IBI GROUP
8101 North High Street, Suite 100
Columbus, Ohio 43235
tel 614 818 4900
ibigroup.com

March 12, 2021

Mr. Jeff Smith
Council President
Village of Strasburg
358 – 5th Street SW
Strasburg, Ohio 44680

Subject: US 250 Traffic Study

Dear Mr. Smith:

IBI Group is pleased to submit our analysis and recommendations for the subject project. The purpose of this project is to determine whether a two-way left-turn lane is appropriate for the US 250 corridor through the Village of Strasburg and to provide a pavement marking plan for recommended lane usage. Below is a summary of the analyses performed and the results.

Background & Existing Conditions

The Village is interested in improving traffic operations and safety along US 250 by implementing changes to the lane configuration as part of a pavement resurfacing project that ODOT has contracted for 2021.

The purposes of this traffic study are to:

- Evaluate existing conditions on US 250 regarding operations and safety
- Determine if implementation of a center two-way left-turn lane (TWLTL) is appropriate and can be accommodated within existing pavement limits.
- Identify areas where on-street parking can be maintained
- Prepare a conceptual pavement marking plan for the recommended lane use

In the study area US 250 is classified as an urban principal arterial. The roadway provides one lane in each direction on 40-foot asphalt pavement. There are marked shoulders in the far northern and southern segments and on-street parking within the "downtown" area. A total of 22 parking spaces are provided between 1st Street and 2nd Street NW, and an additional 10 marked spaces south of 1st Street.

Between 9th Street SW and the I-77 southbound ramps there are designated turn lanes at the signalized intersections. The posted speed limit is 35 mph except for the segment from 2nd Street SW to 3rd Street NW which is posted at 25 mph. Average daily traffic is approximately 9000 vehicles per day based on 2019 counts by ODOT with 25% trucks. A copy of the 2019 traffic data is included in Attachment A.

There are traffic signals at Ft. Laurens Road, 9th Street SW, 1st Street, and 2nd Street NW. Numerous unsignalized side streets intersect US 250 and there are both residential and commercial driveways throughout the corridor.

Traffic Observations

Traffic observations were conducted on US 250 to gain an overall perspective on operations, parking, and driver behaviors in the corridor. Left turns from US 250 to 1st Street and 2nd Street NW were counted during the midday and afternoon peak hours. While the number of left turns at these signalized intersections is low (10 or fewer per hour) the turning vehicles generally had to wait for the light to change before being able to complete their turn, which often resulted in traffic queuing behind them for the entire length of the block between 1st Street and 2nd Street. Some motorists did pass on the right at the end of the parking spaces, but that isn't possible for semi-trailers and other large vehicles.

Spot speed checks were conducted at the north and south ends of the study corridor to determine whether the excessive pavement width results in motorists exceeding the speed limit. It was noted that traffic is often steady enough that drivers are limited by traffic in front of them, but when in free-flow conditions many drivers do speed. Based on the limited observations taken during midafternoon periods, the 85th percentile speed (speed which 85% of drivers travel at or below) near 12th Street NW is 39 mph. The 85th percentile speed between 5th Street and 7th Street SW is also 39 mph. While these speeds are not excessively fast, they do indicate that without traffic to impede them drivers tend to drive 10% above the speed limit. At the north end of town, approximately half of drivers headed out of town drive 40 mph or higher. The speed check data is included in Attachment B.

Parking occupancy in the "downtown" area was also noted. During the midday and afternoon peak hours it appears that the on-street spaces are under-utilized. While many of the businesses in the area do not have private parking lots and there are no public parking areas, only 25-30% of parking spaces are in use at any time. Although there are only marked parking spaces in two blocks, there are no signs restricting parking throughout the remainder of the corridor. However, there were no cars observed parking in unmarked areas.

There are a large number of trucks using US 250 to travel between Tuscarawas, Stark, and Wayne Counties. These vehicles have slower start-up speeds when stopped at traffic signals and take longer to stop. This can become an issue if trucks are following too closely when a driver stops to make a left turn into a driveway or side street.

It was noted that southbound traffic approaching the signal at 9th Street SW backs up significantly during the afternoon hours. Between 3:00-3:45 p.m. the traffic queues extended 800-1500 feet during most cycles of the signal.

Safety Evaluation

As part of analyzing the TWLTL a review of current traffic safety conditions was performed. ODOT maintains a statewide database of crash information that includes data from local police departments, county sheriffs, and the Ohio Highway Patrol. Data for the years 2018-2020 were downloaded for the US 250 corridor in Strasburg to review the recent crash history. In addition to total number of crashes, the data was evaluated as to type of crash,

time of day, severity, and weather conditions to identify any patterns that exist. The tables below show a summary of the crash history.

CRASH_SEVERITY	Number	%
Injury Crash	**15**	20.8%
Property Damage Crash	**57**	79.2%
Grand Total	**72**	**100.0%**

TYPE_OF_CRASH	Number	%
Rear End	**49**	68.1%
Angle	**7**	9.7%
Sideswipe - Passing	**6**	8.3%
Fixed Object	**4**	5.6%
Left Turn	**2**	2.8%
Right Turn	**2**	2.8%
Pedestrian	**1**	1.4%
Pedalcycles	**1**	1.4%
Grand Total	**72**	**100.0%**

ROAD_CONDITION	Number	%
Dry	**58**	80.6%
Wet	**13**	18.1%
Snow	**1**	1.4%
Grand Total	**72**	**100.0%**

HOUR_OF_DAY	Number	%
0	**1**	1.4%
2	**1**	1.4%
3	**1**	1.4%
7	**3**	4.2%
8	**1**	1.4%
9	**3**	4.2%
10	**5**	6.9%
11	**2**	2.8%
12	**6**	8.3%
13	**9**	12.5%
14	**6**	8.3%
15	**8**	11.1%
16	**8**	11.1%
17	**6**	8.3%
18	**6**	8.3%
19	**1**	1.4%
20	**3**	4.2%
21	**1**	1.4%
22	**1**	1.4%
Grand Total	**72**	**100.0%**

The data indicates that a total of 72 crashes occurred in the 1.75-mile section between 9th Street SW and 12th Street NW. The majority of crashes were rear-end type crashes (49, 68%), which is typical for a two-lane roadway with intersections and driveways. Motorists turning left into these access points must stop in the stream of thru traffic waiting for a gap in oncoming traffic to make their turn and are struck by following traffic that doesn't have a clear distance to stop. Most crashes occurred on dry roads. Just over half of the crashes were between noon and 5 pm, when traffic volumes are heaviest. Attachment C shows aerial photos of the corridor with markers indicating the location of crashes.

The Federal Highway Administration has found that providing a TWLTL can reduce crashes by 19-47%. In addition, experience has shown that wide travel lanes often lead to increased speeds and improper driver behaviors.

TWLTL Analysis & Pavement Marking Plan

ODOT provides the following guidelines to justify when a TWLTL should be considered in their *Location & Design Manual, Volume 1*:

- 5,000 to 12,000 vehicles per day for two-lane highways
- 70 midblock turns per 1000 feet during peak hour
- Left-turn peak hour volume 20% or more of total volume
- Minimum length of 1000 feet or two blocks

The US 250 corridor meets the traffic volume and minimum length criteria, and likely would meet the number of midblock turns, although those were not counted other than at the signalized intersections.

The purpose of a TWLTL is to give motorists waiting to make a left turn a refuge area out of the stream of thru traffic. This is both safer and results in better traffic flow, particularly

when there are closely spaced driveways and unsignalized side streets such as along US 250 in Strasburg. The history of rear-end crashes is another indicator that a TWLTL may be needed.

It is preferable that TWLTL have the same width as the thru travel lanes, but a lane as narrow as 10 feet can be used in restricted areas. The minimum lane width for an urban arterial roadway is 11 feet with an offset of 1-2 feet from the curb. On-street parking spaces are generally 8 feet wide.

The pavement on US 250 is 40 feet wide, therefore a cross section with one 12-foot lane in each direction plus a 12-foot TWLTL can be provided with a 2-foot offset to the curb on each side.

In the section where on-street parking is desired the pavement is not wide enough to accommodate three travel lanes plus parking on both sides. It is understood that the Village is open to having parking on one side only, however it is not possible to have a continuous turn lane the length of the block while maintaining adequate thru lane widths and a parking lane.

The following options were considered for the section with on-street parking:

1. Keep the parking on both sides as it is now between 1st Street and 2nd Street NW. This allows for 8-foot parking lanes and 12-foot travel lanes. The TWLTL would be suspended south of 1st Street and north of 2nd Street NW. This is not ideal since turning motorists stay in the stream of traffic and the parking limits the ability to go around them.
2. Provide parking on the east side only, with a marked buffer zone and two 12-foot thru lanes (with curb offset on the west side). Again, this does not provide any turning lanes. A total of 11 parking spaces would be provided.
3. Provide parking on both sides in a truncated section, allowing a short turn lane at each end of the block to improve safety and traffic flow. This configuration provides 10 parking spaces.

A suggestion was made to consider switching which side has parking on either of the alley that bisects the block between 1st Street and 2nd Street NW. Based on the distance of approximately 200 feet between the stop lines of the signalized intersections and the alley, and the tapers required to shift lanes, it is not feasible to vary the parking in this manner.

Conceptual typical sections for the three-lane section with no parking, as well as the three parking options, are included in Attachment D. A pavement marking plan for the corridor is also included in Attachment D, which currently shows Option 3 for the area with on-street parking. Upon review by the Village and determination of the preferred parking and lane configuration the pavement marking plan will be finalized and submitted to ODOT.

<u>Conclusion & Recommendations</u>
Based on the results of this traffic study, a TWLTL is appropriate for the portion of US 250 through the Village of Strasburg from 9th Street SW to 12th Street NW. The existing pavement has excess width for a two-lane section, which has been shown to lead to excess speed and unsafe driving behaviors. Additionally, with the number of side

streets and private driveways, there is no way for motorists to get out of the stream of thru traffic while waiting to make a left turn.

It is recommended that the road be reconfigured to a three-lane section following the ODOT resurfacing project. Two 12-foot thru lanes and a 12-foot TWLTL can be provided through the majority of the corridor. Between 1st Street and 2nd Street NW on-street parking can be maintained. Although it provides the fewest parking spaces, it is recommended that Option 3 be implemented in order to provide left-turn lanes at the signalized intersections.

We welcome this opportunity to assist you with this matter and look forward to building our relationship with the Village of Strasburg. Please feel free to call with any questions you may have.

Sincerely,

IBI Group

Judith M. Bennett, PE, PTOE

c: Kyle Koppes

ATTACHMENT A

Location Info	
Location ID	22779
Type	I-SECTION
Functional Class	3
Located On	WOOSTER AVE
	US250 N OF 1ST ST, IN STRASBURG
Direction	2-WAY
Community	STRASBURG
MPO_ID	
HPMS ID	
Agency	Ohio Department of Transportation

Count Data Info	
Start Date	3/7/2019
End Date	3/8/2019
Start Time	12:00 AM
End Time	12:00 AM
Direction	
Notes	
Count Source	
File Name	
Weather	
Study	
Owner	countelectronics
QC Status	Accepted

Interval: 15 mins

Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
00:00 - 01:00	25	25	29	17	96
01:00 - 02:00	21	16	19	6	62
02:00 - 03:00	11	38	22	23	94
03:00 - 04:00	11	22	21	25	79
04:00 - 05:00	36	50	48	66	200
05:00 - 06:00	50	90	110	111	361
06:00 - 07:00	105	141	137	126	509
07:00 - 08:00	124	138	172	124	558
08:00 - 09:00	149	137	119	134	539
09:00 - 10:00	131	109	114	122	476
10:00 - 11:00	147	108	117	132	504
11:00 - 12:00	110	120	128	126	484
12:00 - 13:00	128	131	141	145	545
13:00 - 14:00	135	135	147	161	578
14:00 - 15:00	153	126	150	137	566
15:00 - 16:00	147	136	112	133	528
16:00 - 17:00	168	143	145	158	614
17:00 - 18:00	157	153	142	146	598
18:00 - 19:00	142	133	126	126	527
19:00 - 20:00	114	117	102	90	423
20:00 - 21:00	108	91	78	97	374

ATTACHMENT A

21:00 - 22:00	75	77	71	68	291
22:00 - 23:00	56	51	43	49	199
23:00 - 24:00	41	54	29	22	146
TOTAL					9351

Speed Check

Location: US 250 @ Valley Center

Date: 3-4-2021 Day: Thur. County: TUS

Observer: J. Bennett

Type Pavement: Asph Dry: X Wet: ____ Condition: Good Width: 40'

Weather: Cloudy Temperature: 38°F

SB Bound, Time: 2:10P M to 2:30P M						NB Bound, Time: 2:10P M to 2:30P M				
Com. %	Cum. Total	No.	Vehicles: Passenger Cars	Vehicles: Commercial	mph	Vehicles: Passenger Cars	Vehicles: Commercial	No.	Cum. Total	Com. %
					Over					
					90.0					
					88.0					
					86.0					
					84.0					
					82.0					
					80.0					
					78.0					
					76.0					
					74.0					
					72.0					
					70.0					
					68.0					
					66.0					
					64.0					
					62.0					
					60.0					
					58.0					
					56.0					
					54.0					
					52.0					
					50.0					
					48.0					
					46.0					
					44.0	II			22	100%
100%	26		I		42.0	II			20	91%
96%	25		II		40.0	IIII	II		18	82%
88%	23		IIII I	II	38.0		II		11	50%
54%	14		IIII	IIII	36.0	III	I		9	41%
19%	5		III	I	34.0	II	III		5	23%
4%	1		I		32.0					
					30.0					
					28.0					
					26.0					
					24.0					
					22.0					
					20.0					
					18.0					
					16.0					
					14.0					
					Below					
			18	8	Totals	14	8			

NOTE:

Minimum recorded observations per direction is 100 or one hour duration, whichever comes first
Free flow speeds during off-peak weekday hours are to be recorded
Minimum headway for free flow is five seconds; there should be no acceleration or deceleration
For zones 0.25 miles in length, observations should be near the center
For zones 0.25 miles to 1.00 miles in length, observations should be near the one third points
For zones over 1.00 miles in length, observations should be taken at 0.50 to 0.75 mile intervals

Speed Check

Location: US 250/7th St SW

Date: 3-4-2021 Day: Thurs County: TVS

Observer: J. Bennett

Type Pavement: Asph Dry: X Wet: ____ Condition: Fair Width: 40'

Weather: Cold & Cloudy Temperature: 37° F

NB Bound, Time: 1:40P M to 2:00P M					mph	SB Bound, Time: 1:40P M to 2:00P M				
Com. %	Cum. Total	No.	Vehicles: Passenger Cars	Vehicles: Commercial		Vehicles: Passenger Cars	Vehicles: Commercial	No.	Cum. Total	Com. %
					Over					
					90.0					
					88.0					
					86.0					
					84.0					
					82.0					
					80.0					
					78.0					
					76.0					
					74.0					
					72.0					
					70.0					
					68.0					
					66.0					
					64.0					
					62.0					
					60.0					
					58.0					
					56.0					
					54.0					
					52.0					
					50.0					
					48.0					
					46.0					
					44.0					
					42.0	1			12	100%
100%	16		11		40.0	11			11	92%
88%	14		IIII	1	38.0	11			9	75%
56%	9		III	1	36.0	1	11		7	58%
31%	5		II	III	34.0	11	11		4	33%
					32.0					
					30.0					
					28.0					
					26.0					
					24.0					
					22.0					
					20.0					
					18.0					
					16.0					
					14.0					
					Below					
			II	5	Totals	8	4			

NOTE:

Minimum recorded observations per direction is 100 or one hour duration, whichever comes first

Free flow speeds during off-peak weekday hours are to be recorded

Minimum headway for free flow is five seconds; there should be no acceleration or deceleration

For zones 0.25 miles in length, observations should be near the center

For zones 0.25 miles to 1.00 miles in length, observations should be near the one third points

For zones over 1.00 miles in length, observations should be taken at 0.50 to 0.75 mile intervals

J:\133502_US250SR21Trf\6.0_Technical\6.04_Design-Analysis\Drawings\crashes.dgn 2021-03-12 9:37:47 AM judy.bennett

	ATTACHMENT C	2018-2020 CRASH LOCATION DIAGRAM US-250 TRAFFIC STUDY	CALCULATED JMB CHECKED BSS	0 175 350 HORIZONTAL SCALE IN FEET

ON STREET PARKING OPTION 1
US-250 TRAFFIC STUDY

ATTACHMENT D

1
3

CALCULATED BSS
CHECKED JMB

0 20 40 80
HORIZONTAL SCALE IN FEET

N

CALCULATED BSS
CHECKED JMB

ON STREET PARKING OPTION 2
US-250 TRAFFIC STUDY

ATTACHMENT D

2
3

ON STREET PARKING OPTION 3
US-250 TRAFFIC STUDY

ATTACHMENT D

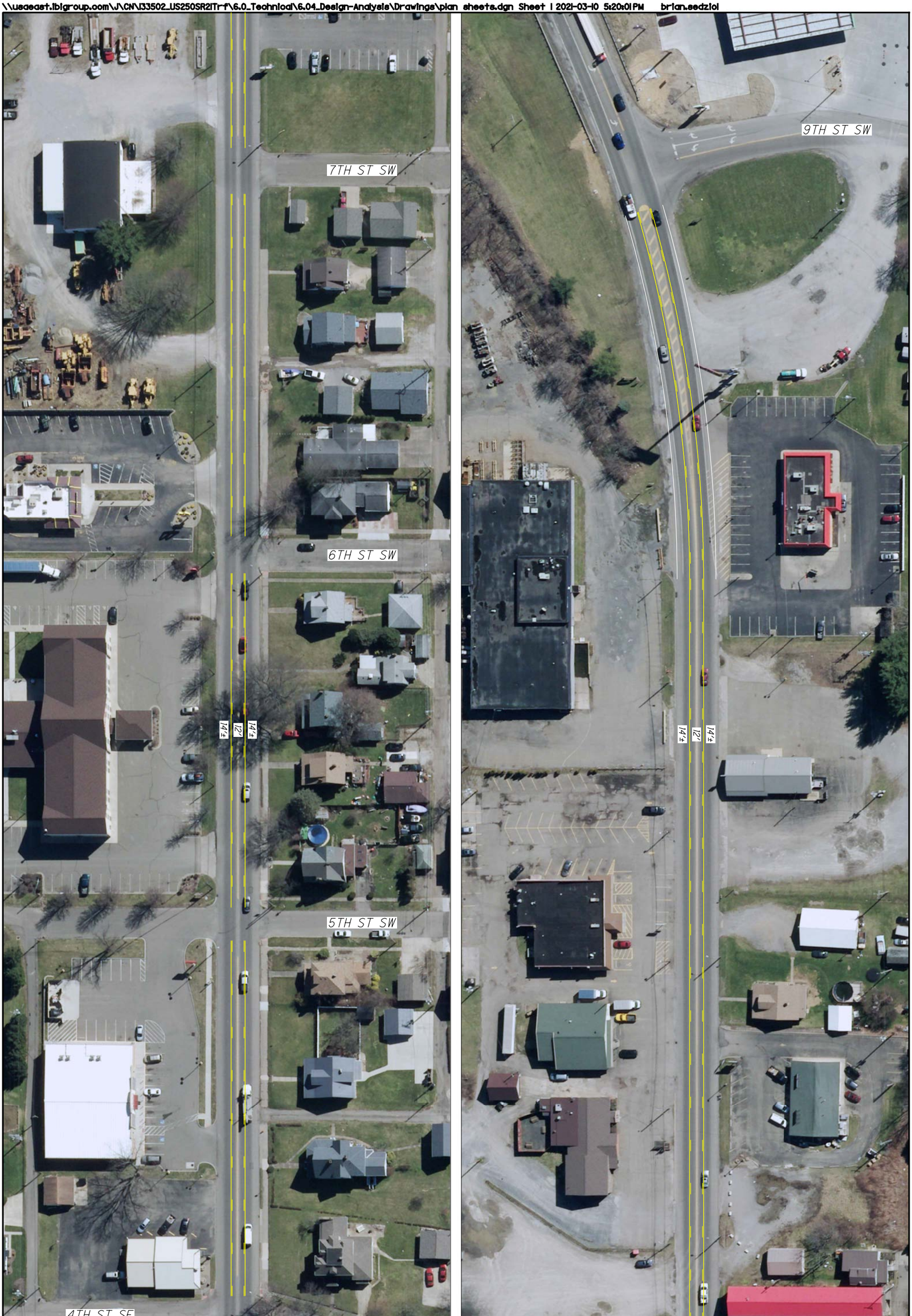
CALCULATED BSS
CHECKED JMB

0 20 40 80
HORIZONTAL SCALE IN FEET

3
3

\\wseast.ibigroup.com\VJ\CN\133502_US250SR2ITr-FV\6.0_Technical\6.04_Design-Analysis\Drawings\plan sheets.dgn Option 3 2021-03-10 5:19:56 PM brian.seaziol

\\usaeast.ibigroup.com\J\CN\133502_US250SR2Trf\6.0_Technical\6.04_Design-Analysis\Drawings\plan sheets.dgn Sheet 1 2021-03-10 5:20:01 PM brian.sedzio



ATTACHMENT D

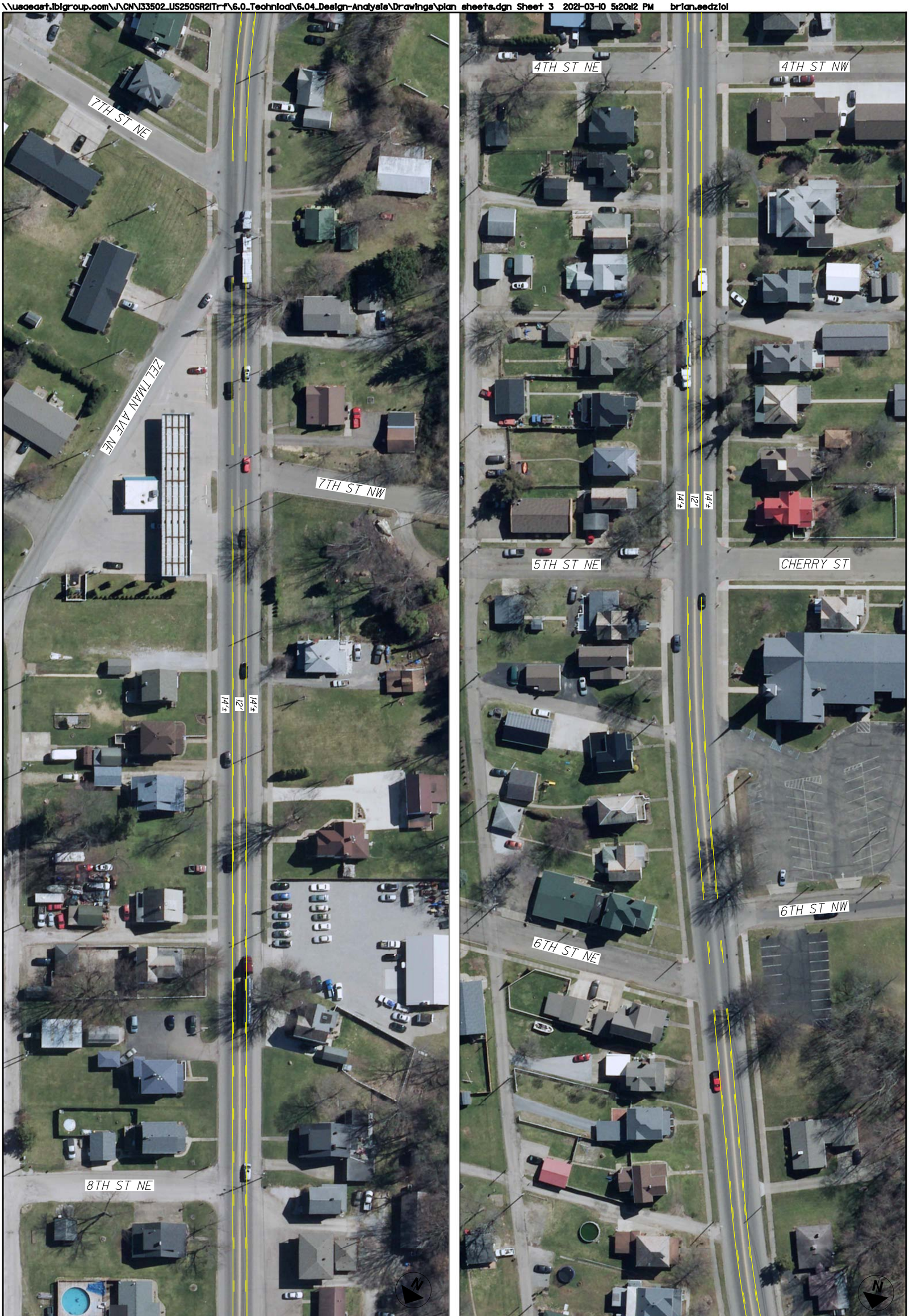
PAVEMENT MARKING PLAN
US-250 TRAFFIC STUDY

CALCULATED BSS
CHECKED JMB

0 40
20 80
HORIZONTAL SCALE IN FEET

N

4 2	ATTACHMENT D	PAVEMENT MARKING PLAN US-250 TRAFFIC STUDY	CALCULATED BSS CHECKED JMB	0 20 40 80 HORIZONTAL SCALE IN FEET



4 3	ATTACHMENT D	PAVEMENT MARKING PLAN US-250 TRAFFIC STUDY	CALCULATED BSS CHECKED JMB	0 40 20 80 HORIZONTAL SCALE IN FEET

\\usaeast.ibigroup.com\J\CN\133502_US250SR2Tr-f\6.0_Technical\6.04_Design-Analysis\Drawings\plan sheets.dgn Sheet 4 2021-03-10 5:20:17 PM brian.sedziol

4 | 4

ATTACHMENT D

PAVEMENT MARKING PLAN
US-250 TRAFFIC STUDY

CALCULATED BSS
CHECKED JMB

0 40
20 80
HORIZONTAL SCALE IN FEET

N