

Technical Memorandum

DATE: March 28, 2011

TO: Stan Lukasz, DAAR Engineering, WisDOT SE Region LPMC

FR: John Elkin, R.A. Smith National Project Manager

CC: Peter Daniels, City of West Allis

RE: ID 2160-14-00
S 76th Street, City of West Allis
W Greenfield Ave - W Pierce St
TRANS 75 Bicycle Accommodation Analysis

The following is an analysis of providing bicycle accommodations on the S. 76th Street project in accordance with Wisconsin Administrative Code Chapter Trans 75. Trans 75 requires bikeways and sidewalks in all highway reconstruction projects funded in whole or part from state funds or federal funds. Sidewalks are present along the existing S. 76th Street corridor, and curb ramps will be reconstructed to meet Americans with Disabilities Act (ADA) Standards. However, the current roadway does not have adequate width for bicycle accommodations.

Alternatives Considered

The typical existing section on S. 76th Street consists of two 21' (face of curb to face of curb) roadways separated by a 16' raised median (face of curb to face of curb). This provides a 12' travel lane and 9' parking lane in each direction. See Exhibit 1, Typical Existing Section.

The Wisconsin Department of Transportation's (WisDOT's) Facilities Development Manual (FDM) Section 11-45-10.3.3.2 indicates that when a parking lane is provided next to a travel lane, the minimum width is 12 feet for parking and a bicycle accommodation. On S 76th Street, this 12' shared lane width would require widening each roadway 3' to provide an 11' travel lane with 1' shy distance to the median curb, and a 12' shared parking/bicycle lane for a total width of 24' face of curb to face of curb.

Option #1 – Original Design

The typical finished section of the original design on S. 76th Street maintains the two 21' roadways. The existing concrete pavement would be cracked and sealed, and a 4" HMA Pavement overlay would be placed. The existing median curb and outer curb & gutter would remain, with spot replacements for existing curb and gutter that is in poor condition. This provides an 11' travel lane with 1' shy distance to the median curb, and a 9' parking lane. This option would not provide bicycle accommodations meeting the requirements of Trans 75. The estimated construction cost for this option is \$667,000. See Exhibit 2, Typical Finished Section and Exhibit 3, Construction Cost Estimates. No additional right of way would need to be purchased for construction of this option.

Option #2 – Widening Toward Terrace

This option would involve removing the existing outside curb & gutter and widening the roadway by 3' to provide an 11' travel lane with 1' shy distance to the median curb, and a 12' shared parking/bicycle lane for a total width of 24' face of curb to face of curb. This option would narrow the terrace from 9' to 6', and steepen the terrace to 8% (4% is preferred). Since the roadway widening can be done by narrowing the terrace, no additional right of way would be needed for this option, which is the same as Option #1. However, 81 mature trees that are

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present in the terrace would need to be removed and replaced, as the excavation in the terrace for the widening would impact the trees. All driveway aprons would need to be replaced. Inlets would need to be replaced, with storm sewer extensions required for all. See Exhibit 2, Typical Finished Section and Exhibit 3, Construction Cost Estimates.

Option #2 would cost approximately \$321,000 more than the original design (Option #1), which is a 48% increase. See Exhibit 3, Construction Cost Estimates. According to Trans 75.04(1), this cost would be excessively disproportionate to the need or probable use of bikeways, as it exceeds 20% of the estimated total project cost.

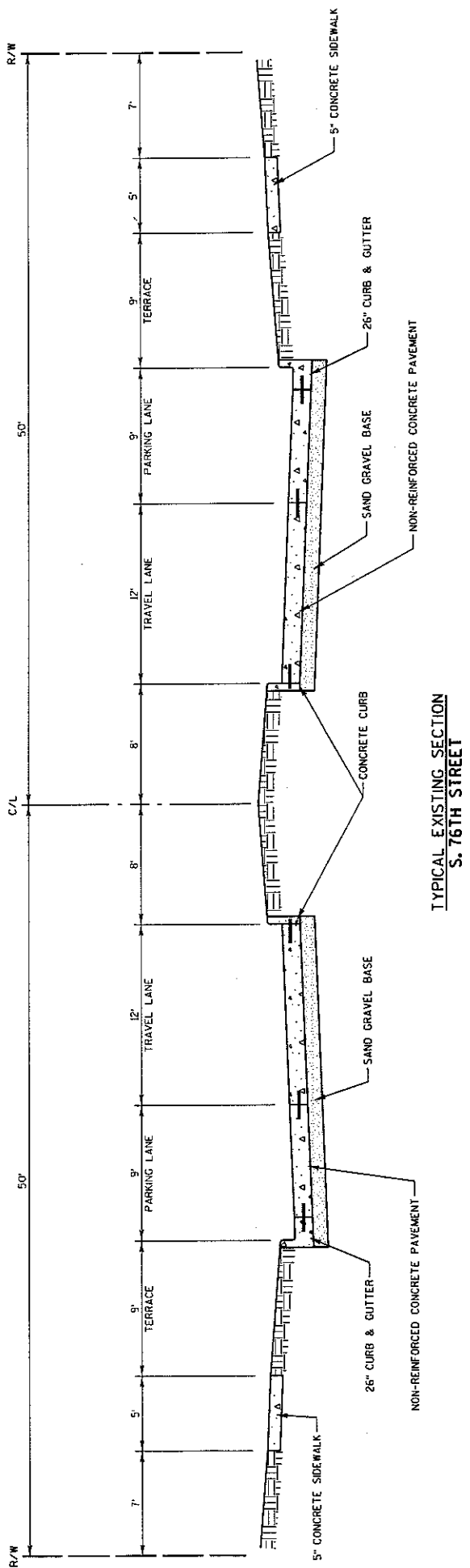
Option #3 – Widening Toward Median

Widening each roadway 3' toward the median was considered. This would narrow the median from 16' to 10'. WisDOT FDM 11-20-1.4.3 states "curbed medians are to be as wide as practical, with 30 feet normally being the maximum width. When crossing traffic is a factor, curbed medians are not to be less than 24 feet." Narrowing the median to 10' would be a significant safety concern. Traffic volumes are relatively heavy for a two-lane roadway (2033 projection is 9,600 AADT), especially during the afternoon rush hour, and vehicles crossing or turning left from side roads may choose to cross S. 76th Street in stages, stopping in the median after crossing one direction of traffic. With a 10' median, vehicles stopped in the median will unexpectedly overhang into the through lanes, increasing the potential for collisions with through traffic. While the 16' existing median width is still below the 24' recommended width, it offers a lower chance of safety issues than a 10' median. Therefore, the option to widen toward the median is not recommended due to safety concerns.

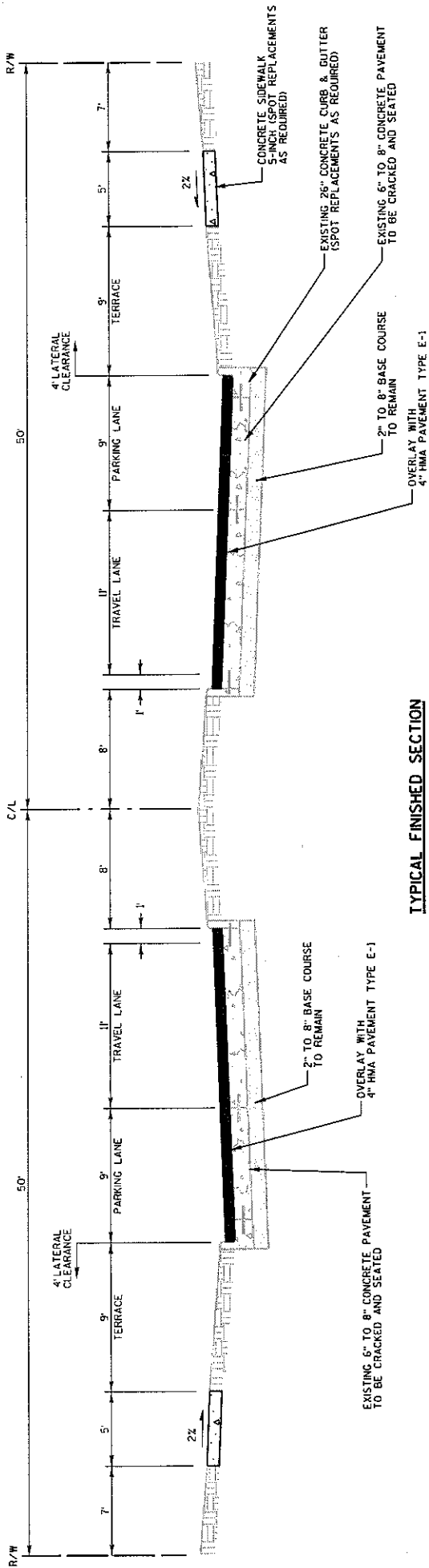
Conclusions and Recommendations

Option #1 is recommended for the S. 76th Street project. Option #1 is the lowest cost option but would not provide bicycle accommodations along the corridor. Option #2 presents a 48% construction cost increase over Option #1 and would require the removal of 81 mature trees along the corridor. See Exhibit 3A and 3B for construction costs for Option #1 and Option #2. Option #3 raises safety concerns due to the reduced median width and was not analyzed further.

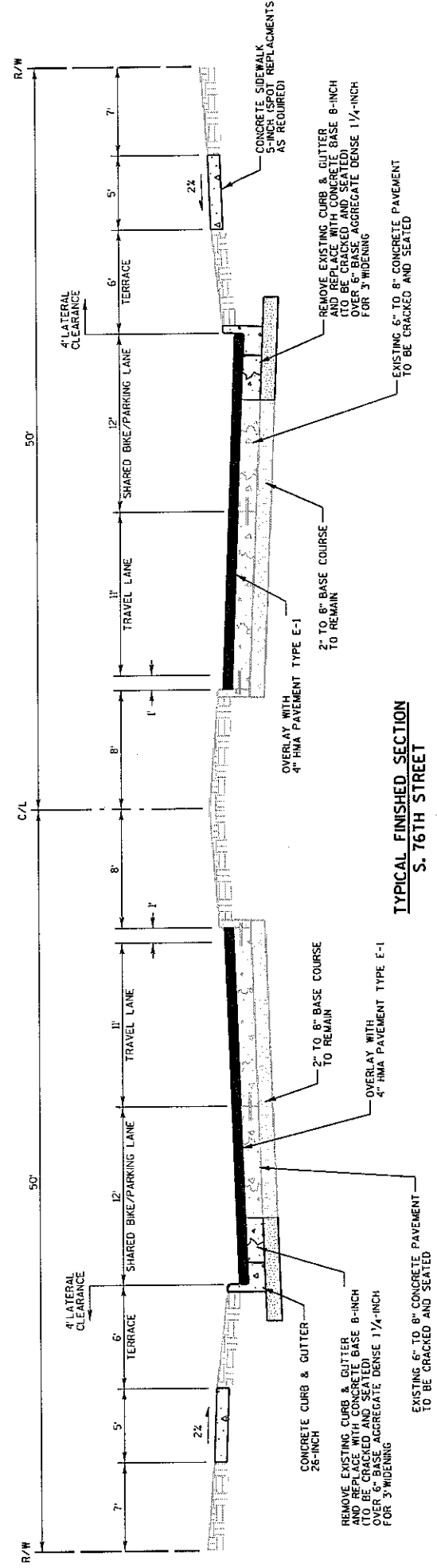
To mitigate the lack of bicycle accommodations on S. 76th Street, Shared Lane Use Arrows ("Sharrows") should be added to the pavement. According to section 9C.07 the Manual on Uniform Traffic Control Devices (MUTCD), the "Sharrow" can be used to "Assist bicycles with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane", which would apply to this segment of S 76th Street.



TYPICAL EXISTING SECTION
S. 76TH STREET



**TYPICAL FINISHED SECTION
S. 76TH STREET
OPTION 1
NO BICYCLE ACCOMMODATIONS**



**TYPICAL FINISHED SECTION
S. 76TH STREET
OPTION 2
WITH BICYCLE ACCOMMODATIONS**

EXHIBIT 3A

CONSTRUCTION COST ESTIMATE

3/28/2011

Option #1 - Original Design

S 76th Street - West Allis

2160-14-70

Milwaukee County

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL
204.0100	1,000	SY	REMOVING PAVEMENT	\$9.00	\$9,000
204.0109.S	113,000	SF	REMOVING CONCRETE SURFACE PARTIAL DEPTH	\$0.50	\$56,500
204.0115	250	SY	REMOVING ASPHALTIC SURFACE BUTT JOINTS	\$15.00	\$3,750
204.0120	500	SY	REMOVING ASPHALTIC SURFACE MILLING	\$2.00	\$1,000
204.0130	1,250	LF	REMOVING CURB	\$5.00	\$6,250
204.0150	810	LF	REMOVING CURB & GUTTER	\$5.00	\$4,050
204.0155	710	SY	REMOVING CONCRETE SIDEWALK	\$9.00	\$6,390
205.0100	750	CY	EXCAVATION COMMON	\$12.00	\$9,000
305.0120	650	TON	BASE AGGREGATE DENSE 1 1/4-INCH	\$15.00	\$9,750
305.0135	750	TON	BASE AGGREGATE DENSE 3-INCH	\$12.00	\$9,000
320.0145	250	SY	CONCRETE BASE 8-INCH	\$30.00	\$7,500
340.0100	12,100	SY	CRACKING AND SEATING	\$0.75	\$9,075
390.0303	1,750	SY	BASE PATCHING CONCRETE	\$35.00	\$61,250
415.0090	370	SY	CONCRETE PAVEMENT 9-INCH	\$45.00	\$16,650
416.0170	200	SY	CONCRETE DRIVEWAY 7-INCH	\$45.00	\$9,000
455.0115	180	TON	ASPHALTIC MATERIAL PG64-22	\$150.00	\$27,000
460.1101	3,100	TON	HMA PAVEMENT TYPE E-1	\$50.00	\$155,000
465.0120	15	TON	ASPHALTIC SURFACE DRIVEWAYS AND FIELD ENTRANCES	\$200.00	\$3,000
601.0110	1,550	LF	CONCRETE CURB TYPE D	\$15.00	\$23,250
602.0410	3,100	SF	CONCRETE SIDEWALK 5-INCH	\$4.00	\$12,400
602.0420	3,050	SF	CONCRETE SIDEWALK 7-INCH	\$5.00	\$15,250
611.8110	15	EACH	ADJUSTING MANHOLE COVERS	\$350.00	\$5,250
611.8115	25	EACH	ADJUSTING INLET COVERS	\$350.00	\$8,750
619.1000	1	EACH	MOBILIZATION (3% OF CONSTRUCTION)	\$20,000.00	\$20,000
SPV.0060	9	EACH	ADJUSTING SANITARY MANHOLES	\$500.00	\$4,500
SPV.0090	1,300	LF	CONCRETE CURB & GUTTER 26-INCH	\$14.00	\$18,200
SPV.0165	110	SF	CONCRETE SIDEWALK 7-INCH COLORED	\$15.00	\$1,650

CONSTRUCTION SUBTOTAL \$513,000

CONSTRUCTION, MISC ITEMS (Traffic Control, Erosion Control, Marking, Removals, ETC.) 30% \$154,000

CONSTRUCTION TOTAL \$667,000

EXHIBIT 3B

BICYCLE ACCOMMODATION CONSTRUCTION COST ESTIMATE

3/28/2011

Option #2 - Additional Costs for Widening Toward Outside

S 76th Street - West Allis

2160-14-70

Milwaukee County

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL
201.0105	26	STA	CLEARING	\$300.00	\$7,800
201.0205	26	STA	GRUBBING	\$300.00	\$7,800
204.0150	4,300	LF	REMOVING CURB & GUTTER	\$5.00	\$21,500
204.0155	240	SY	REMOVING CONCRETE SIDEWALK	\$9.00	\$2,160
205.0100	1,600	CY	EXCAVATION COMMON	\$12.00	\$19,200
305.0120	1,600	TON	BASE AGGREGATE DENSE 1 1/4-INCH	\$15.00	\$24,000
305.0135	300	TON	BASE AGGREGATE DENSE 3-INCH	\$12.00	\$3,600
320.0145	1,850	SY	CONCRETE BASE 8-INCH	\$30.00	\$55,500
340.0100	1,850	SY	CRACKING AND SEATING	\$0.75	\$1,388
416.0170	230	SY	CONCRETE DRIVEWAY 7-INCH	\$45.00	\$10,350
455.0115	25	TON	ASPHALTIC MATERIAL PG64-22	\$150.00	\$3,750
460.1101	400	TON	HMA PAVEMENT TYPE E-1	\$50.00	\$20,000
520.8000.S	22	EACH	CULVERT PIPE CONCRETE COLLAR	\$250.00	\$5,500
602.0410	1,400	SF	CONCRETE SIDEWALK 5-INCH	\$4.00	\$5,600
608.0412	80	LF	STORM SEWER PIPE REINFORCED CONCRETE CLASS IV 12-INCH	\$100.00	\$8,000
608.0415	3	LF	STORM SEWER PIPE REINFORCED CONCRETE CLASS IV 15-INCH	\$130.00	\$390
611.0225	22	EACH	MANHOLES TYPE 11	\$1,300.00	\$28,600
611.0657	22	EACH	INLET COVERS TYPE W	\$500.00	\$11,000
SPV.0060	81	EACH	TREES	\$300.00	\$24,300
SPV.0090	4,300	LF	CONCRETE CURB & GUTTER 26-INCH	\$14.00	\$60,200

CONSTRUCTION SUBTOTAL

\$321,000

PERCENTAGE OF ORIGINAL ESTIMATE

48%

Note: The estimate for this option only includes costs in excess of the original design.