

Design Exception Request

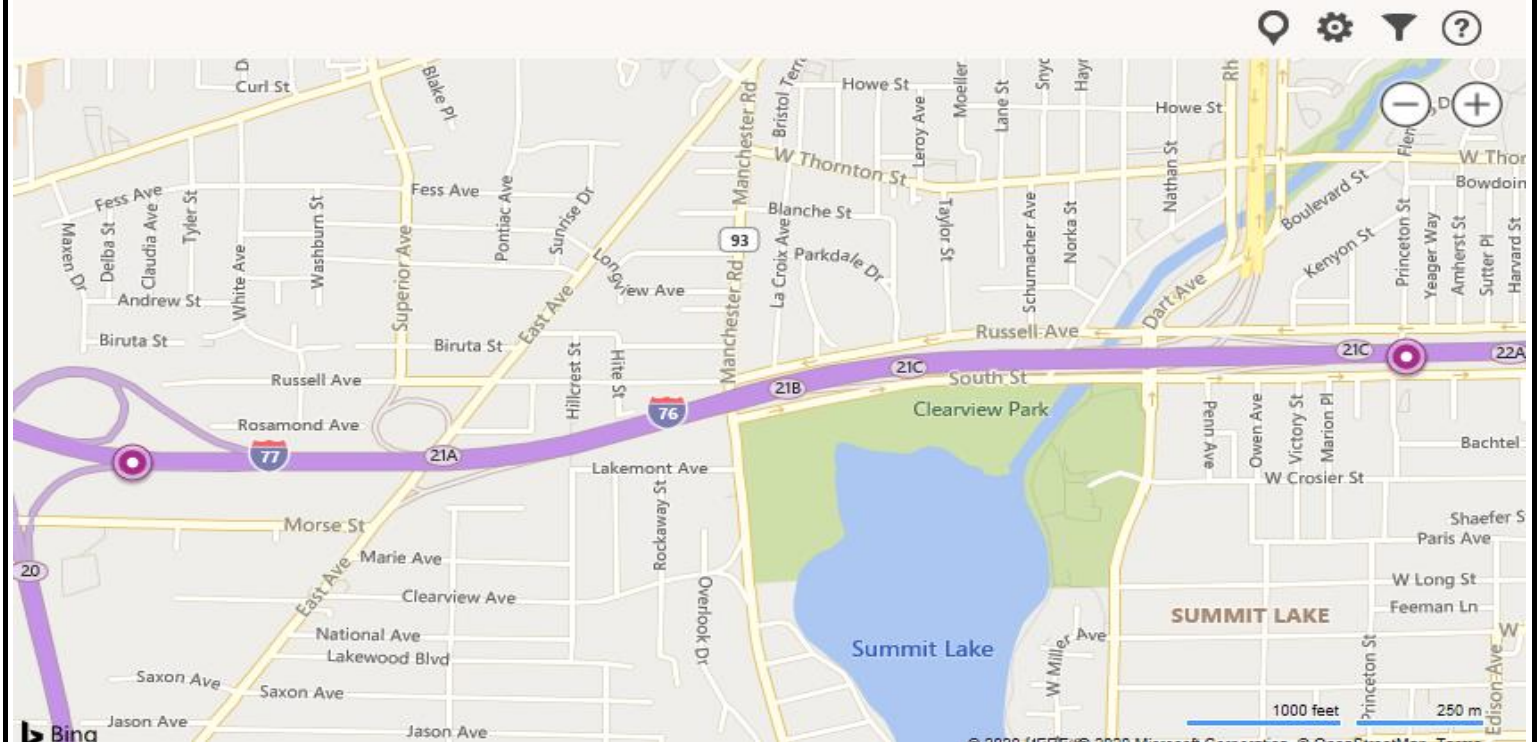
Akron Beltway Design Build

PID: 102329; Request 01

Letting Type: ODOT-Let

Design Designation

Current ADT (2020)	101,350	Td	0.013
Design Year ADT (2040)	95,820	Design Speed	60
Design Hourly Volume (2040)	15,543	Legal Speed	60
Directional Distribution	.59	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	0.013	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Jason Wise
on 2020-05-21 13:00:58 GMT

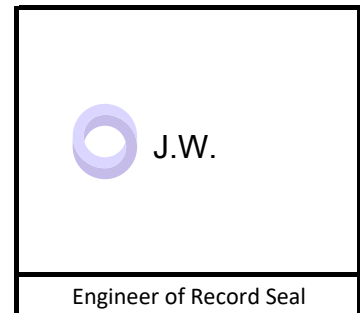
Jason Wise
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-21 13:24:39 GMT

Brenton Bogard

Approval Date: 5/21/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 01

Controlling Criteria Identification

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	Inside Shoulder 10' (L&D 301-4)	8.6'	8.6'
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This is a design-build project, to reconstruct the pavement, address vertical clearance issues and upgrade lighting, drainage, traffic control devices. All work is within existing right now.

Proposed Mitigation

None

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The project is scheduled to reconstruct the existing pavement in the existing footprint so that the side slopes and existing R/W are maintained. The proposed shoulder will generally be held at 8.6 feet, but reduced down to 7.1 at isolated locations where the median barrier widens out for pier columns and sign foundations along this segment.

Analysis of the existing crash data (2015-2017) shows the majority of the crashes are congested related crashes, Rear End Crashes (54%) with the major contributing factor of following too closely. Since the roadway improvements are matching the existing, the proposed shoulder will not significantly alter the current crash conditions.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location;#Yes, Blue Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Design Exception Request

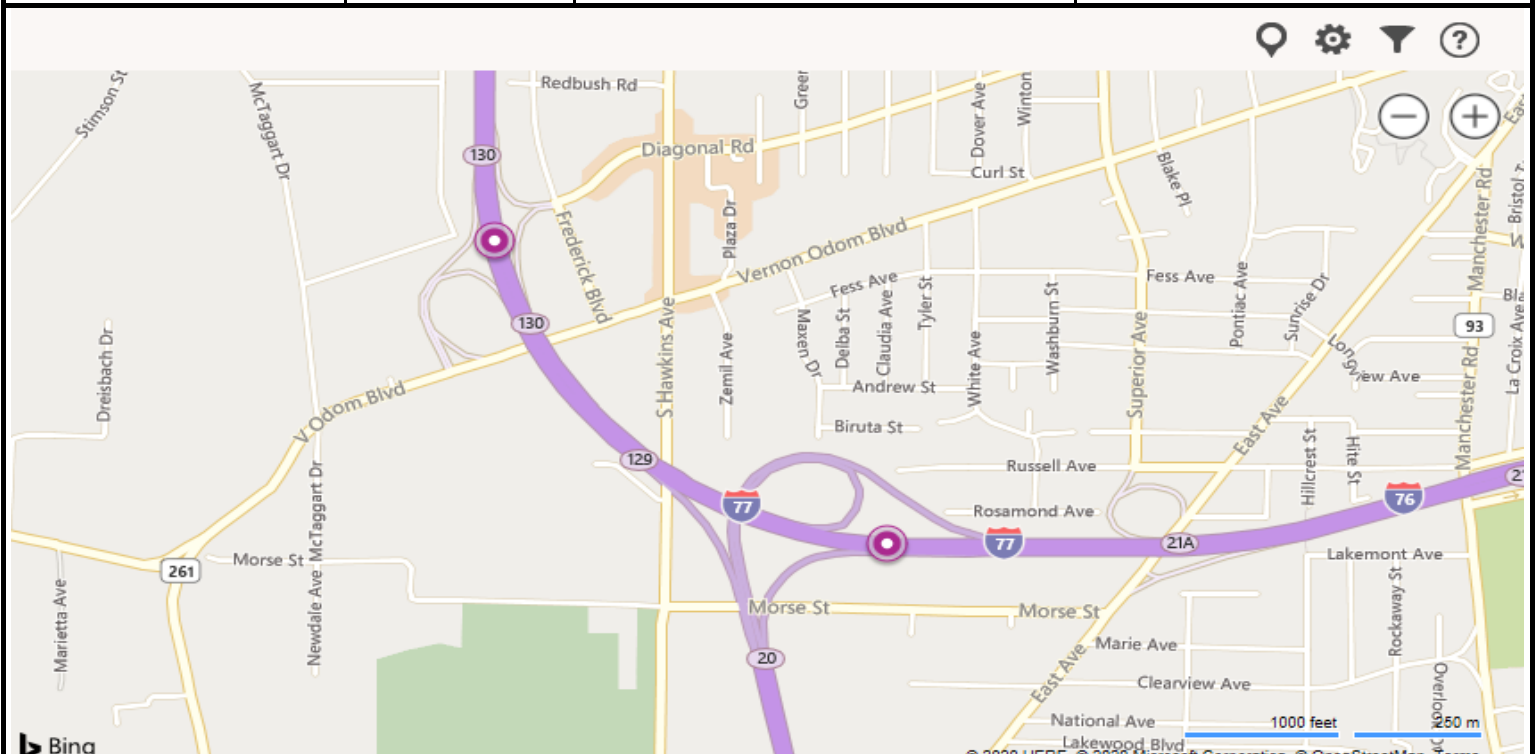
Akron Beltway Design Build

PID: 102329; Request 02

Letting Type: ODOT-Let

Design Designation

Current ADT (2020)	86,920	Td	0.06
Design Year ADT (2040)	100,800	Design Speed	60
Design Hourly Volume (2040)	9,420	Legal Speed	55
Directional Distribution	0.55	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	0.09	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Jason Wise
on 2020-04-23 15:10:03 GMT

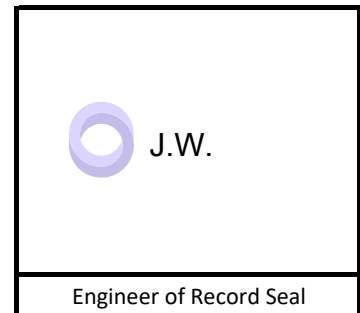
Jason Wise
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-04-23 16:07:52 GMT

Brenton Bogard

Approval Date: 3/30/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 02

Controlling Criteria Identification

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	Inside Shoulder 10' (L&D 301-4)	8.6'	8.6'
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This is a design-build project, to reconstruct the pavement, address vertical clearance issues and upgrade lighting, drainage, traffic control devices. All work is within existing ROW.

Proposed Mitigation

None

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The project is scheduled to reconstruct the existing pavement in the existing footprint so that the side slopes and existing R/W are maintained. The proposed shoulder will generally be held at 8.6 feet but reduced down to 7.1 at isolated locations where the median barrier widens out for pier columns and sign foundations along this segment.

After reviewing the existing crash data (2015-2017), the major types are Sideswipe Passing (39%) and Rear End (35%) which are common at interchanges. This segment has the system to system interchange of I-76 and I-77 which would explain the crash history at this location. Our proposed shoulder will match the existing and will not have a detrimental effect on safety in this segment.

Of the crash types attributed to shoulder width, there was only a single parked vehicle crash which occurred on the outside shoulder which meets current design standards

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Design Exception Request

Akron Beltway Design Build

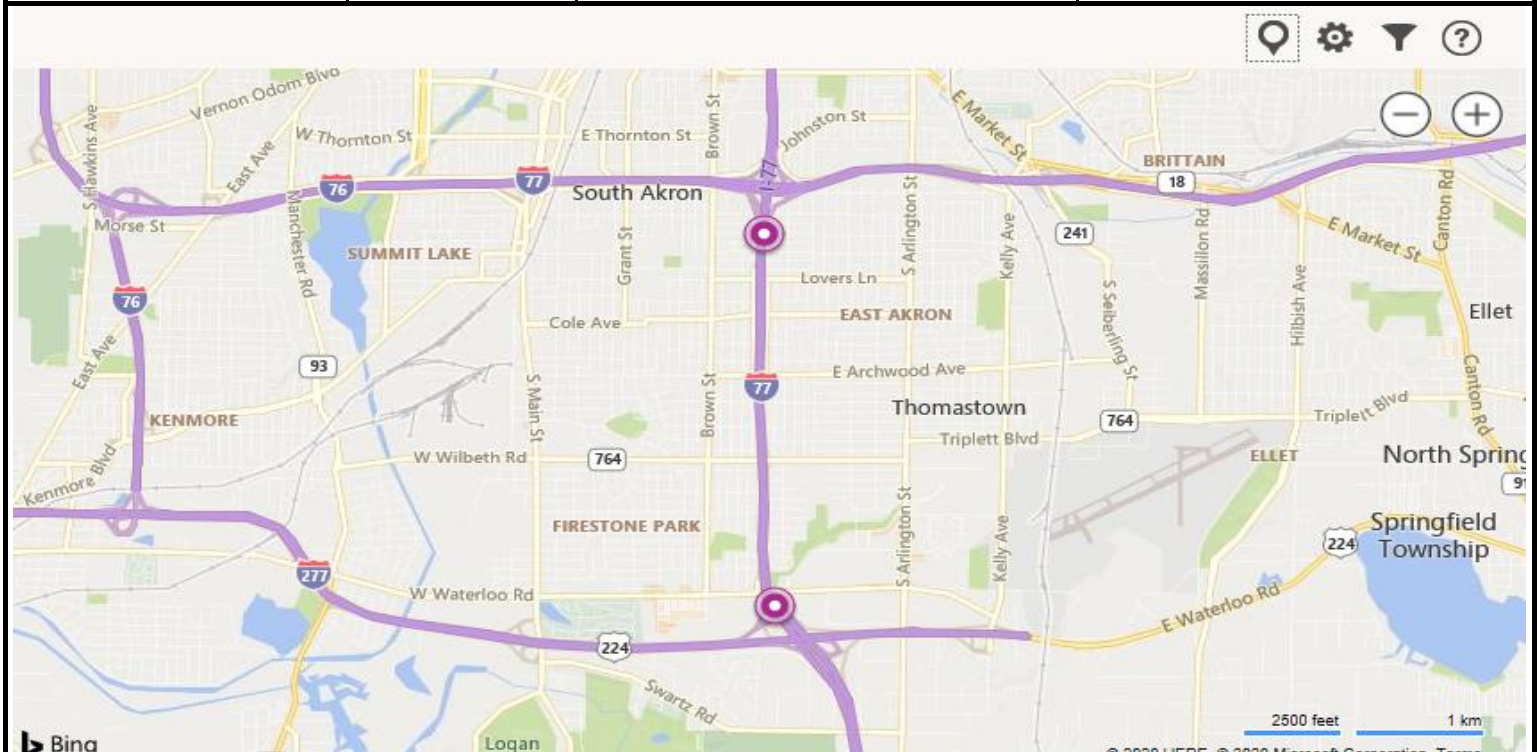
PID: 102329; Request 03

Letting Type: ODOT-Let

Design Designation

I-77; 9.678-11.781

Current ADT (2019)	128,870	Td	7%
Design Year ADT (2045)	135,830	Design Speed	60
Design Hourly Volume (2045)	13,240	Legal Speed	55
Directional Distribution	51%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	9,508	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Brian Toombs
on 2020-05-12 20:33:44 GMT

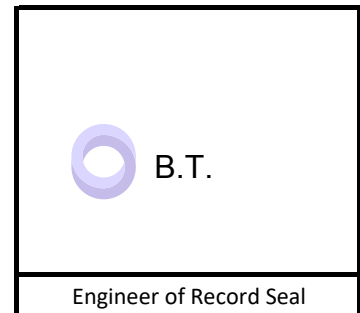
Brian Toombs
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-13 10:04:28 GMT

Brenton Bogard

Approval Date: 5/12/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 03

Controlling Criteria Identification

Section: I-77; 9.678-11.781

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 feet median shoulder	8.6 feet median shoulder	5.5 feet median shoulder (4 feet minimum at bridge piers)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This project is a Design-Build project to improve congestion along SR 8 and I-77 from the I-277 interchange to the Carroll Street interchange. This project will replace the pavement, upgrade lighting, upgrade the drainage, and improve the traffic control along this section of freeway. This project also includes adding an additional lane of capacity in the northbound direction from the I-277 interchange to the exit to I-76 along I-77, and adding an additional lane of capacity along SR 8/I-77 in the southbound direction from the Carroll Street interchange to the I-277 interchange.

Existing I-77 between the I-277/US 224 interchange and the interchange with I-76, known as the Central Interchange, utilizes 12-foot wide lanes, a 10-foot wide outside shoulder, and an 8.6-foot wide inside shoulder adjacent to a median barrier. I-77 has several grade separations and interchanges within this section. Starting from the south and moving north along the corridor, I-77 travels under a bridge carrying Catawba Avenue and under a bridge carrying Wilbeth Avenue (SR 764), travels along a bridge over Firestone Boulevard and Archwood Avenue, then under a bridge carrying Cole Avenue, Lovers Lane, and Lafollette Street before entering the Central Interchange as the lower level of a 3-level interchange.

An additional lane of capacity is being added along I-77 in both directions in the proposed condition. This additional lane is being added with minimal widening by reducing the lane widths from 12 feet to 11 feet and by reducing the shoulder widths where necessary to fit under the existing bridges. For the entire length of this section, the median (left) shoulder width is being reduced to 5.5 feet and reducing to a minimum of 4 feet at the existing bridge pier locations at Catawba Avenue, Wilbeth Avenue, Cole Avenue and Lovers Lane. I-77 is on primarily a tangential horizontal alignment through this section. Three large-radius horizontal curves are present along the alignment. The southern-most horizontal curve utilizes a radius of 3,905 feet. The middle horizontal curve utilizes a radius of 5,731 feet. The northern-most horizontal curve within this section of I-77 utilizes a radius of 11,460 feet.

Proposed Mitigation

This project will add an additional lane of capacity along this section of I-77, significantly reducing congestion. This project will also improve the lighting along the corridor, including in the Central Interchange. Wider edge lines, barrier reflectors, and rumble strips will be utilized. These countermeasures will provide audio and visual reference of the proximity of the median barrier along I-77.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.1.2 and Figure 301-4, the required minimum shoulder width is 10 feet. This project is utilizing Performance Based Project Development strategies to add an additional lane of capacity along a very congested section of urban freeway near downtown Akron, Ohio. This additional lane of capacity improves mainline level of services (LOS) from F to typically D or better and increases the throughput through the Central Interchange segment by as many as 1,500 vehicles in the peak hour. This additional lane of capacity is being added without impacting the existing structures along and over I-77 by reducing the shoulder and lane widths and accommodating the additional lane within the existing pavement width in the laterally constrained areas. Through this entire section, the median (left) shoulder width is being reduced to 5.5 feet and reducing to a minimum of 4 feet at the existing bridge pier locations at Catawba Avenue, Wilbeth Avenue, Cole Avenue and Lovers Lane. The proposed left shoulder width is established to allow for a consistent alignment of the traveled lanes and avoid the lanes shifting closer, then farther from the median barrier to accommodate the wider sections of barrier needed for the bridge piers. With the reduced lane widths throughout this section, minimizing the amount of lateral shifting of the lanes was deemed to be an appropriate strategy to avoid introducing additional side swipe crashes.

I-77 travels over bridges over Firestone Boulevard and Archwood Avenue. To meet minimum lane and shoulder width requirements, these bridges would require 13.4 feet of widening on each side, or a total of 26.8 feet of additional width per structure. This would add an additional \$2,100,000 of cost to the construction project. Widening these bridges would introduce substandard vertical clearance safety issues along Firestone Boulevard, which would require either raising I-77 or lowering Firestone Boulevard nearly 0.5 feet to mitigate the deficiency. I-77 travels under bridges at Catawba Avenue, SR 764, Cole Avenue, Lovers Lane, and Lafollette Street. The bridge at Lafollette Street is being removed as part of this project. The other four bridges would have to be replaced if I-77 was widened to meet lane and shoulder width standards. This would add nearly \$12,000,000 to the cost of the construction project. For each of these bridges, the span lengths would need to increase to span the additional width established by the additional lanes of capacity, wider lanes, and wider shoulders, which would increase the structure depths for these bridges over I-77 and would require them to be raised vertically to achieve the required vertical clearance requirements over the interstate. This profile revision along these roadways would extend back several hundred feet adjacent to the bridge and would impact the existing interchange ramps along SR 764 and Archwood Avenue. The closely spaced intersections along Cole Avenue and Lovers Lane at Burkhardt Avenue and Coventry Street would also need to be vertically raised, which would impact several adjacent residential properties along these roadways within the limits of the revised vertical profiles.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. There were 340 crashes in this section of I-77 from 2015-2017. 2018 crash data was not used for this location because this section of the corridor was under construction for most of that calendar year and there was a concern of those numbers skewing the crash history. The crash history for this segment indicates that most of the crashes (293 of 340 – 86.2%) are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by adding an additional lane of capacity along I-77 through the entire length of the section. The improved capacity will reduce the amount of start-stop driving tendencies and abrupt braking associated with congestion, providing a smoother ride where drivers won't be required to make as many avoidance maneuvers as being made in the existing conditions. This section where 4-foot minimum left shoulder width is being proposed is along a tangential horizontal alignment and large-radius horizontal curves where horizontal stopping sight distance isn't a concern like would be through small-radii horizontal curves.

In all, the crash history at this location does not show a crash pattern resulting from substandard left shoulder width. Widening the left shoulder width along I-77 to 10 feet would significantly increase the impacts and construction cost, introduce significant impacts to adjacent residential properties along the corridor, and introduce a substandard vertical clearance safety concern at Firestone Boulevard. It is not anticipated that these extra impacts and cost would yield a safety benefit at this location.

Design Exception Request

Akron Beltway Design Build

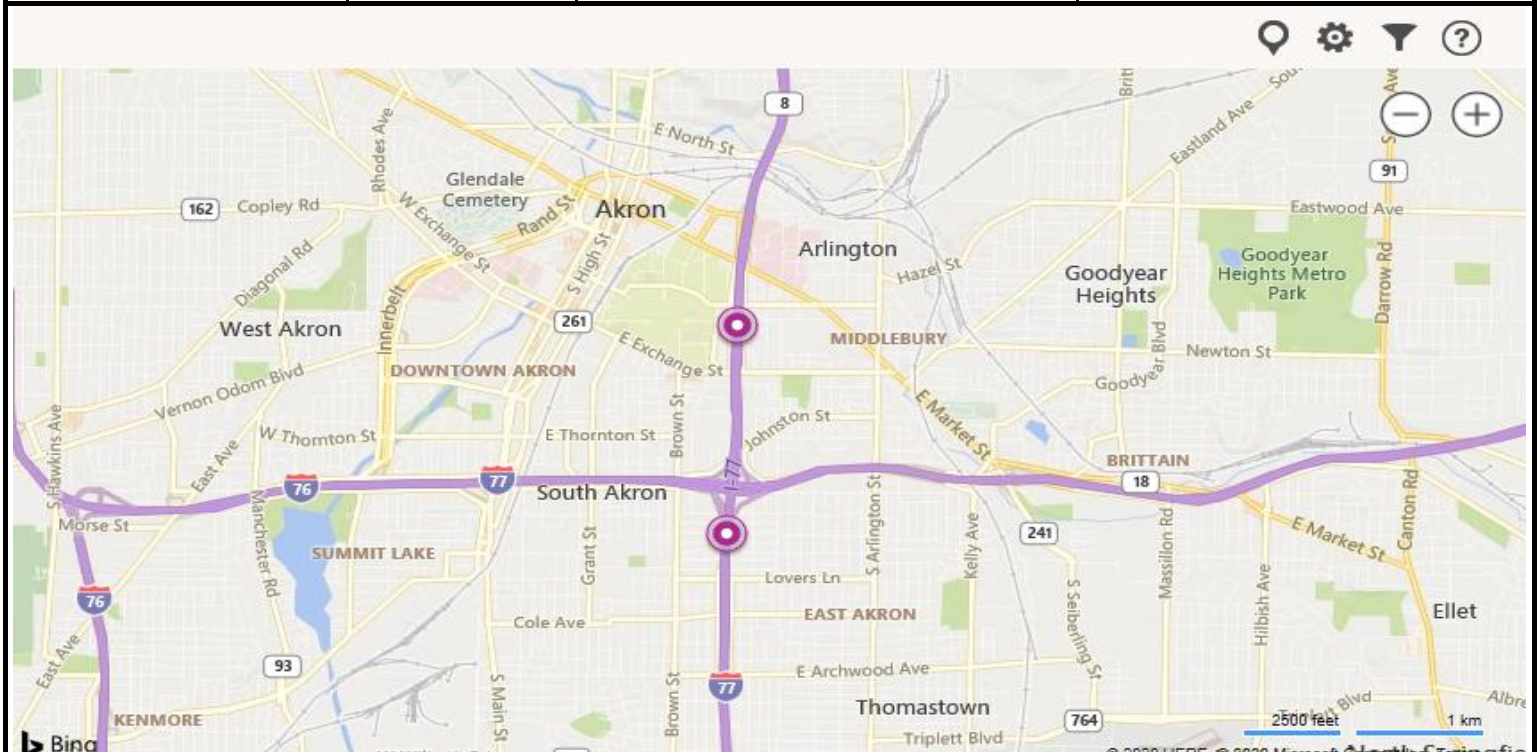
PID: 102329; Request 04

Letting Type: ODOT-Let

Design Designation

SR 8; 0-1.143

Current ADT (2019)	117,420	Td	5%
Design Year ADT (2045)	122,840	Design Speed	60
Design Hourly Volume (2045)	12,720	Legal Speed	55
Directional Distribution	51%	Design Functional Class	2 - Other Freeways or Expressways
Trucks (24hr B&C)	6140	Functional Class Area Type	Urban
		NHS Project	No



Submitted By:

E-SIGNED by Brian Toombs
on 2020-05-12 20:32:56 GMT

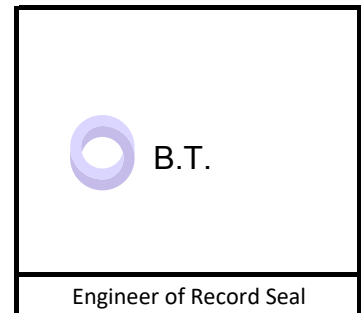
Brian Toombs
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-13 10:04:02 GMT

Brenton Bogard

Approval Date: 5/12/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 04

Controlling Criteria Identification

Section: SR 8; 0-1.143

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 feet median shoulder	7 feet median shoulder (minimum)	5.5 feet median shoulder (reduced width at bridge piers)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This project is a Design-Build project to improve congestion along SR 8 and I-77 from the I-277 interchange to the Carroll Street interchange. This project will replace the pavement, upgrade lighting, upgrade the drainage, and improve the traffic control along this section of freeway. This project also includes adding an additional lane of capacity in the northbound direction from the I-277 interchange to the exit to I-76 along I-77, and adding an additional lane of capacity along SR 8/I-77 in the southbound direction from the Carroll Street interchange to the I-277 interchange.

Existing SR 8 SB between Carroll Street and the interchange with I-76, known as the Central Interchange, is a 3-lane facility utilizing 12-foot wide lanes, a 10-foot wide outside shoulder, and an 8.6-foot wide inside shoulder adjacent to a median barrier. Through the Central Interchange, SR 8 SB is a 2-lane facility utilizing 12-foot wide lanes, 9.5-foot wide outside shoulder, and a 7-foot wide inside shoulder. SR 8 SB travels through the Central Interchange as the lower level of a 3-level interchange. The middle level of the interchange carries the NB to WB and the SB to EB system ramps connecting SR 8, I-76, and I-77. Retaining walls are utilized along the middle-level bridges placed immediately adjacent to the edge of shoulders along SR 8. The top level of the interchange is I-76, being carried by two separate bridges over the interchange. The piers for these bridges are spaced to avoid the middle-level roadways and are also placed immediately adjacent to the edge of shoulders along SR 8.

An additional lane of capacity is being added along SR 8 SB in the proposed condition. This additional lane is being added with minimal widening by reducing the lane widths from 12 feet to 11 feet and by reducing the shoulder widths where necessary to fit under the existing bridges. For the entire length of this section, the median (left) shoulder width is being reduced to 5.5 feet except at existing and proposed bridge pier locations. Under the Johnston Street bridge, the left shoulder width is being reduced to 3.06 feet for a length of 55 feet. Through the Central Interchange, the left median shoulder width is being reduced to a minimum width of 4.18 feet at the middle-level bridge crossings over a length of about 225 feet in both directions. At the proposed bridge piers for the new structures carrying the I-76 EB to SR 8 NB (Ramp Q) and I-76 WB to I-77 SB (Ramp N), the left shoulder width is being reduced to a minimum width of 2.5 feet for a length of about 50 feet for each bridge in both directions. SR 8 is on a tangential horizontal alignment through this section

Proposed Mitigation

This project will add an additional lane of capacity along this section of SR 8, significantly reducing congestion. This project will also improve the lighting along the corridor, including in the Central Interchange. Wider edge lines, barrier reflectors, and rumble strips will be utilized. These countermeasures will provide audio and visual reference of the proximity of the median barrier along SR 8 SB.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.1.2 and Figure 301-4, the required minimum shoulder width is 10 feet. This project is utilizing Performance Based Project Development strategies to add an additional lane of capacity along a very congested section of urban freeway near downtown Akron, Ohio. This additional lane of capacity improves mainline level of services (LOS) from F to typically D or better and increases the throughput through the Central Interchange segment by as many as 1,500 vehicles in the peak hour. This additional lane of capacity is being added without impacting the existing structures along and over SR 8 SB by reducing the shoulder and lane widths and accommodating the additional lane within the existing pavement width in the laterally constrained areas. Through this entire section, the median (left) shoulder width is being reduced to 5.5 feet except at existing and proposed bridge pier locations. Under the Johnston Street bridge, the left median shoulder width is being reduced to 3.06 feet for a length of 55 feet. Along SR 8 NB, the median shoulder width is 4.52 feet under Johnston Street. Through the Central Interchange, the median left shoulder width is being reduced to a minimum width of 4.18 feet at the middle-level bridge crossings over a length of about 225 feet in both directions. At the proposed bridge piers for the new structures carrying the I-76 EB to SR 8 NB (Ramp Q) and I-76 WB to I-77 SB (Ramp N), the left shoulder width is being reduced to a minimum width of 2.5 feet for a length of about 50 feet for each bridge in both directions. The proposed left median shoulder width is established to allow for a consistent alignment of the traveled lanes and avoid the lanes shifting closer, then farther from the median barrier to accommodate the wider sections of barrier needed for the bridge piers. With the reduced lane widths throughout this section, minimizing the amount of lateral shifting of the lanes was deemed to be an appropriate strategy to avoid introducing additional side swipe crashes.

To meet minimum lane and shoulder width requirements, the existing bridge over Beacon Street, south of Carroll Street and north of the Central Interchange, would need to be widened. Accommodating four 12-foot wide lanes and full width shoulders, both right and left, on this bridge would require 13.4 feet of widening, adding an additional \$470,000 of cost to the construction project. Widening this bridge to the west to accommodate the additional width needed for the southbound direction could have geometric implications along Beacon Street below. The SR 8 bridge over Beacon Street is a highly skewed (approximately 33 degrees) crossing. Extending the bridge substructure and pier along the existing bridge skew will significantly reduce horizontal stopping sight distance along Beacon Street, where it is traveling along a horizontal curve under the bridge. This would introduce a safety concern along Beacon Street. To avoid this, Beacon Street could be re-aligned to avoid the horizontal curve under the bridge. Doing this would require the relocation of multiple large overhead utilities as there is an existing utility pole carrying electric, fiber, cable, and lighting immediately adjacent to Beacon Street on the south side of the street. It would also require the acquisition and relocation of one business and two residences.

The Johnston Street bridge, located immediately north of the Central Interchange, would be impacted to widen the roadway to meet full lane and shoulder width standards. This is a skewed bridge crossing over SR 8 immediately south of the diverge to the I-76/I-77 ramps. Accommodating three 12-foot wide lanes and full width shoulders, both right and left, under this bridge would require the replacement of this bridge, adding an additional \$3,600,000 of cost to the construction project. Replacing this bridge would require additional construction along Johnston Street adjacent to the interchange in order to establish new bridge abutments and drill and pour new foundations. This construction would impact an existing paint shop in the NE quadrant of SR 8 and Johnston Street and a Resource Conservation and Recovery Act (RCRA) property (Sacks Electric, Inc.). These two impacts would introduce additional environmental impacts to the project. Due to the skew of the bridge, this narrowed right shoulder width is for a short distance of about 50 feet in length, necessary only to get around the existing pier. Once past this existing pier, the right shoulder widens back out to 10 feet.

The final location of significant impact to accommodate full lane and shoulder width standards is through the center of the Central Interchange. In this area, SR 8 SB is the lowest level of a 3-level interchange, with the overhead ramp bridges and I-76 bridges utilizing abutment walls and bridge piers located tight against the edge of shoulder of SR 8. Accommodating three 12-foot wide lanes and full width shoulders, both right and left, through this section would require the replacement of the existing SB to EB system ramp (Lane S) bridge and the existing NB to WB system ramp (Lane O) bridge. It would also require the replacement of the I-76 WB bridge, which is the top level of the interchange, due to the proximity of its pier immediately west of the SR 8 SB edge of shoulder. Replacing these three bridges would add an additional \$11,800,000 of cost to the construction project. For these bridges, because of the wider footprint of SR 8 SB, the span lengths would increase and would cause the structure depths to increase, creating a situation where the vertical clearance between the levels of the interchange would be insufficient. This would introduce an additional safety concern or would require extensive modifications to the vertical grades of the approaches to all the bridges to correct. These modifications would then cascade back into the adjacent ramp exit and entrance gores. This would require the reconstruction of a significant portion of the Central Interchange.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. There were 138 crashes in this section of SR 8 SB from 2015-2017. 2018 crash data was not used for this location because this section of the corridor was under construction for most of that calendar year and there was a concern of those numbers skewing the crash history. The crash history for this segment indicates that most of the crashes (118 of 138 – 85.5%) are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by adding an additional lane of capacity along SR 8 through the entire length of the section. The improved capacity will reduce the amount of start-stop driving tendencies and abrupt braking associated with congestion, providing a smoother ride where drivers won't be required to make as many avoidance maneuvers as being made in the existing conditions. This section where the reduced left shoulder width is being proposed is along a tangential horizontal alignment where horizontal stopping sight distance isn't a concern like would be through small-radii horizontal curves.

In all, the crash history at this location does not show a crash pattern resulting from substandard left shoulder width. Widening the left shoulder width along SR 8 to 10 feet would significantly increase the impacts and construction cost and likely introduce a substandard vertical clearance safety concern in the Central Interchange. It is not anticipated that these extra impacts and cost would yield a safety benefit at this location.

Design Exception Request

Akron Beltway Design Build

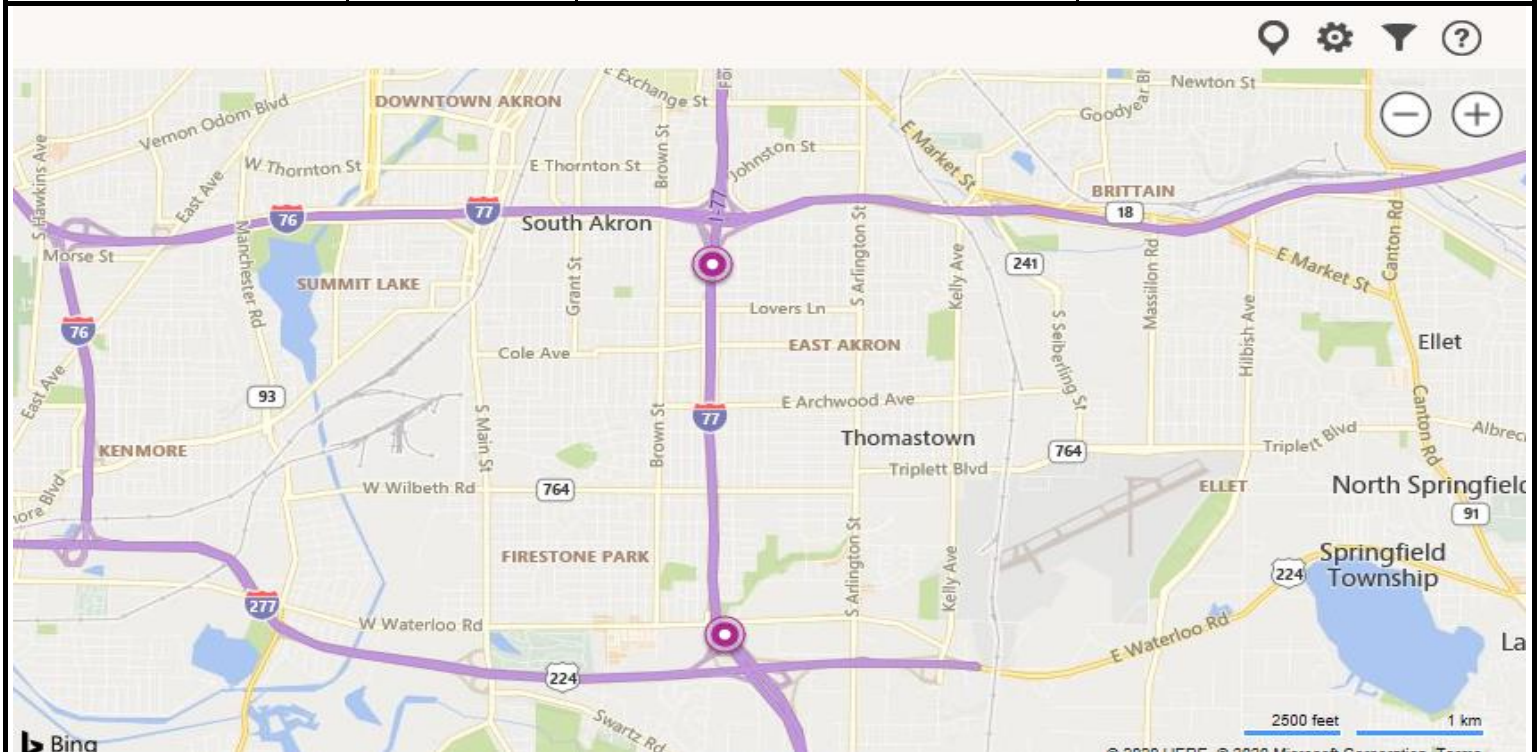
PID: 102329; Request 05

Letting Type: ODOT-Let

Design Designation

I-77; 9.678-11.781

Current ADT (2019)	128,870	Td	7%
Design Year ADT (2045)	135,380	Design Speed	60
Design Hourly Volume (2045)	13,240	Legal Speed	55
Directional Distribution	51%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	9508	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Brian Toombs
on 2020-05-12 20:31:49 GMT

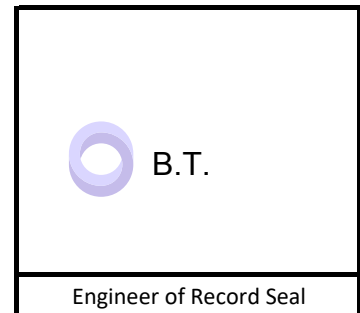
Brian Toombs
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-13 10:03:38 GMT

Brenton Bogard

Approval Date: 5/12/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 05

Controlling Criteria Identification

Section: I-77; 9.678-11.781

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width	12 feet	12 feet	11 feet
Shoulder Width	10 feet outside shoulder	10 feet outside shoulder	5.09 feet outside shoulder (minimum)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This project is a Design-Build project to improve congestion along SR 8 and I-77 from the I-277 interchange to the Carroll Street interchange. This project will replace the pavement, upgrade lighting, upgrade the drainage, and improve the traffic control along this section of freeway. This project also includes adding an additional lane of capacity in the northbound direction from the I-277 interchange to the exit to I-76 along I-77, and adding an additional lane of capacity along SR 8/I-77 in the southbound direction from the Carroll Street interchange to the I-277 interchange.

Existing I-77 between the I-277/US 224 interchange and the interchange with I-76, known as the Central Interchange, utilizes 12-foot wide lanes, a 10-foot wide outside shoulder, and an 8.6-foot wide inside shoulder adjacent to a median barrier. I-77 has several grade separations and interchanges within this section. Starting from the south and moving north along the corridor, I-77 travels under a bridge carrying Catawba Avenue and under a bridge carrying Wilbeth Avenue (SR 764), travels along a bridge over Firestone Boulevard and Archwood Avenue, then under a bridge carrying Cole Avenue, Lovers Lane, and Lafollette Street before entering the Central Interchange as the lower level of a 3-level interchange.

An additional lane of capacity is being added along I-77 in both directions in the proposed condition. This additional lane is being added with minimal widening by reducing the lane widths from 12 feet to 11 feet and by reducing the shoulder widths where necessary to fit under the existing bridges. On the bridge over Firestone Boulevard, the outside shoulder width (SB) is being reduced to 5.09 feet, which is the narrowest width along this section. At the other bridge locations, the outside shoulder width ranges from 5.33 feet to 8.50 feet. Starting at the south end of the project limits, the outside shoulder widths in both directions for each bridge is noted: under Catawba Avenue bridge (SB = 8.42 feet, NB = 8.42 feet); under Wilbeth Road bridge (SB = 7.50 feet, NB = 7.50 feet); over Firestone Boulevard bridge (SB = 5.09 feet, NB = 6.08 feet); over Archwood Avenue bridge (SB = 5.33 feet, NB = 6.08 feet); under Cole Avenue bridge (SB = 8.50 feet, NB = 8.50 feet minimum); under Lovers Lane bridge (SB = 8.49 feet, NB = 8.50 feet). For each of these instances, the reduced shoulder width along I-77 was no more than 100 feet in length with long stretches of distances between the bridges. Outside of the bridges, where there are no width constraints, the pavement is being widened to accommodate a standard 10-foot wide outside shoulder. I-77 is on primarily a tangential horizontal alignment through this section. Three large-radius horizontal curves are present along the alignment. The southern-most horizontal curve utilizes a radius of 3,905 feet. The middle horizontal curve utilizes a radius of 5,731 feet. The northern-most horizontal curve within this section of I-77 utilizes a radius of 11,460 feet.

Proposed Mitigation

This project will add an additional lane of capacity along this section of I-77, significantly reducing congestion. This project will also improve the lighting along the corridor, including in the Central Interchange. Advisory signs warning drivers of reduced right side shoulder widths will be placed when approaching the existing bridges where this reduction occurs. Raised pavement markers (RPM) will be used along the lane lines. The signs and RPMs will provide audio and visual reference to the reduced lane widths and proximity of the existing bridge piers and retaining walls on the outside of I-77.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.1.2 and Figure 301-4, the required minimum lane width for an Urban Freeway is 12 feet and the required minimum right shoulder width is 10 feet. This project is utilizing Performance Based Project Development strategies to add an additional lane of capacity along a very congested section of urban freeway near downtown Akron, Ohio. This additional lane of capacity improves mainline level of services (LOS) from F to typically D or better and increases the throughput through the Central Interchange segment by as many as 1,500 vehicles in the peak hour. This additional lane of capacity is being added without impacting the existing structures along and over I-77 by reducing the shoulder and lane widths and accommodating the additional lane within the existing pavement width in the laterally constrained areas. Through this entire section, the lane widths are being reduced from 12 feet to 11 feet. Outside of the existing bridges, the pavement is being widened to accommodate the standard 10-foot wide right shoulder while still retaining the proposed 11-foot lane widths.

I-77 travels over bridges over Firestone Boulevard and Archwood Avenue. To meet minimum lane and shoulder width requirements, these bridges would require 13.4 feet of widening on each side, or a total of 26.8 feet of additional width per structure. This would add an additional \$2,100,000 of cost to the construction project. Widening these bridges would introduce substandard vertical clearance safety issues along Firestone Boulevard, which would require either raising I-77 or lowering Firestone Boulevard nearly 0.5 feet to mitigate the deficiency. I-77 travels under bridges at Catawba Avenue, SR 764, Cole Avenue, Lovers Lane, and Lafollette Street. The bridge at Lafollette Street is being removed as part of this project. The other four bridges would have to be replaced if I-77 was widened to meet lane and shoulder width standards. This would add nearly \$12,000,000 to the cost of the construction project. For each of these bridges, the span lengths would need to increase to span the additional width established by the additional lanes of capacity, wider lanes, and wider shoulders, which would increase the structure depths for these bridges over I-77 and would require them to be raised vertically to achieve the required vertical clearance requirements over the interstate. This profile revision along these roadways would extend back several hundred feet adjacent to the bridge and would impact the existing interchange ramps along SR 764 and Archwood Avenue. The closely spaced intersections along Cole Avenue and Lovers Lane at Burkhardt Avenue and Coventry Street would also need to be vertically raised, which would impact several adjacent residential properties along these roadways within the limits of the revised vertical profiles.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. There were 340 crashes in this section of I-77 from 2015-2017. 2018 crash data was not used for this location because this section of the corridor was under construction for most of that calendar year and there was a concern of those numbers skewing the crash history. The crash history for this segment indicates that most of the crashes (293 of 340 – 86.2%) are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by adding an additional lane of capacity along I-77 through the entire length of the section. The improved capacity will reduce the amount of start-stop driving tendencies and abrupt braking associated with congestion, providing a smoother ride where drivers won't be required to make as many avoidance maneuvers as being made in the existing conditions. This section where 11-foot wide lanes are being proposed is along a tangential horizontal alignment and large-radius horizontal curves where path overlap for trucks shouldn't be a concern like would be through small-radii horizontal curves. This section will utilize 10-foot wide outside (right) shoulders as much as possible, with it only narrowing below this standard at narrow-width locations over and under existing bridges. Reducing this shoulder width does not negatively impact horizontal stopping sight distance due to the presence of a tangential horizontal alignment and large-radius horizontal curves.

In all, the crash history at this location does not show a crash pattern resulting from substandard lane or shoulder width. Widening the lane widths or right shoulder width along I-77 to 12 feet (lane width) and 10 feet (shoulder width) would significantly increase the impacts and construction cost, introduce significant impacts to adjacent residential properties along the corridor, and introduce a substandard vertical clearance safety concern at Firestone Boulevard. It is not anticipated that these extra impacts and cost would yield a safety benefit at this location.

Design Exception Request

Akron Beltway Design Build

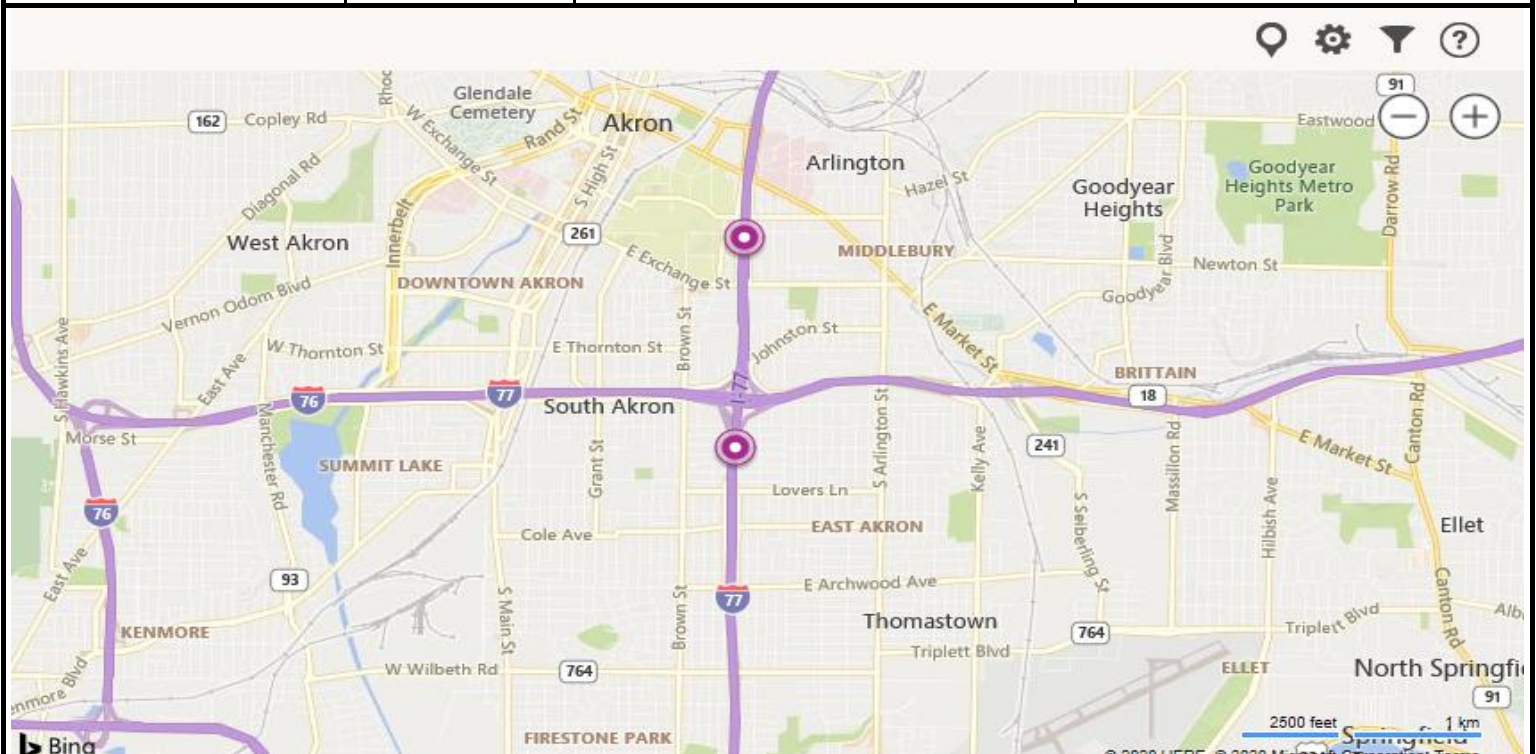
PID: 102329; Request 06

Letting Type: ODOT-Let

Design Designation

SR 8; 0-1.143

Current ADT (2019)	117,420	Td	5%
Design Year ADT (2045)	122,840	Design Speed	60
Design Hourly Volume (2045)	12,720	Legal Speed	55
Directional Distribution	51%	Design Functional Class	2 - Other Freeways or Expressways
Trucks (24hr B&C)	6140	Functional Class Area Type	Urban
		NHS Project	No



Submitted By:

E-SIGNED by Brian Toombs
on 2020-05-12 20:30:15 GMT

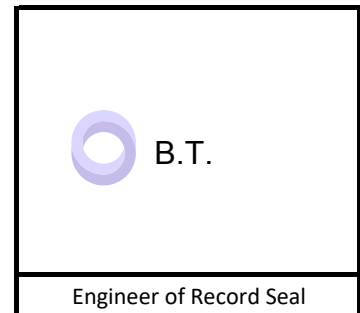
Brian Toombs
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-13 10:03:06 GMT

Brenton Bogard

Approval Date: 5/12/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 06

Controlling Criteria Identification

Section: SR 8; 0-1.143

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width	12 feet	12 feet	11 feet
Shoulder Width	10 feet outside shoulder	9.5 feet outside shoulder (minimum)	2.7 feet (minimum)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This project is a Design-Build project to improve congestion along SR 8 and I-77 from the I-277 interchange to the Carroll Street interchange. This project will replace the pavement, upgrade lighting, upgrade the drainage, and improve the traffic control along this section of freeway. This project also includes adding an additional lane of capacity in the northbound direction from the I-277 interchange to the exit to I-76 along I-77, and adding an additional lane of capacity along SR 8/I-77 in the southbound direction from the Carroll Street interchange to the I-277 interchange. Finally, this project modifies the existing single lane exit ramp from SR 8 NB to Carroll Street to a two-lane exit to improve the weave segment between the I-76/I-77 interchange and this exit along SR 8.

Existing SR 8 SB between Carroll Street and the interchange with I-76, known as the Central Interchange, is a 3-lane facility utilizing 12-foot wide lanes, a 10-foot wide outside shoulder, and an 8.6-foot wide inside shoulder adjacent to a median barrier. Through the Central Interchange, SR 8 SB is a 2-lane facility utilizing 12-foot wide lanes, 9.5-foot wide outside shoulder, and 7-foot wide inside shoulder. SR 8 SB travels through the Central Interchange as the lower level of a 3-level interchange. The middle level of the interchange carries the NB to WB and the SB to EB system ramps connecting SR 8, I-76, and I-77. Retaining walls are utilized along the middle-level bridges placed immediately adjacent to the edge of shoulders along SR 8. The top level of the interchange is I-76, being carried by two separate bridges over the interchange. The piers for these bridges are spaced to avoid the middle-level roadways and are also placed immediately adjacent to the edge of shoulders along SR 8.

An additional lane of capacity is being added along SR 8 SB in the proposed condition. This additional lane is being added with minimal widening by reducing the lane widths from 12 feet to 11 feet and by reducing the shoulder widths where necessary to fit under the existing bridges. Along SR 8 SB, on the bridge over Beacon Street, the outside shoulder width is being reduced to 8.75 feet. Under the Johnston Street bridge, the outside shoulder width is being reduced to 5.29 feet. Through the Central Interchange, the outside shoulder width is being reduced to a minimum width of 2.7 feet at the middle-level bridge crossings over a length of about 225 feet. Along SR 8 NB, the outside shoulder width is being reduced to a minimum of 4 feet over across the bridge over Exchange Street to accommodate a two-lane ramp diverge to Carroll Street. Across the bridges over Beacon Street and Exchange Street and under the Johnston Street bridge, the reduced shoulder width along SR 8 was no more than 100 feet in length with long stretches of distances between the bridges. Outside of these locations, where there are no width constraints, the pavement is being widened to accommodate a standard 10-foot wide outside shoulder. SR 8 is on a tangential horizontal alignment through this section.

Proposed Mitigation

This project will add an additional lane of capacity along this section of SR 8, significantly reducing congestion. Advisory signs warning drivers of reduced right side shoulder widths will be placed when approaching the existing bridges where this reduction occurs. Raised pavement markers (RPM) will be used along the lane lines. The signs and RPMs will provide audio and visual reference to the reduced lane widths and proximity of the existing bridge piers and retaining walls on the outside of SR 8.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.1.2 and Figure 301-4, the required minimum lane width for an Urban Freeway is 12 feet and the required minimum right shoulder width is 10 feet. This project is utilizing Performance Based Project Development strategies to add an additional lane of capacity along a very congested section of urban freeway near downtown Akron, Ohio. This additional lane of capacity improves mainline level of services (LOS) from F to typically D or better and increases the throughput through the Central Interchange segment by as many as 1,500 vehicles in the peak hour. This additional lane of capacity is being added without impacting the existing structures along and over SR 8 SB by reducing the shoulder and lane widths and accommodating the additional lane within the existing pavement width in the laterally constrained areas. Through this entire section, the lane widths are being reduced from 12 feet to 11 feet. Outside of the existing bridges, the pavement is being widened to accommodate the standard 10-foot wide right shoulder while still retaining the proposed 11-foot lane widths. Along SR 8 NB, there is one location where the outside shoulder width is reduced below the 10-foot standard.

The first location where the right shoulder width drops below the 10-foot standard is across the existing bridge over Beacon Street, south of Carroll Street and north of the Central Interchange. The proposed right shoulder width over this bridge is 8.75 feet. Accommodating four 12-foot wide lanes and full width shoulders, both right and left, on this bridge would require 13.4 feet of widening, adding an additional \$470,000 of cost to the construction project. Widening this bridge to the west to accommodate the additional width needed for the southbound direction could have geometric implications along Beacon Street below. The SR 8 bridge over Beacon Street is a highly skewed (approximately 33 degrees) crossing.

Extending the bridge substructure and pier along the existing bridge skew will significantly reduce horizontal stopping sight distance along Beacon Street, where it is traveling along a horizontal curve under the bridge. This would introduce a safety concern along Beacon Street. To avoid this, Beacon Street could be re-aligned to avoid the horizontal curve under the bridge. Doing this would require the relocation of multiple large overhead utilities as there is an existing utility pole carrying electric, fiber, cable, and lighting immediately adjacent to Beacon Street on the south side of the street. It would also require the acquisition and relocation of one business and two residences.

The next location where the right shoulder width drops below the 10-foot standard is under the existing Johnston Street bridge, located immediately north of the Central Interchange. This is a skewed bridge crossing over SR 8 immediately south of the diverge to the I-76/I-77 ramps. The proposed right shoulder width over this bridge is 5.29 feet. Accommodating three 12-foot wide lanes and full width shoulders, both right and left, under this bridge would require the replacement of this bridge, adding an additional \$3,600,000 of cost to the construction project. Replacing this bridge would require additional construction along Johnston Street adjacent to the interchange in order to establish new bridge abutments and drill and pour new foundations. This construction would impact an existing paint shop in the NE quadrant of SR 8 and Johnston Street and a Resource Conservation and Recovery Act (RCRA) property (Sacks Electric, Inc.). These two impacts would introduce additional environmental impacts to the project. Due to the skew of the bridge, this narrowed right shoulder width is for a short distance of about 50 feet in length, necessary only to get around the existing pier. Once past this existing pier, the right shoulder widens back out to 10 feet.

The third location where the right shoulder width drops below the 10-foot standard is through the center of the Central Interchange. In this area, SR 8 SB is the lowest level of a 3-level interchange, with the overhead ramp bridges and I-76 bridges utilizing abutment walls and bridge piers located tight against the edge of shoulder of SR 8. The section of reduced shoulder width begins just north of the existing SB to EB system ramp (Lane S) bridge and ends just south of the existing NB to WB system ramp (Lane O) bridge, covering a distance of 203 feet. Accommodating three 12-foot wide lanes and full width shoulders, both right and left, under this bridge would require the replacement of those two bridges and the I-76 WB bridge, which is the top level of the interchange, due to the proximity of its pier immediately west of the SR 8 SB edge of shoulder. Replacing these three bridges would add an additional \$11,800,000 of cost to the construction project. For these bridges, because of the wider footprint of SR 8 SB, the span lengths would increase and would cause the structure depths to increase, creating a situation where the vertical clearance between the levels of the interchange would be insufficient. This would introduce an additional safety concern or would require extensive modifications to the vertical grades of the approaches to all the bridges to correct. These modifications would then cascade back into the adjacent ramp exit and entrance gores. This would require the reconstruction of a significant portion of the Central Interchange.

The final location where the right shoulder drops below the 10-foot standard is across the existing bridge over Exchange Street, south of Carroll Street and north of the Central Interchange. The proposed right shoulder width over this bridge varies from 10 feet to 4 feet (minimum) across the bridge as the proposed two-lane exit ramp to Carroll Street diverges from SR 8 NB at the southern edge of this bridge. As a result of this diverge being placed on this bridge, the outside shoulder tapers to a minimum of 4 feet at the northern end of this bridge. This proposed reduction in outside shoulder width does not impinge the horizontal stopping sight distance along the exit to Carroll Street. Drivers can still see the entire diverge and a portion of the ramp along SR 8 NB and can see if a queue has formed along the ramp from the ramp terminal intersection. Accommodating four 12-foot wide lanes and full width shoulders, both right and left, on this bridge would require 5.4 feet of widening, adding an additional \$300,000 of cost to the construction project

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. There were 138 crashes in this section of SR 8 SB from 2015-2017. 2018 crash data was not used for this location because this section of the corridor was under construction for most of that calendar year and there was a concern of those numbers skewing the crash history. The crash history for this segment indicates that most of the crashes (118 of 138 – 85.5%) are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by adding an additional lane of capacity along SR 8 through the entire length of the section. The improved capacity will reduce the amount of start-stop driving tendencies and abrupt braking associated with congestion, providing a smoother ride where drivers won't be required to make as many avoidance maneuvers as being made in the existing conditions. This section where 11-foot wide lanes are being proposed is along a tangential horizontal alignment where path overlap for trucks shouldn't be a concern like would be through small-radii horizontal curves. This section will utilize 10-foot wide outside (right) shoulders as much as possible, with it only narrowing below this standard at narrow-width locations under existing bridges. Reducing this shoulder width does not negatively impact horizontal stopping sight distance due to the presence of a tangential horizontal alignment.

In all, the crash history at this location does not show a crash pattern resulting from substandard lane or shoulder width. Widening the lane widths or right shoulder width along SR 8 to 12 feet (lane width) and 10 feet (shoulder width) would significantly increase the impacts and construction cost and likely introduce a substandard vertical clearance safety concern in the Central Interchange. It is not anticipated that these extra impacts and cost would yield a safety benefit at this location.

Design Exception Request

Akron Beltway Design Build

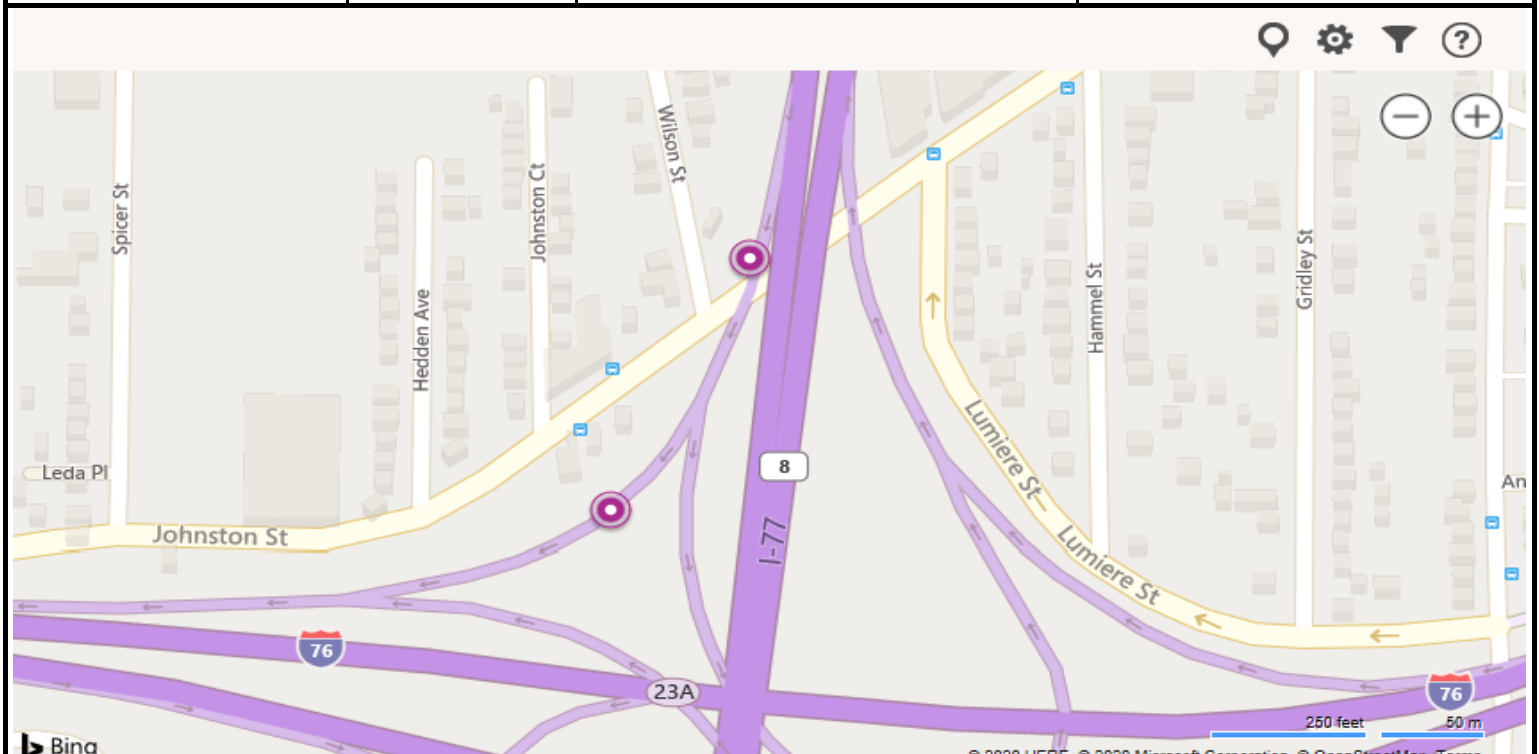
PID: 102329; Request 07

Letting Type: ODOT-Let

Design Designation

Ramp P; 0.009-0.035

Current ADT (2019)	21,660	Td	3%
Design Year ADT (2045)	22,550	Design Speed	45
Design Hourly Volume (2045)	2,120	Legal Speed	45
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1130	Functional Class Area Type	Urban
		NHS Project	No



Submitted By:

E-SIGNED by Brian Toombs
on 2020-05-13 16:44:11 GMT

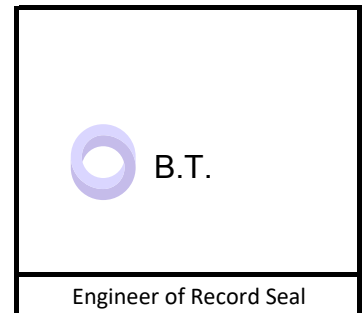
Brian Toombs
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-13 16:50:19 GMT

Brenton Bogard

Approval Date: 5/13/2020



Design Exception Request

Akron Beltway Design Build

PID: 102329; Request 07

Controlling Criteria Identification

Section: Ramp P; 0.009-0.035

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)	360 feet (horizontal)	216 feet (horizontal)	235 feet (horizontal)
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

Major Rehabilitation of I-76 and I-77. This is a design build project.

Section Description

This project is a Design-Build project to improve congestion along SR 8 and I-77 from the I-277 interchange to the Carroll Street interchange. This project will replace the pavement, upgrade lighting, upgrade the drainage, and improve the traffic control along this section of freeway. This project also includes adding an additional lane of capacity in the northbound direction from the I-277 interchange to the exit to I-76 along I-77, and adding an additional lane of capacity along SR 8/I-77 in the southbound direction from the Carroll Street interchange to the I-277 interchange.

The existing SR 8 SB to I-76/I-77 WB ramp (Ramp P) is a single-lane ramp that exits from SR 8 under the existing Johnston Street bridge and curving to the right in the direction of travel as it connects SR 8 SB to I-76/I-77 WB. The existing ramp is two 12-foot wide lanes under the bridge with a 6-foot wide outside (right) shoulder. As the ramp continues to the south and west, it diverges from the existing SR 8 SB to I-76 EB ramp (Lane S) and becomes a single 12-foot wide lane with a 6-foot outside (right) shoulder. The existing horizontal stopping sight distance provided along this ramp is 216 feet due to the proximity of the western abutment of the Johnston Street bridge over SR 8 and the grading between this ramp and the existing Johnston Street roadway south of the bridge.

An additional lane of capacity is being added along SR 8 SB in the proposed condition. This additional lane is being added with minimal widening by reducing the lane widths from 12 feet to 11 feet and by reducing the shoulder widths where necessary to fit under the existing bridges. The diverge of Ramp P from SR 8 SB is being shifted south about 20 feet and the angle of divergence is being slightly modified to accommodate the additional lane along SR 8 SB south of this gore. As a result of these geometric revisions, a minimum of 235 feet of horizontal stopping sight distance is being provided under the Johnston Street bridge and along the ramp.

Proposed Mitigation

This project will add an additional lane of capacity along SR 8 and improve traffic flow along I-76 WB by improving ramp geometry and reducing the congestion. This will provide for smoother traffic flow along Ramp P and reduce the amount of start-stop driving behavior along this ramp. Advisory signs showing 30-mph speeds will be placed when approaching the existing Johnston Street bridge to warn the drivers of the reduced speed associated with the stopping sight distance reduction.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 201.2 and Figure 201-1, the required minimum horizontal stopping sight distance for a ramp utilizing a design speed of 45 mph is 360 feet. The existing stopping sight distance along this ramp is 216 feet. The proposed stopping sight distance is being increased to a minimum of 235 feet due to geometric revisions being made to the ramp diverge and the ramp as it travels under the Johnston Street bridge.

This project is utilizing Performance Based Project Development strategies to add an additional lane of capacity along a very congested section of SR 8 near downtown Akron, Ohio. This project is also reconstructing the geometrically deficient left-hand exit ramps along I-76 EB and WB. Along I-76 WB, the existing I-76 WB to I-77 SB ramp (Ramp N) is being reconstructed to provide greater deceleration length and a larger horizontal radius. This will improve traffic flow along I-76 WB and reduce the amount of start-stop driving behavior and abrupt braking associated with unstable and congested traffic flow. This will reduce the instances of drivers braking through the horizontal curve along Ramp P and provide consistent traffic flow along this ramp. Accommodating the outside shoulder width under Johnston Street necessary to provide 360 feet of horizontal stopping sight distance would require the ramp shoulder to be widened by 8 additional feet. This would require the replacement of the Johnston Street bridge over SR 8, adding an additional \$3,600,000 of cost to the construction project. Replacing this bridge would require additional construction along Johnston Street adjacent to the interchange in order to establish new bridge abutments and drill and pour new foundations. This construction would impact an existing paint shop in the NE quadrant of SR 8 and Johnston Street and a Resource Conservation and Recovery Act (RCRA) property (Sacks Electric, Inc.). These two impacts would introduce additional environmental impacts to the project. Continuing along the ramp to the south, the portion of the roadside grading between the ramp and the Johnston Street roadway would need to be flatter near the ramp to accommodate the horizontal sight line offset required to achieve the stopping sight distance requirement. This would require either a large retaining wall between the ramp and the Johnston Street roadway or the re-alignment of Johnston Street west of SR 8. This would introduce additional construction cost (approximately \$800,000 for the retaining wall) or impacts to and relocations of several businesses and residences along both sides of Johnston Street west of SR 8.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. There were 36 crashes in this section of Ramp P from 2015-2017. 2018 crash data was not used for this location because this section of the corridor was under construction for most of that calendar year and there was a concern of those numbers skewing the crash history. The crash history for this segment indicates that most of the crashes (24 of 36 – 67%) are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. Several of the fixed object crashes documented during this time period were noted by the officer as being associated with the drivers attempting to make rapid avoidance maneuvers due to abrupt braking on the ramp because of stopped traffic on I-76 WB and losing control of their vehicle. This project is reconstructing the geometrically deficient left-hand exit ramps along I-76 EB and WB. Along I-76 WB, the existing I-76 WB to I-77 SB ramp (Ramp N) is being reconstructed to provide greater deceleration length and a larger horizontal radius. This will improve traffic flow along I-76 WB and reduce the amount of start-stop driving behavior and abrupt braking associated with unstable and congested traffic flow. This will reduce the instances of drivers braking through the horizontal curve along Ramp P and provide consistent traffic flow along this ramp.

In all, the crash history at this location shows a problem with vehicles coming to a stop on an existing free-flow interchange ramp. Widening the right shoulder width along Ramp P to achieve the required stopping sight distance requirements would significantly increase the impacts and construction cost and likely introduce environmental and constructability concerns along Johnston Street. It is not anticipated that these extra impacts and cost would yield as great of a safety benefit at this location as what is currently being done with this project to improve traffic flow along I-76 WB and this ramp to reduce the need to stop on this ramp.

Design Exception Request

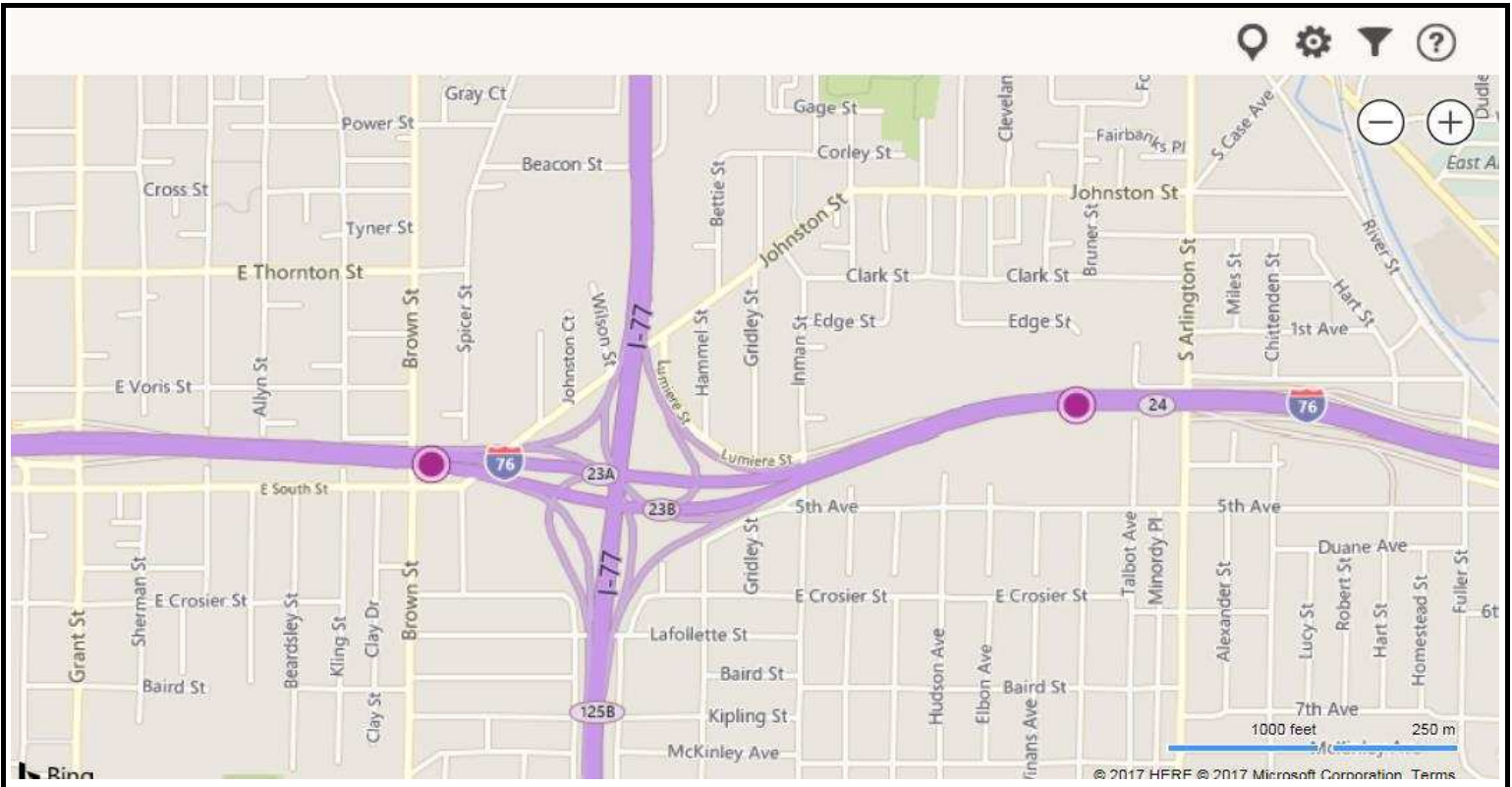
SUM-76-11.31

PID: 101402

Letting Type: ODOT-Let

Design Designation

Current ADT (2020)	15,570	Td	0.04
Design Year ADT (2040)	15,580	Design Speed	45
Design Hourly Volume (2040)	1,160	Legal Speed	45
Directional Distribution	100	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1,246	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

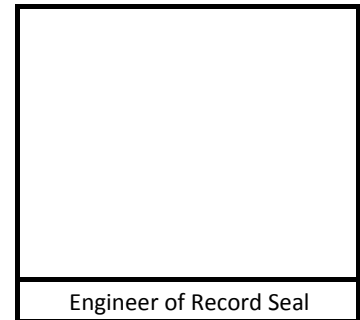
Tom Bolte
(Engineer of Record)

Approved by:

D. Holstein

David Holstein

Approval Date: 3/29/2017



Design Exception Request

SUM-76-11.31

PID: 101402

Controlling Criteria Identification

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade	+5% (Ramp R)	N/A	+6.75% (Ramp R)
SSD (Horizontal & Crest Vertical)	360 feet (HSSD Ramp R) 360 feet (VSSD Ramp R)	N/A	310 feet (HSSD Ramp R) 308 feet (VSSD Ramp R)
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Proposed Mitigation

Advisory speed signage alerting the drivers of the need for reduced speed along Ramp R will be placed approaching the segment that has the reduced stopping sight distance.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc):

Per ODOT L&D Volume 1, Section 503.2 and Figure 503-1, the proposed Ramp R design speed should meet 45-mph design standards due to the 60-mph design speed for I-76, the mainline freeway that Ramp R connects to. The proposed Ramp R horizontal ramp geometry will meet 40-mph design standards for horizontal stopping sight distance (HSSD) requirements, an increase of 15-mph over the existing alignment. The proposed Ramp R vertical ramp geometry will meet 40-mph design standards for vertical stopping sight distance (VSSD) requirements for the crest vertical curve over I-76 WB. A +6.75% vertical grade is used along Ramp R to allow it to climb and span over existing I-76 WB.

The proposed Ramp R horizontal alignment utilizes a 10-foot left shoulder width, providing HSSD of 309 feet, meeting 40-mph design standards. In order to achieve HSSD of 360 feet (45-mph standards) a 16.3-foot left shoulder would need to be provided, causing an undesirable situation where a shoulder width exceeding 12 feet would be utilized. This would add about \$1.2M to the construction cost of the project. With this shoulder being on the low side of superelevation along Ramp R, this extra width would further reduce the vertical clearance over I-76 WB which would cause the vertical upgrade to increase.

Lengthening the crest vertical curve along Ramp R to achieve a 45-mph VSSD of 360 feet would require the replacement of the existing I-76 WB structure (approximately \$4.6M additional cost) and the Johnston Street structure (approximately \$3.6M additional cost) over SR 8. When replacing and raising the Johnston Street bridge, the approaches to the bridge along Johnston Street would need to also raise, which would impact:

- The existing paint shop in the NE quadrant of quadrant of SR 8 and Johnston Street
- Resource Conservation and Recovery Act (RCRA) property – A&C Welding, Inc.
- Several potential Ohio Historic Structures along Johnston Street west and east of SR 8
- The neighborhood east of SR 8, introducing further environmental impacts, including the introduction of impacts to an existing Environmental Justice neighborhood.

The proposed vertical design of Ramp R utilizes a 6.75% upgrade between the diverge from I-76 EB and the crest curve over I-76 WB. This grade is utilized in order to constrain the project limits and impacts. Using a 5.0% upgrade for this ramp would shift the diverge from I-76 EB 900 feet west and would cause the proposed alignment of I-76 EB to shift south an additional 18 feet. This shift would result in:

- Two commercial building takes
- Additional retaining wall (approximately 800 additional feet averaging 24 feet in height - \$4.3M additional cost)

Signature Certificate

 Document Reference: 5VIB9NILCKT7ZUB4T3ED7M

RightSignature
Easy Online Document Signing



David Holstein
Party ID: EYZ7TRJPI4JEGA6CRHXNHV
IP Address: 156.63.133.8
VERIFIED EMAIL: dave.holstein@dot.ohio.gov

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

6cb189237c903762fd9d97c9b565fe6c39a8dcb8



Tom Bolte
Party ID: ITI8B7I9Y3FPVIRBIMCICZ
IP Address: 159.63.2.158
VERIFIED EMAIL: tom.bolte@burgessniple.com

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

a7bf31344da1ff5cb3b0b6a527fc8e4882dc55f0



Timestamp

2017-03-30 09:30:09 -0700
2017-03-30 09:30:09 -0700
2017-03-30 09:30:08 -0700
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2017-03-30 05:59:12 -0700
2017-03-30 05:50:32 -0700
2017-03-30 03:49:44 -0700

Audit

All parties have signed document. Signed copies sent to: Derek Troyer, Robert Rosen, Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.133.8
David Holstein (dave.holstein@dot.ohio.gov) has viewed Consumer Disclosure and affirmatively consented. - 156.63.133.8
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.133.8
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte (tom.bolte@burgessniple.com) has viewed Consumer Disclosure and affirmatively consented. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.133.8



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Design Exception Request

SUM-76-11.31

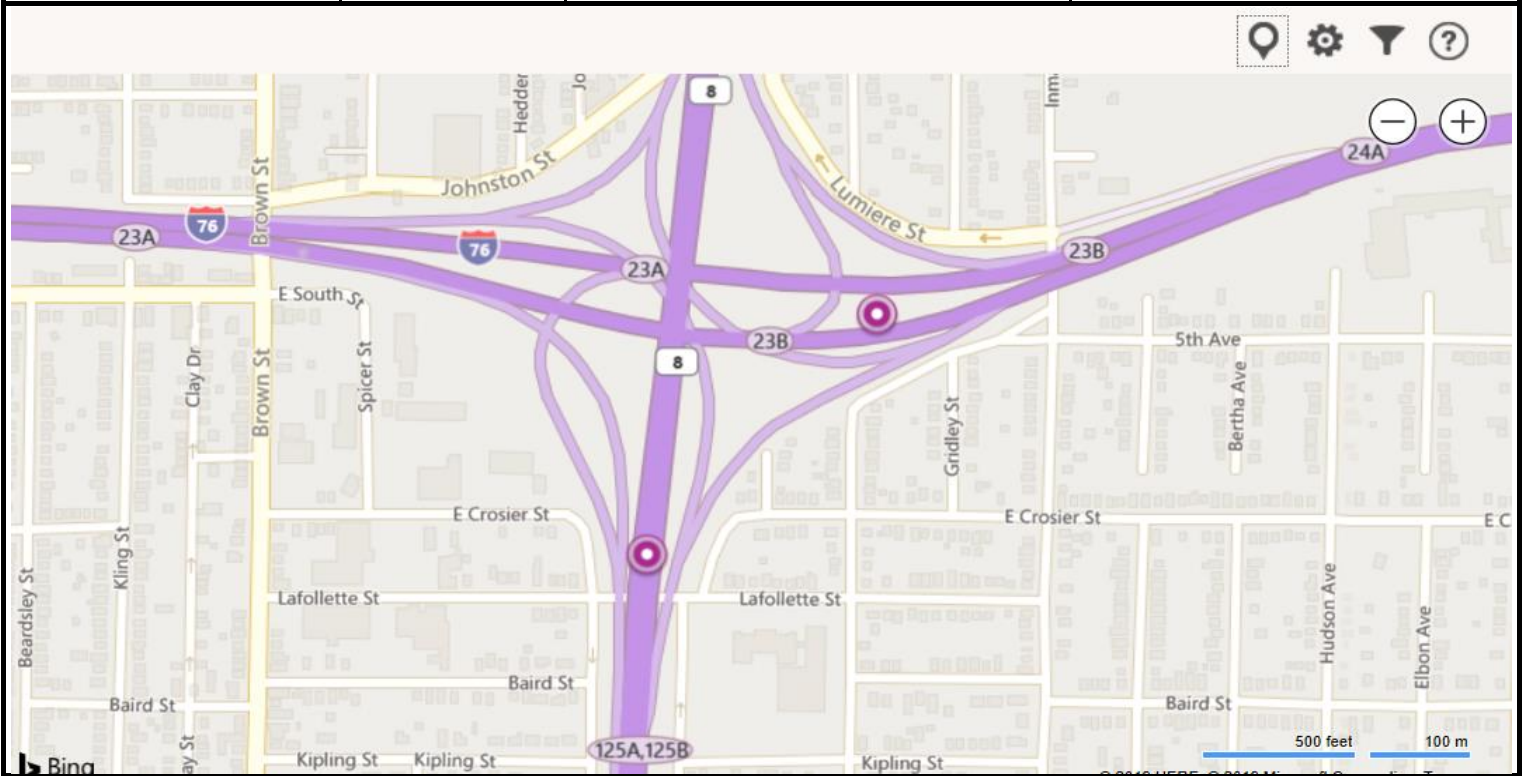
PID: 101402; Request 02

Letting Type: ODOT-Let

Design Designation

Ramp N; 0-0

Current ADT (2020)	14,590	Td	0.10
Design Year ADT (2040)	15,640	Design Speed	45
Design Hourly Volume (2040)	1,390	Legal Speed	45
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1,564	Functional Class Area Type	Urban
		NHS Project	Yes

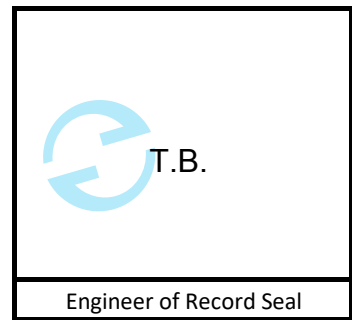


Submitted By:

E-SIGNED by Tom Bolte
on 2019-10-23 12:40:51 GMT

Tom Bolte

(Engineer of Record)



Approved by:

E-SIGNED by David Holstein
on 2019-11-07 13:06:37 GMT

David Holstein

Approval Date: 10/21/2019

Design Exception Request

SUM-76-11.31

PID: 101402; Request 02

Controlling Criteria Identification

Section: Ramp N; 0-0

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)	360 feet (HSSD)	194 feet (HSSD)	305 feet (HSSD)
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along I-76 WB and EB to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Ramp N carrying I-76 WB to I-77/SR 8 SB is a single-lane ramp that in the proposed condition will climb over existing I-76 EB and then drop down underneath the Lafollette Street bridge at the southern edge of the interchange project. This ramp is the top level of the interchange and is largely on a horizontal curve on structure as it travels over I-76 EB, the existing system ramps connecting SR 8 SB to I-76 EB and I-77 NB to I-76 WB, and SR 8.

Proposed Mitigation

The single-lane ramp typical section as provided in ODOT's L&D Volume 1, Section 303.1 and Figure 303-1 provides guidance for a 6-foot paved right shoulder and 4-foot paved left shoulder adjacent to a concrete barrier (see Note G). For the proposed geometry of Ramp N, these shoulder widths are flipped. The wider shoulder is the left shoulder to provide greater HSSD. The shoulder width was also increased from 6 feet to 10 feet to provide a HSSD value that closer matches the proposed design speed. As a result, 40-mph HSSD guidance was provided along the ramp that has a design speed of 45-mph. Advisory speed signage alerting the drivers of the need for reduced speed along Ramp N will be placed approaching the segment that has the reduced stopping sight distance.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 503.2 and Figure 503-1, the proposed Ramp N design speed should meet 45-mph design standards due to the 60-mph design speed for I-76, the mainline freeway that Ramp N connects to. The proposed Ramp N horizontal ramp geometry will meet 45-mph design standards for horizontal curvature and 40-mph design standards for horizontal stopping sight distance (HSSD) requirements. The existing Ramp N geometry provides a design speed of 25-mph. The proposed Ramp N design provides an increase of design speed for HSSD of 15-mph over the existing alignment.

The proposed Ramp N horizontal alignment utilizes a 10-foot left shoulder width, providing HSSD of 305 feet, meeting 40-mph design standards. The existing Ramp N horizontal alignment provides HSSD of 194 feet, meeting 25-mph design standards. Per ODOT L&D Volume 1, Section 201.2 and Figure 201-1, the HSSD provided must be a minimum of 360 feet to meet 45-mph design standards. In order for the proposed horizontal alignment of Ramp N to achieve HSSD of 360 feet, a 16.9-foot left shoulder would need to be provided, causing an undesirable situation where a shoulder width exceeding 12 feet would be utilized. With this shoulder being on the low side of superelevation along Ramp N, this extra width would further reduce the vertical clearance over I-76 EB which would either cause a deficient proposed vertical clearance or cause the vertical upgrade to increase. The current design of Ramp N provides a vertical clearance over the future I-76 EB alignment (to be constructed in later phases of the Akron Beltway Improvement), is 16.0 feet. Widening the inside shoulder an additional 6.9 feet would reduce this vertical clearance by 0.42 feet. This additional shoulder widening would add approximately \$2.1M to the construction cost of the project.

The proposed geometry of Ramp N, with the HSSD meeting 40-mph design guidance, is a betterment of the existing condition as it will provide greater distance and design speed for the ramp movement. Additionally, the change in the lane configuration along I-76 WB that introduces a drop-lane to this ramp allows vehicles to adjust to the speed of the ramp. In the existing condition, a very short deceleration length is provided along I-76 WB, which forces drivers to either reduce their speeds in the mainline travel lanes, or force drivers to enter the horizontal curve along the ramp at too great of a speed. Both of these create an unsafe condition that is mitigated with the larger proposed horizontal radius curve along the ramp and the deceleration lane along I-76 WB approaching the ramp.

In all, providing a wider inside shoulder along Ramp N, the proposed shoulder would exceed 12 feet wide and could cause driver confusion if they perceive it as a travel lane. It would also create a deficient vertical clearance over future I-76 EB to a value that is below the design guidance for an interstate. Finally, it would be anticipated to add an additional \$2.1M to the construction cost of the project. It is not anticipated that this extra cost and impacts would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Blue Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Design Exception Request

SUM-76-11.31

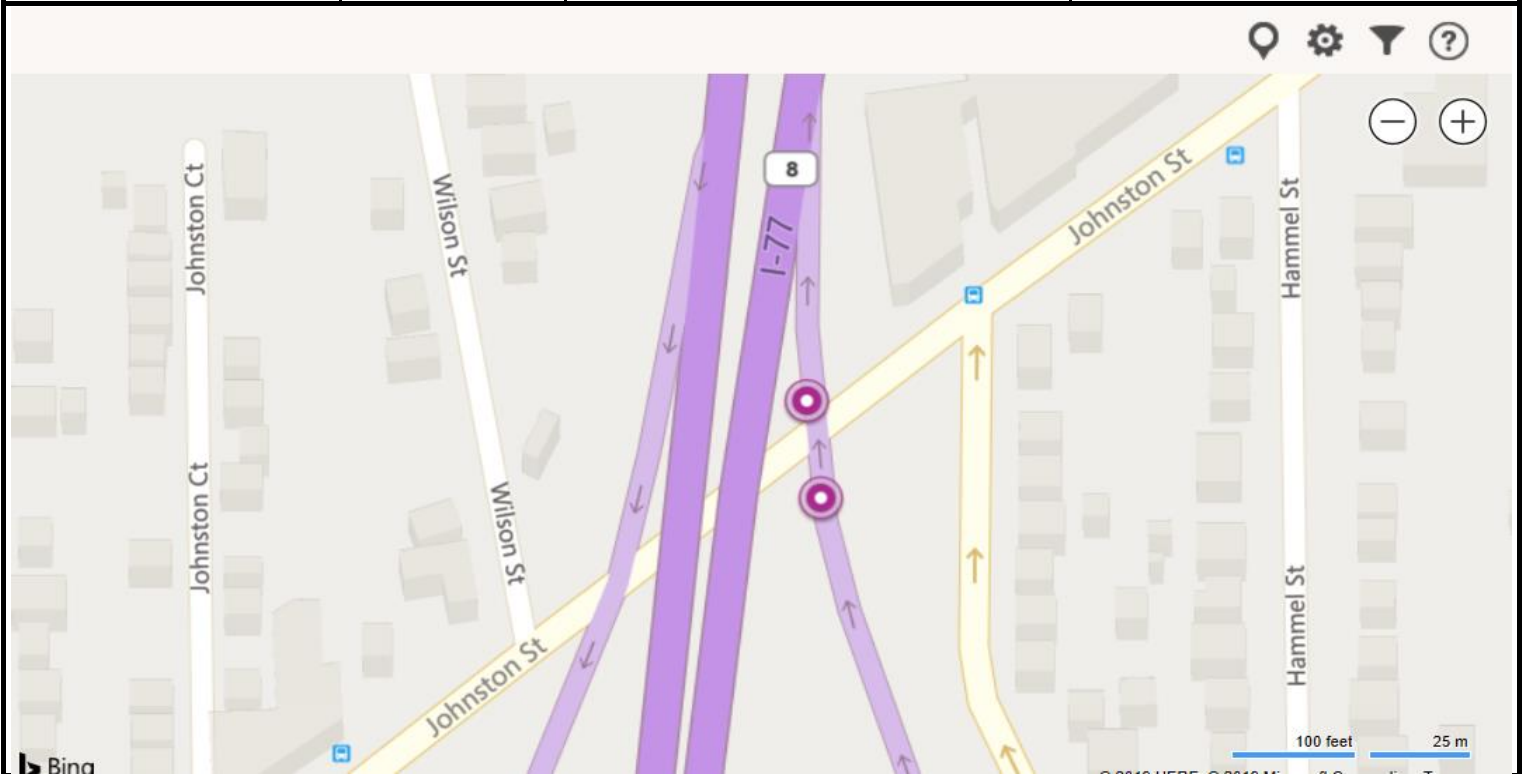
PID: 101402; Request 03

Letting Type: ODOT-Let

Design Designation

Ramp R; -

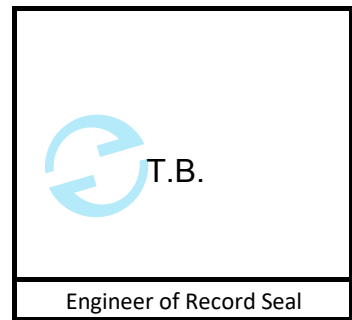
Current ADT (2020)	15,570	Td	0.04
Design Year ADT (2040)	15,580	Design Speed	45
Design Hourly Volume (2040)	1,160	Legal Speed	45
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1,246	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Tom Bolte
on 2019-10-23 12:39:14 GMT

Tom Bolte
(Engineer of Record)



Approved by:

E-SIGNED by David Holstein
on 2019-11-07 13:06:08 GMT

David Holstein

Approval Date: 10/21/2019

Design Exception Request

SUM-76-11.31

PID: 101402; Request 03

Controlling Criteria Identification

Section: Ramp R; -

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance	16.5 feet	15.1 feet	15.1 feet
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along I-76 EB and WB to provide drop lanes for NB and SB exits in each direction as well as two through lanes for I-76 to address both safety and operations.

Ramp R carrying I-76 EB to I-77 NB is a single-lane ramp that in the proposed condition will climb over existing I-76 WB and then drop down underneath the Johnston Street bridge at the north edge of the interchange project. This ramp is the top level of the interchange. It travels over I-76 WB, the existing system ramps connecting SR 8 SB to I-76 EB and I-77 NB to I-76 WB, and SR 8. It joins the reconstructed I-76 WB to I-77 NB ramp (Ramp U) just south of the Johnston Street bridge to form a 2-lane ramp that matches the existing horizontal and vertical geometry just prior to merging into I-77 NB just north of the Johnston Street bridge. This existing ramp, as it travels under the existing Johnston Street bridge, achieves a vertical clearance of 15.1 feet. The proposed ramp matches this vertical clearance dimension of 15.1 under the Johnston Street bridge.

Proposed Mitigation

Without a history of bridge impacts at this location along Ramp R and with the anticipated increase in construction cost and impacts by replacing the Johnston Street bridge, it is determined that no mitigation is needed for this design exception.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

#NAME?

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Design Exception Request

SUM-76-11.31

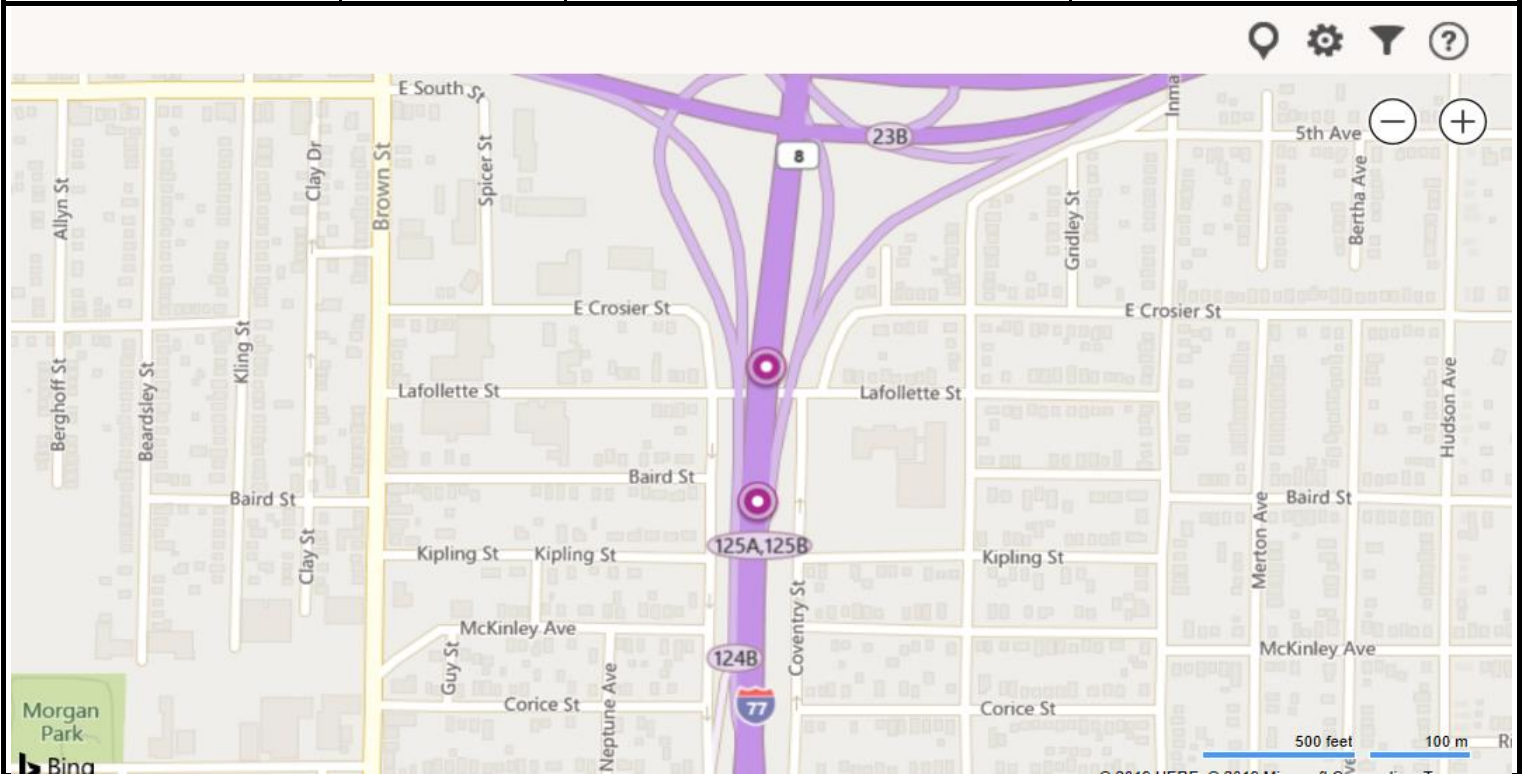
PID: 101402; Request 04

Letting Type: ODOT-Let

Design Designation

I-77; 11.769-0.055

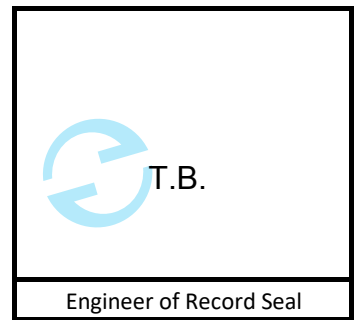
Current ADT (2020)	135,920	Td	0.08
Design Year ADT (2040)	153,200	Design Speed	60
Design Hourly Volume (2040)	14,800	Legal Speed	55
Directional Distribution	58%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	12,256	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Tom Bolte
on 2019-10-23 12:36:36 GMT

Tom Bolte
(Engineer of Record)



Approved by:

E-SIGNED by David Holstein
on 2019-11-07 13:05:24 GMT

David Holstein

Approval Date: 10/21/2019

Design Exception Request

SUM-76-11.31

PID: 101402; Request 04

Controlling Criteria Identification

Section: I-77; 11.769-0.055

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10.0 feet	varies 7.5 feet to 8.5 feet	8.5 feet
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure how these two ramps merge into SR 8 NB and I-77 SB. With the revised geometry, these entrance points onto the interstate have shifted away from the interchange in the proposed condition.

The improvements along I-77 SB/SR 8 SB near and under the existing Lafollette Street bridge include a new configuration for the I-76 WB to I-77 SB (Ramp N) and the I-76 EB to I-77 SB (Lane M) merge with each other and their merge onto I-77 SB. This was done in order to provide a design for Ramp N that provided a greater design speed and longer horizontal stopping sight distance (HSSD) than the existing ramp configuration. The existing typical section along I-77 SB, in the direction of travel, utilizes a 7.5 to 8.5-foot left shoulder, four 12-foot travel lanes, and a 10-foot right shoulder. The proposed typical section for the project improvements utilizes an 8.5-foot left, four 12-foot travel lanes, and a 10-foot right shoulder width.

Proposed Mitigation

None.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.2.3 and Figure 301-3, the left and right shoulder widths along I-77 SB should be 10 feet wide when the number of travel lanes exceed two in a single direction of travel. The proposed typical section of I-77 SB throughout this section perpetuates the shoulder width in the existing condition. The existing shoulder width in this section ranges from 7.5 feet to 8.5 feet; the proposed improvements provide a constant left shoulder width of 8.5 feet.

By revising this geometry, the footprint of I-77 SB just south of Lafollette Street became wider as the entrance ramps were added onto the mainline as add-lanes. This means that retaining walls are needed in order to not impact additional properties along the west side of I-77 along Burkhardt Avenue. The current position of this retaining wall is located as far west as necessary to allow for the full footprint of I-77 SB to be constructed and still be able to support and maintain Burkhardt Avenue. Moving the retaining wall further west from its current position would require the permanent closure of Burkhardt Avenue. Therefore, widening the left shoulder of I-77 SB to 10-feet would require permanent closure of Burkhardt Avenue, and most likely impacts to 4 additional properties along that neighborhood street. This section of I-77 SB that is being improved by the project is only about 1,000 feet in length. Widening the left shoulder in this section would be short relative to the overall length of the corridor that would still have a substandard shoulder width.

The crash history for this segment of I-77 SB indicates that the majority of crashes (28 of 34 in the past three years) that have occurred are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by improving the geometry and the entrance ramp geometry by increasing the acceleration length of the ramp merge lanes adjacent to the mainline. This will allow traffic merging onto I-77 SB to be at a similar speed as the mainline traffic, which will improve traffic flow and reduce congestion. The 8.5-foot shoulder is on the left side of the travel lanes along a large-radius horizontal curve to the left. The proposed shoulder provides a horizontal stopping sight distance of 1,165 feet, which significantly exceeds the 570 feet necessary to meet 60-mph design standards.

In all, the crash history at this location do not show a crash pattern resulting from substandard shoulder width. Widening the left shoulder along I-77 SB to 10 feet would increase the impacts along the west side of I-77. It is not anticipated that these extra impacts would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Blue Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Design Exception Request

SUM-76-11.31

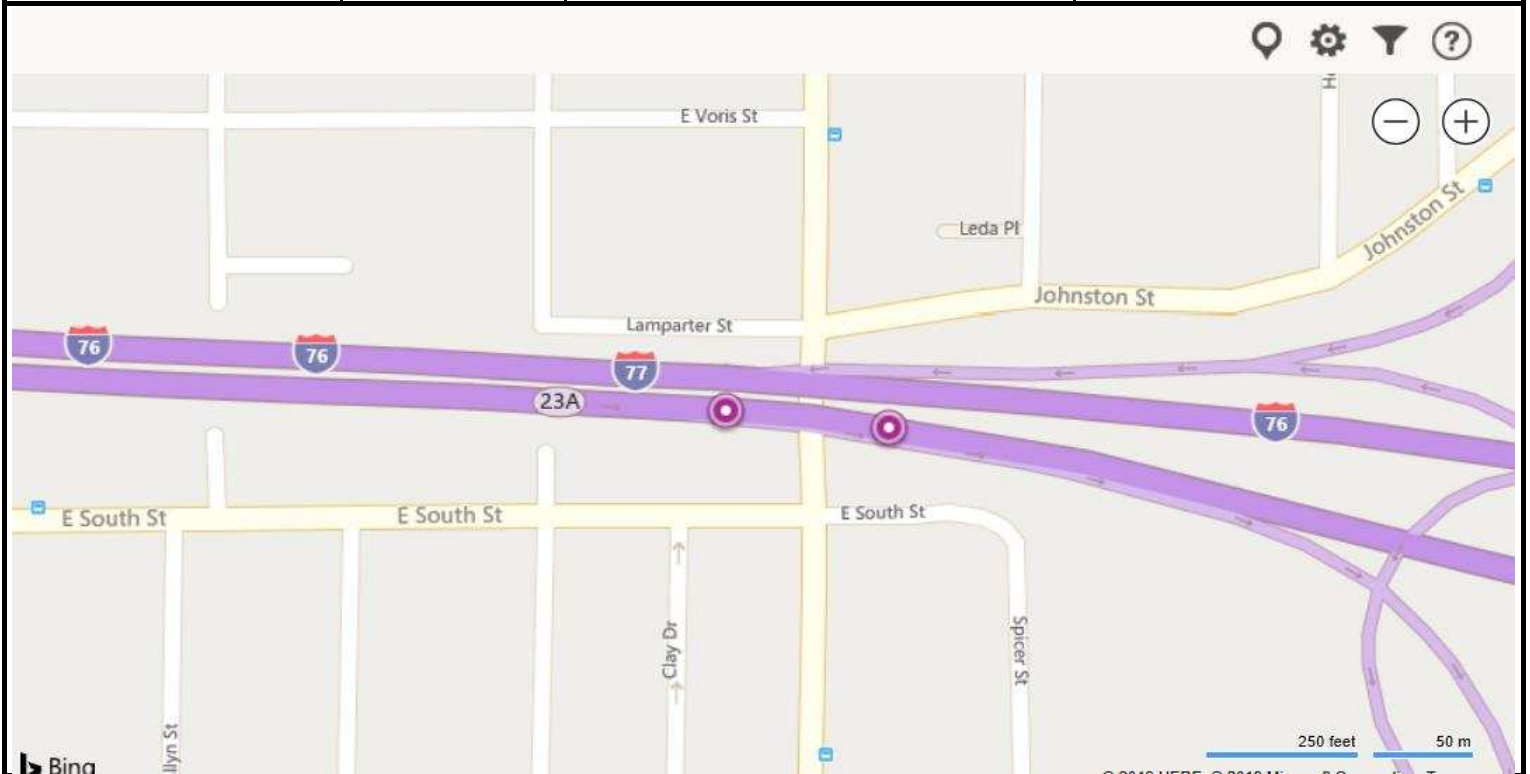
PID: 101402; Request 05

Letting Type: ODOT-Let

Design Designation

Ramp R; 11.262-11.315

Current ADT (2020)	15,570	Td	0.04
Design Year ADT (2040)	15,580	Design Speed	45
Design Hourly Volume (2040)	1,160	Legal Speed	45
Directional Distribution	100	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1,246	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas A. Bolte

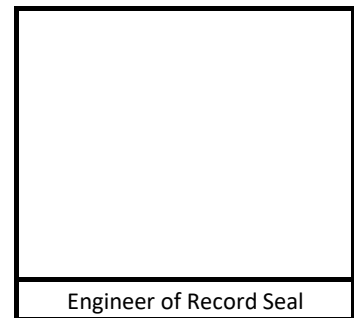
Tom Bolte
(Engineer of Record)

Approved by:

D. Holstein

David Holstein

Approval Date: 5/30/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 05

Controlling Criteria Identification

Section: Ramp R; 11.262-11.315

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate	0.016	N/A	0.025
Vertical Clearance			
Design Loading Structural			
(a.) "Existing" may be N/A (i.e. New alignment or new ramp)			

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns.

Ramp R is a single-lane ramp that in the proposed condition will climb over existing I-76 WB and then drop down underneath the Johnston Street bridge at the north edge of the interchange project. This ramp is the top level of the interchange. The proposed configuration of the interchange improvement maintains the left-hand exit from I-76 EB for Ramp R. The proposed radius of the ramp is increased from 180 feet to 655 feet. Because this ramp climbs over I-76 WB as the top level of the interchange, the proposed diverge from I-76 occurs significantly farther west than the existing diverge. Moving this diverge west pushes the nose of the diverging gore west of the existing I-76 bridge over Brown Street (SUM-77-1127; SFN 7703031) and the interchange gore spreads across the entire length of the bridge. At this diverging gore, I-76 EB is on a 8,185-foot radius horizontal curve to the right (degree of curve = 0.70°), and the Ramp R horizontal alignment is on a 22,918-foot radius curve to the right (degree of curve = 0.25°). This horizontal curve radius does not require additional cross slope exceeding normal crown to meet 60-mph design standards. The existing cross slope of I-76 on the bridge over Brown Street is 0.025. The existing bridge is about 90 feet wide and carries 4 lanes of I-76 EB. This bridge is a twin structure to the structure immediately to the north carrying 4 lanes of I-76 WB, separated by a foot, with a concrete barrier between the two directions of travel. There are no pavement cross slope breaks between travel lanes along the I-76 EB bridge. The proposed cross slope of Ramp R as it is diverging from I-76 across this bridge is 0.025 to match the existing cross slope across the bridge.

Proposed Mitigation

None

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-8, the cross slope required for Ramp R for the 22,918-foot horizontal radius at 60-mph design standards is 0.016 (NC). The proposed cross slope for this horizontal curve along Ramp R is 0.025. This was done to match the existing cross slope of the existing bridge. Ramp R is a dedicated lane located adjacent to the median across the bridge. The proposed gore between Ramp R and I-76 EB is 415 feet long and spans fully across the bridge. This bridge is being widened to the south, and only a minor overlay is being proposed across the bridge outside of the widening. Changing the left-hand (median) lane to 0.016 cross slope introduces a pavement cross slope break in the middle of the bridge. Flattening this portion of the bridge deck from 0.025 to 0.016 would cut into the existing superstructure and would require it to be replaced. This bridge was just modified two years ago with a new concrete deck and is now in excellent condition. Replacing the existing superstructure would add an additional \$1,700,000 in construction cost to the project and would most likely require replacement of the concrete barrier and closed drainage system across and adjacent to the bridge to meet the safety requirements for barrier height along an interstate.

The crash history for this section of I-76 over the existing bridge over Brown Street shows only 5 crashes in the past three years. All these crashes were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry. This project is improving the lane utilization for I-76 EB, improving the geometrics of Ramp R, and increasing the deceleration length for the Ramp R diverge. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. It is not anticipated that the extra cost and impacts to reduce the cross slope across the Ramp R lane on the bridge would yield a safety benefit at this location.

Signature Certificate

 Document Reference: JITHP2ICL5REBYF4HDXPWC

RightSignature
Easy Online Document Signing



David Holstein
Party ID: TVM9EWIEG3LNNBEUECEX9H
IP Address: 156.63.133.86
VERIFIED EMAIL: dave.holstein@dot.ohio.gov

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

16a68c8038ad6c2d4a64219a86e94e610bfea037



Tom Bolte
Party ID: 57Y8FGJ32JS2YJMD496ENH
IP Address: 159.63.2.158
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Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

a5f81a5317418d36e04469bd820c3ceac8c492db



Timestamp

2019-06-05 12:21:21 -0700
2019-06-05 12:21:20 -0700
2019-06-05 12:20:49 -0700
2019-05-30 11:58:33 -0700
2019-05-30 11:56:27 -0700
2019-05-30 11:50:36 -0700
2019-05-30 09:46:37 -0700

Audit

All parties have signed document. Signed copies sent to: Derek Troyer, Thomas Powell, Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.133.86
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.133.86
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.jpg) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.133.86



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Design Exception Request

SUM-76-11.31

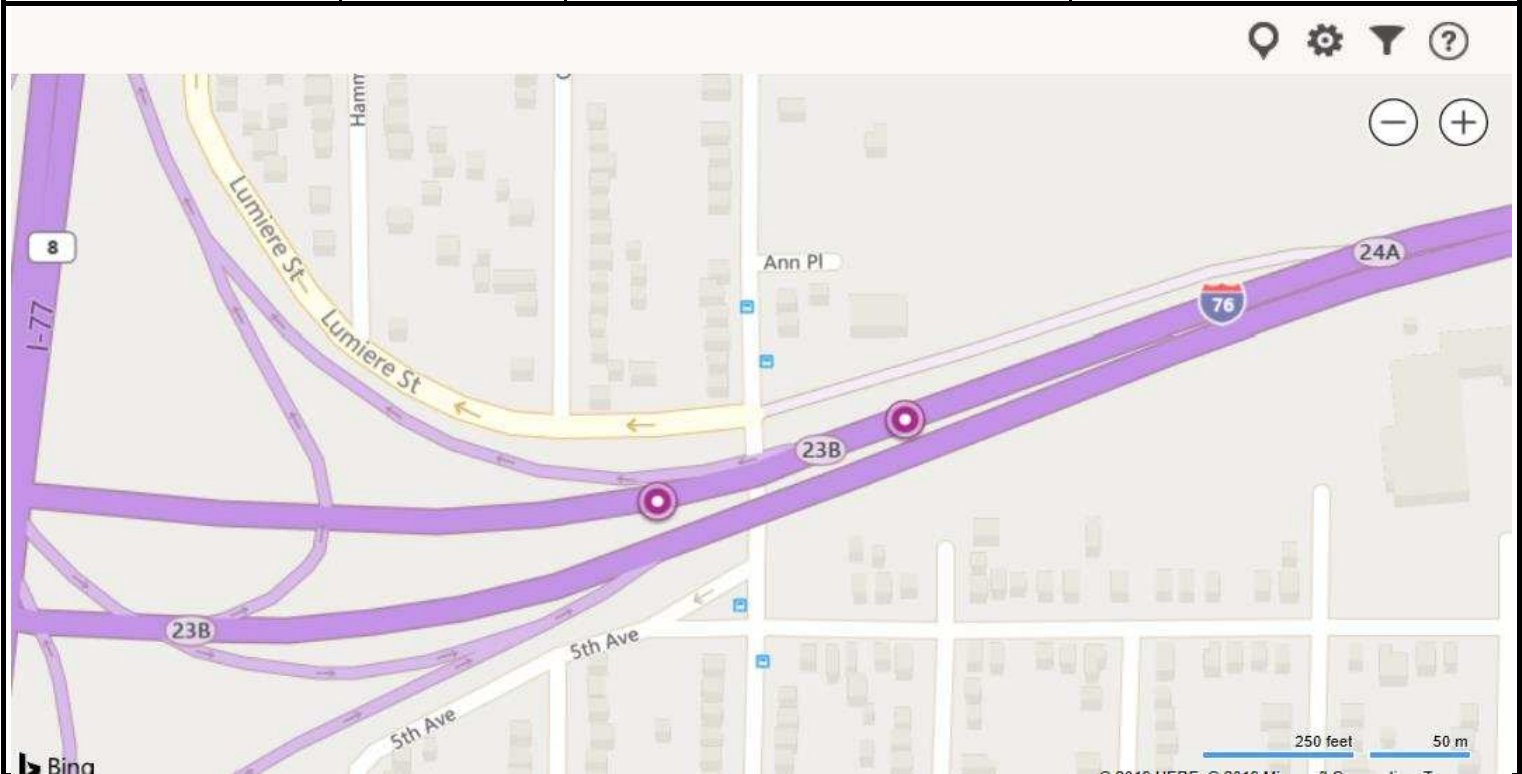
PID: 101402; Request 06

Letting Type: ODOT-Let

Design Designation

Ramp N; 11.772-11.855

Current ADT (2020)	14,590	Td	0.10
Design Year ADT (2040)	15,640	Design Speed	60
Design Hourly Volume (2040)	1,390	Legal Speed	60
Directional Distribution	100	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1564	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

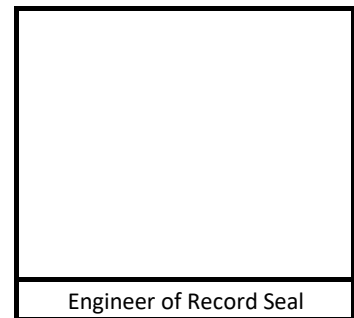
(Engineer of Record)

Approved by:

David Holstein

David Holstein

Approval Date: 11/6/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 06

Controlling Criteria Identification

Section: Ramp N; 11.772-11.855

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)			
Pavement Cross Slope			
Superelevation Rate	0.021	N/A	0.048
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns.

The proposed configuration of the interchange improvement maintains the left-hand exit from I-76 WB for Ramp N. The proposed radius through the center section of the ramp is increased from 180 feet to 636 feet. Because this ramp climbs over I-76 EB as the top level of the interchange, the proposed diverge from I-76 occurs significantly farther east than the existing diverge. Moving this diverge east pushes the nose of the diverging gore east of the existing I-76 bridge over Inman Street (SUM-76-1179L) and the interchange gore spreads across the entire length of the bridge. At this diverging gore, I-76 WB is on a 2,546-foot radius horizontal curve to the right (degree of curve = 2.25°), and the Ramp N horizontal alignment is on a 7,639-foot radius curve to the right (degree of curve = 0.75°). This horizontal curve radius requires a superelevation rate of 0.021 to meet 60-mph design standards. The existing superelevation of I-76 on the bridge over Inman Street is 0.048 to meet 60-mph design standards. The existing bridge is about 90 feet wide and carries 4 lanes of I-76 WB. This bridge is a twin structure to the structure immediately to the south carrying 4 lanes of I-76 EB, separated by a foot, with a concrete barrier between the two directions of travel. There are no pavement cross slope breaks between travel lanes along the I-76 WB bridge. The proposed superelevation of Ramp N as it is diverging from I-76 across this bridge is 0.048 to match the existing cross slope across the bridge.

Proposed Mitigation

None.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-8, the superelevation required for Ramp N for the 7,639-foot horizontal radius at 60-mph design standards is 0.021. The proposed superelevation for this horizontal curve along Ramp N is 0.048. This was done to match the existing superelevation of the existing bridge. Ramp N is a dedicated lane located adjacent to the median across the bridge. The proposed gore between Ramp N and I-76 WB is 245 feet long and begins immediately west of the existing bridge. This bridge is being widened to the north, and no additional work is being proposed across the bridge outside of the widening. Changing the left-hand (median) lane to 0.021 superelevation introduces a pavement cross slope break in the middle of the bridge. Flattening this portion of the bridge deck from 0.048 to 0.021 would cut into the existing superstructure and would require it to be replaced. Replacing the existing superstructure would add an additional \$1,500,000 in construction cost to the project and would most likely require replacement of the concrete barrier and closed drainage system across and adjacent to the bridge to meet the safety requirements for barrier height along an interstate.

The crash history for this section of I-76 over the existing bridge over Inman Street shows 38 crashes in the past three years. 35 of these crashes (92%) were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry. This project is improving the lane utilization for I-76 WB, improving the geometrics of Ramp N, and increasing the deceleration length for the Ramp N diverge. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. It is not anticipated that the extra cost and impacts to reduce the superelevation across the Ramp N lane on the bridge would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of I-76 over the existing bridge over Inman Street shows 38 crashes in the past three years. 35 of these crashes (92%) were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry.

Signature Certificate

 Document Reference: 7NBV4DJG3359M84ZR2E3MU

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Easy Online Document Signing



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Timestamp

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Audit

All parties have signed document. Signed copies sent to: Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.69.14
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.69.14
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.69.133



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Design Exception Request

SUM-76-11.31

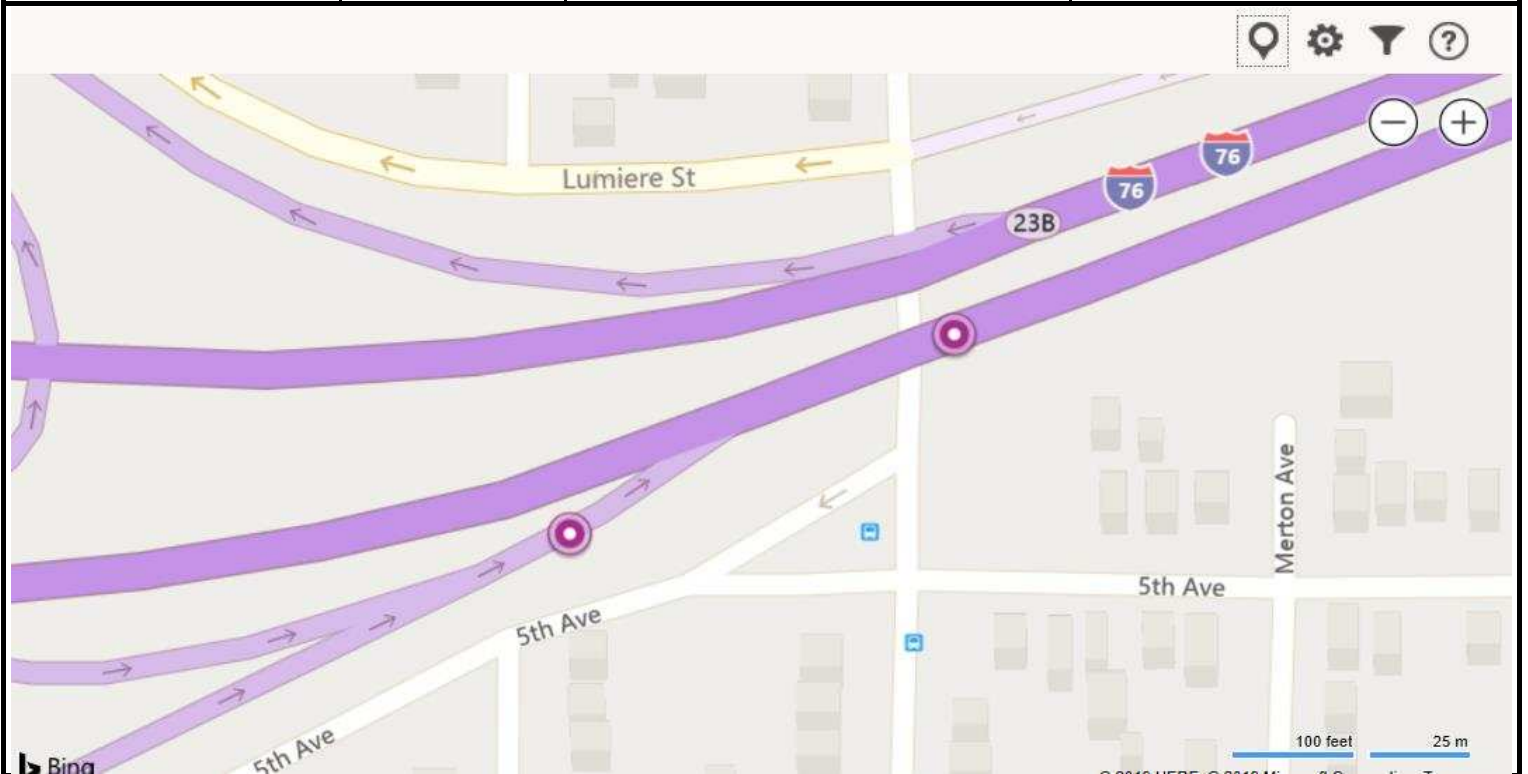
PID: 101402; Request 07

Letting Type: ODOT-Let

Design Designation

Ramp T; -

Current ADT (2020)	13,750	Td	0.10
Design Year ADT (2040)	15,260	Design Speed	60
Design Hourly Volume (2040)	1,250	Legal Speed	60
Directional Distribution	100	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	1526	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

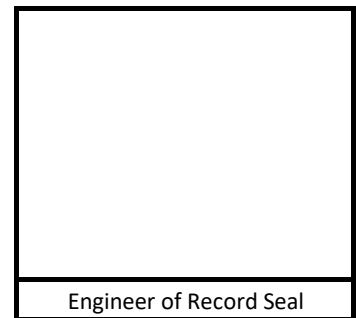
(Engineer of Record)

Approved by:

D. Holstein

David Holstein

Approval Date: 11/6/2019



Design Exception Request

SUM-76-11.31

PID: 101402; Request 07

Controlling Criteria Identification

Section: Ramp T; -

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest			
Pavement Cross Slope			
Superelevation Rate	0.041	0.030	0.030
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns. Outside of these alignments, this project will complete the full-depth pavement replacement along the other ramp alignments in the interchange, including Ramp T (I-77 NB to I-76 EB).

Ramp T has a 45-mph minimum design speed and the horizontal and vertical alignment established for this project matches the existing alignment. This single-lane ramp adds to the single-lane SR 8 SB to I-76 EB ramp to form two lanes that then add to the two lanes from I-76 EB to form four lanes across the I-76 EB bridge over Inman Street (SUM-76-1179R). This project reconstructs the pavement along I-76 EB and these two ramps west of Inman Street and does not include work on the SUM-76-1179R structure or east of this bridge.

Proposed Mitigation

New pavement along Ramp T to increase the friction factor.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-8, the superelevation required for Ramp T for the 3,724-foot horizontal radius at 60-mph design standards is 0.041. The proposed superelevation for this horizontal curve along Ramp T is 0.030. This was done to match the existing superelevation of the existing bridge over Inman Street. Ramp T is a dedicated lane located on the outside of four lanes across the bridge. No work is currently being proposed across this bridge as part of this project, and no geometric modifications are being proposed along Ramp T or the SR 8 SB to I-76 EB ramp. The only work that is being completed along these two ramps is full-depth pavement replacement on the existing horizontal and vertical alignments. The proposed superelevation rate across the Inman Street bridge matches the existing rate.

Changing the proposed superelevation for these two ramps to 0.041 introduces a pavement cross slope break in the middle of the bridge. Increasing the superelevation rate across this portion of the bridge deck from 0.030 to 0.041 would cut into the existing superstructure and would require it to be replaced. Replacing the existing superstructure as well as the pavement on each side of the bridge necessary to transition to the new superelevation rate would add an additional \$1,300,000 in construction cost to the project and would most likely require replacement of the concrete barrier and closed drainage system across and adjacent to the bridge to meet the safety requirements for barrier height along an interstate. Increasing this superelevation rate across the bridge would also reduce the existing vertical clearance over Inman Street from 15'-2" to 14'-11". The horizontal curve along Ramp T that requires 0.041 superelevation is only 272 feet long. The beginning (western edge) of this horizontal curve begins prior to the entrance gore with I-76 EB and the full length of the horizontal curve that requires greater superelevation rate is within the existing entrance gore with I-76 EB limits. The proposed superelevation provided across this horizontal curve, which matches the existing, meets 48-mph design standards. I-76 EB in the area of the entrance gore with Ramp T meets 60-mph design standards, which provides a speed differential that is not substantial between the two alignments.

The crash history for this section of Ramp T over the existing bridge over Inman Street shows only eight crashes in the past three years. Five of these crashes were classified as either fixed object (four) or overturning (one). Two of these five crashes occurred on wet pavement. This project will be replacing the pavement and will provide a higher-friction new pavement surface that should alleviate some of the issues with wet pavement traction. The project will be constructing a new retaining wall and cutting back existing vegetation which will improve the horizontal stopping sight distance along Ramp T, which should provide greater time to react to and make a decision if there is an issue along the ramp.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of Ramp T over the existing bridge over Inman Street shows only eight crashes in the past three years. Five of these crashes were classified as either fixed object (four) or overturning (one). Two of these five crashes occurred on wet pavement.

Signature Certificate

 Document Reference: 6AKFK4I8AJAR36C7G8CU9N

RightSignature
Easy Online Document Signing



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Audit

All parties have signed document. Signed copies sent to: Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.69.14
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Design Exception Request

SUM-76-11.31

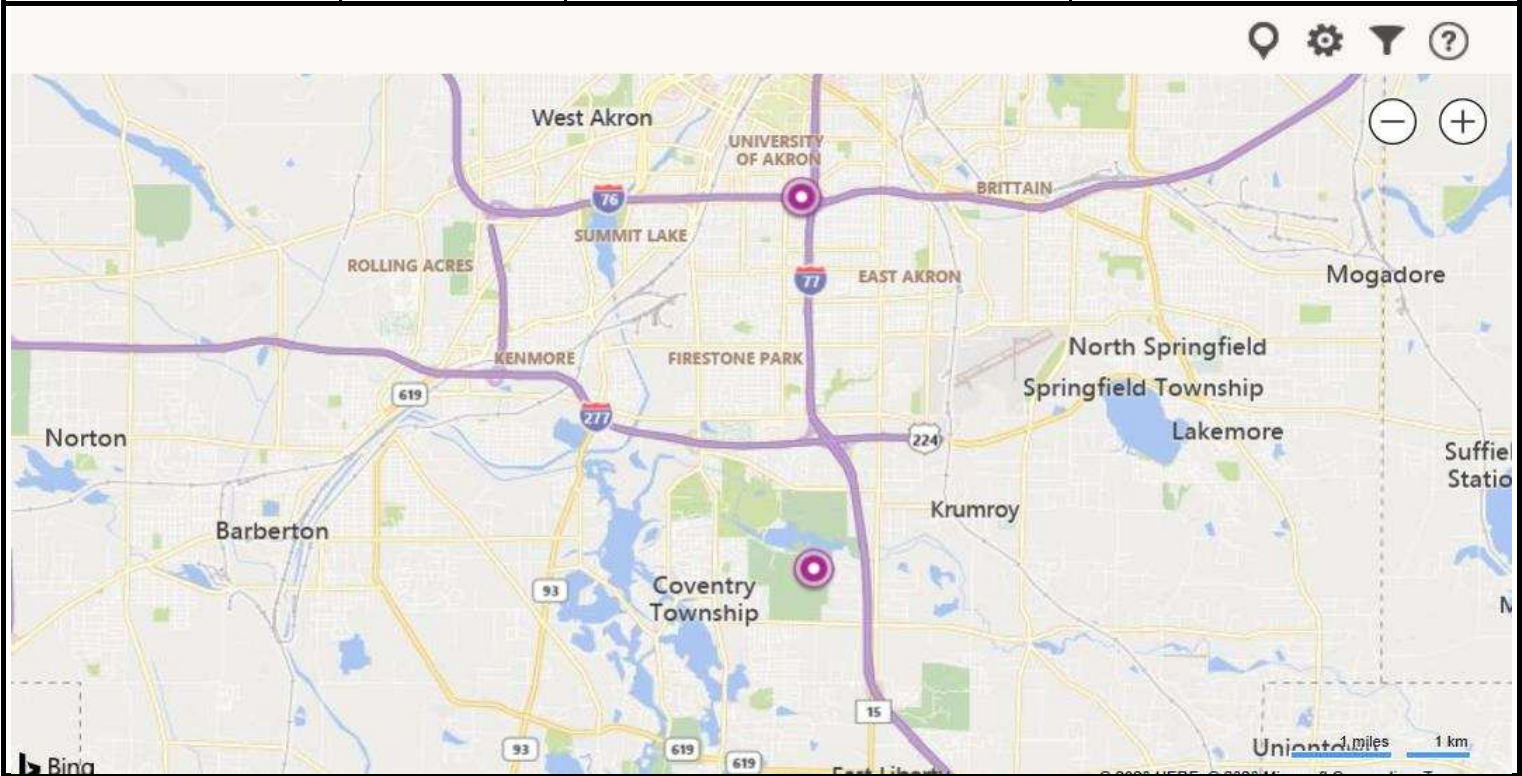
PID: 101402; Request 08

Letting Type: ODOT-Let

Design Designation

Lane O; -

Current ADT (2020)	19,470	Td	0.02
Design Year ADT (2040)	19,720	Design Speed	45
Design Hourly Volume (2040)	1,600	Legal Speed	45
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	395	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

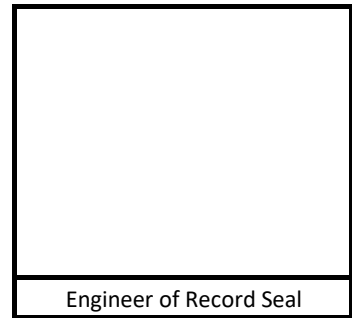
(Engineer of Record)

Approved by:

Brent Bogard

Brenton Bogard

Approval Date: 2/24/2020



Design Exception Request

SUM-76-11.31

PID: 101402; Request 08

Controlling Criteria Identification

Section: Lane O; -

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)	360 feet (HSSD)	288 feet (HSSD)	318 feet (HSSD)
Pavement Cross Slope			
Superelevation Rate	0.06	0.08	0.08
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns. Outside of these alignments, this project will complete the full-depth pavement replacement along the other ramp alignments in the interchange, including Lane O (I-77 NB to I-76 WB/I-77 NB).

Lane O has a 45-mph minimum design speed and the horizontal and vertical alignment established for this project matches the existing alignment. This single-lane ramp exits from I-77 NB on the right side, travels over SR 8 on structure (SUM-77-1201R) while traveling under I-76, then adds to I-76 WB/I-77 NB west of the interchange. This project reconstructs the pavement along Lane O along the existing horizontal and vertical alignment and does not include work on the SUM-77-1201R structure. This existing bridge is 37 feet wide. The existing condition utilizes a 8-foot wide left shoulder, a 16-foot traveled lane, and a 13-foot wide right shoulder in the direction of travel. The proposed condition shifts the 16-foot traveled lane to the outside, yielding a 13.5-foot wide left shoulder and a 7.5-foot wide right shoulder in the direction of travel.

Proposed Mitigation

New pavement along Lane O to increase the friction factor. Lateral shift of the traveled lane along Lane O toward the outside to increase the inside shoulder width will increase the HSSD being provided.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 503.2 and Figure 503-1, the proposed Lane O design speed should meet 45-mph design standards due to the 60-mph design speed for I-77, the mainline freeway that Lane O connects to. The proposed Lane O horizontal ramp geometry will meet 41-mph design standards for horizontal stopping sight distance (HSSD) requirements. The existing Lane O geometry provides a design speed of 38-mph for HSSD requirements. No work is prescribed to be completed on the SUM-77-1201R bridge as a result of this project. To achieve an increase in the HSSD length, the traveled lane was shifted towards the outside of the bridge to accommodate the wider left-hand (inside) shoulder. The approach roadway on each side of this bridge can accommodate this lateral shift in the traveled lane without requiring widening of the existing pavement. Shifting the traveled lane farther toward the outside to further increase the inside shoulder width would require additional widening along Lane O adjacent to the bridge, which would require lengthening of the existing abutment/wingwall on the north side of SR 8. Widening the SUM-77-1201R bridge to the inside to accommodate the required 17-foot wide shoulder necessary for 45-mph design standards would provide a shoulder width that was substantially greater than 12 feet, which is undesirable. With this shoulder being on the low side of superelevation along Lane O, this extra width would further reduce the vertical clearance over SR 8 and would yield a new vertical clearance of 14.79 feet. This reduction could introduce another safety concern with oversized vehicles traveling along SR 8 through the interchange. Widening this bridge an additional 3.5 feet would also create a clearance issue with the existing piers for the overhead I-76 EB bridge (SUM-76-1152R). To widen this bridge, the overhead I-76 EB bridge would need to be replaced due to the existing pier that would be in conflict. The replacement of this bridge, the widening of the existing SUM-77-1201R bridge, and the widening of the approach pavement would add about \$9.1M to the construction cost for the project.

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-10, the cross slope required for Lane O for the 636-foot horizontal radius at 45-mph design standards is 0.060. The proposed cross slope for this horizontal curve along Lane O is 0.083. This was done to match the existing cross slope of the ramp across the existing SUM-77-1201R bridge. The existing cross slope of this ramp was based upon rural criteria (0.083 maximum superelevation table) when it was constructed rather than on the urban criteria (0.06 maximum superelevation table) that it would be designed against now. Flattening this cross slope to 0.06 across the bridge over SR 8 would create additional vertical clearance concerns over SR 8 and under I-76 EB and WB and would likely require either one or both I-76 overhead bridges to be replaced. The 0.083 superelevation was the standard at the time that the structure was constructed and this project is not anticipating to change this structure. Flattening the cross slope to 0.06 would also cut into the existing superstructure of the SUM-77-1201R bridge which would cause it to have to be replaced at an anticipated construction cost increase of \$780,000.

The crash history for this section of Lane O shows 30 crashes in the past three years. 16 of these were rear-end crashes which is indicative of congestion and not due to deficient roadway geometry. This project is improving the lane utilization for I-76 WB and improving the HSSD along Lane O. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. Eight of these crashes were classified as fixed object. Seven of these eight crashes occurred on wet pavement. This project will be replacing the pavement and will provide a higher-friction new pavement surface that should alleviate some of the issues with wet pavement traction. The improved HSSD along Lane O will provide greater time to react to and make a decision if there is an issue along the ramp. It is not anticipated that the extra cost and impacts to reduce the cross slope across this bridge would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Signature Certificate

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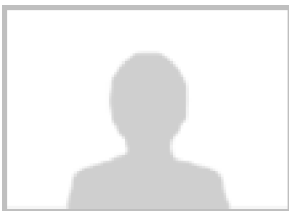


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Audit

All parties have signed document. Signed copies sent to: Christi Collins, Brenton Bogard, and Tom Bolte.
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Document viewed by Brenton Bogard (brenton.bogard@dot.ohio.gov). - 40.107.235.12
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Design Exception Request

SUM-76-11.31

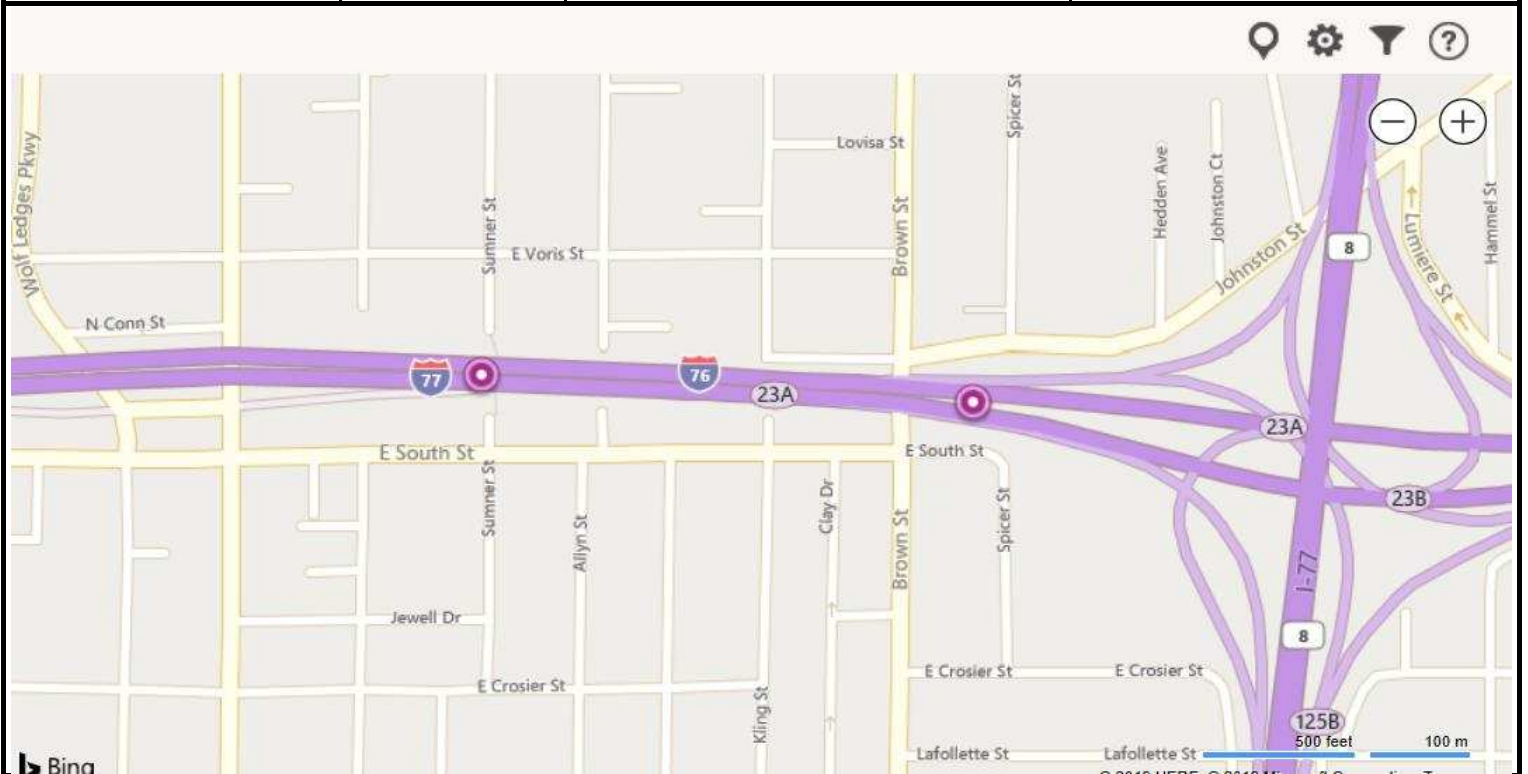
PID: 101402; Request 09

Letting Type: ODOT-Let

Design Designation

I-76; 11.017-11.336

Current ADT (2020)	120,890	Td	0.12
Design Year ADT (2040)	124,010	Design Speed	60
Design Hourly Volume (2040)	10,710	Legal Speed	55
Directional Distribution	63%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	14880	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Tom Bolte

Tom Bolte

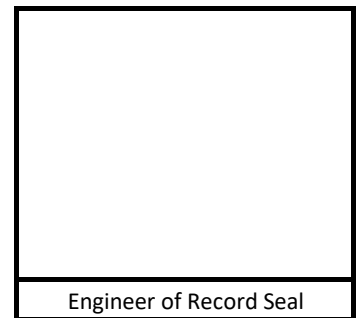
(Engineer of Record)

Approved by:

David Holstein

David Holstein

Approval Date: 6/28/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 09

Controlling Criteria Identification

Section: I-76; 11.017-11.336

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 feet	8 feet	8.5 feet
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Existing Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Existing Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns. Along existing I-76, the median shoulder is between 8 and 8.5 feet wide in both directions.

In the proposed condition, the diverge to Ramp R is shifted west to increase its horizontal radius and allow for it to vertically climb to get over existing I-76 WB. The I-76 EB lanes from the western limits of the project to the I-76 over Brown Street bridge (SUM-77-1127) are being slightly shifted south away from the median barrier to accommodate this new diverge to Ramp R. The I-76 WB lanes in this same area are being reconstructed along the existing horizontal and vertical alignment. For both directions, the existing left (median) shoulder width in the direction of travel is being maintained in the proposed condition. The horizontal alignment through this section of I-76 is along a tangent alignment and the beginning of an 8,185-foot radius horizontal curve (degree of curve = 0°42').

Proposed Mitigation

Rumble strips will be used along the pavement edge line, and barrier reflectors will be used along the median barrier. These measures will provide audio and visual reference to the proximity of the median barrier.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.2.3 and Figure 301-3, the left and right shoulder widths along I-76 should be 10 feet wide when the number of travel lanes exceed two in a single direction of travel. The proposed typical section of I-76 throughout this section perpetuates the shoulder width in the existing condition. The existing left (median) shoulder width in this section ranges from 8.0 feet to 8.5 feet; the proposed improvements provide a constant left shoulder width of 8.5 feet.

The portion of I-76 where this is applicable is from the western project limits to the I-76 bridge over Brown Street. In this section, the pavement is being replaced on the same horizontal and vertical alignments. No proposed grading is scheduled to be completed in this section. The existing shoulder widths, lane widths, and median barrier location is being perpetuated. This is due to the desire to keep the project work limits narrow to avoid business and residential impacts along I-76. This is also due to the need to match into the existing pavement section at the western edge of the project, located about 1,500 feet west of the bridge over Brown Street. The existing typical section, which utilizes a median shoulder width of 8 feet, is maintained along I-76/I-77 from the western I-76 & I-77 interchange to the western terminus of this project, which is 3 miles in length. This 1,500-foot section of I-76 will match the 3 miles of roadway connecting to the west. Because the horizontal geometry is along a tangent alignment and large-radius horizontal curve, horizontal stopping sight distance is not impinged by the 8.5-foot shoulder width.

The crash history for this segment of I-76 indicates that the majority of crashes (63 of 71 in the past three years) that have occurred are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by improving the geometry, lane utilization, and deceleration length of the adjacent ramps along the mainline. This will allow traffic to move at a similar speed across all lanes of traffic, which will improve traffic flow and reduce congestion.

In all, the crash history at this location do not show a crash pattern resulting from substandard shoulder width. Widening the left shoulder along I-76 to 10 feet would increase the impacts along I-76 and would be for a short section of the entire length of I-76 that utilizes substandard shoulder width. It is not anticipated that these extra impacts would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Signature Certificate

 Document Reference: M89LAHJSUK32WBV2Y232XT

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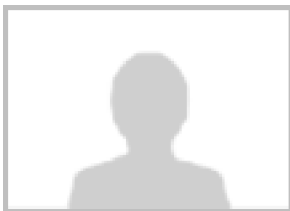


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Tom Bolte
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Digital Fingerprint Checksum

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Audit

All parties have signed document. Signed copies sent to: Derek Troyer, Thomas Powell, Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.133.86
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.133.86
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.133.86



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Design Exception Request

SUM-76-11.31

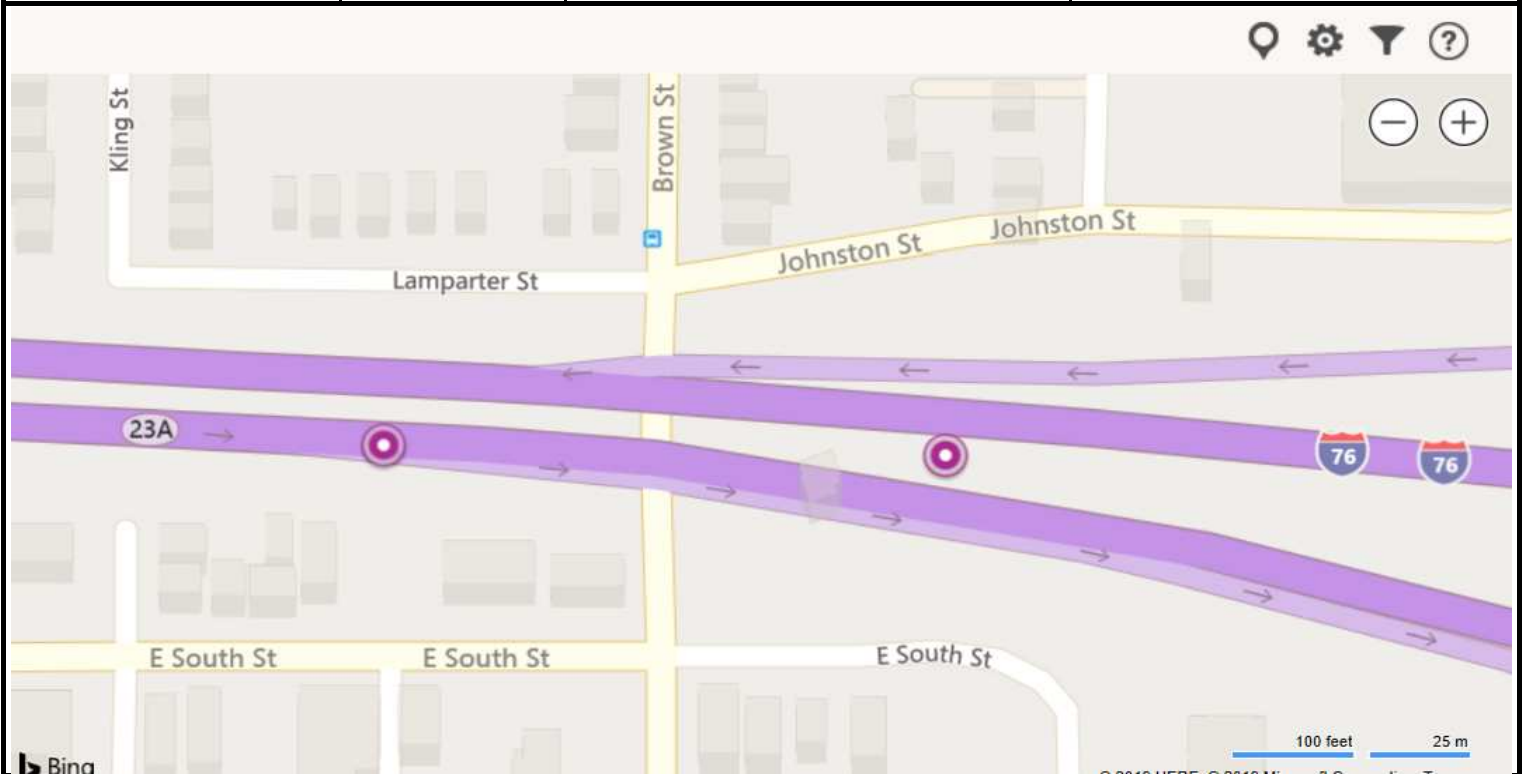
PID: 101402; Request 10

Letting Type: ODOT-Let

Design Designation

I-76 EB; 11.246-11.336

Current ADT (2020)	59,980	Td	0.11
Design Year ADT (2040)	62,600	Design Speed	60
Design Hourly Volume (2040)	6,030	Legal Speed	55
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	6886	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

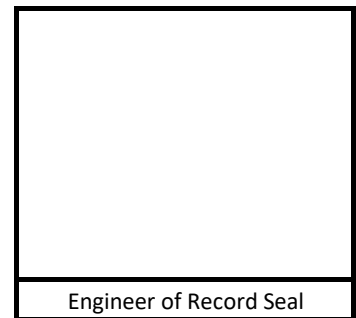
(Engineer of Record)

Approved by:

D. Holstein

David Holstein

Approval Date: 11/6/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 10

Controlling Criteria Identification

Section: I-76 EB; 11.246-11.336

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)			
Pavement Cross Slope			
Superelevation Rate	0.020	0.025	0.025
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Existing Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Existing Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns.

I-76 EB approaching the Central Interchange with I-77 and SR 8 is 4 lanes wide across the bridge over Brown Street (SUM-77-1127; SFN 7703031). The left-hand (median) lane is a dedicated lane for Ramp R (I-76 EB to SR 8 NB). The right-hand (outside) lane is a dedicated lane for Lane M (I-76 EB to I-77 NB). The middle two lanes are dedicated for the I-76 EB through movement. In the proposed condition, the diverge to Ramp R is shifted west to increase its horizontal radius and allow for it to vertically climb to get over existing I-76 WB. Moving this diverge west pushes the nose of the diverging gore west of the existing I-76 bridge over Brown Street and the interchange gore spreads across the entire length of the bridge. At this diverging gore, I-76 EB is on a 8,185-foot radius horizontal curve to the right (degree of curve = 0.70°), and the Ramp R horizontal alignment is on a 22,918-foot radius curve to the right (degree of curve = 0.25°). The horizontal curve radius for I-76 EB requires 0.020 superelevation to meet 60-mph design standards. The existing superelevation of I-76 on the bridge over Brown Street is 0.025. The existing bridge is about 90 feet wide and carries 4 lanes of I-76 EB. This bridge is a twin structure to the structure immediately to the north carrying 4 lanes of I-76 WB, separated by a foot, with a concrete barrier between the two directions of travel. There are no pavement cross slope breaks between travel lanes along the I-76 EB bridge. The proposed superelevation of I-76 EB across this bridge is 0.025 to match the existing across the bridge.

Proposed Mitigation

None.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-8, the superelevation required for I-76 EB for the 8,185-foot horizontal radius at 60-mph design standards is 0.020. The proposed superelevation for this horizontal curve along I-76 EB is 0.025. This was done to match the superelevation of the existing bridge. When it was constructed, 0.025 superelevation was required to meet 60-mph design standards using rural highway criteria (0.083 max superelevation rate). During this time, superelevation rate was determined by a simple formula. Now it is determined by AASHTO Method 5. Since the time when this section of I-76 was constructed, the maximum superelevation rate for rural highway criteria has been revised from 0.083 max to 0.08 max. As it stands, if this horizontal curve was constructed today along this section of I-76, it would be designed and constructed using urban highway criteria, which utilizes 0.06 maximum superelevation rate. Using this revised criterion, this horizontal curve would require 0.020 superelevation to meet 60-mph design standards for the same curve that originally required 0.025 cross slope. This bridge is being widened to the south, and only a minor overlay is being proposed across the bridge outside of the widening. Flattening the superelevation of this bridge deck from 0.025 to 0.020 would cut into the existing superstructure and would require it to be replaced. This bridge was just modified two years ago with a new concrete deck and is now in excellent condition. Replacing the existing superstructure would add an additional \$1,700,000 in construction cost to the project and would most likely require replacement of the concrete barrier and closed drainage system across and adjacent to the bridge to meet the safety requirements for barrier height along an interstate.

The crash history for this section of I-76 over the existing bridge over Brown Street shows only 5 crashes in the past three years. All these crashes were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry. This project is improving the lane utilization for I-76 EB, improving the geometrics of Ramp R, and increasing the deceleration length for the Ramp R diverge. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. It is not anticipated that the extra cost and impacts to reduce the superelevation across this bridge would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of I-76 over the existing bridge over Brown Street shows only 5 crashes in the past three years. All these crashes were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry.

Signature Certificate



Document Reference: U2C89HI2SJSVJKUP49PHTU

RightSignature
Easy Online Document Signing



David Holstein

Party ID: NH4B42I3KJUXCEYNGH89DS

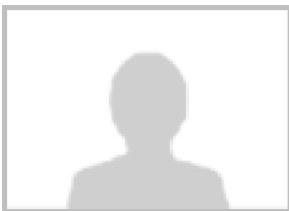
IP Address: 156.63.69.14

VERIFIED EMAIL: dave.holstein@dot.ohio.gov

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

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Tom Bolte

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Digital Fingerprint Checksum

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Audit

All parties have signed document. Signed copies sent to: Christi Collins, David Holstein, and Tom Bolte.

Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.69.14

Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.69.14

Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158

Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158

Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158

Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.69.133



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Design Exception Request

SUM-76-11.31

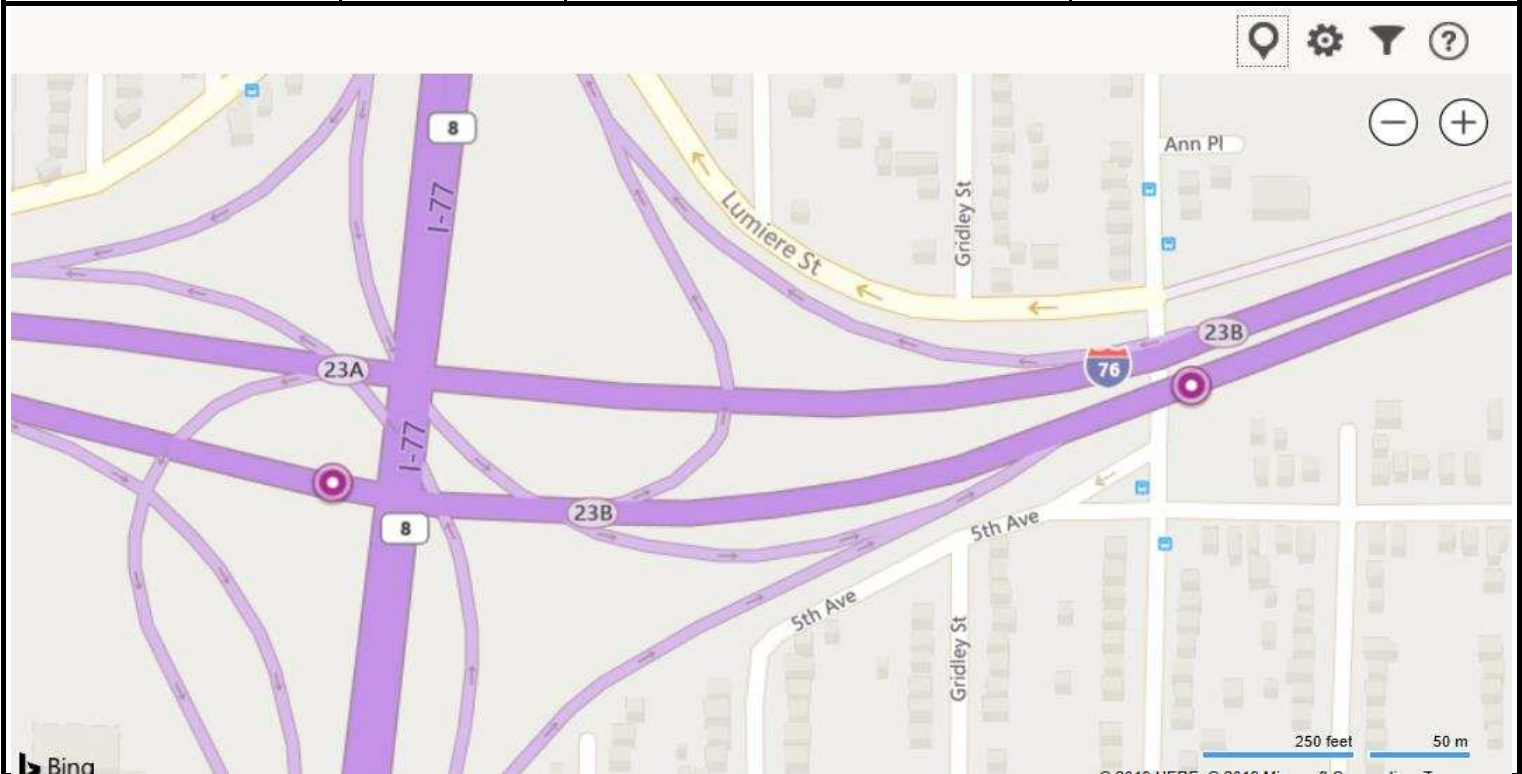
PID: 101402; Request 11

Letting Type: ODOT-Let

Design Designation

I-76 EB; 11.535-11.81

Current ADT (2020)	59,980	Td	0.11
Design Year ADT (2040)	62,600	Design Speed	60
Design Hourly Volume (2040)	6,030	Legal Speed	55
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	6886	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

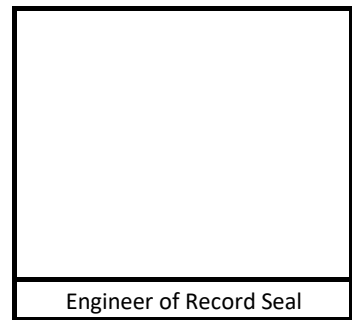
(Engineer of Record)

Approved by:

D Holstein

David Holstein

Approval Date: 11/6/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 11

Controlling Criteria Identification

Section: I-76 EB; 11.535-11.81

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)			
Pavement Cross Slope			
Superelevation Rate	0.052	0.035	0.035
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Existing Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Existing Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns.

I-76 EB departing the Central Interchange with I-77 and SR 8 is 2 lanes wide across the I-76 bridge over SR 8 (SUM-76-1152R). This 2-lane section is joined by a single lane from the SR 8 SB to I-76 EB ramp (Lane S) and a single lane from the I-77 NB to I-76 EB ramp (Ramp T) to make four lanes across the existing I-76 bridge over Inman Street (SUM-76-1179R). From the bridge over SR 8 to the bridge over Inman Street, I-76 EB is on a 2,162-foot radius horizontal curve to the left (degree of curve = 2.65°). The existing superelevation rate of I-76 in this section is 0.035. The existing bridge over SR 8 is a curved structure that is about 60 feet wide and carries 3 lanes of I-76 EB since the left-hand lane is a drop lane to the existing Ramp R. The existing bridge over Inman Street is a tangent structure that is about 90 feet wide and carries 4 lanes of I-76 EB. This bridge is a twin structure to the structure immediately to the north carrying 4 lanes of I-76 WB, separated by a foot, with a concrete barrier between the two directions of travel. There are no pavement cross slope breaks between travel lanes along either of these two existing bridges. The proposed superelevation rate of I-76 EB from SR 8 to Inman Street matches the existing cross slope of 0.035.

Proposed Mitigation

None.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 202.4.1 and Figure 202-8, the superelevation required for I-76 EB for the 2,162-foot horizontal radius at 60-mph design standards is 0.052. The proposed superelevation for this horizontal curve along I-76 EB is 0.035. This was done to match the existing superelevation of the existing bridges and the pavement section between the two bridges. I-76 EB's pavement is being replaced in the same horizontal and vertical location as the existing pavement with no grading outside of the pavement being required. Increasing the superelevation along I-76 EB from 0.035 to 0.052 in this section would require the vertical grade of the SR 8 SB to I-76 EB to be increased from +4.0% to +4.2%. This would also further complicate the existing entrance gore between these two roadways and the I-77 NB to I-76 EB ramp by creating multiple cross slope breaks within the gore to get the desired cross slope for all three roadways. Finally, increasing the superelevation rate would require the replacement of both of the bridges. Replacing the existing bridges, the pavement, and the retaining wall between I-76 EB and the existing SR 8 SB to I-76 EB ramp would add an additional \$6.5M in construction cost to the project.

The crash history for this section of I-76 EB from SR 8 to Inman Street shows 62 crashes in the past three years. 54 of these 62 (87%) of these crashes were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry. This project is improving the lane utilization for I-76 EB, improving the geometrics of Ramp R, and increasing the deceleration length for the Ramp R diverge. In the existing condition, this section is where existing Ramp R is diverging from I-76 EB with a speed differential between the ramp and the mainline that is significant. In the proposed design, Ramp R's diverge is farther west and is provided a larger radius and higher design speed, reducing the speed differential between the two alignments. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. It is not anticipated that the extra cost and impacts to increase the superelevation rate along I-76 EB between SR 8 and Inman Street would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of I-76 EB from SR 8 to Inman Street shows 62 crashes in the past three years. 54 of these 62 (87%) of these crashes were rear end and sideswipe passing crashes, which is indicative of congestion and not due to deficient roadway geometry.

Signature Certificate

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RightSignature
Easy Online Document Signing

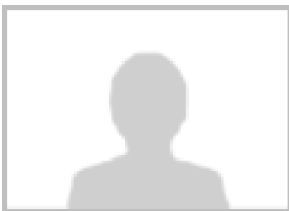


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Tom Bolte
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Audit

All parties have signed document. Signed copies sent to: Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.69.14
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.69.14
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
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Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.69.133



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Design Exception Request

SUM-76-11.31

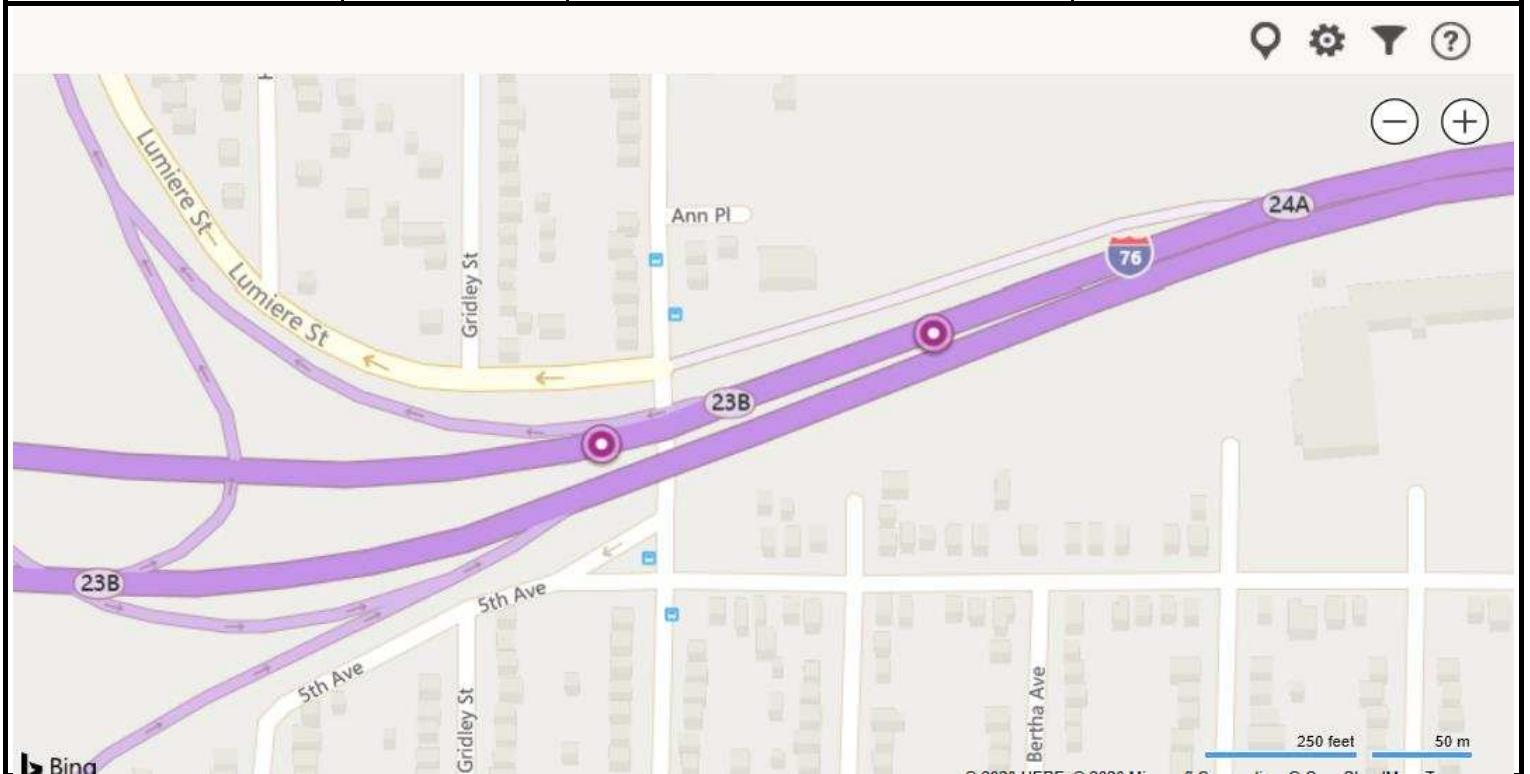
PID: 101402; Request 12

Letting Type: ODOT-Let

Design Designation

I-76 WB; 11.783-11.896

Current ADT (2020)	39,330	Td	0.13
Design Year ADT (2040)	40,630	Design Speed	60
Design Hourly Volume (2040)	5,200	Legal Speed	55
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	5282	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

Tom Bolte

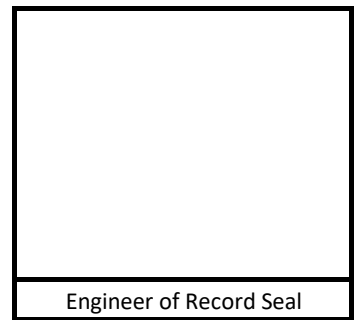
(Engineer of Record)

Approved by:

Brent Bogard

Brenton Bogard

Approval Date: 2/24/2020



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 12

Controlling Criteria Identification

Section: I-76 WB; 11.783-11.896

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 feet	4 feet	4 feet
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Existing Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Existing Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns. East of the I-76 bridge over Inman Street (SUM-76-1179L), the existing left (median) shoulder along I-76 is 4 feet wide.

In the proposed condition, the diverge to Ramp N is shifted east to increase its horizontal radius and allow for it to vertically climb to get over existing I-76 EB. The I-76 WB lanes from the eastern limits of the project to Inman Street are being shifted north away from the median barrier to accommodate this new diverge to Ramp N. In this section from the eastern project limits to Inman Street in the area where the Ramp N diverge is being developed, the left (median) shoulder remains 4 feet wide. Immediately west of the I-76 WB over Inman Street bridge, the left shoulder width increases to 10 feet. The horizontal alignment through this section of I-76 is along a curved alignment to the right in the direction of travel as a 2,546-foot radius horizontal curve (degree of curve = 2.25°). This 4-foot wide shoulder is on the outside of this horizontal curve.

Proposed Mitigation

Rumble strips will be used along the pavement edge line, and barrier reflectors will be used along the median barrier. These measures will provide audio and visual reference to the proximity of the median barrier.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Section 301.2.3 and Figure 301-3, the left and right shoulder widths along I-76 should be 10 feet wide when the number of travel lanes exceed two in a single direction of travel. The proposed typical section of I-76 throughout this section perpetuates the shoulder width in the existing condition. The existing left (median) shoulder width in this section is 4 feet; the proposed improvements provide a constant left shoulder width of 4 feet.

The 4-foot wide left shoulder is maintained until west of the I-76 WB over Inman Street bridge to avoid widening the existing bridge and reducing the shoulder width of I-76 EB. The proposed shoulder width east of Inman Street matches the existing shoulder width. Widening the shoulder from 4 feet to 10 feet would require shifting the I-76 WB lanes to the north, requiring additional widening of the pavement, widening of the I-76 over Inman Street bridge, and the potential closure or need for a retaining wall between the I-76 WB to SR 8 NB ramp and Lumiere Street. Using a 70:1 taper rate, it would require 420 feet to transition the shoulder to the standard width. With only 550 feet from the eastern edge of the bridge over Inman Street to the eastern project limits, all these additional impacts would only yield an additional 130 feet of 10-foot wide shoulder. Because the horizontal geometry is along a curved alignment to the right and this shoulder is on the outside of the curve, horizontal stopping sight distance is not impinged by the 4-foot shoulder width.

The crash history for this segment of I-76 WB indicates that the majority of crashes (92 of 106 in the past three years) that have occurred are rear-ends and sideswipe-passing crashes, which are typically associated with congestion. This proposed project will improve the congestion in this section by improving the geometry, lane utilization, and deceleration length of the adjacent ramps along the mainline. This will allow traffic to move at a similar speed across all lanes of traffic, which will improve traffic flow and reduce congestion.

In all, the crash history at this location do not show a crash pattern resulting from substandard shoulder width. Widening the left shoulder along I-76 to 10 feet would increase the impacts along I-76 and Lumiere Street and would yield only a short section of I-76 that would utilize a standard shoulder width. It is not anticipated that these extra impacts would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this segment of I-76 WB indicates that the majority of crashes (92 of 106 in the past three years) that have occurred are rear-ends and sideswipe-passing crashes, which are typically associated with congestion.

Signature Certificate



Document Reference: PJXINFIZ75UWJCWX6GACFP

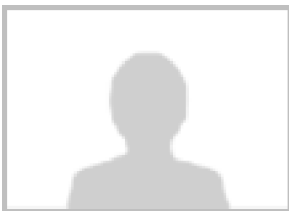


Brenton Bogard
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Multi-Factor
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7385d3e2ae3745674c1be863f2ac2dff3d2124e9



Tom Bolte
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Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

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2020-02-25 07:15:58 -0800
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2020-02-25 05:50:13 -0800

Audit

All parties have signed document. Signed copies sent to: Brenton Bogard, Tom Bolte, and Christi Collins.
Document signed by Brenton Bogard (brenton.bogard@dot.ohio.gov) with drawn signature. - 156.63.69.14
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document viewed by Brenton Bogard (brenton.bogard@dot.ohio.gov). - 40.107.235.44
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.69.14



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Design Exception Request

SUM-76-11.31

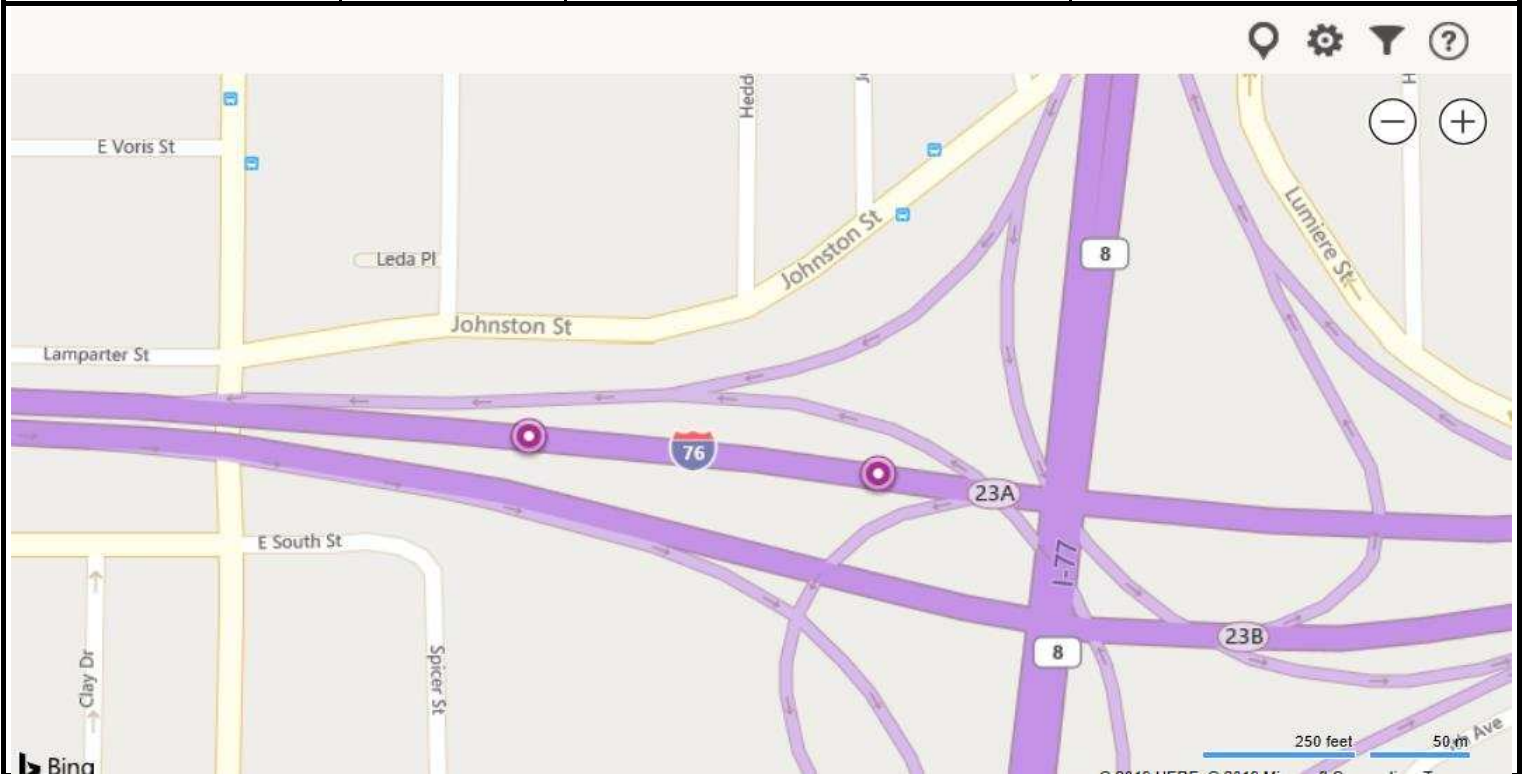
PID: 101402; Request 13

Letting Type: ODOT-Let

Design Designation

I-76 WB; 11.387-11.501

Current ADT (2020)	24,990	Td	0.09
Design Year ADT (2040)	24,740	Design Speed	60
Design Hourly Volume (2040)	3,900	Legal Speed	55
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	2227	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

Thomas Bolte

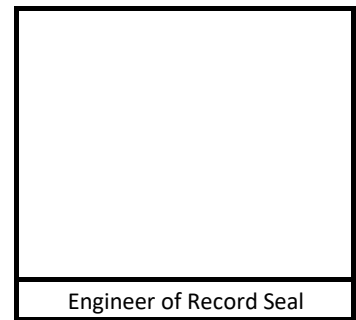
Tom Bolte
(Engineer of Record)

Approved by:

D. Holstein

David Holstein

Approval Date: 6/28/2019



Engineer of Record Seal

Design Exception Request

SUM-76-11.31

PID: 101402; Request 13

Controlling Criteria Identification

Section: I-76 WB; 11.387-11.501

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest)	570 feet (VSSD)	431 feet (VSSD)	431 feet (VSSD)
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

This project is the first identified project from the Akron Beltway Planning Study and is to reconstruct the left-handed exit ramps (Ramps N and R) from both I-76 WB and EB in the Akron Central Interchange. Existing Ramp R (I-76 EB to SR 8 NB) exits from I-76 EB on the left on the back side of an existing crest vertical curve along I-76. The first horizontal curve along Ramp R meets 25-mph design standards with minimal deceleration length available along I-76 prior to this curve to transition to a lower speed. Existing Ramp N (I-76 WB to I-77 SB), like Ramp R, exits from I-76 WB on the left side on the back side of an existing crest vertical curve and has the same low-speed geometrics along the ramp with minimal deceleration length along I-76 to transition to a lower speed. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will reconfigure the lane assignments along I-76 EB and WB to provide drop lanes for the exiting ramps in each direction as well as two through lanes along I-76 to address both safety and operations concerns. West of the I-76 WB bridge over SR 8 (SUM-76-1152R), the existing vertical alignment is along a crest vertical curve utilizing a -0.28% grade intersecting a -4.40% grade (in the direction of travel which is opposite of the direction of stationing) using a 338-foot long vertical curve. The existing condition yields a vertical stopping sight distance (VSSD) through this vertical curve of 431 feet, which achieves 50-mph design standards.

In the proposed condition, the diverge to Ramp N is shifted east to increase its horizontal radius and allow for it to vertically climb to get over existing I-76 EB. The new diverge occurs nearly 1,000 feet east of the existing bridge over SR 8. Between this new diverge and SR 8, I-76 WB is on a new horizontal alignment and vertical alignment to facilitate the additional width between the two directions of I-76 to allow for the new Ramp N alignment to be positioned. I-76 WB travels across the bridge over SR 8 on the existing horizontal and vertical geometry and continues to match the existing horizontal and vertical geometry to the western edge of the project limits. West of the bridge over SR 8, the proposed vertical geometry is along a crest vertical curve utilizing a -0.28% grade intersecting a -4.40% grade (in the direction of travel which is opposite of the direction of stationing) using a 338-foot long vertical curve. The proposed vertical stopping sight distance provided is 431 feet, which meets the existing condition. In this section, the pavement is being replaced, but no proposed widening or grading is to be done.

Proposed Mitigation

None.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The proposed design speed for I-76 is 60 mph. Per ODOT L&D Volume 1, Section 201.2 and Figure 201-1, a facility that meets 60-mph design standards should provide 570 feet of available stopping sight distance. The proposed profile of I-76 west of the bridge over SR 8, which matches the existing profile, meets 50-mph design standards for vertical stopping sight distance. Other than pavement replacement, no work is anticipated to be completed to I-76 in this section as part of this project. No work is being completed along the I-76 WB over SR 8 bridge as part of this project. To achieve an increase in the VSSD, the vertical curve would need to be lengthened from 338 feet to 620 feet assuming the same vertical grades are to be maintained. This would require the vertical curve to extend back onto the existing bridge nearly 150 feet. This would require the bridge to be replaced, adding approximately \$3.6M to the construction cost. Lengthening the vertical curve from 338 feet to 620 feet would lower the proposed elevation over the existing I-77 NB to I-76 WB/I-77 NB ramp (Lane O) 0.66 feet. The existing minimum vertical clearance between I-76 WB and Lane O is 15.25 feet. Reducing this vertical clearance another 0.66 feet would create a safety concern as this would have a resulting vertical clearance of 14.59 feet. Raising the I-76 WB bridge over SR 8 to accommodate the required vertical clearance over Ramp O would require additional retaining walls between both Ramp R and Lane O, and would shift the entrance gore where Lane O merges into I-76 WB west about another 240 feet, reducing the weave distance between it and the next adjacent diverge along I-76 WB at Main Street.

In the existing condition, the diverge to Ramp N is located on the backside of the existing vertical curve, creating a “blind” exit for vehicles wishing to diverge onto Ramp N due to the pavement obstructing the view of the exit. This creates situations where vehicles are slowing down abruptly along the mainline to exit successfully from the freeway. In the proposed condition, the Ramp N diverge is shifted east to just west of the bridge over Inman Street. As a result, there is no longer a decision point for drivers as they approach and travel through this vertical curve.

The crash history for this section of I-76 WB from SR 8 to the western project limits shows 22 crashes in the past three years. 19 of these 22 (87%) of these crashes were rear end and sideswipe passing crashes, which is indicative of congestion. This project is improving the lane utilization for I-76 WB, improving the geometrics of Ramp N, and increasing the deceleration length for the Ramp N diverge. In the existing condition, this section is where existing Ramp N is diverging from I-76 WB with a speed differential between the ramp and the mainline that is significant. In the proposed design, Ramp N’s diverge is farther east and is provided a larger radius and higher design speed, reducing the speed differential between the two alignments. Without Ramp N’s diverge in this section now, speeds should be nearly uniform between lanes for I-76 WB across this vertical curve. This is expected to reduce the frequency of vehicles being forced to slow down significantly through this section. It is not anticipated that the extra cost and impacts to increase the vertical stopping sight distance along I-76 WB between SR 8 and the western project limits would yield a safety benefit at this location.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?**Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?**

Signature Certificate

 Document Reference: CTFANKIY74GVUFVL2WT954

RightSignature
Easy Online Document Signing

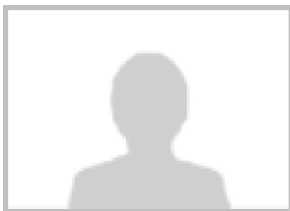


David Holstein
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16a68c8038ad6c2d4a64219a86e94e610bfea037



Tom Bolte
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Multi-Factor
Digital Fingerprint Checksum

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2019-07-03 08:04:29 -0700
2019-07-03 07:58:03 -0700
2019-07-01 04:28:37 -0700

Audit

All parties have signed document. Signed copies sent to: Derek Troyer, Thomas Powell, Christi Collins, David Holstein, and Tom Bolte.
Document signed by David Holstein (dave.holstein@dot.ohio.gov) with drawn signature. - 156.63.133.86
Document viewed by David Holstein (dave.holstein@dot.ohio.gov). - 156.63.133.86
Document signed by Tom Bolte (tom.bolte@burgessniple.com) with drawn signature. - 159.63.2.158
Tom Bolte attached a file (Filename: bolte_ohio_PE_stamp.pdf) - 159.63.2.158
Document viewed by Tom Bolte (tom.bolte@burgessniple.com). - 159.63.2.158
Document created by Christi Collins (christi.collins@dot.ohio.gov). - 156.63.133.86



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Design Exception Request

SUM-76-11.31

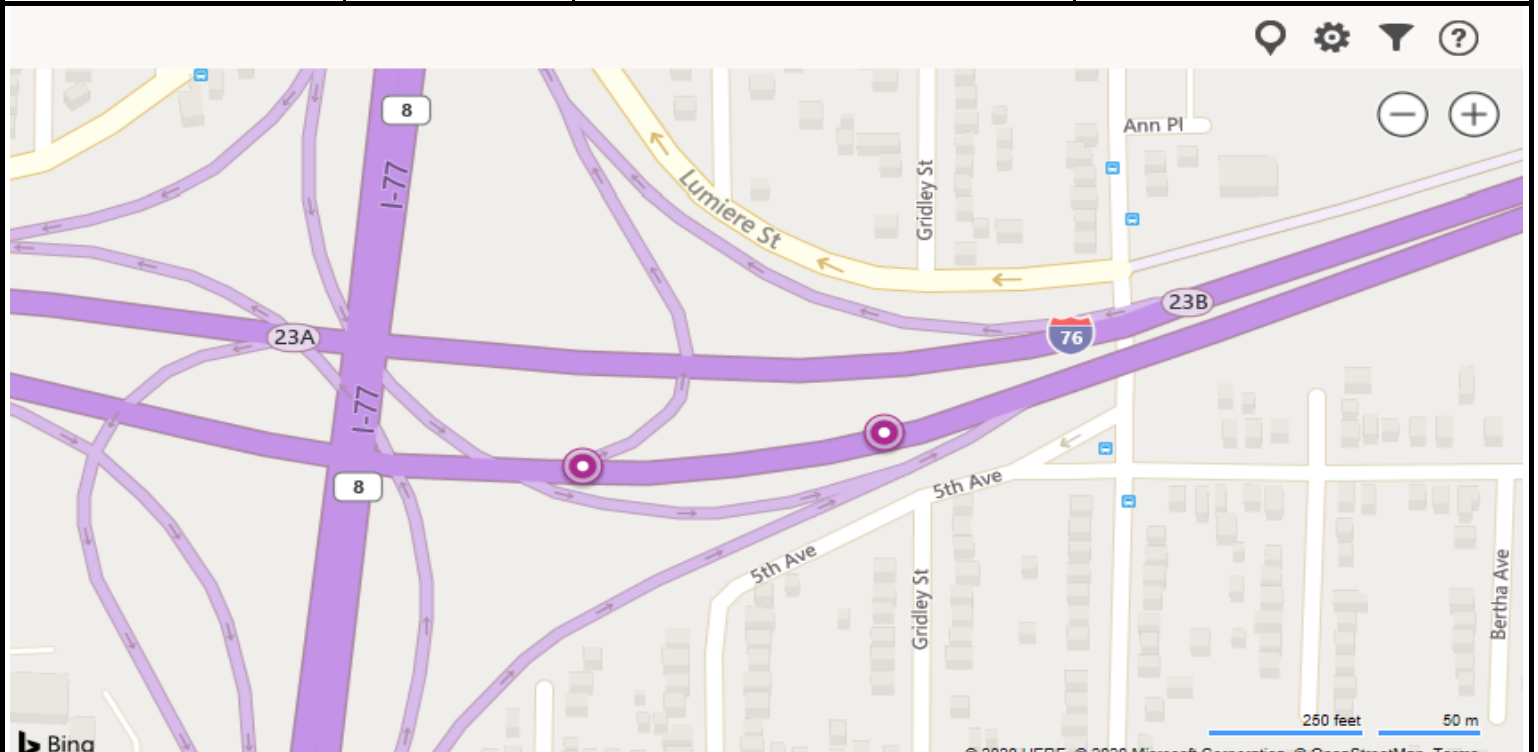
PID: 101402; Request 14

Letting Type: ODOT-Let

Design Designation

I-76 EB; 11.629-11.72

Current ADT (2020)	22,610	Td	6%
Design Year ADT (2040)	22,620	Design Speed	60
Design Hourly Volume (2040)	2,930	Legal Speed	55
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	8%	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Tom Bolte
on 2020-05-13 18:53:29 GMT

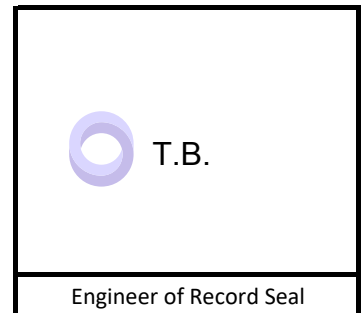
Tom Bolte
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-05-14 10:11:18 GMT

Brenton Bogard

Approval Date: 5/13/2020



Design Exception Request

SUM-76-11.31

PID: 101402; Request 14

Controlling Criteria Identification

Section: I-76 EB; 11.629-11.72

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)	570 feet (VSSD)	461 feet (VSSD)	461 feet (VSSD)
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

The pavement along IR-76 EB between SR-8 and the existing I-77/SR-8 to IR-76 EB entrance ramp terminal is in poor condition and is being replaced to match the existing horizontal and vertical roadway geometry. The existing geometry at this location contains a 450-foot vertical curve that starts on the bridge over SR-8 and ends just before a sag curve near the entrance ramp terminal where vehicles from I-77/SR-8 enter IR-76 EB. This vertical curve meets 52-mph design standards by achieving 461 feet of vertical stopping sight distance.

Proposed Mitigation

As part of this project, the exit ramp location from I-76 EB to SR-8 NB will be relocated. The existing ramp diverge is located within this existing vertical curve. The proposed ramp diverge will be located several hundred feet west of this vertical curve. The relocation of this ramp diverge is needed for better sight distance for vehicles approaching this diverge to be able to see the decision point. This relocation will reduce congestion and reduce rear end collisions by eliminating the abrupt and random braking that currently occurs as driver's negotiate this existing ramp diverge in the middle of the vertical curve.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The proposed design speed for IR-76 at this location is 60-mph. Per ODOT L&D Volume 1, Section 203.3.3 and Figure 203-3, a facility that meets 60-mph design standards should provide 570 feet of available stopping sight distance. The existing vertical curve at this location currently provides an available stopping sight distance of 461 feet which allows for a design speed of 52-mph. The proposed profile as part of this project for IR-76 begins just east of the bridge over SR-8 and uses a shorter vertical curve to approximate the existing profile while not extending the curve into the bridge limits. This profile will retain the existing 461 feet of vertical stopping sight distance. Other than pavement replacement, no work is anticipated in this section of IR-76 and the bridge over SR-8 is only receiving minor rehab work as part of the design build project. To meet 60-mph design standards for stopping sight distance, the crest vertical curve would need to be longer than the existing length of 450 feet. Lengthening the vertical curve would require the curve to extend approximately 225 feet onto the existing bridge. This would lower the profile of the existing bridge approximately 1.2 feet which would reduce vertical clearance over Lane O and Lane S which are currently 16.2 feet and 16.1 feet respectively. In order to accommodate this change to the existing vertical geometry, the bridge and retaining wall running adjacent to IR-76 eastbound just beyond the bridge would need to be replaced adding \$5M to the construction cost of this project.

The crash history for this section of IR-76 EB between SR-8 and the entrance ramp from IR-77/SR-8 shows only five crashes in the past three years. Three of these five crashes were rear end and sideswipe passing crashes, which is indicative of congestion. The remaining two crashes were classified as fixed object crashes. One of these two were a result of trying to avoid a rear end crash so could also be attributed to the existing congestion problem. In the existing condition, the ramp from IR-76 EB to SR-8 NB exits IR-76 EB as a left-hand ramp located on the back side of this vertical curve. This means that it is hidden from view by the vertical curve for approaching vehicles on IR-76 EB. This results in an increase in braking, greater speed differentials between the through traffic on IR-76 EB and the exiting traffic at the ramp, and errant driving due to this increased braking as drivers attempt to change lanes to avoid being behind vehicles decelerating at a quick rate to negotiate the ramp diverge and alignment. As part of this project, this ramp diverge is being shifted west off this vertical curve and the horizontal alignment is being improved to provide a larger radius and greater design speed. This shift will improve uniformity of speeds between IR-76 EB and the ramp through this corridor and improve congestion through the interchange, including through the section where this exception applies. This decrease in congestion eliminates the likely cause of 80% of the existing crashes in this section. It is not anticipated that the extra costs and impacts to increase the available vertical stopping sight distance along IR-76 EB between the existing bridges over SR-8 and Inman Street would yield a safety benefit.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of IR-76 EB between SR-8 and the entrance ramp from IR-77/SR-8 shows only five crashes in the past three years. Three of these five crashes were rear end and sideswipe passing crashes, which is indicative of congestion. The remaining two crashes were classified as fixed object crashes. One of these two were a result of trying to avoid a rear end crash so could also be attributed to the existing congestion problem. In the existing condition, the ramp from IR-76 EB to SR-8 NB exits IR-76 EB as a left-hand ramp located on the back side of this vertical curve. This means that it is hidden from view by the vertical curve for approaching vehicles on IR-76 EB. This results in an increase in braking, greater speed differentials between the through traffic on IR-76 EB and the exiting traffic at the ramp, and errant driving due to this increased braking as drivers attempt to change lanes to avoid being behind vehicles decelerating at a quick rate to negotiate the ramp diverge and alignment. As part of this project, this ramp diverge is being shifted west off this vertical curve and the horizontal alignment is being improved to provide a larger radius and greater design speed. This shift will improve uniformity of speeds between IR-76 EB and the ramp through this corridor and improve congestion through the interchange, including through the section where this exception applies. This decrease in congestion eliminates the likely cause of 80% of the existing crashes in this section.

Design Exception Request

SUM-76-11.31

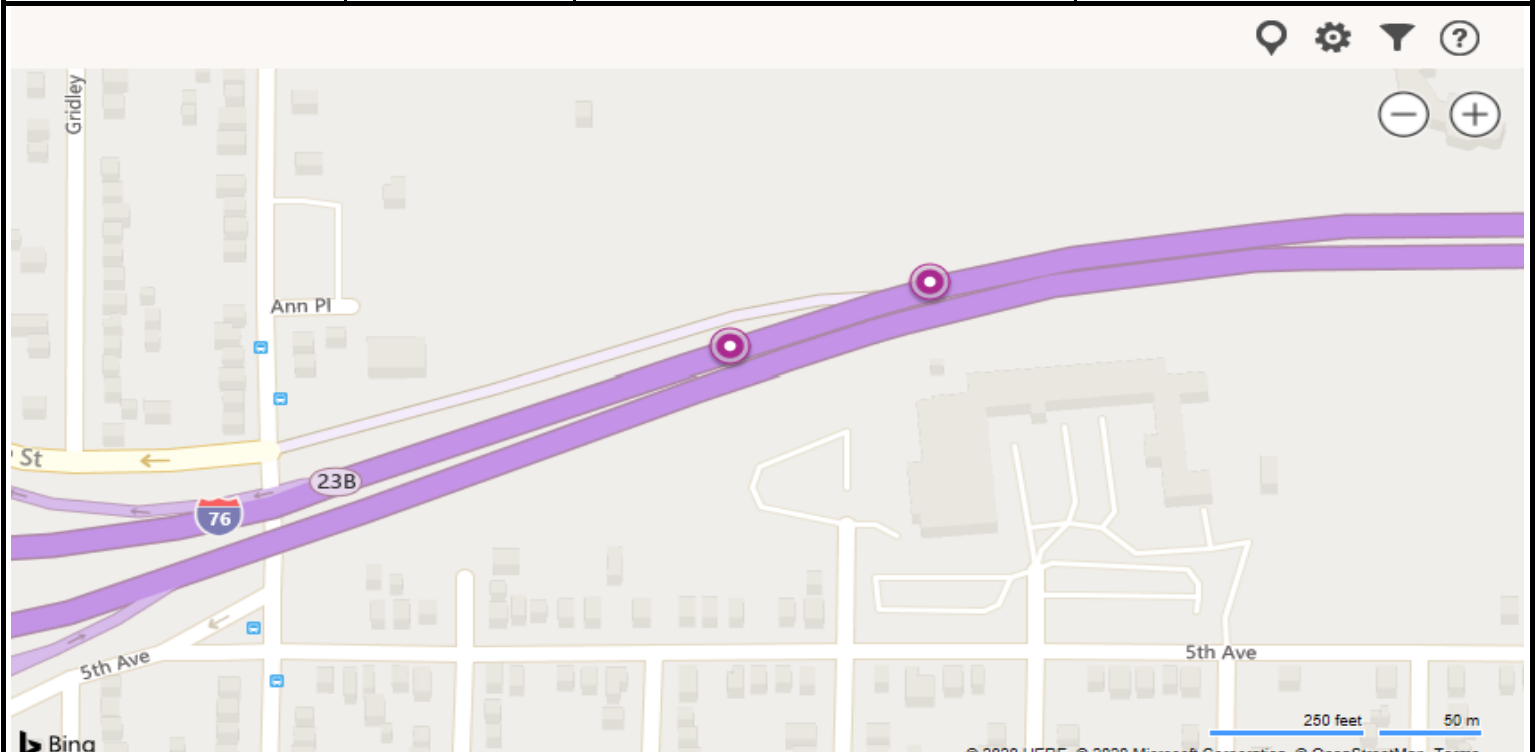
PID: 101402; Request 15

Letting Type: ODOT-Let

Design Designation

I-76 WB; 11.96-12.025

Current ADT (2020)	51,430	Td	10%
Design Year ADT (2040)	52,740	Design Speed	65
Design Hourly Volume (2040)	6,710	Legal Speed	60
Directional Distribution	100%	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	10%	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Tom Bolte
on 2020-05-29 18:39:02 GMT

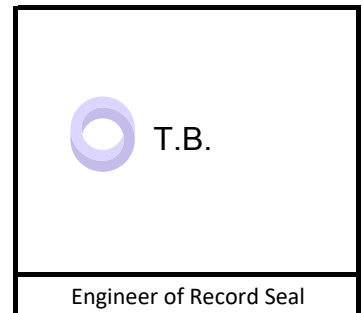
Tom Bolte
(Engineer of Record)

Approved by:

E-SIGNED by Brenton Bogard
on 2020-06-01 10:01:22 GMT

Brenton Bogard

Approval Date: 5/29/2020



Design Exception Request

SUM-76-11.31

PID: 101402; Request 15

Controlling Criteria Identification

Section: I-76 WB; 11.96-12.025

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width			
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)	645 feet (VSSD)	541 feet (VSSD)	541 feet (VSSD)
Pavement Cross Slope			
Superelevation Rate	0.050	0.030	0.030
Vertical Clearance			
Design Loading Structural			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

This project is the first identified project from the Akron Beltway Planning Study and is to replace the left-handed exit ramps (Ramps N and R) from both WB and EB I-76 in the Akron Central Interchange. Reconstruction of these ramps will address both the poor bridge conditions and the substandard ramp geometrics. This project will also reconfigure the lane arrangements along WB and EB I-76 to provide drop lanes for NB and SB exits in each direction as well as two thru lanes movements for I-76 to address both safety and operations.

Section Description

The eastern project terminus for the IR-76 WB lanes is within an existing 1,100-foot-long 2°00'00" horizontal curve. As part of this project only 378 feet of pavement length within this horizontal curve will be replaced. The existing IR-76 WB to Inman Street exit ramp is being permanently closed and removed to improve lane utilization and interchange spacing along IR-76 WB. By removing this exit ramp, the existing ramp terminal diverge area will be reconfigured to allow the existing outside lane to continue past to the Central Interchange where it is configured as a drop lane. This will provide additional deceleration length and reduce the amount of traffic shifts and lane changes by allowing this high-volume exit to be signed farther back and give drivers plenty of warning of the exit ramp location. The portion of the horizontal curve that is being reconstructed passes under an existing pedestrian bridge that is not being disturbed with this project. The existing exit terminal for this ramp is located just west of this pedestrian bridge and at the western end of the existing 2°00'00" horizontal curve. This curve has an existing superelevation rate of 0.030. The proposed full depth pavement of this section ends 325 feet into an existing 600-foot-long crest vertical curve. The proposed full depth pavement limits at this location were determined based on what was necessary to reconstruct the pavement within the ramp terminal being removed to reconfigure the lane utilization and create the drop-lane exit for IR-76 WB at the Central Interchange.

Proposed Mitigation

This project removes the existing exit ramp to Inman Street and allows that ramp's speed-change lane to continue west over Inman Street bridge to the diverge to SR-8 NB. This adds capacity along IR-76 WB, provides better traffic flow through this section of the corridor, and reduces the amount of braking and traffic turbulence. All of this should reduce the number of congestion-related crashes, which are currently the most prominent crash-type in the past three years in this area.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

Per ODOT L&D Volume 1, Figure 202-8, the required superelevation rate for a 2°00'00" curve on an urban highway with a design speed of 65-mph is 0.050. The existing curve is currently superelevated at a rate of 0.030. In order to achieve the required superelevation rate, an additional 1,000 feet of length of IR-76 WB pavement would need to be reconstructed in order to rebuild the remainder of the horizontal curve and accommodate the superelevation transition length. This would result in the full-width of IR-76 WB, which is 64 feet wide through this section, to be reconstructed. The cost for the additional full-depth pavement replacement would be \$415,000.

Per ODOT L&D Volume 1, Section 203.3.3 and Figure 203-3, a facility that is to be designed to meet 65-mph design standards should provide 645 feet of available stopping sight distance. The existing vertical curve at this location currently provides an available stopping sight distance of 541 feet which meets 58-mph design standards. To provide the required vertical stopping sight distance, the vertical curve would need to be lengthened from 600 feet to 1052 feet. This would result in a profile that cuts approximately 3 feet below the existing ground through this vertical curve. This would extend the current work limits a minimum of 500 feet in the WB lanes and 1,800 feet in the EB direction. The roadway section at this location is in an area of rock cut and retaining walls will be needed to accommodate lowering the roadway 3 feet. The cost for the additional length of roadway work would be \$2M which includes costs for pavement, retaining walls, drainage items and concrete barrier. Also, the existing piers for the pedestrian bridge are located within the limits of this vertical curve. Lowering the profile below its existing location would impact the footings of the bridge piers resulting in the need to replace the bridge. Replacement of the pedestrian bridge would add an additional \$1M to the construction cost for this project.

The crash history for this section of IR-76 WB between the bridge over Inman Street and the bridge over South Arlington Street shows 40 crashes in the past 3 years. 30 (75%) of these crashes were rear end and sideswipe passing crashes, which is indicative of congestion. Under existing conditions, vehicles traveling westbound approaching the Central Interchange cross over Inman Street on a 3-lane wide bridge. This 3-lane section is a capacity pinch along IR-76 WB, resulting in braking and abrupt lane shifts as vehicles are forced to slow down and perform avoidance maneuvers around slowing vehicles until they get past the diverge to SR-8 NB ramp. With this project, the IR-76 WB exit to Inman Street will be closed and the former exiting lane will be reconfigured to become an additional lane of capacity across the Inman Street bridge. The additional capacity along IR-76 WB in this section and the elimination of the bottleneck over the Inman Street bridge will allow traffic to flow with less braking or lane shifts, which should greatly decrease the number of crashes in this area. Most of the crashes in this section are related to congestion and not substandard highway geometrics; therefore, it is unlikely that increasing the existing rate of superelevation and/or lengthening the vertical curve would provide any additional significant reduction in the number of crashes or yield a safety benefit along IR-76 WB between the bridge over Inman Road and the pedestrian bridge.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

No. The crash history for this section of IR-76 WB between the bridge over Inman Street and the bridge over South Arlington Street shows 40 crashes in the past 3 years. 30 (75%) of these crashes were rear end and sideswipe passing crashes, which is indicative of congestion. Under existing conditions, vehicles traveling westbound approaching the Central Interchange cross over Inman Street on a 3-lane wide bridge. This 3-lane section is a capacity pinch along IR-76 WB, resulting in braking and abrupt lane shifts as vehicles are forced to slow down and perform avoidance maneuvers around slowing vehicles until they get past the diverge to SR-8 NB ramp. With this project, the IR-76 WB exit to Inman Street will be closed and the former exiting lane will be reconfigured to become an additional lane of capacity across the Inman Street bridge. The additional capacity along IR-76 WB in this section and the elimination of the bottleneck over the Inman Street bridge will allow traffic to flow with less braking or lane shifts, which should greatly decrease the number of crashes in this area.