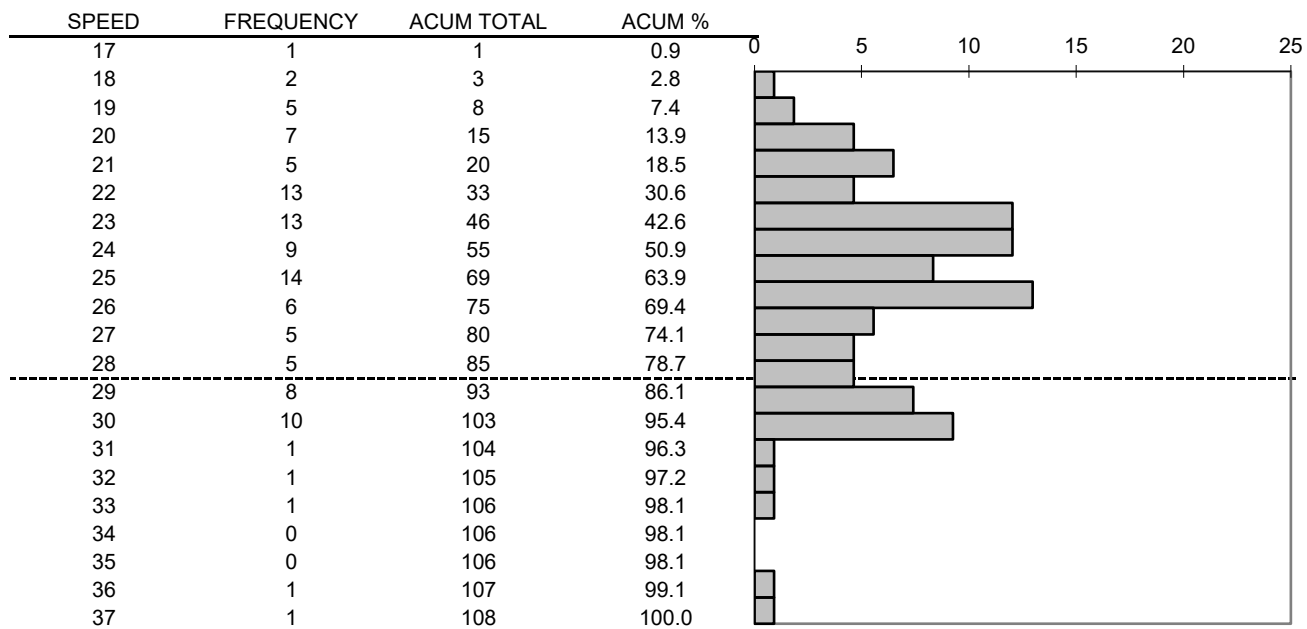
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: COMBINED EB/WB

LOCATION: Clay Street, Between 16th Street & 15th Street  
 TIME START: 12:04 PM  
 TIME END: 2:06 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 24.8  
 50th PERCENTILE = 23.9  
 85th PERCENTILE = 28.9  
 90th PERCENTILE = 29.4  
 95th PERCENTILE = 30.

PACE = 21 - 30  
 VEHICLES IN PACE = 88  
 % IN PACE = 81.5  
 % BELOW PACE = 13.9  
 % ABOVE PACE = 4.6

SAMPLE VARIANCE = 15.258567  
 STANDARD DEVIATION = 3.9062216  
 RANGE 1\*S = 64.81481  
 RANGE 2\*S = 97.22222  
 RANGE 3\*S = 99.07407



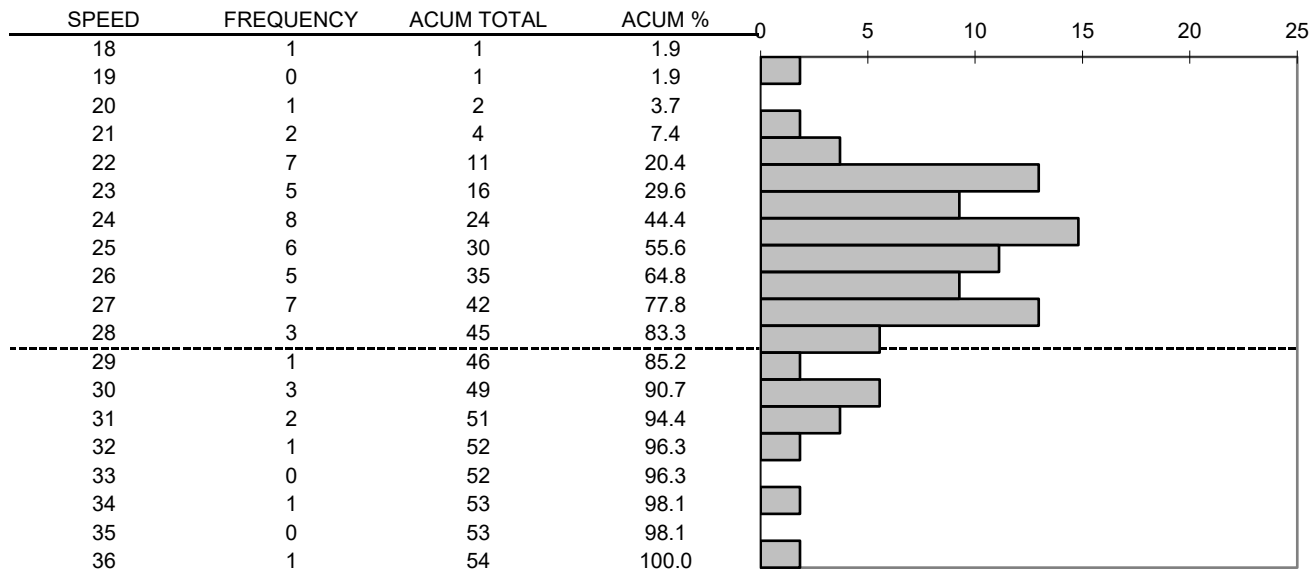
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: EASTBOUND ONLY

LOCATION: Clay Street @ 12th Street  
 TIME START: 2:38 PM  
 TIME END: 5:20 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 25.5  
 50th PERCENTILE = 24.5  
 85th PERCENTILE = 28.9  
 90th PERCENTILE = 29.9  
 95th PERCENTILE = 31.3

PACE = 21 - 30  
 VEHICLES IN PACE = 47  
 % IN PACE = 87.  
 % BELOW PACE = 3.7  
 % ABOVE PACE = 9.3

SAMPLE VARIANCE = 12.4056604  
 STANDARD DEVIATION = 3.522167  
 RANGE 1\*S = 77.77778  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

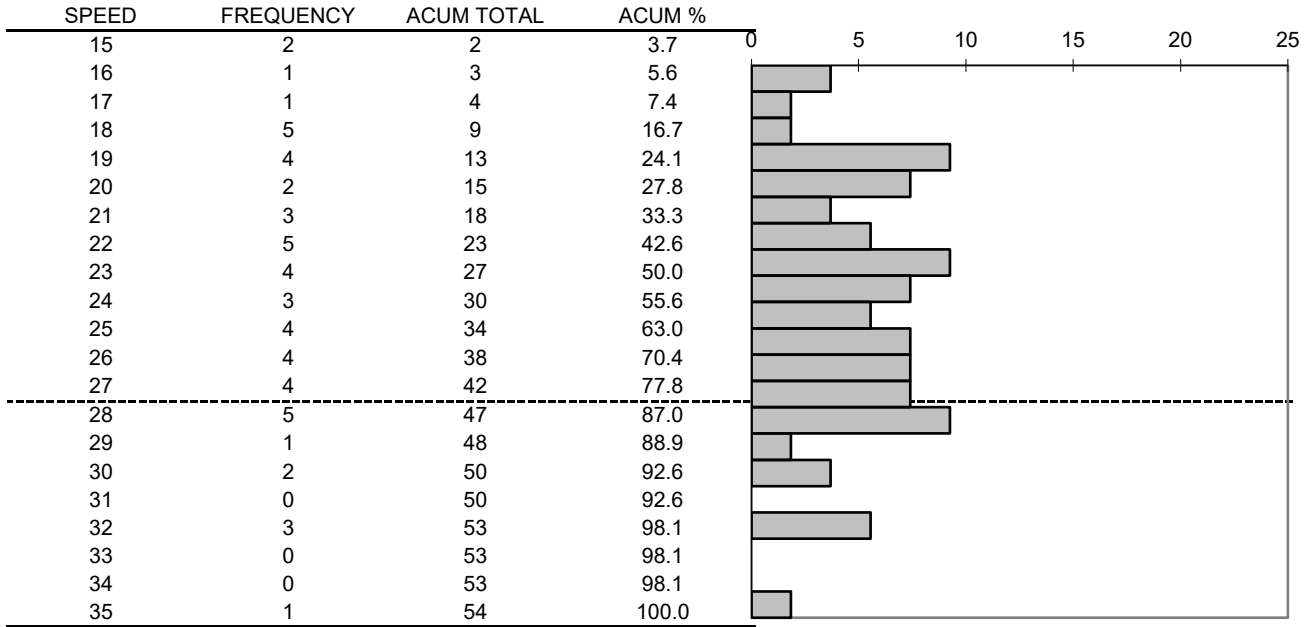
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: WESTBOUND ONLY

LOCATION: Clay Street @ 12th Street  
 TIME START: 2:38 PM  
 TIME END: 5:20 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 23.7  
 50th PERCENTILE = 23.  
 85th PERCENTILE = 27.8  
 90th PERCENTILE = 29.3  
 95th PERCENTILE = 31.4

PACE = 18 - 27  
 VEHICLES IN PACE = 38  
 % IN PACE = 70.4  
 % BELOW PACE = 7.4  
 % ABOVE PACE = 22.2

SAMPLE VARIANCE = 22.2264151  
 STANDARD DEVIATION = 4.7144899  
 RANGE 1\*S = 70.37037  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 100.

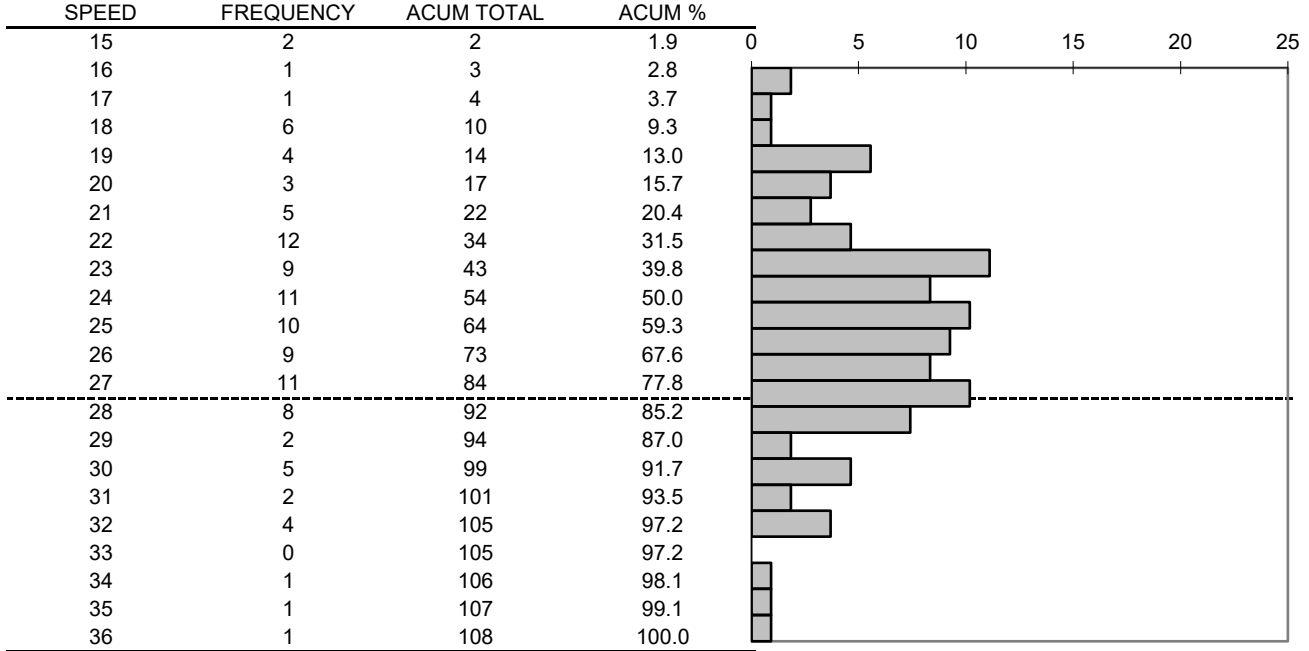
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: COMBINED EB/WB

LOCATION: Clay Street @ 12th Street  
 TIME START: 2:38 PM  
 TIME END: 5:20 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 24.6  
 50th PERCENTILE = 24.  
 85th PERCENTILE = 28.  
 90th PERCENTILE = 29.6  
 95th PERCENTILE = 31.4

PACE = 19 - 28  
 VEHICLES IN PACE = 82  
 % IN PACE = 75.9  
 % BELOW PACE = 9.3  
 % ABOVE PACE = 14.8

SAMPLE VARIANCE = 18.0023364  
 STANDARD DEVIATION = 4.242916  
 RANGE 1\*S = 72.22222  
 RANGE 2\*S = 95.37037  
 RANGE 3\*S = 100.

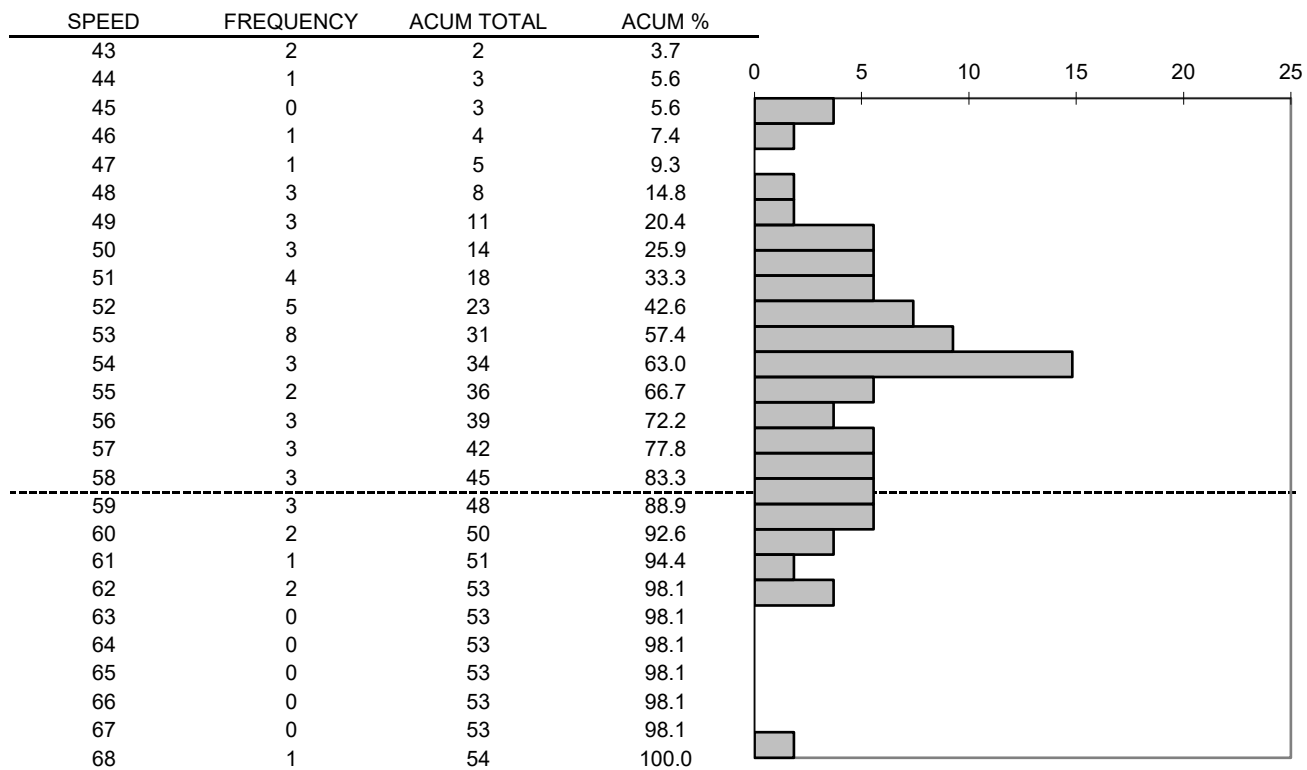
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7,2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, 0.32 Miles North of Paddock Street North of NCL  
 TIME START: 12:40 PM  
 TIME END: 1:06 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 53.5  
 50th PERCENTILE = 52.5  
 85th PERCENTILE = 58.3  
 90th PERCENTILE = 59.3  
 95th PERCENTILE = 61.2

PACE = 48 - 57  
 VEHICLES IN PACE = 37  
 % IN PACE = 68.5  
 % BELOW PACE = 9.3  
 % ABOVE PACE = 22.2

SAMPLE VARIANCE = 25.347659  
 STANDARD DEVIATION = 5.0346459  
 RANGE 1\*S = 74.07407  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 100.

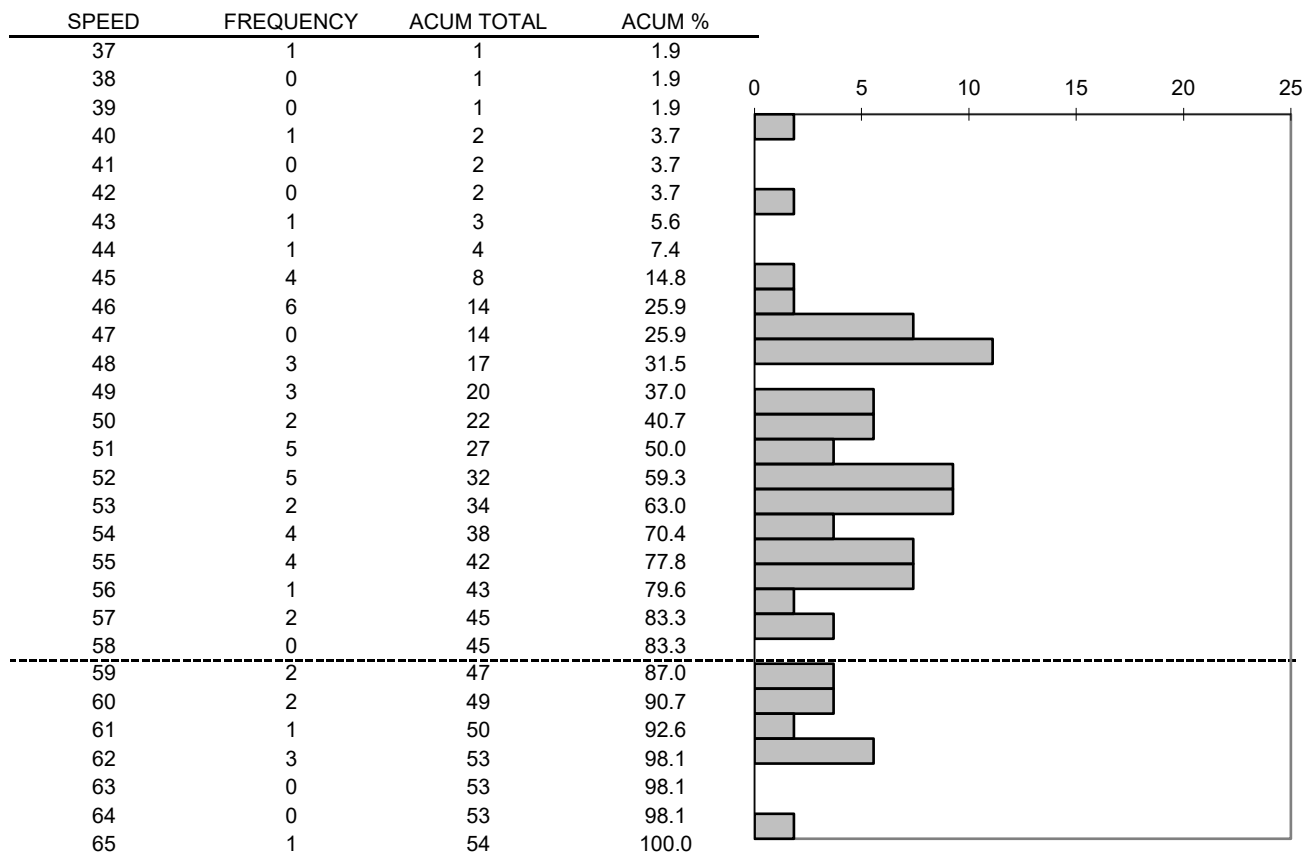
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, 0.32 Miles North of Paddock Street North of NCL  
 TIME START: 12:40 PM  
 TIME END: 1:06 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 51.6  
 50th PERCENTILE = 51.  
 85th PERCENTILE = 58.5  
 90th PERCENTILE = 59.8  
 95th PERCENTILE = 61.4

PACE = 45 - 54  
 VEHICLES IN PACE = 34  
 % IN PACE = 63.  
 % BELOW PACE = 7.4  
 % ABOVE PACE = 29.6

SAMPLE VARIANCE = 35.8979734  
 STANDARD DEVIATION = 5.9914918  
 RANGE 1\*S = 68.51852  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

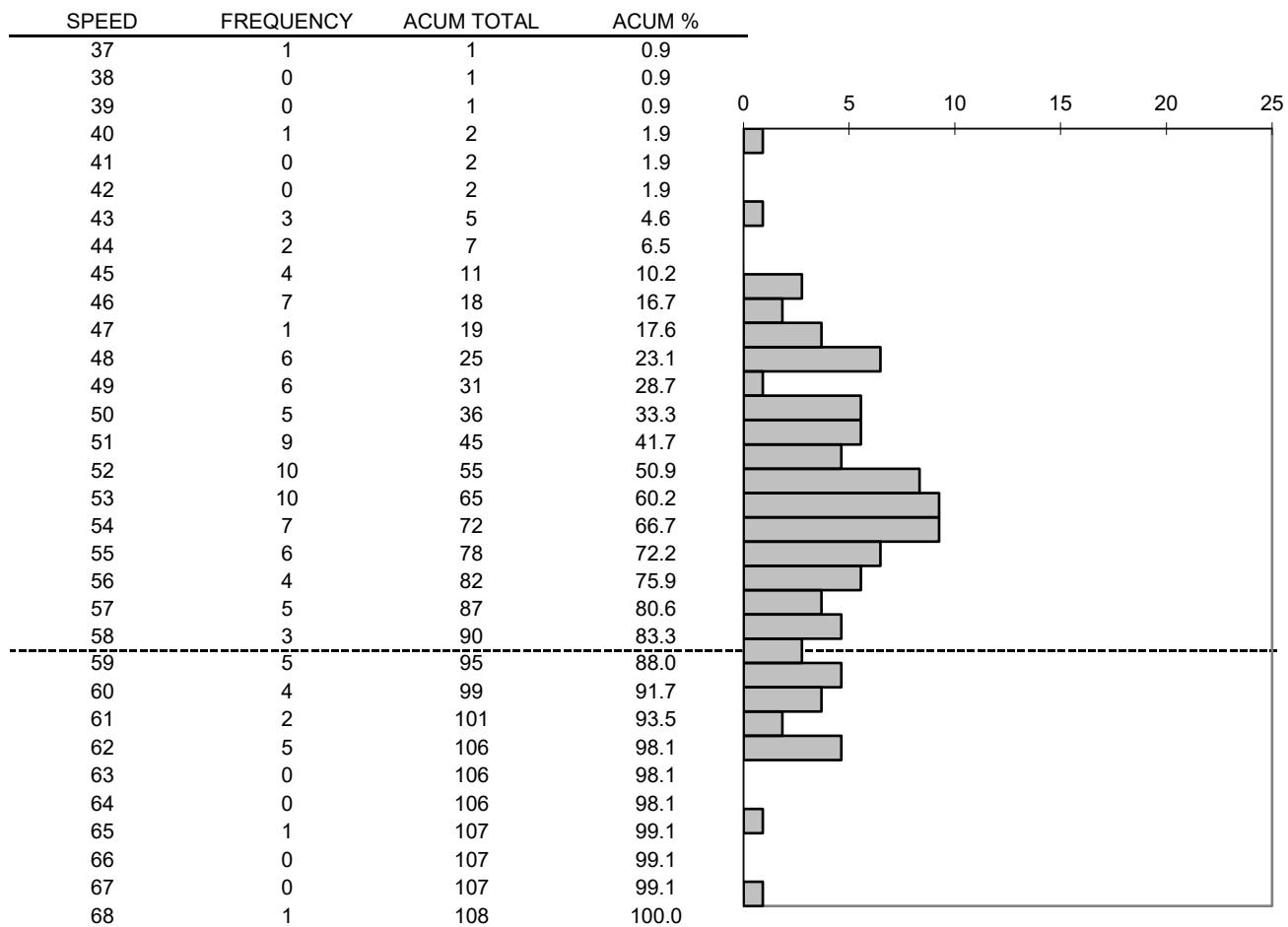
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, 0.32 Miles North of Paddock Street North of NCL  
 TIME START: 12:40 PM  
 TIME END: 1:06 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 52.5  
 50th PERCENTILE = 51.9  
 85th PERCENTILE = 58.4  
 90th PERCENTILE = 59.6  
 95th PERCENTILE = 61.3

PACE = 48 - 57  
 VEHICLES IN PACE = 68  
 % IN PACE = 63.  
 % BELOW PACE = 17.6  
 % ABOVE PACE = 19.4

SAMPLE VARIANCE = 31.1847525  
 STANDARD DEVIATION = 5.584331  
 RANGE 1\*S = 66.66667  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

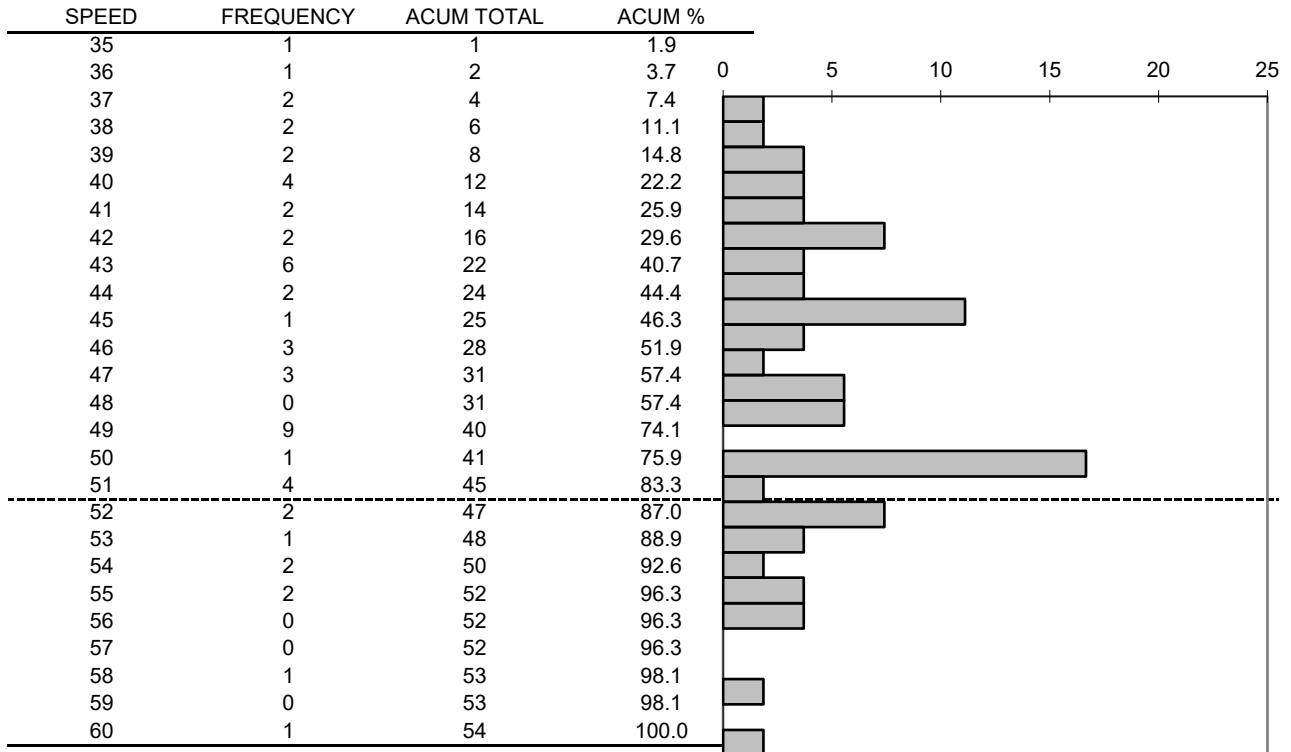
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, Middle of 45 MPH N of Paddock St.  
 TIME START: 1:25 PM  
 TIME END: 1:55 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 46.  
 50th PERCENTILE = 45.7  
 85th PERCENTILE = 51.5  
 90th PERCENTILE = 53.3  
 95th PERCENTILE = 54.7

PACE = 40 - 49  
 VEHICLES IN PACE = 32  
 % IN PACE = 59.3  
 % BELOW PACE = 14.8  
 % ABOVE PACE = 25.9

SAMPLE VARIANCE = 34.886443  
 STANDARD DEVIATION = 5.9064747  
 RANGE 1\*S = 68.51852  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

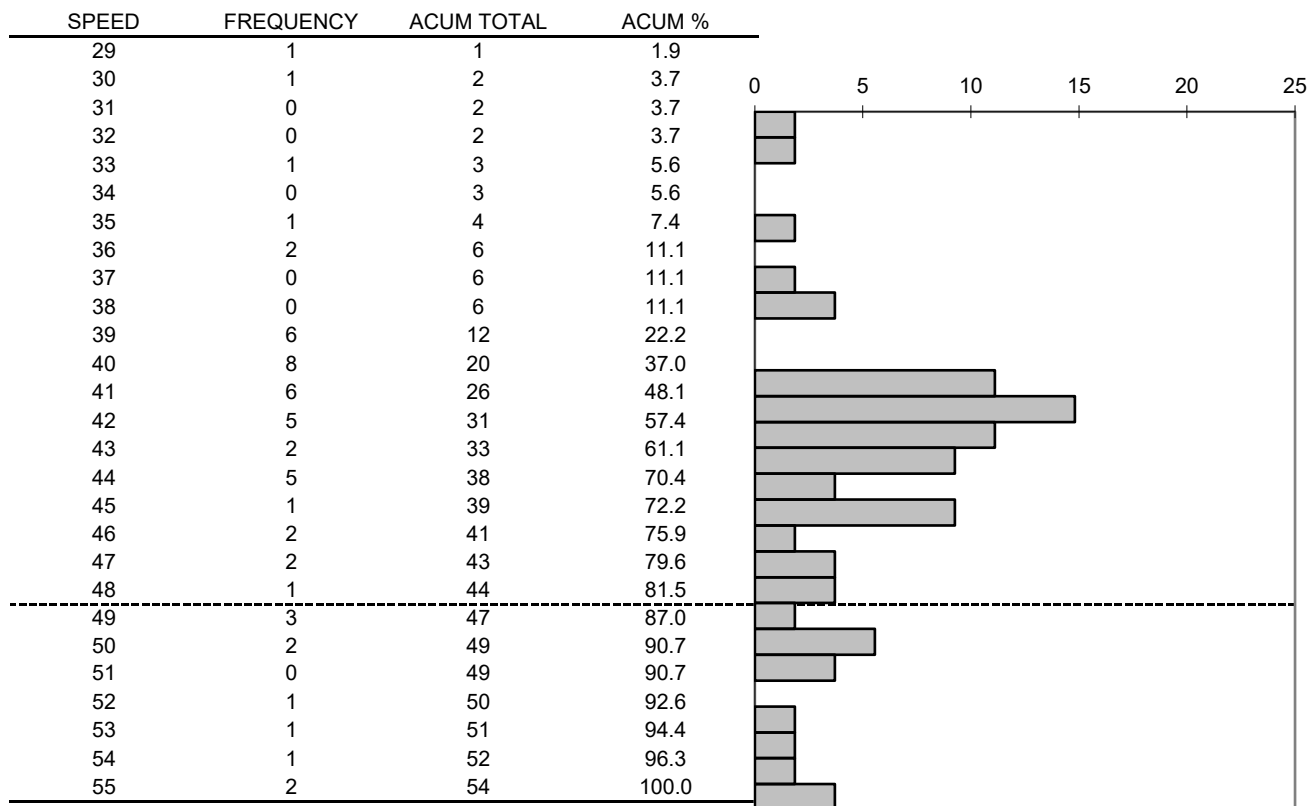
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, Middle of 45 MPH N of Paddock St.  
 TIME START: 1:25 PM  
 TIME END: 1:55 PM

#### PERCENTAGE BREAKDOWN



AVERAGE SPEED = 42.8  
 50th PERCENTILE = 41.2  
 85th PERCENTILE = 48.6  
 90th PERCENTILE = 49.8  
 95th PERCENTILE = 53.3

PACE = 39 - 48  
 VEHICLES IN PACE = 38  
 % IN PACE = 70.4  
 % BELOW PACE = 11.1  
 % ABOVE PACE = 18.5

SAMPLE VARIANCE = 32.1006289  
 STANDARD DEVIATION = 5.6657417  
 RANGE 1\*S = 70.37037  
 RANGE 2\*S = 92.59259  
 RANGE 3\*S = 100.



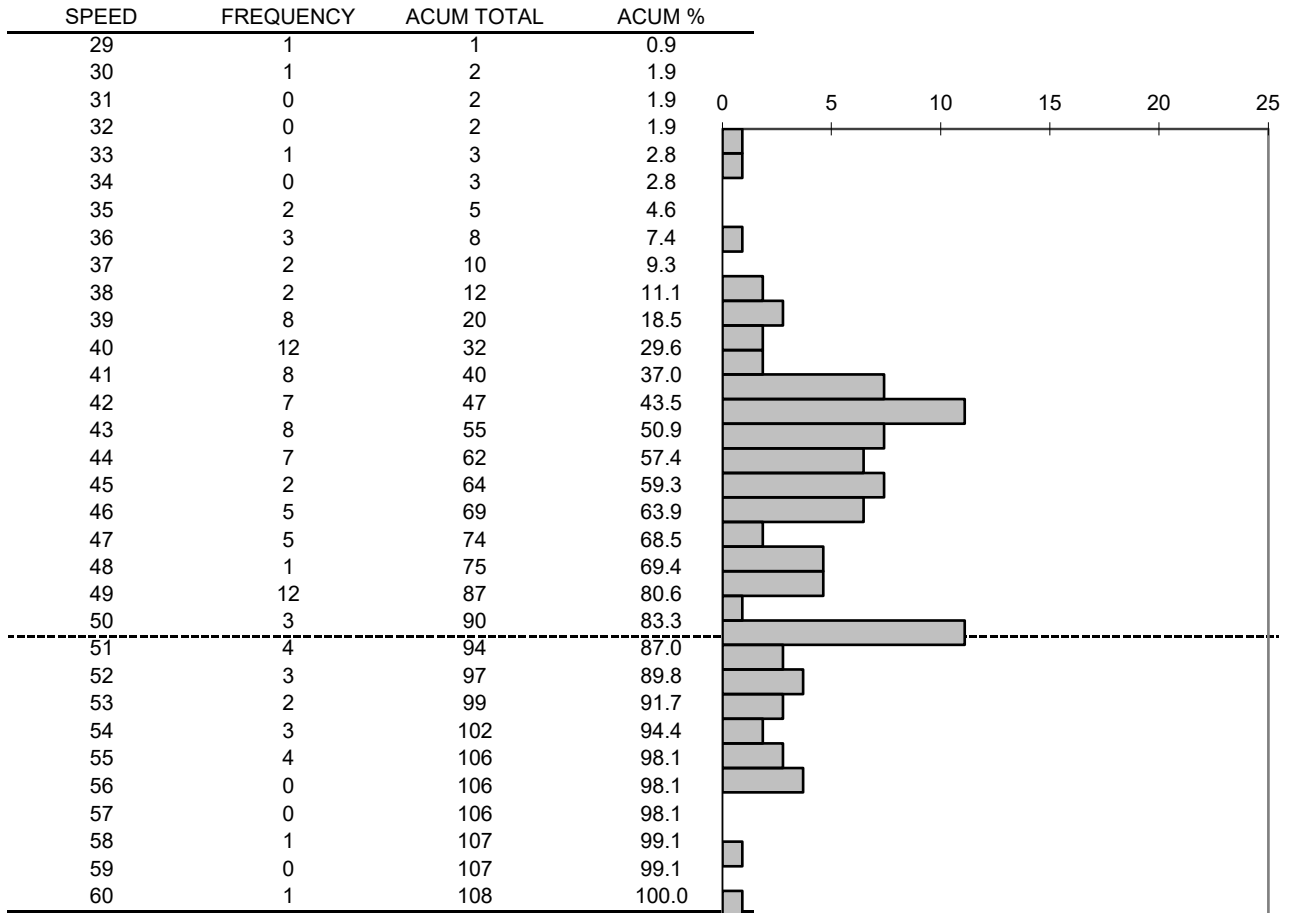
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, Middle of 45 MPH N of Paddock St.  
 TIME START: 1:25 PM  
 TIME END: 1:55 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 44.4  
 50th PERCENTILE = 42.9  
 85th PERCENTILE = 50.5  
 90th PERCENTILE = 52.1  
 95th PERCENTILE = 54.2

PACE = 40 - 49  
 VEHICLES IN PACE = 67  
 % IN PACE = 62.  
 % BELOW PACE = 18.5  
 % ABOVE PACE = 19.4

SAMPLE VARIANCE = 35.7704223  
 STANDARD DEVIATION = 5.9808379  
 RANGE 1\*S = 74.07407  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

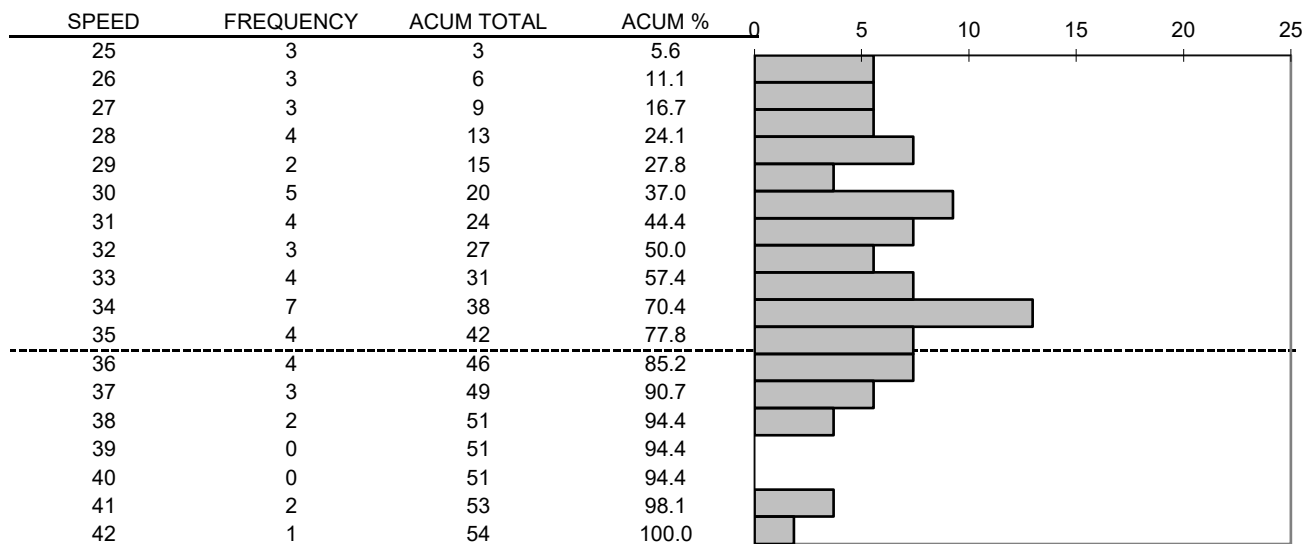
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, Middle of 35 MPH Zone South of Stevenson St.  
 TIME START: 11:18 AM  
 TIME END: 11:43 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 32.2  
 50th PERCENTILE = 32.  
 85th PERCENTILE = 36.  
 90th PERCENTILE = 36.9  
 95th PERCENTILE = 40.2

PACE = 27 - 36  
 VEHICLES IN PACE = 40  
 % IN PACE = 74.1  
 % BELOW PACE = 11.1  
 % ABOVE PACE = 14.8

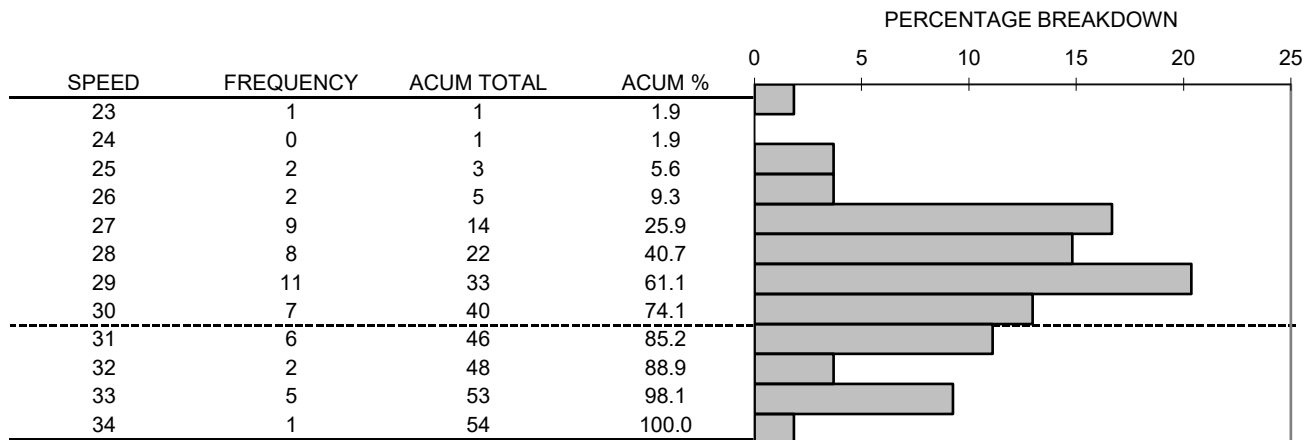
SAMPLE VARIANCE = 18.3916841  
 STANDARD DEVIATION = 4.2885527  
 RANGE 1\*S = 68.51852  
 RANGE 2\*S = 94.44444  
 RANGE 3\*S = 100.

### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, Middle of 35 MPH Zone South of Stevenson St.  
 TIME START: 11:18 AM  
 TIME END: 11:43 AM



AVERAGE SPEED = 29.1  
 50th PERCENTILE = 28.5  
 85th PERCENTILE = 31.  
 90th PERCENTILE = 32.1  
 95th PERCENTILE = 32.7

PACE = 25 - 34  
 VEHICLES IN PACE = 53  
 % IN PACE = 98.1  
 % BELOW PACE = 1.9  
 % ABOVE PACE = .

SAMPLE VARIANCE = 5.3529001  
 STANDARD DEVIATION = 2.3136335  
 RANGE 1\*S = 75.92593  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

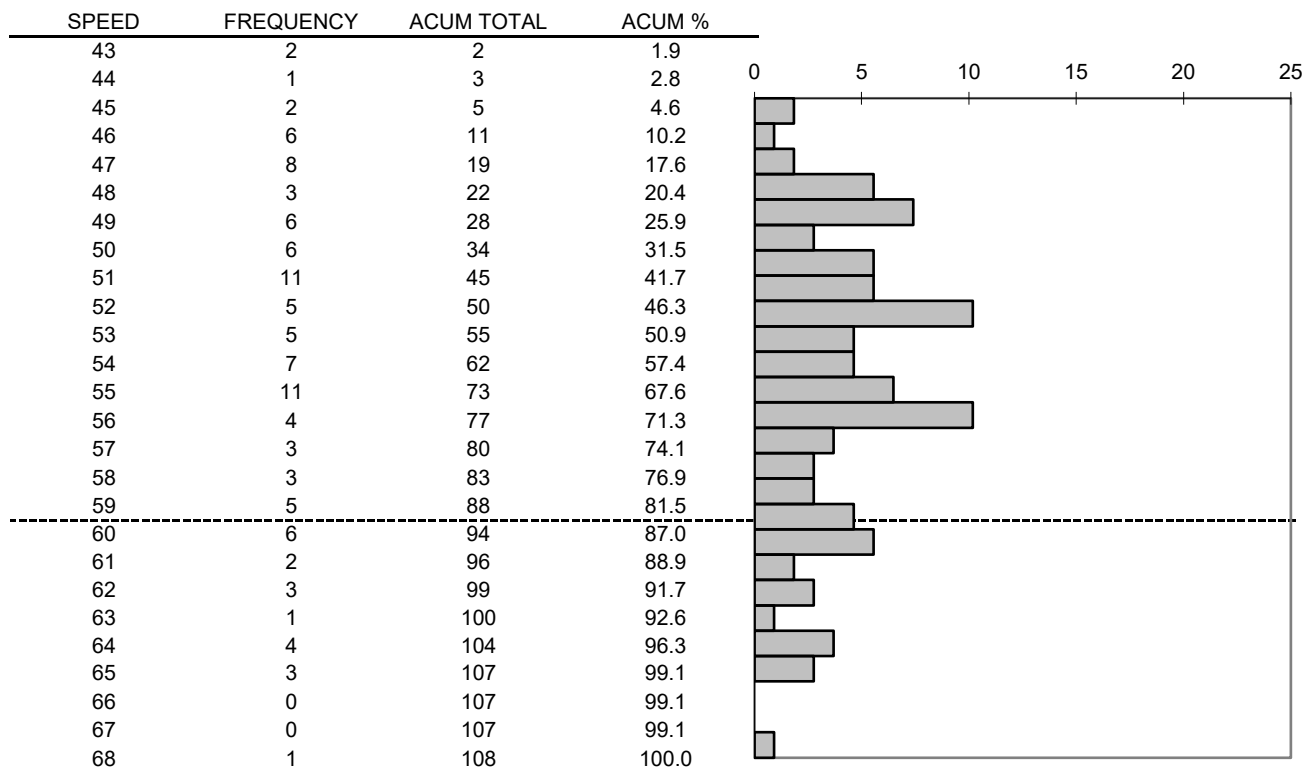
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, 0.32 Miles South of P43 South of SCL  
 TIME START: 11:25 AM  
 TIME END: 11:55 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 53.6  
 50th PERCENTILE = 52.8  
 85th PERCENTILE = 59.6  
 90th PERCENTILE = 61.4  
 95th PERCENTILE = 63.7

PACE = 46 - 55  
 VEHICLES IN PACE = 68  
 % IN PACE = 63.  
 % BELOW PACE = 4.6  
 % ABOVE PACE = 32.4

SAMPLE VARIANCE = 32.8683801  
 STANDARD DEVIATION = 5.7330952  
 RANGE 1\*S = 63.88889  
 RANGE 2\*S = 99.07407  
 RANGE 3\*S = 100.

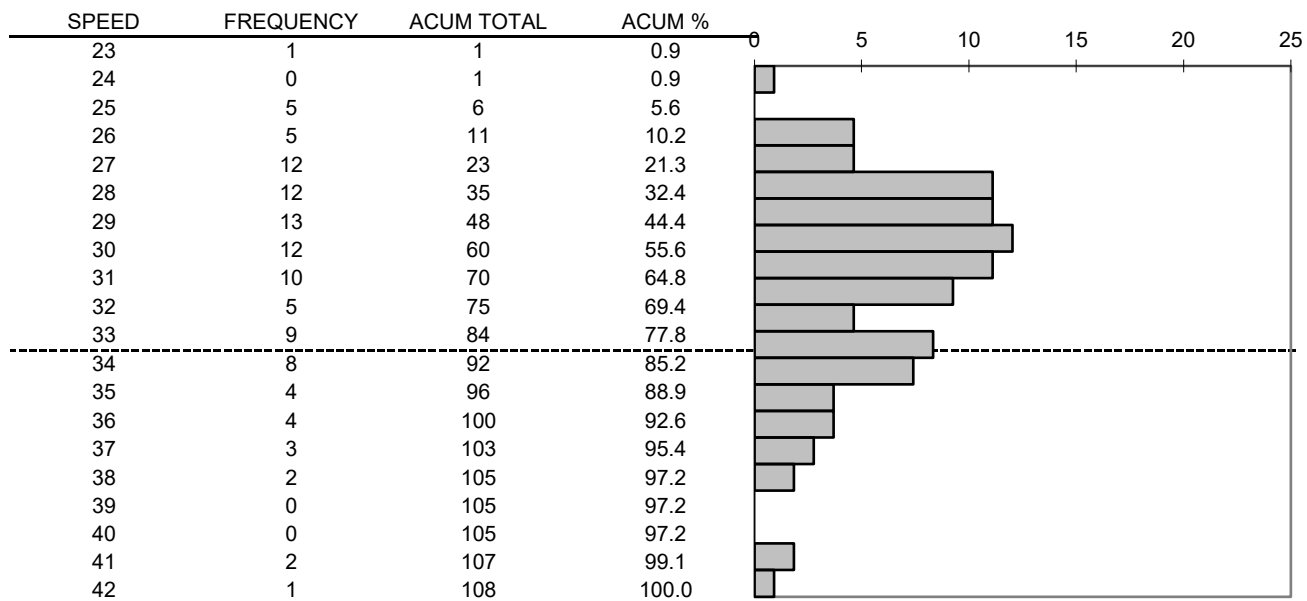
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, Middle of 35 MPH Zone South of Stevenson St.  
 TIME START: 11:18 AM  
 TIME END: 11:43 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 30.6  
 50th PERCENTILE = 29.5  
 85th PERCENTILE = 34.  
 90th PERCENTILE = 35.3  
 95th PERCENTILE = 36.9

PACE = 25 - 34  
 VEHICLES IN PACE = 91  
 % IN PACE = 84.3  
 % BELOW PACE = .9  
 % ABOVE PACE = 14.8

SAMPLE VARIANCE = 14.232866  
 STANDARD DEVIATION = 3.7726471  
 RANGE 1\*S = 75.  
 RANGE 2\*S = 97.22222  
 RANGE 3\*S = 99.07407

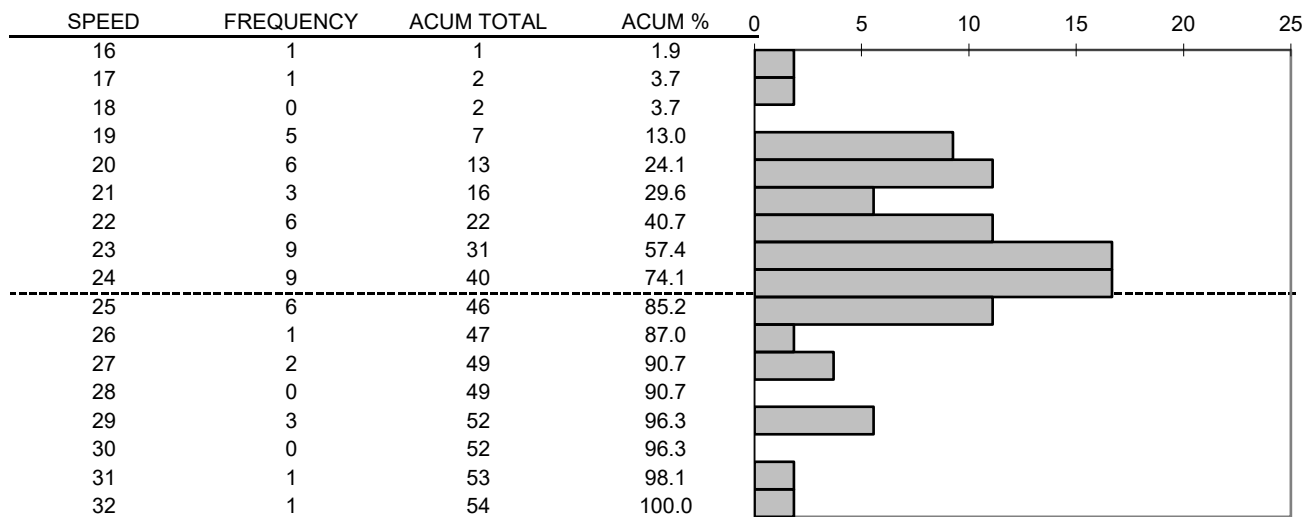
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, Middle of 25 MPH Zone South of Monroe  
 TIME START: 10:42 AM  
 TIME END: 11:10 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 23.1  
 50th PERCENTILE = 22.6  
 85th PERCENTILE = 25.  
 90th PERCENTILE = 26.8  
 95th PERCENTILE = 28.8

PACE = 18 - 27  
 VEHICLES IN PACE = 47  
 % IN PACE = 87.  
 % BELOW PACE = 3.7  
 % ABOVE PACE = 9.3

SAMPLE VARIANCE = 10.6359189  
 STANDARD DEVIATION = 3.2612757  
 RANGE 1\*S = 74.07407  
 RANGE 2\*S = 94.44444  
 RANGE 3\*S = 100.

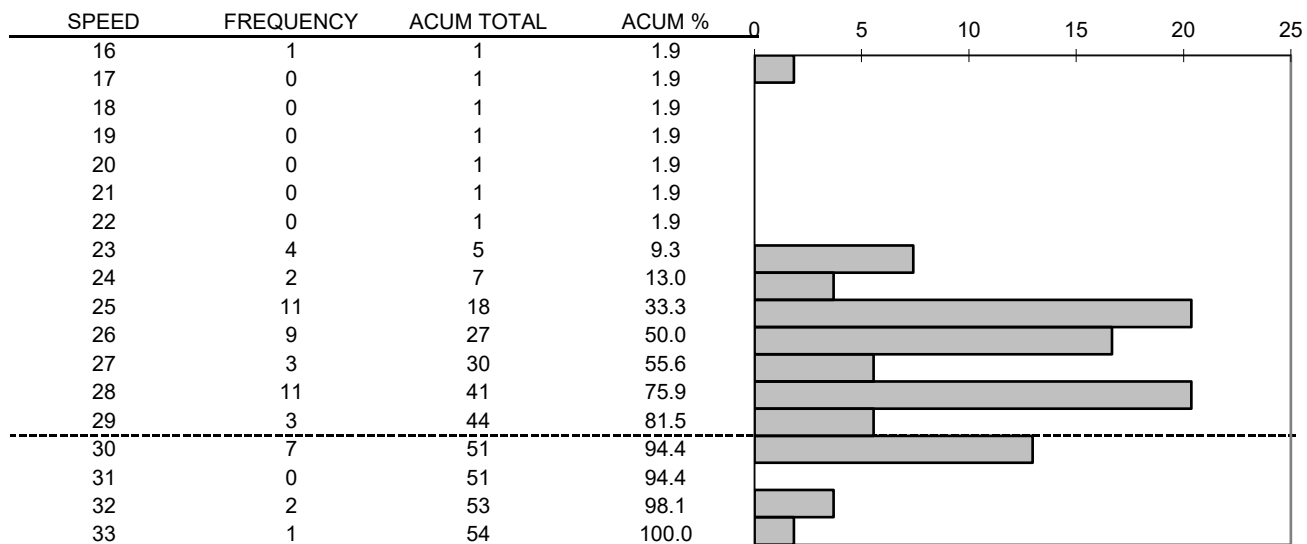
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, Middle of 25 MPH Zone South of Monroe  
 TIME START: 10:42 AM  
 TIME END: 11:10 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 26.8  
 50th PERCENTILE = 26.  
 85th PERCENTILE = 29.3  
 90th PERCENTILE = 29.7  
 95th PERCENTILE = 31.2

PACE = 23 - 32  
 VEHICLES IN PACE = 52  
 % IN PACE = 96.3  
 % BELOW PACE = 1.9  
 % ABOVE PACE = 1.9

SAMPLE VARIANCE = 8.0405311  
 STANDARD DEVIATION = 2.835583  
 RANGE 1\*S = 72.22222  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 98.14815

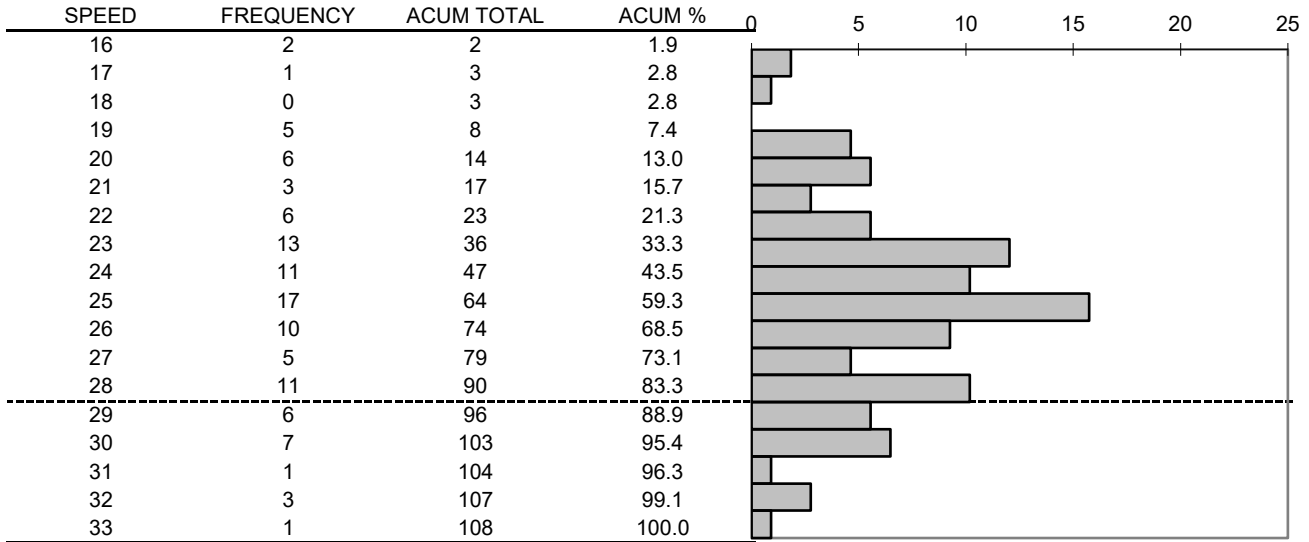
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 25 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, Middle of 25 MPH Zone South of Monroe  
 TIME START: 10:42 AM  
 TIME END: 11:10 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 24.9  
 50th PERCENTILE = 24.4  
 85th PERCENTILE = 28.3  
 90th PERCENTILE = 29.2  
 95th PERCENTILE = 29.9

PACE = 21 - 30  
 VEHICLES IN PACE = 89  
 % IN PACE = 82.4  
 % BELOW PACE = 13.  
 % ABOVE PACE = 4.6

SAMPLE VARIANCE = 12.7819315  
 STANDARD DEVIATION = 3.5751827  
 RANGE 1\*S = 70.37037  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.



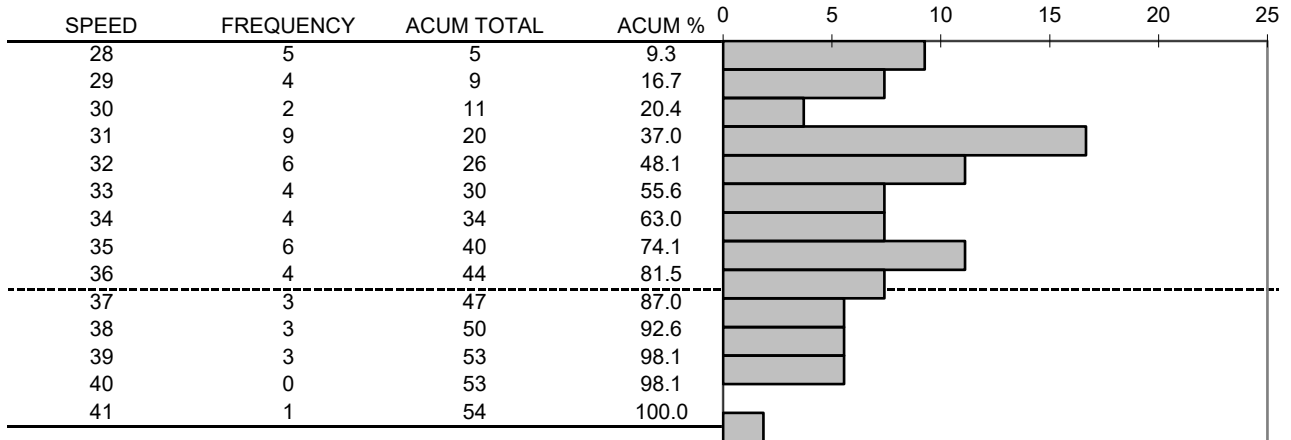
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, Middle of 35 MPH Zone S of Washington St.  
 TIME START: 10:14 AM  
 TIME END: 10:40 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 33.2  
 50th PERCENTILE = 32.3  
 85th PERCENTILE = 36.6  
 90th PERCENTILE = 37.5  
 95th PERCENTILE = 38.4

PACE = 28 - 37  
 VEHICLES IN PACE = 47  
 % IN PACE = 87.  
 % BELOW PACE = .  
 % ABOVE PACE = 13.

SAMPLE VARIANCE = 11.4367575  
 STANDARD DEVIATION = 3.3818275  
 RANGE 1\*S = 64.81481  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 100.

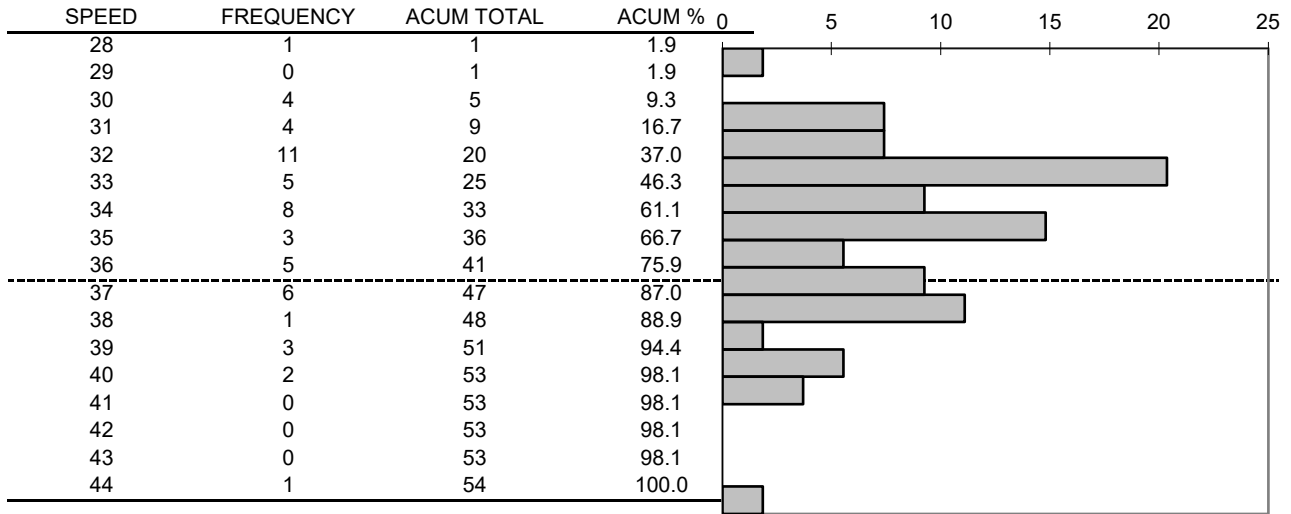
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, Middle of 35 MPH Zone S of Washington St.  
 TIME START: 10:14 AM  
 TIME END: 10:40 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 34.2  
 50th PERCENTILE = 33.3  
 85th PERCENTILE = 36.8  
 90th PERCENTILE = 38.2  
 95th PERCENTILE = 39.2

PACE = 30 - 39  
 VEHICLES IN PACE = 50  
 % IN PACE = 92.6  
 % BELOW PACE = 1.9  
 % ABOVE PACE = 5.6

SAMPLE VARIANCE = 9.8633823  
 STANDARD DEVIATION = 3.1406022  
 RANGE 1\*S = 77.77778  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 98.14815

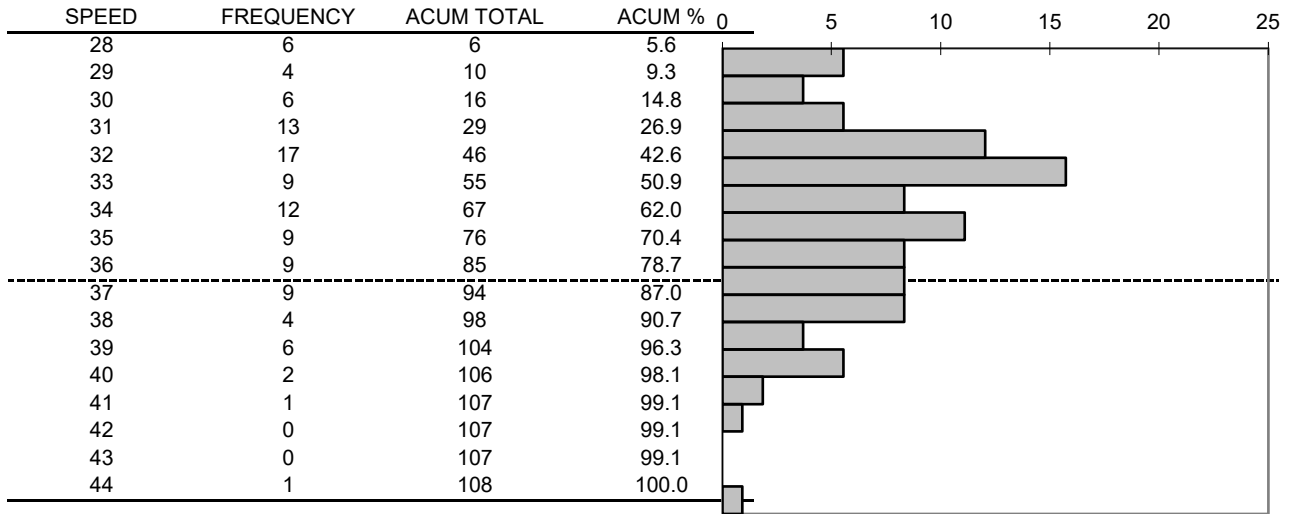
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 11, 2023

COUNTY: Washington  
 SPEED LIMIT: 35 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, Middle of 35 MPH Zone S of Washington St.  
 TIME START: 10:14 AM  
 TIME END: 10:40 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 33.7  
 50th PERCENTILE = 32.9  
 85th PERCENTILE = 36.8  
 90th PERCENTILE = 37.8  
 95th PERCENTILE = 38.8

PACE = 28 - 37  
 VEHICLES IN PACE = 94  
 % IN PACE = 87.  
 % BELOW PACE = .  
 % ABOVE PACE = 13.

SAMPLE VARIANCE = 10.8123053  
 STANDARD DEVIATION = 3.288207  
 RANGE 1\*S = 69.44444  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 99.07407

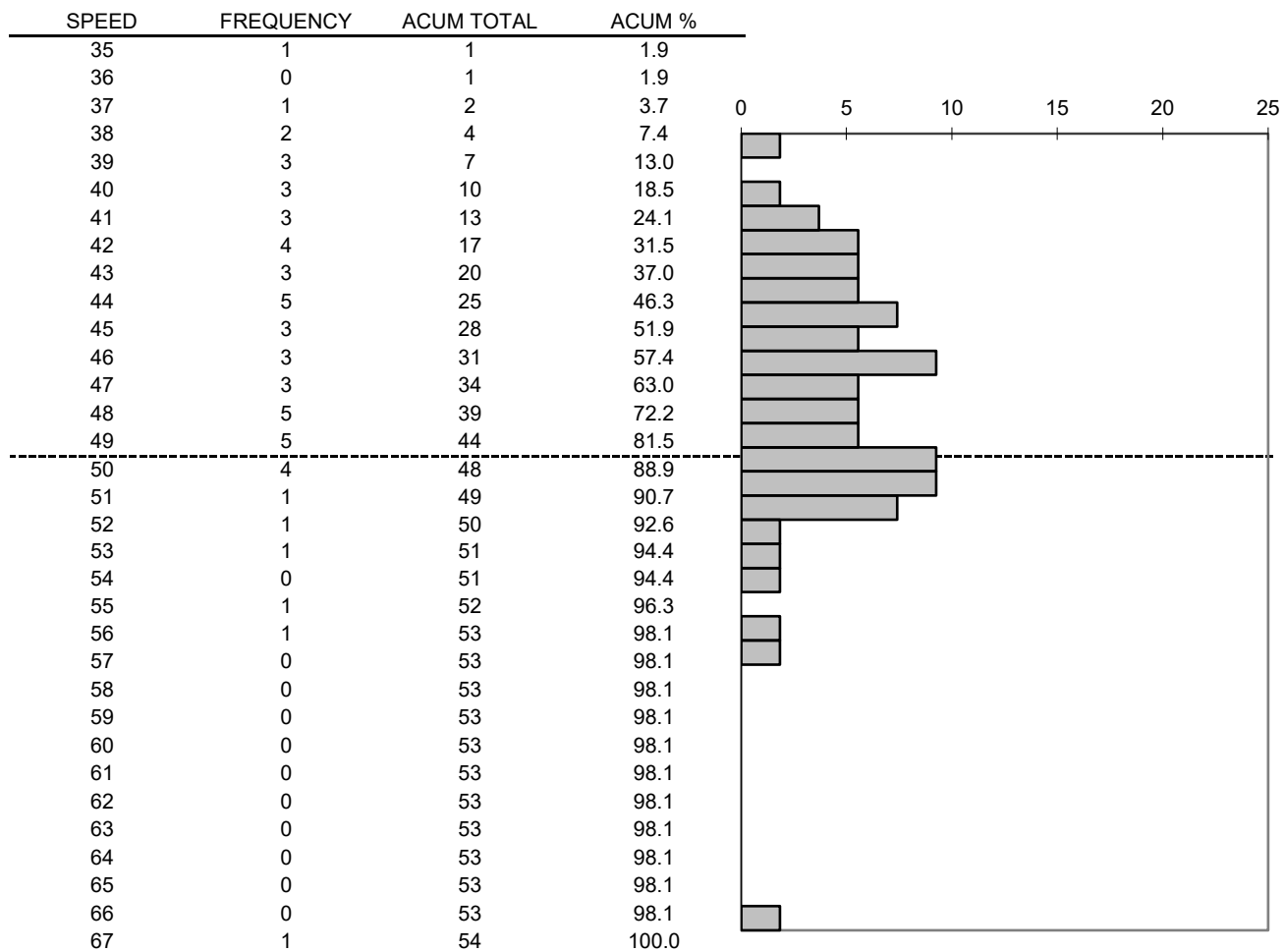
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, Middle of 45 MPH Zone South of SCL  
 TIME START: 11:55 AM  
 TIME END: 12:21 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 45.5  
 50th PERCENTILE = 44.7  
 85th PERCENTILE = 49.5  
 90th PERCENTILE = 50.6  
 95th PERCENTILE = 54.3

PACE = 41 - 50  
 VEHICLES IN PACE = 38  
 % IN PACE = 70.4  
 % BELOW PACE = 18.5  
 % ABOVE PACE = 11.1

SAMPLE VARIANCE = 30.6694619  
 STANDARD DEVIATION = 5.5380016  
 RANGE 1\*S = 77.77778  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 98.14815

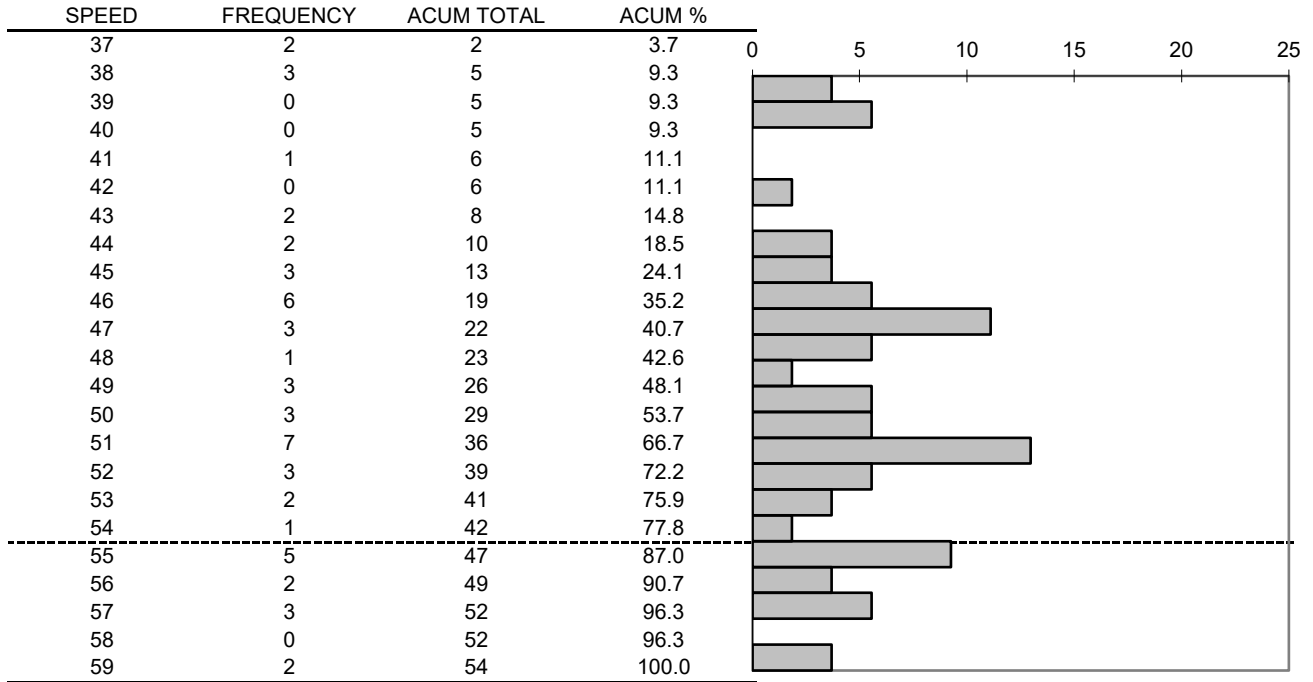
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, Middle of 45 MPH Zone South of SCL  
 TIME START: 11:55 AM  
 TIME END: 12:21 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 49.1  
 50th PERCENTILE = 49.3  
 85th PERCENTILE = 54.8  
 90th PERCENTILE = 55.8  
 95th PERCENTILE = 56.8

PACE = 46 - 55  
 VEHICLES IN PACE = 34  
 % IN PACE = 63.  
 % BELOW PACE = 24.1  
 % ABOVE PACE = 13.

SAMPLE VARIANCE = 32.7704403  
 STANDARD DEVIATION = 5.7245472  
 RANGE 1\*S = 66.66667  
 RANGE 2\*S = 96.2963  
 RANGE 3\*S = 100.

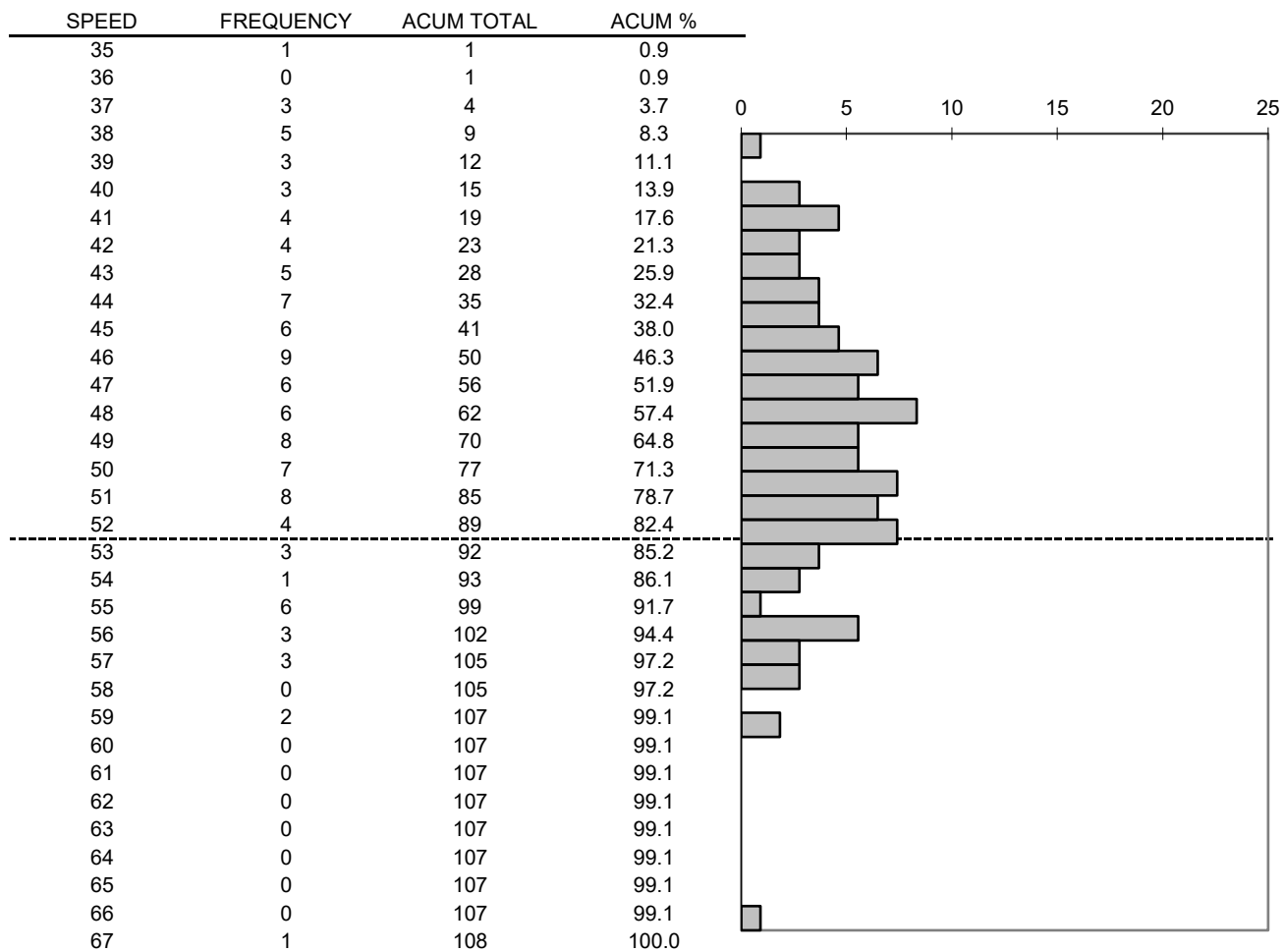
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 45 MPH  
 DIRECTION: COMBINED NB/SB

LOCATION: US-75, Middle of 45 MPH Zone South of SCL  
 TIME START: 11:55 AM  
 TIME END: 12:21 PM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 47.3  
 50th PERCENTILE = 46.7  
 85th PERCENTILE = 52.9  
 90th PERCENTILE = 54.7  
 95th PERCENTILE = 56.2

PACE = 42 - 51  
 VEHICLES IN PACE = 66  
 % IN PACE = 61.1  
 % BELOW PACE = 17.6  
 % ABOVE PACE = 21.3

SAMPLE VARIANCE = 34.5803911  
 STANDARD DEVIATION = 5.8805094  
 RANGE 1\*S = 71.2963  
 RANGE 2\*S = 98.14815  
 RANGE 3\*S = 99.07407

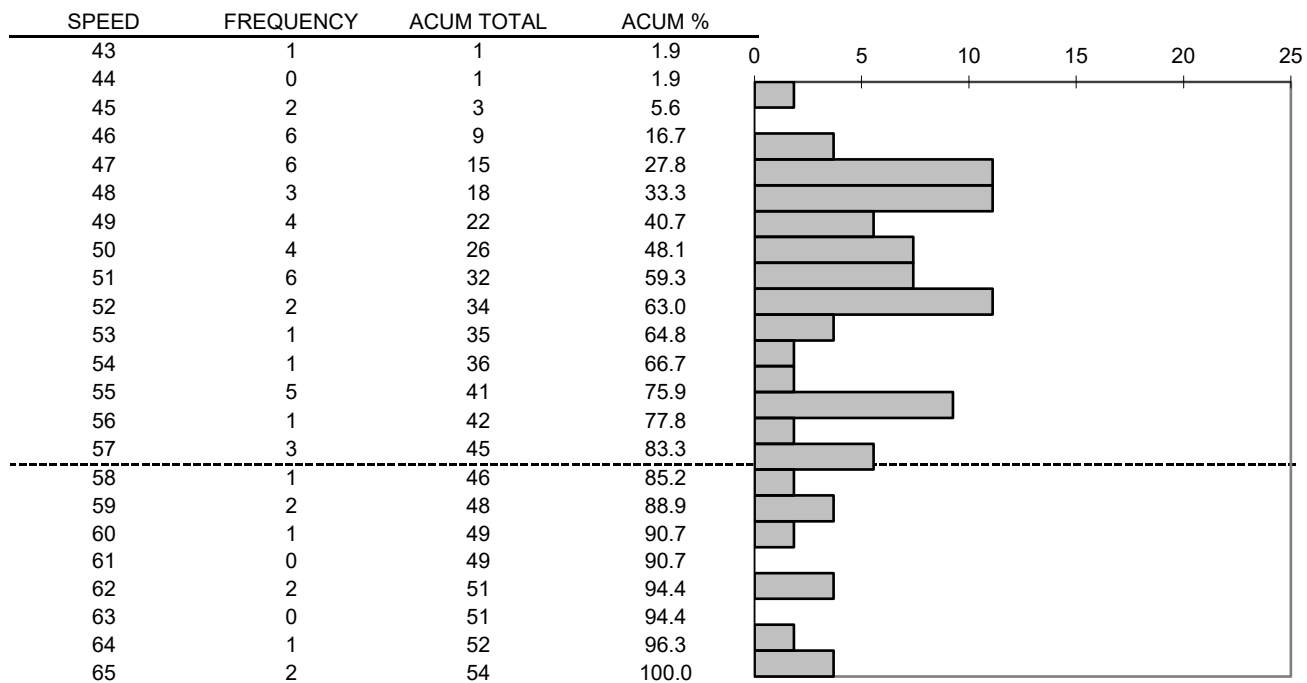
### SPEED STUDY

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: NORTHBOUND ONLY

LOCATION: US-75, 0.32 Miles South of P43 South of SCL  
 TIME START: 11:25 AM  
 TIME END: 11:55 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 51.9  
 50th PERCENTILE = 50.2  
 85th PERCENTILE = 57.9  
 90th PERCENTILE = 59.6  
 95th PERCENTILE = 63.3

PACE = 46 - 55  
 VEHICLES IN PACE = 38  
 % IN PACE = 70.4  
 % BELOW PACE = 5.6  
 % ABOVE PACE = 24.1

SAMPLE VARIANCE = 31.5415793  
 STANDARD DEVIATION = 5.616189  
 RANGE 1\*S = 77.77778  
 RANGE 2\*S = 94.44444  
 RANGE 3\*S = 100.

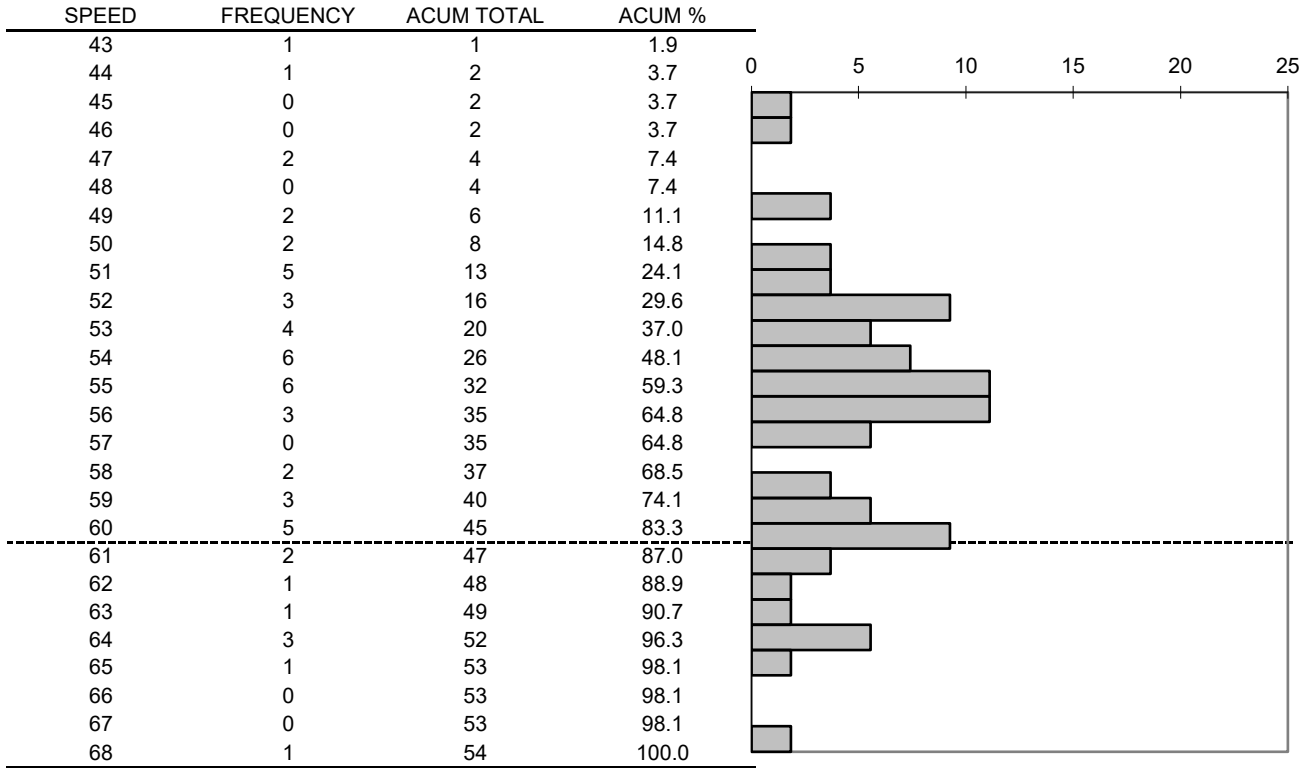
**SPEED STUDY**

CITY: Fort Calhoun  
 OBSERVER: JA  
 DATE: September 7, 2023

COUNTY: Washington  
 SPEED LIMIT: 65 MPH  
 DIRECTION: SOUTHBOUND ONLY

LOCATION: US-75, 0.32 Miles South of P43 South of SCL  
 TIME START: 11:25 AM  
 TIME END: 11:55 AM

PERCENTAGE BREAKDOWN



AVERAGE SPEED = 55.4  
 50th PERCENTILE = 54.2  
 85th PERCENTILE = 60.5  
 90th PERCENTILE = 62.6  
 95th PERCENTILE = 63.8

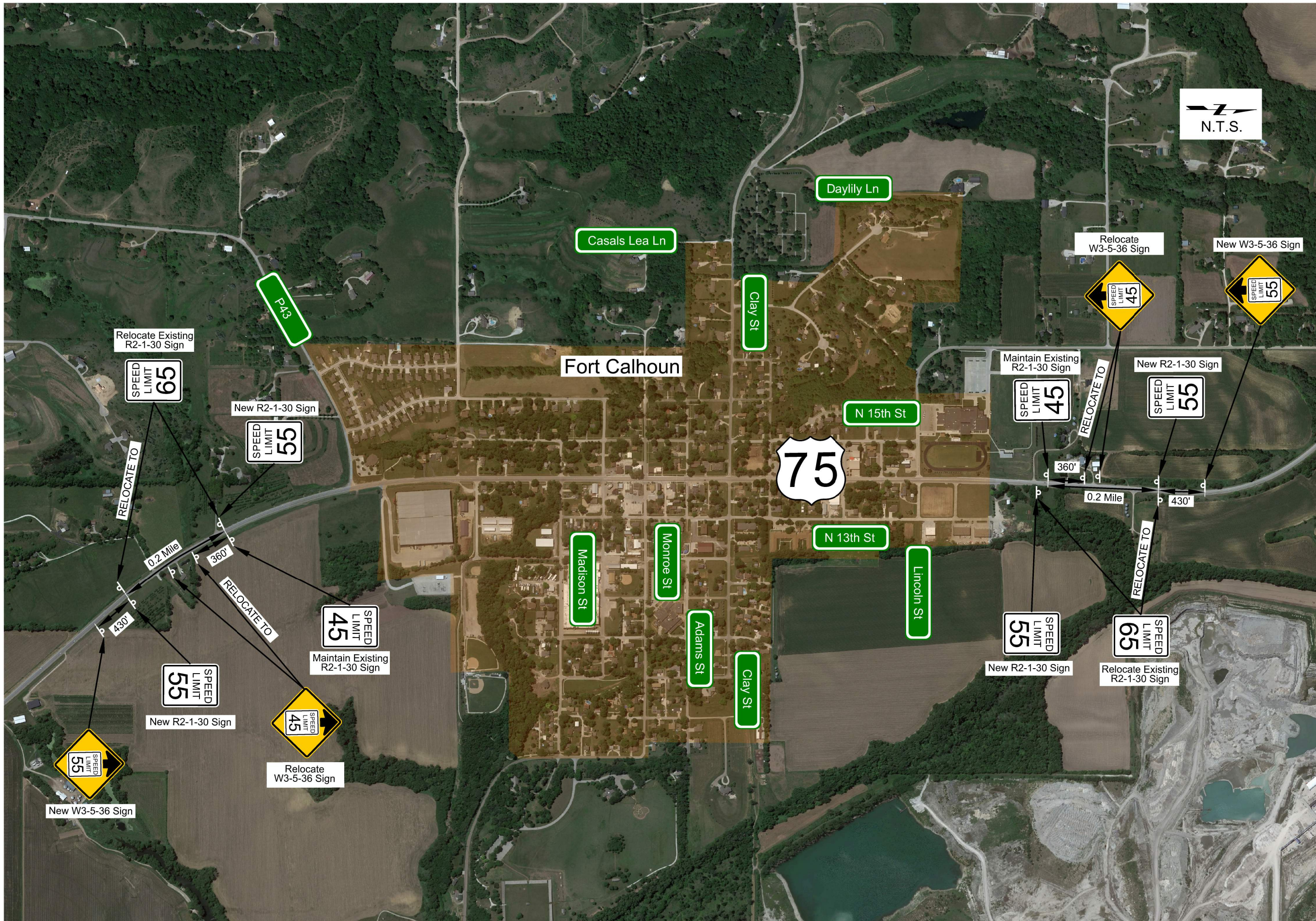
PACE = 51 - 60  
 VEHICLES IN PACE = 37  
 % IN PACE = 68.5  
 % BELOW PACE = 14.8  
 % ABOVE PACE = 16.7

SAMPLE VARIANCE = 28.8361286  
 STANDARD DEVIATION = 5.3699282  
 RANGE 1\*S = 72.22222  
 RANGE 2\*S = 94.44444  
 RANGE 3\*S = 100.



**Attachment C. Speed Zone Modification Exhibits**

File Name and Location: P:\Engineering\231524.00 - Fort Calhoun Speed Studies\5 Study and Report\1 Drawings\S-231524.dgn  
 Print Date/Time: 2/20/2024 3:43 PM  
 Plot Driver Used: K:\Bentley\Resources\18\JEO\_OpenRoads\Workspace\Standards\plotters\jcof\_nls.ctb  
 Pen Table Used: K:\Bentley\Resources\18\JEO\_OpenRoads\Workspace\Standards\tables\JEO\_penstable.tbl



2023  
 CITY OF FORT CALHOUN SPEED STUDIES  
 FORT CALHOUN, NE

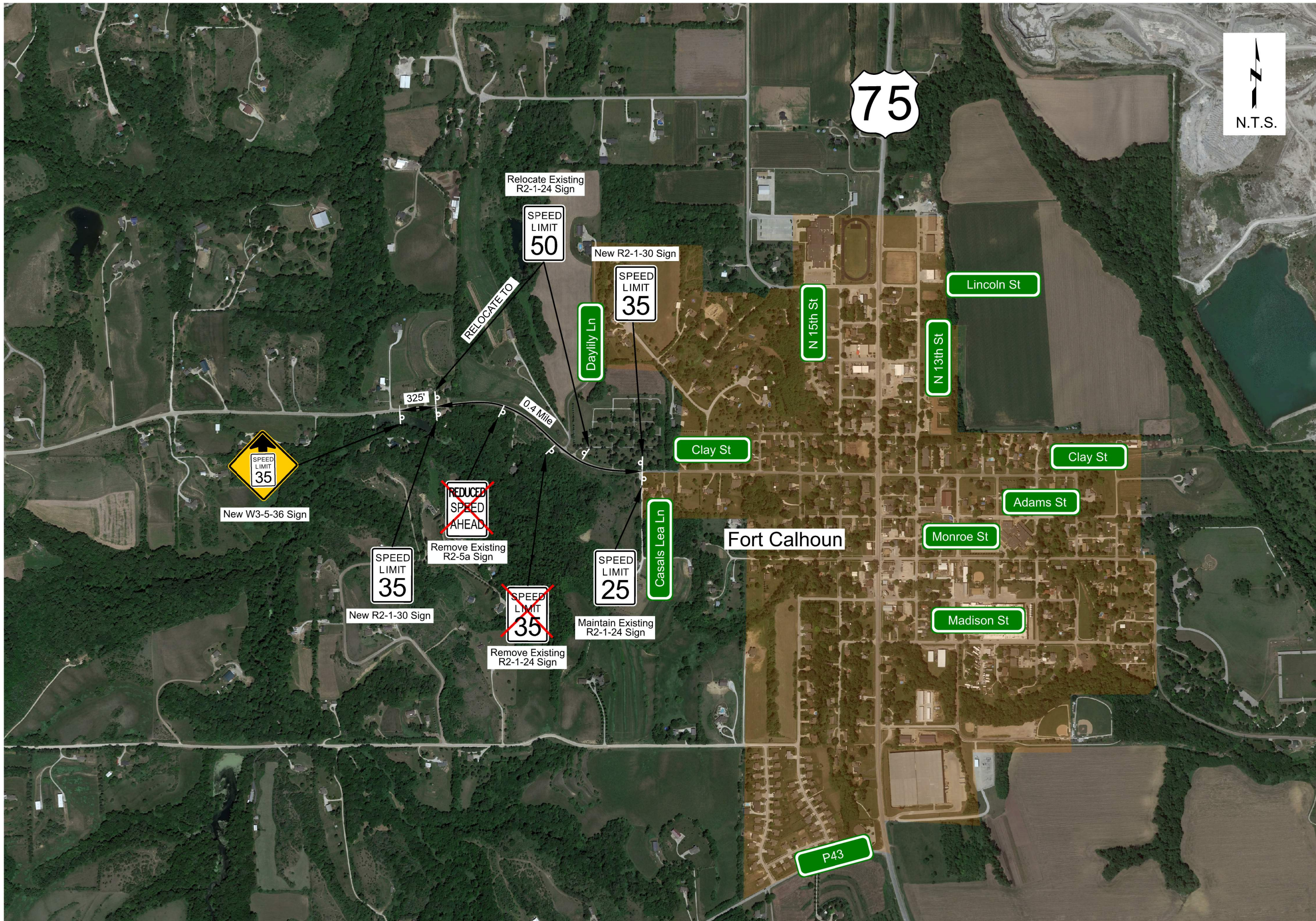
PROPOSED SPEED ZONES FOR US-75

PROJECT NO.	231524.00
DATE	2/20/2024
DRAWN BY	jaquilar
FILE NAME	S-231524.dgn
FIELD BOOK	
FIELD CREW	
SURVEY FILE NO.	
PLAN IN HAND	
INITIALS	
DATE	
70 PERCENT REVIEW	
INITIALS	
DATE	
95 PERCENT REVIEW	
INITIALS	
DATE	
REVISIONS	

EXHIBIT 2

Plot Driver Used: K:\Bentley\Resources\1\8\JEO\_OpenRoads\Workspace\Standards\tables\JEO\_penTable.tbl  
Pen Table Used: K:\Bentley\Resources\1\8\JEO\_OpenRoads\Workspace\Standards\tables\JEO\_penTable.tbl

File Name and Location: P:\Engineering\231524.00 - Fort Calhoun Speed Studies\Drawings\S-231524.dgn  
Print Date/Time: 2/20/2024 3:42:22 PM  
By: jaguilar



2023  
CITY OF FORT CALHOUN SPEED STUDIES  
FORT CALHOUN, NE

PROPOSED SPEED ZONE FOR CLAY STREET

PROJECT NO.	231524.00
DATE	2/20/2024
DRAWN BY	jaguilar
FILE NAME	S-231524.dgn
FIELD BOOK	
FIELD CREW	
SURVEY FILE NO.	
PLAN IN HAND	
INITIALS	
DATE	
70 PERCENT REVIEW	
INITIALS	
DATE	
95 PERCENT REVIEW	
INITIALS	
DATE	
REVISIONS	

EXHIBIT 1