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Clark County-Springfield Transportation Coordinating Committee

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Subject: South Main Street Safety Study

The goal of this study was to assess the existing conditions and crash data along South Main Street (US 68) from the Urbana Elementary/Junior High School to Reynolds Street in Urbana, Ohio. ODOT is resurfacing this segment of South Main Street as part of the ODOT Urban Resurfacing Program. Resurfacing will take place in the Summer of 2022 starting at Reynolds Street and ending to the south near the Champaign County Building. Resurfacing from the Champaign County Building to the south near the school will be part of a separate project that will be completed at a later date. The striping changes from this study will be included in the paving plans with the goal of mitigating crashes along South Main Street. Any additional signage will be purchased and installed by the City of Urbana in coordination with the resurfacing project.

Roadway Conditions

South Main Street is a principal arterial with an annual average daily traffic (AADT) of 13,795 vehicles per day from Reynolds Street to Lewis B Moore Drive (SR 55) and 14,235 vehicles per day south of Lewis B Moore Drive (SR 55). South Main Street is two-way two-lane roadway between Reynolds Street and Lewis B Moore Drive (SR 55) with on street parking on both sides of the roadway. South Main Street between Lewis B Moore Drive (SR 55) and the Urbana Elementary/Junior High School is a two-way two-lane roadway with 8-foot to 13-foot paved shoulders. There is no on-street parking available on this section of South Main Street.

South Main Street has a speed limit of 35 mph from Reynolds Street to Lewis B Moore Drive (SR 55) and 45 mph between Lewis B Moore Drive (SR 55) to the Urbana Elementary/Junior High School. A designated school zone is present with a speed limit of 20 mph during restricted hours. Throughout the corridor, driveways for both residential and commercial properties are prevalent. Sidewalks are present along both sides of the corridor from Reynolds Street to approximately 250 feet north of Lewis B Moore Drive (SR 55). An existing conditions diagram that shows the existing signage along South Main Street is provided in **Attachment 1**.

Crash Analysis

Crash data from January 1, 2017 through December 31, 2019 was obtained for the study area using ODOT's GIS Crash Analysis Tool (GCAT) and analyzed using the Crash Analysis Module (CAM) Tool. The crash reports were opened and reviewed to verify to location of the crash and the crash type. A collision diagram that shows crash patterns by illustrating the approximate location of each reported crash is provided in **Attachment 2**. The output for the CAM tool is provided in **Attachment 3**. There was a total of 86 crashes with 26 (30 percent) resulting in injury. Three serious injuries occurred in the study area. **Figure 1** shows the crash frequency by year and severity.

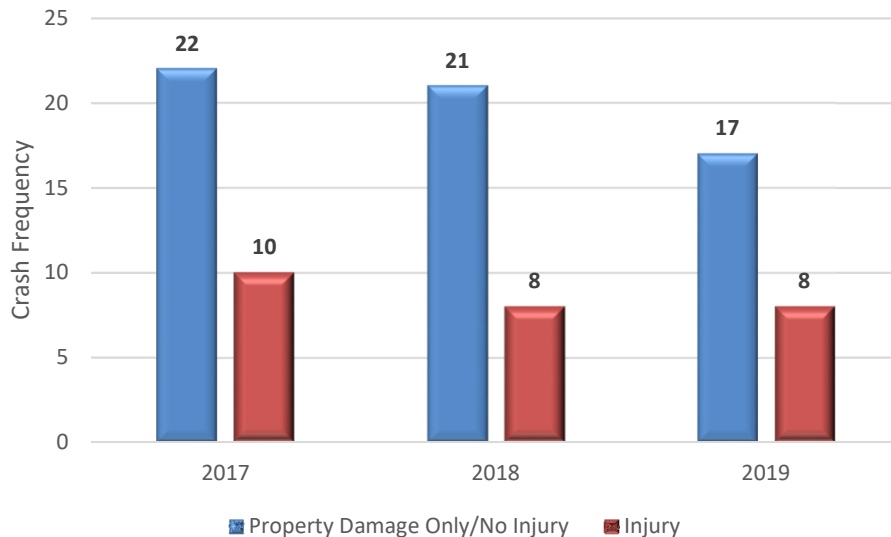


Figure 1: Crash Frequency by Severity

Table 1 shows the crashes in the study area by crash type. Rear end collisions were the most prevalent crash type along South Main Street (62 percent). 14 out of the 53 rear end collisions resulted in injury (26 percent). The crash patterns at each location along South Main Street will be described in more detail in the following section.

Table 1: Crash Frequency by Crash Type

Crash Type	Total Crashes	Percentage
Rear End	53	62 %
Parked Vehicle	6	7 %
Fixed Object	6	7 %
Right Turn	5	6 %
Left Turn	4	5 %
Angle	3	4 %
Pedestrian	2	2 %
Sideswipe - Opposite	2	2 %
Backing	2	2 %
Sideswipe - Passing	1	1 %
Head On	1	1 %
Overturning	1	1 %
Grand Total	86	100 %

Locations for Improvement

The existing conditions and potential improvements for each location along the corridor are detailed below. All layouts were optimized to maintain as much parking as possible. Detailed layouts of the potential improvements are shown in **Attachment 4**. The corresponding page number for each location is included below.

Urbana Elementary/Junior High School Driveway

Existing Conditions

- Since construction, there have been three rear end collisions on the northbound and southbound approaches to the signal. These crashes could be attributed to the recent installation of the signal.
- During the site visit it was observed that the lane use sign on the eastern leg of the intersection was not mounted at the standard sign height. The current sign post is approximately four feet high, shown in **Photo 1**.

*Potential Improvements (See **Attachment 4, Page 1**)*

- Re-erect existing lane use sign to standard height based on ODOT Standard Construction Drawing 42.20.



Photo 1: Improperly Mounted Lane Use Sign

South Main Street between Urbana Elementary/Junior High School and Lewis B Moore Drive (SR 55)

Existing Conditions

- Four rear end collisions occurred at the driveway to the Champaign County Building likely as a result of vehicles slowing or stopping in the through lane to turn left. The driveway is shown in **Photo 2**.
- Backing, fixed object and rear end collisions occurred along this section of South Main Street, likely due to the prevalent number of driveways and local roadway intersections.
- During the site visit the school crossing pedestrian sign was leaning and not mounted at the standard sign height, shown in **Photo 3**.



Photo 2: Driveway to Community Building

Potential Improvements (See Attachment 4, Page 2 & 3)

- Install a two-way left-turn lane (TWLTL) from the Urbana Elementary/Junior High School Driveway to Lewis B Moore Drive (SR 55). This may require shoulder reconstruction and re-grading of the surrounding ditches (**Photo 4**). The provided information does not indicate if the shoulders are full-depth to accommodate traffic with the reallocation of the pavement.
- Re-erect existing school crossing pedestrian sign to standard height based on ODOT Standard Construction Drawing 42.20.



Photo 3: Improperly Mounted Sign



Photo 4: Ditch North of Pearce Place

Lewis B Moore Drive (SR 55)

Existing Conditions

- During the field visit, it was observed that the northbound protected left-turn signal phase was called when there were no vehicles present.
- The pavement at the signalized gas station driveway has deteriorated, shown in **Photo 5**, making it difficult to traverse for some vehicles.
- Rear end crashes occurred on the eastbound and westbound approaches of the intersection, likely due to driver inattention to slowing or stopped turning traffic.



Photo 5: Deteriorated Gas Station Driveway

Potential Improvements (See **Attachment 4, Page 4**)

- Add a southbound left-turn lane into the gas station driveway.
- Add a sign on US 68 to notify drivers they are not permitted to turn left into the southern gas station driveway.
- Add a “LEFT TURN YIELD ON GREEN” sign on eastern approach to reinforce that drivers need to yield to other vehicles exiting the gas station.
- It is recommended that the loop detectors be checked at this intersection to ensure they are operational due to the operations observed during the field visit.
- The following improvements are proposed to improve safety but not as part of the resurfacing project:
 - A long-term improvement at this intersection is to convert this signalized intersection to a roundabout with truck aprons. This improvement has been laid out and documented in a previous study for the City of Urbana.
 - Repair the pavement on the gas station driveway. The City of Urbana is planning improvements for the sidewalk on the east side of the intersection that would require the replacement of the driveway by the property owner. The cost of replacing this drive will not be included in the cost estimate.
 - Install backplates to improve signal visibility.

Powell Avenue

Existing Conditions

- During the field visit, it was found that both pedestrian push buttons were damaged, shown in **Photo 6**.
- A utility line obstructed the westbound signal head, shown in **Photo 7**.
- A pedestrian on a mobility scooter was observed riding through the intersection during the field visit, shown in **Photo 8**.
- It was observed that vehicles traveling northbound had difficulty turning right onto E Powell Avenue due to the tight radius of the curb. One fixed object occurred when a large vehicle was turning right and hit a pole on the southeast corner of the intersection.
- Four rear end collisions occurred on northern leg of intersection.

- One left-turn collision occurred between a southbound left-turning vehicle and a northbound left-turning vehicle due to the path overlap resulting from the offset intersection. This offset is shown in **Photo 9**.
- One pedestrian collision occurred when a left-turning vehicle on East Powell Avenue struck a northbound pedestrian in the crosswalk at night. The pedestrian was crossing during the “Do Not Walk” phase.

Potential Improvements (See Attachment 4, Page 6, 11 & 12)

- Introduce split-phasing on eastbound and westbound approaches to eliminate left-turn path overlap (see below for results from the traffic analysis).
- Add a southbound left-turn lane onto E Powell Avenue. Adding this turn lane would take away approximately 220 feet of parking, or eight parking spaces.
- Add “LEFT TURN YIELD ON GREEN” on eastbound and westbound approaches to reinforce yielding procedures due to the offset intersection (this improvement is not necessary if the intersection is split-phased).
- The following improvements are proposed to improve safety but not as part of the resurfacing project:
 - Replace pedestrian push button faces.
 - Install backplates to improve signal visibility.



Photo 6: Damaged Pushbutton



Photo 7: Obstructed Signal



Photo 8: Pedestrian on Roadway



Photo 9: S Main St and Powell Ave

- Adjust utility line to not interfere with signal head.
- A long-term improvement is to align E Powell Avenue with W Powell Avenue by relocating E Powell Avenue to the north into a vacant parking lot, illustrated on **Page 11**.
- Another long-term improvement is to increase the curb radius of the southeast corner, illustrated on **Page 12**.

Lincoln Street / Park Avenue

Existing Conditions

- Seven rear end collisions occurred near/at this intersection.
- Two fixed objects occurred around the intersection. One fixed object was related to a northbound vehicle turning right and striking a pole on the southeast corner. The other fixed object was the result of a vehicle losing control.

Potential Improvements (See Attachment 4, Page 7)

- Install a southbound left-turn lane onto Park Avenue.

South Main Street and Thompson Street to Hovey Street

Existing Conditions

- Several rear end collisions occurred at Thompson, Henry and Hovey Street likely as a result of vehicles slowing or stopping in the through lane to turn left.

Potential Improvements (See Attachment 4, Page 8 & 13)

- A possible alternative is to install dedicated northbound left-turn lanes at Thompson Street and Hovey Street and a dedicated southbound left-turn lane at Henry Street.
- Another alternative is to have a TWLTL continue north after the intersection of Park Street/Lincoln Street until College Street/Hill Street.

College Street / Hill Street

Existing Conditions

- Five rear end collisions have occurred around this intersection. Three rear end collisions likely resulted from vehicles slowing or stopping in the through lane to turn left.

Potential Improvements (See Attachment 4, Page 9)

- Install northbound and southbound left-turn lanes.

Alternative Analysis

Capacity analysis was performed at the intersection of South Main Street and Powell Avenue. Synchro analysis was performed for the existing condition and for the alternative to split-phase the eastbound and westbound approaches. Turning movement counts were collected at this intersection on Thursday June 17, 2021. Synchro output is provided in **Attachment 5**.

Table 2 summarizes the results for the current signal timings at South Main Street and Powell Avenue and the alternative to split-phase the eastbound and westbound approaches. In both conditions in both the AM and PM, the overall intersection operates at LOS A. All approaches for the existing condition and the split-phase alternative are operating at LOS D or better. Compared to existing conditions, the eastbound approach changed from LOS C to LOS D. Should this improvement be implemented, timings could be further optimized for less delay on the eastbound and westbound approaches. This analysis indicates that the split-phasing would work and would adequately accommodate traffic.

Table 2. Operational Analysis Results

Intersection	Approach	Delay (Seconds)	LOS
		AM (PM)	AM (PM)
Existing South Main Street and Powell Avenue	Eastbound	33.3 (33.4)	C (C)
	Westbound	35.7 (35.6)	D (D)
	Northbound	2.1 (2.7)	A (A)
	Southbound	2.3 (2.6)	A (A)
	Overall Intersection	5.3 (4.9)	A (A)
Intersection	Approach	Delay (Seconds)	LOS
		AM (PM)	AM (PM)
Spilt Phase - South Main Street and Powell Avenue	Eastbound	46.3 (46.3)	D (D)
	Westbound	45.9 (46.3)	D (D)
	Northbound	3.8 (4.8)	A (A)
	Southbound	4.2 (4.7)	A (A)
	Overall Intersection	8.0 (7.6)	A (A)

Cost Estimates

The following items were included in the cost estimates:

Resurfacing

- Additional signage

Additional Improvements

- Backplates (Existing signals are assumed to support the addition of backplates).
- Pedestrian push button face replacement at South Main Street and Powell Avenue.
- Minor shoulder widening and re-grading ditch from Urbana School Drive to Lewis B Moore Drive (SR 55). It was assumed that the shoulders are full depth and would not require reconstruction.
- Re-aligning East and West Powell Avenue.
- Re-curbng the southeast corner of South Main Street and Powell Avenue.

Table 3 shows the cost estimate for both the resurfacing project costs and the additional safety improvements. Costs that will be covered in the ODOT Resurfacing Project (such as striping) are not included. The ODOT Resurfacing Project does not include the cost to bring pedestrian facilities to ADA compliance. These costs are detailed in **Attachment 6**. It should be noted that these costs do not include an inflation factor on the 2020 unit bid prices.

Table 3: Cost Estimates

Improvement	2021 Construction Costs
Additional Resurfacing Costs	\$ 9,174
Shoulder Widening/Re-Grading Ditch	\$ 59,553
Adding Backplates	\$ 5,600
Push Button Replacements	\$ 1,530
SE Curb at Powell Avenue	\$ 46,829
Realignment of Powell Avenue	\$ 584,233