

E. Kenwood Boulevard & N. Lake Drive Traffic Analysis

By

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Masters of Urban Planning

Pedestrian & Bicycle Transportation
May, 2018



Project Brief

- E. Kenwood Boulevard & N. Lake Drive
Pedestrian & Bicycle Analysis
- Two Hour traffic count
- Existing Street Conditions
- Proposed Intervention
- Cost Estimates
- Design Guidelines & Resources



Site Aerial

Intersection Analysis

Traffic, Bike, & Pedestrian counts, Crash Data



Count Data

Peak Travel Time
16:40-18:40

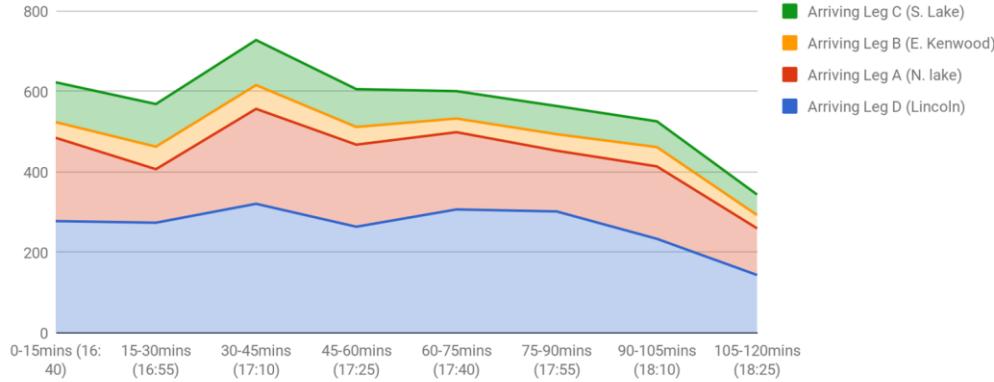


Data Collection

Vehicle Counts

Thursday April 19th, 2018 16:40-18:40 CST (43° - Clear)

Automobile Crossings - By Leg

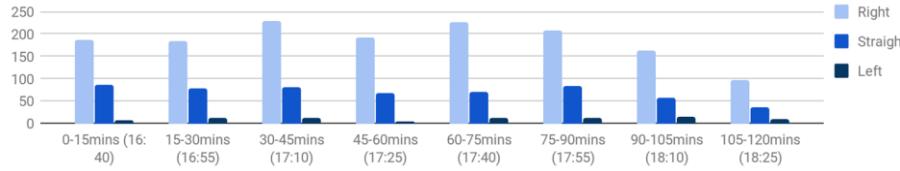


2hr Automobile Total : 4561

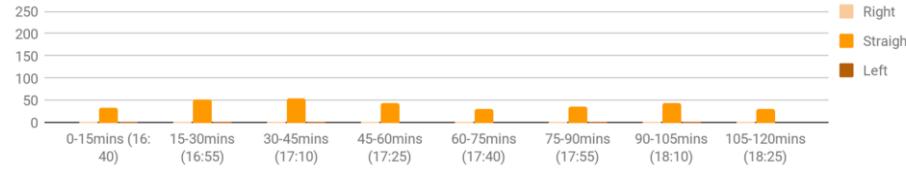
Arriving A: 1419
Arriving B: 354
Arriving C: 664
Arriving D: 2124



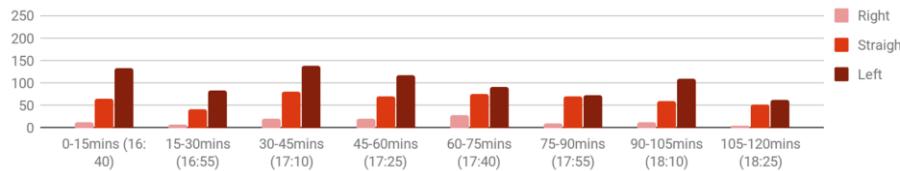
Arriving Leg D (Lincoln)



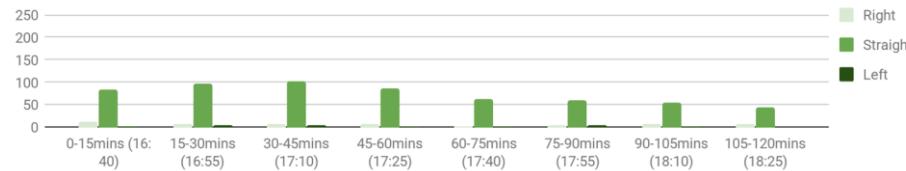
Arriving Leg B (E. Kenwood)



Arriving Leg A (N. lake)



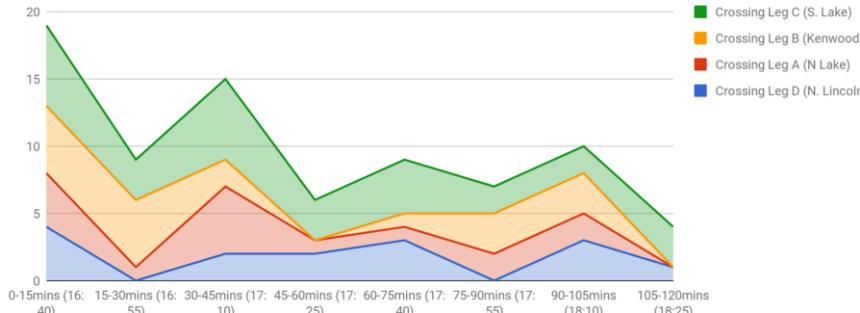
Arriving Leg C (S. Lake)



Pedestrian & Bicycle Counts

Thursday April 19th, 2018 16:40-18:40 CST (43° - Clear)

Pedestrian Crossings - By Leg

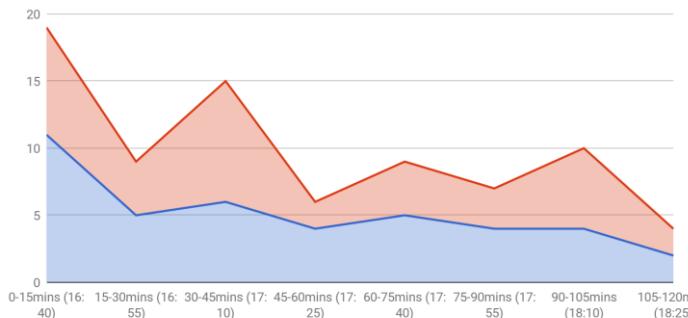


2hr Pedestrian Total : 79

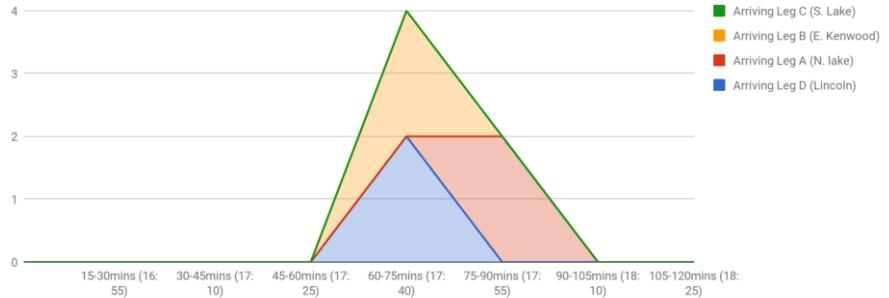
Male : 41

Female : 38

Pedestrian Crossings - By Gender



Bicycle Crossings - By Leg

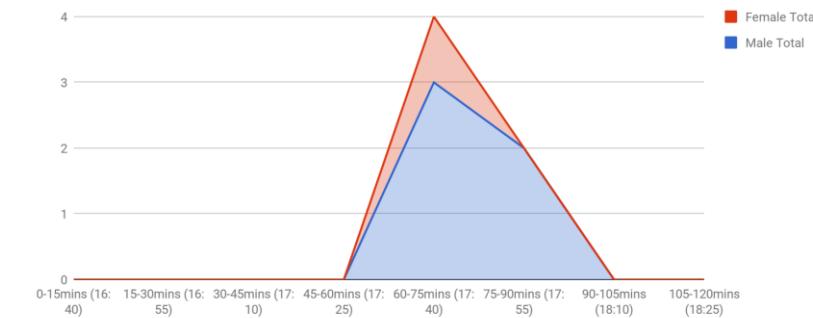


2hr Bicycle Total : 6

Male : 5

Female : 1

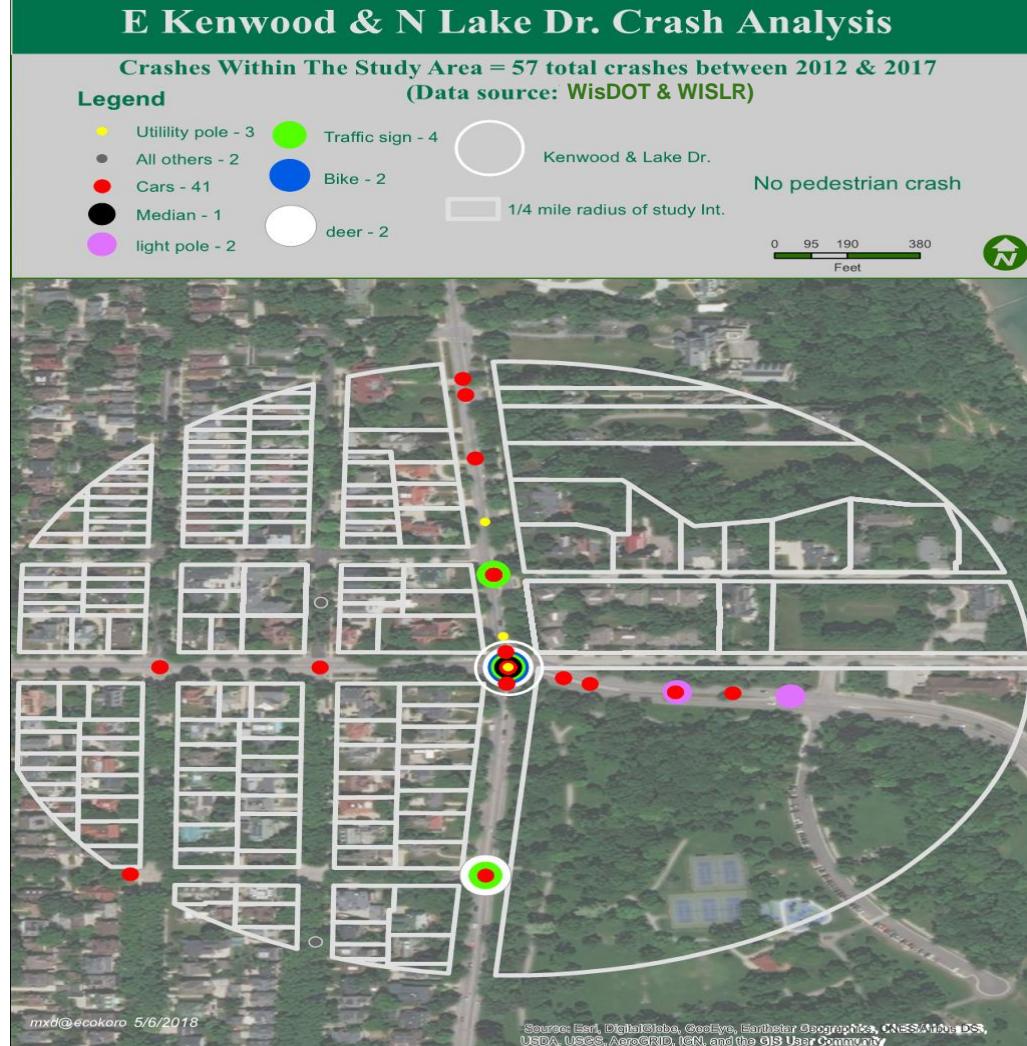
Bicycle Crossings - By Gender



Crash Analysis

Over 50% of the total crashes within a $\frac{1}{4}$ mile of E Kenwood & N Lake Dr. occurred at its intersection, which is why it needs attention.

- 100% Car & Bike crash
- 100% Car & Median crash
- 51% Car & Car crash
- 50% Car & Deer crash
- 50% Car & Traffic sign crash
- 33% Car & Utility pole crash



Crash Data

OBJECT_ID	ACCDATE	ACCDTYPE	ROADCOND	WTHRCOND	LGTCOND	VEHTYPE1_1	DRVRRD01	AGE1	SEX1_1	DRVRRD02	AGE2	SEX2_1	FID_MKEcrash	OBJECTID	DOCTNMBR	NTFYHOUR	REGION_1	COUNTY_1	MUNICIPALI_1	MUNIETYPE_1	ONHWYWRP	ONHWYDIR	ONHWY	ONSTR_1		
1	12/6/2016	OTHFX	CLR	LIGT	CAR	GO STR	0	N		0			66102	80860	QPV9NIMP	18	SE	MLWAUKEE	MLWAUKEE	C	0			N MARIETTA AVE		
2	3/12/2017	SNOW	SNOW	CAR	BLNK	49 M	BLNK	21 F		3219			17977	J9L01F68W5	10	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR		
3	6/12/2016	TFSIGN	CLDY	CAR	RT TRN	26 F		0		3220			17978	QOHGQXX	14	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	E LINWOOD AVE		
4	8/27/2014	DEER	BLNK	BLNK		22 M		0		55295			70053	QOCW65	0	SE	MLWAUKEE	MLWAUKEE	C	0			0	LAKE DR N		
5	4/20/2016	CLDY	CAR	GO STR	47 F		GO STR	45 F		49810			64568	QPVJBD	16	SE	MLWAUKEE	MLWAUKEE	C	0			0	E LINWOOD AVE		
6	11/21/2014	LTPOLE	CLR	LIGT	CAR	NEGCRV	27 M		0	65958			80716	BN03QNB	3	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR		
7	6/21/2015	CLR	CAR	U TURN	22 M		U TURN	41 M		65969			80727	BMZKF1Z	17	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR		
8	2/11/2012	LTPOLE	SNOW	CLR	CAR	GO STR	56 M		0	56507			71265	9GK8K5W	9	SE	MLWAUKEE	MLWAUKEE	C	0			0	LINCOLN MEM DR N PARK RD		
9	1/11/2017	WET	CLDY	DUSK	CAR	BLNK	65 M		BLNK	40 M		65968	80726	J9L101713G	18	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR		
10	11/16/2016		CLR	TRK ST	LT TRN	22 M		LT TRN	51 M		65967			80725	QQM59KP	15	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR	
11	6/16/2014		CLR	CAR	GO STR	27 M		STOPED	39 F		55302			70060	QPZL61K	15	SE	MLWAUKEE	MLWAUKEE	C	0			0	LAKE DR N	
12	3/1/2014		CLR	LIGT	CAR	GO STR	0	N	STOPED	63 F		65946	80704	QPSP7FB	18	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LAKE DR		
13	5/5/2016		CLR		CAR	SL/ST	22 M		STOPED	67 M		65966	80724	QPTL62Q	9	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR		
14	7/21/2015	BIKE	CLR	CAR	RT TRN	73 F	OTHR	19 F		3221			17979	QPZBRLX	16	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N		
15	6/15/2015		CLDY	CAR	GO STR	32 M		STOPED	52 M		3222			17980	QOXXXB	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
16	1/11/2012		WET	CLDY	CAR	GO STR	44 F		GO STR	71 F		3223		17981	9G8GV3N	11	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
17	3/27/2013		CLR	CAR	GO STR	35 F		GO STR	22 M		3224			17982	QPZRC1I	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
18	11/25/2014		SNOW	CLDY	CAR	RT TRN	21 M		GO STR	69 M		3225		17983	QJ172QJ	7	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
19	7/19/2012		CLDY	CAR	GO STR	0	N	RT TRN	26 M		3226			17984	QQ8GV1V	16	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
20	2/14/2012		WET	CLDY	CAR	GO STR	63 F		GO STR	90 F		3227		17985	9G8B2CK	8	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
21	3/5/2017		CLR	CAR	BLNK	0	N	BLNK	45 F		3228			17986	J9L0L1Z7RT	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR	
22	9/12/2017		CLR	CAR	GO STR	47 F		GO STR	19 F		3229			17987	J9L17LCTL4	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR	
23	12/8/2017		CLDY	CAR	RT TRN	63 F		NEGCRV	70 M		3230			17988	J9L16WD6P4	7	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR	
24	11/24/2015		WET	CLR	TRK SA	44 M		RT TRN	60 M		3231			17989	QPX4H6B	8	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	E KENWOOD BLVD	
25	3/9/2017		CLR	DUSK	CAR	BLNK	22 M		BLNK	41 F		3232		17990	J9L16RP2BJ	19	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	E KENWOOD BLVD	
26	9/7/2012		WET	RAIN	CAR	SL/ST	32 F		STOPED	18 F		3233		17991	QP7VBPN	18	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
27	4/19/2013		CLR	LIGT	CAR	GO STR	21 M		GO STR	28 F		3234		17992	QO16BFG	0	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
28	12/29/2014	TFSIGN	CLR	LIGT	CAR	GO STR	49 F		0		3235			17993	Q110DQQ	2	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
29	10/3/2012		WET	RAIN	CLR	GO STR	0	N	RT TRN	26 M		3236		17994	QPW3CK9	21	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
30	6/30/2012	TFSIGN	CLR		CAR	LT TRN	27 M		0		3237			17995	BMQ6PMK	16	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
31	6/25/2012	BKE	CLR	CAR	GO STR	30 M		GO STR	24 F		3238			17996	QPV3CJC	8	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	KENWOOD BLVD E	
32	11/22/2014	MED B	ICE	SLET	DAWN	CAR	NEGCRV	57 F		0		3239			17997	QJ172QG	8	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LINCOLN MEMORIAL DR N
33	9/28/2017		CLR	TRK UT	CHG LN	60 M		GO STR	33 M		49653			64411	J9L0LBQK7T	16	SE	MLWAUKEE	MLWAUKEE	C	0			0	E KENWOOD BLVD	
34	1/14/2014		WET	SLET	CAR	GO STR	24 F		LT TRN	45 F		49654			64412	QPSP7FT	11	SE	MLWAUKEE	MLWAUKEE	C	0			0	E KENWOOD BLVD
35	8/13/2017		CLR	DUSK	CAR	LT TRN	22 F		GO STR	19 M		49655			64413	J9L0D2XVQ	12	SE	MLWAUKEE	MLWAUKEE	C	0			0	E KENWOOD BLVD
36	5/17/2017		CLDY		CAR	BLNK	0	N	BLNK	35 F		49656			64414	J9L04VVW7D2	20	SE	MLWAUKEE	MLWAUKEE	C	0			0	E KENWOOD BLVD
37	9/16/2015		CLR	CAR	LT TRN	24 M		GO STR	26 F		55054			69812	QPVROLS	9	SE	MLWAUKEE	MLWAUKEE	C	0			0	KENWOOD BL E	
38	6/6/2014		CLR	CAR	NEGCRV	22 M		0		55300			70058	QO172ND	15	SE	MLWAUKEE	MLWAUKEE	C	0			0	LAKE DR N		
39	2/7/2015		WET	CLDY	CAR	LT TRN	50 M		GO STR	26 M		55301			70059	QO172RP	13	SE	MLWAUKEE	MLWAUKEE	C	0			0	LAKE DR N
40	3/19/2014		WET	RAIN	CAR	GO STR	20 F		STOPED	61 F		65945			80703	Q110DPR	13	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LAKE DR
41	1/11/2017	DEER	BLNK	BLNK	TRK UT	BLNK	65 M		0		65971			80729	J9L0ZN3NP3C	16	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR	
42	6/4/2015	UTPOLE	CLR	LIGT	CAR	RT TRN	21 F		0		66034			80792	BMZKVF0	21	SE	MLWAUKEE	MLWAUKEE	C	0			0	N LINCOLN MEMORIAL DR	
43	11/9/2013		CLDY	CAR	GO STR	22 M		GO STR	18 F		57751			72509	QPX864B	12	SE	MLWAUKEE	MLWAUKEE	C	0			0	MARIETTA AVE N	
44	9/6/2017		CLDY	CAR	LT TRN	57 M		GO STR	25 F		49673			64431	J9L051TJQ4	15	SE	MLWAUKEE	MLWAUKEE	C	0			0	E KENWOOD BLVD	
45	10/23/2015		CLDY	CAR	GO STR	18 F		GO STR	20 F		55056			69814	QO201KZ	16	SE	MLWAUKEE	MLWAUKEE	C	0			0	KENWOOD BL E	
46	7/21/2012		CLDY	CAR	GO STR	44 F		GO STR	56 F		3240			17998	QP7VBF5	10	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
47	10/16/2012	UTPOLE	CLR	LIGT	TRK UT	GO STR	43 M		0		3241			17999	QP7VBFZ	1	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
48	3/7/2017		CLDY	CAR	BLNK	72 F		0		66101			80859	J9L0778HUP	18	SE	MLWAUKEE	MLWAUKEE	C	0			0	N MARIETTA AVE		
49	6/5/2012		CLR	CAR	LT TRN	26 M		GO STR	26 M		3242			18000	QP7VBDR	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
50	3/26/2015		CLDY	CAR	GO STR	45 M		LT TRN	19 F		3243			18001	QP0SH0Q	6	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
51	9/23/2014		CLR	TRK UT	GO STR	45 M		GO STR	39 M		3244			18002	QPX9HKQ	8	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
52	5/13/2016	TFSIGN	CLR	CAR	GO STR	0	N	0		3245			18003	QPX9KB4	9	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR		
53	5/18/2016		CLR	CAR	GO STR	17 M		SL/ST	20 F		3246			18004	QPZ6BMT	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DRIVE	
54	12/16/2014	UTPOLE	CLR	LIGT	CAR	U TURN	16 F		0		3247			18005	QPX9NM4	22	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	
55	6/9/2017		CLR	CAR	BLNK	63 F		BLNK	18 M		3248			18006	J9L01F68XQ	15	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	N LAKE DR	
56	1/29/2015		CLR	LIGT	CAR	LT TRN	29 F		GO STR	54 M		3249			18007	Q22Q6X61	17	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N
57	10/27/2014		CLR	CAR	GO STR	70 M		GO STR	24 M		3250			18008	QPZL63F	15	SE	MLWAUKEE	MLWAUKEE	C	32 N			32	LAKE DR N	

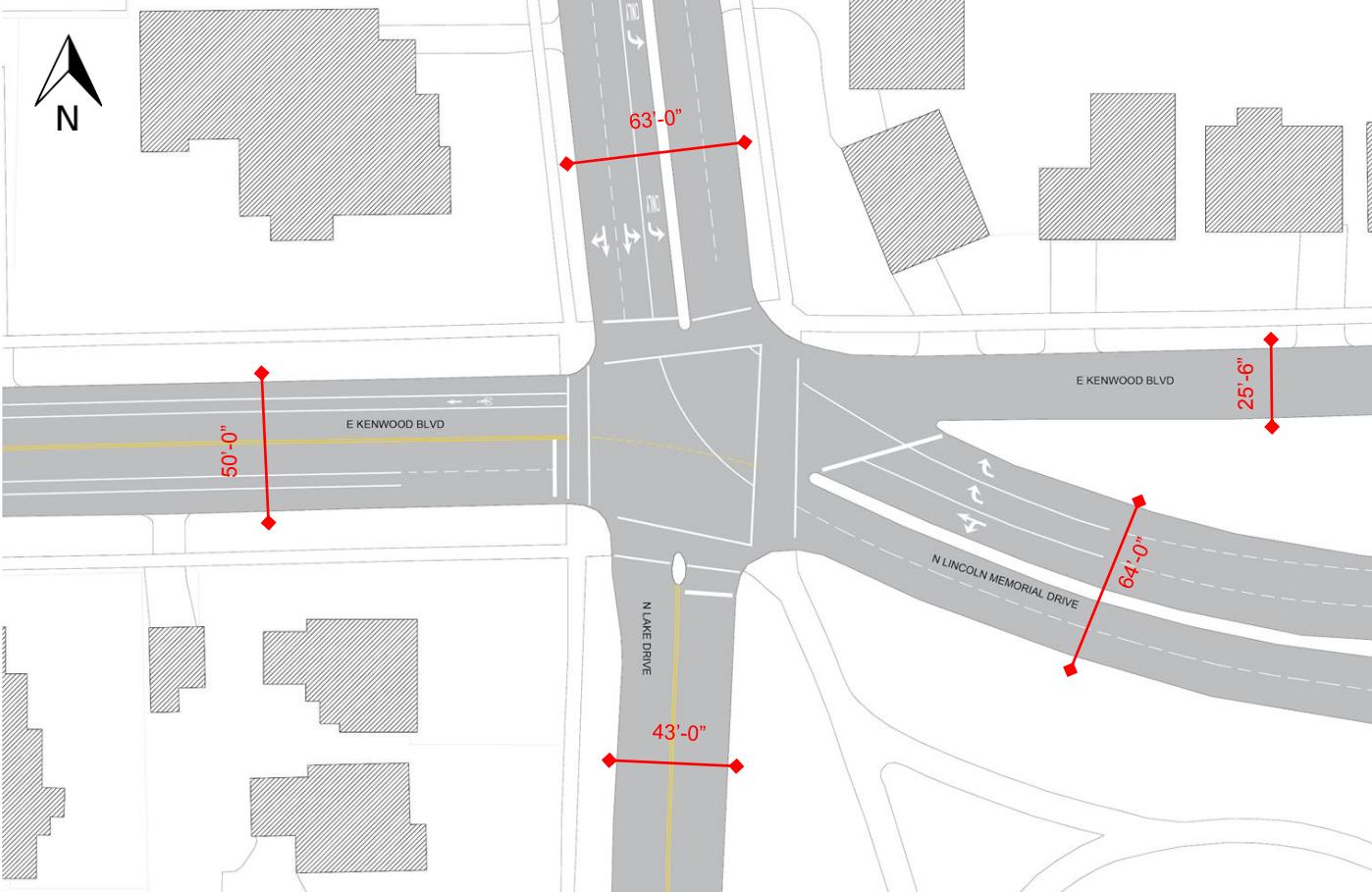


Intersection

Existing Conditions



Existing Condition



Road Widths

- E. Kenwood (west)
 - 50'
- E. Kenwood (east)
 - 25.5'
- N. Lake (north)
 - 63'
- N. Lake (south)
 - 43'
- N. Lincoln
 - 64'

Key Observations

- Kenwood Eastbound
 - No Access
- Dangerous, Illegal Kenwood Left Turn
- Extremely Faded Line Markings
- Long Pedestrian Waits
- Uncertain Bike Travel

Existing Sections

Existing E Kenwood Blvd

98% width • Add location · A few seconds ago



maps.google.com



streetmix.net

Existing Sections



maps.google.com



streetmix.net

Existing Level of Service (LoS) - Southbound Lake Dr.

Current Pedestrian Level of Service Evaluation

Input Variable Description	Variable	Measurement <i>(Measure to the closest 0.5 feet)</i>	Typical range
Number of through lanes in the study direction of travel	Nth	2.0	(1-4)
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0	(0-1)
Motorized vehicle running speed (miles/hour)	Sr	33.0	(5-55)
Midsegment automobile flow rate (vehicles/hour)	vm	780.0	(100-3000)
Width of the outside through lane (feet)	Wol	11.0	(9-16)
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0	(0-7)
Width of the paved outside shoulder or parking area (feet)	Wos	0.0	(0-10)
Curb is present (1 = yes; 0 = no)	C	1.0	(0-1)
Adjusted Width of the paved outside shoulder (feet)	Wos*	-1.5	
Proportion of on-street parking occupied (decimal)	ppk	0.00	(0-0.9)
Effective width of combined bicycle lane and shoulder or parking area (feet)	W1	-1.5	
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5	
Effective width of outside through lane, BL & shoulder as function of traffic volume (feet)	Wv	9.5	
Buffer width between roadway and sidewalk (ft) (use 0 if no SW)	Wbuf	5.0	(0-12)
Continuous barrier (1 = Y; 0 = N)	B	0.0	(0-1)
Buffer area coefficient	fb	1.0	
Sidewalk width (<i>not including buffer</i>) (feet) (use 0 if doesn't exist)	Wsw	6.0	(0-16)
Adjusted available sidewalk width	Was	6.0	
Sidewalk width coefficient	fsw	4.2	
Pedestrian LOS score for the roadway link	Ip,link	2.87	
Pedestrian LOS grade for the roadway link	Grade	C	

- (2 left turn lane options, 2 straight through lane options, 1 right turn lane option)
- Curb height solid median
- Softscape buffer
- Grade= C

Existing Level of Service (LoS) - Southbound Lake Dr.

Current Bicycle Level of Service Evaluation

Input Variable Description	Variable	Measurement <i>(Measure to the closest 0.5 feet)</i>
Number of through lanes in the study direction of travel	Nth	2.0
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0
Pavement condition rating (5 = excellent to 1 = poor)	Pc	2.5
Motorized vehicle running speed (miles/hour)	Sr	33.0
Adjusted motorized vehicle running speed (miles/hour)	Sra	33.0
Midsegment automobile flow rate (vehicles/hour)	vm	780.0
Adjusted midsegment demand flow rate (vehicles/hour)	vma	780.0
Percent heavy vehicle volume (percentage)	PHV	2.0
Adjusted percent heavy vehicle volume (percentage)	PHVa	2.0
Width of the outside through lane (feet)	Wol	11.0
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0
Width of the paved outside shoulder or parking area (feet)	Wos	0.0
Curb is present (1 = yes; 0 = no)	C	1.0
Adjusted Width of the paved outside shoulder or parking area (feet)	Wos*	-1.5
Proportion of on-street parking occupied (decimal)	ppk	0.00
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5
Effective width of outside through lane, BL & shoulder as function of traffic volume (feet)	Wv	9.5
Effective width of outside through lane (feet)	We	9.5
Bicycle LOS score for the roadway link	Ib,link	4.83
Bicycle LOS grade for the roadway link	Grade	E

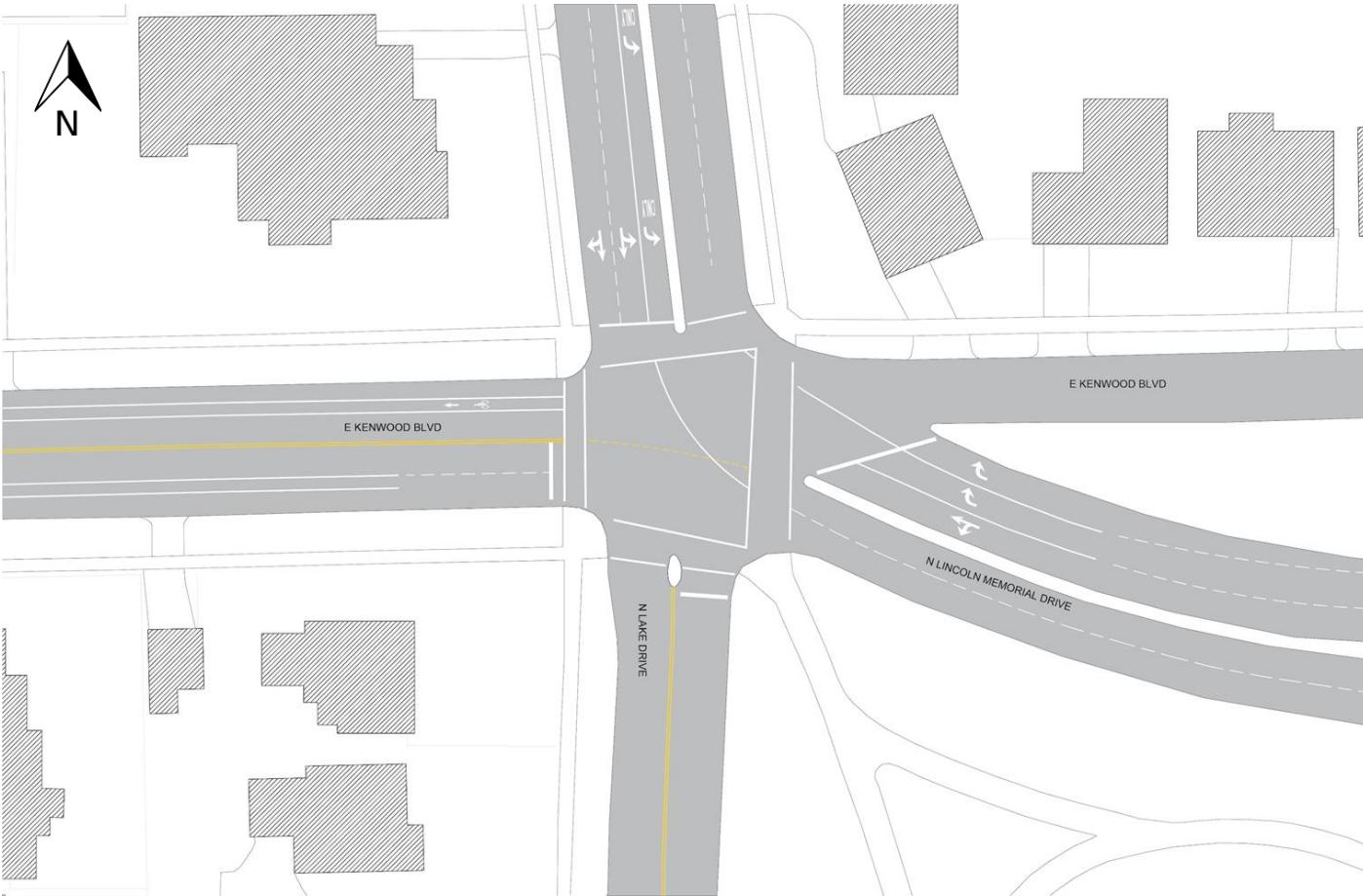
- Curb height median
(1-4)
- Long parallel cracking along travel lanes
(0-1)
- When over 50ft back from intersection, on street parking is present.
(1-5)
(5-55)
- Grade= E
(100-3000)
(0-100)
(9-16)
(0-7)
(0-10)
(0-1)
(0-0.9)



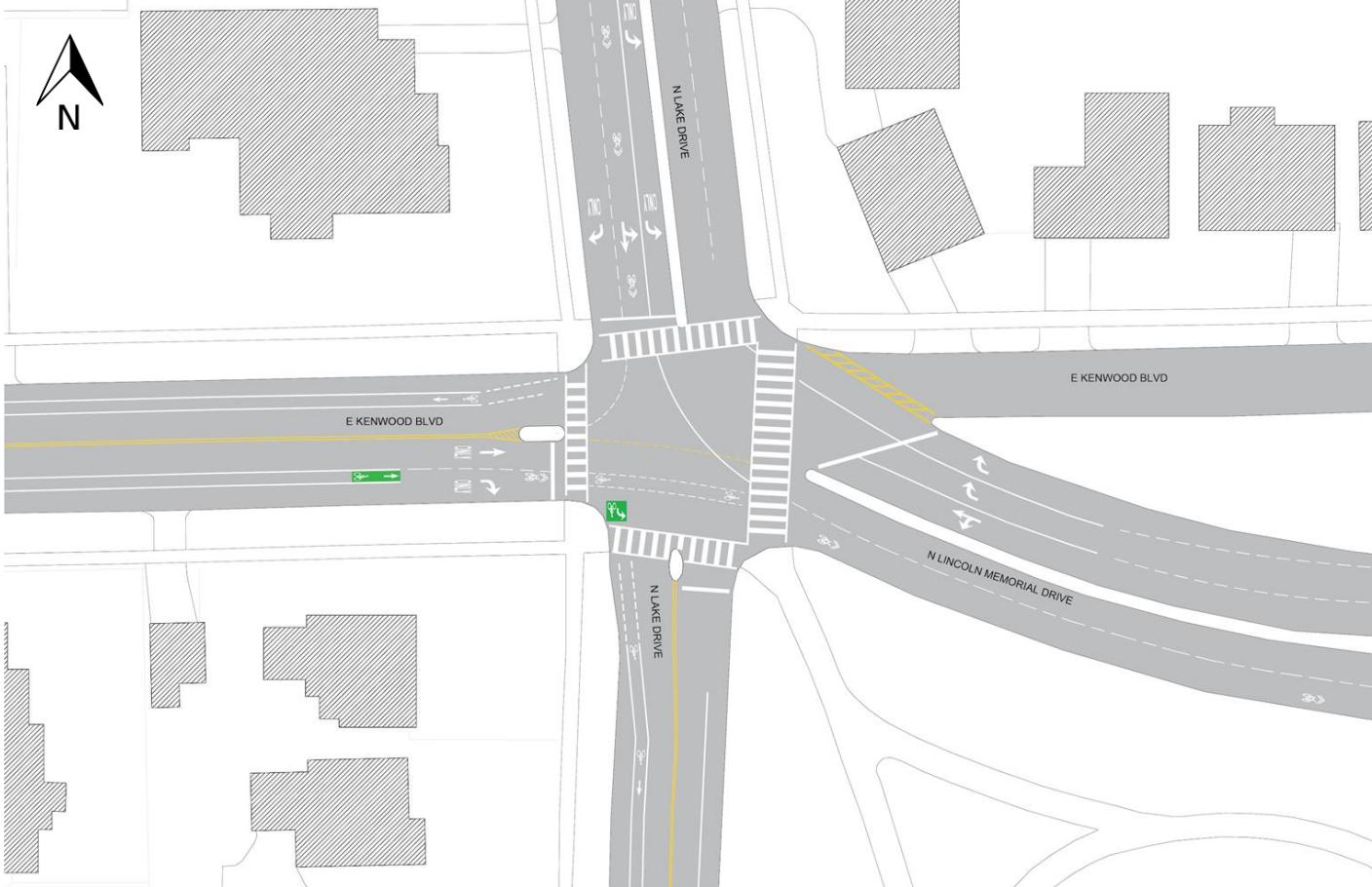
Intersection Proposal



Existing Condition



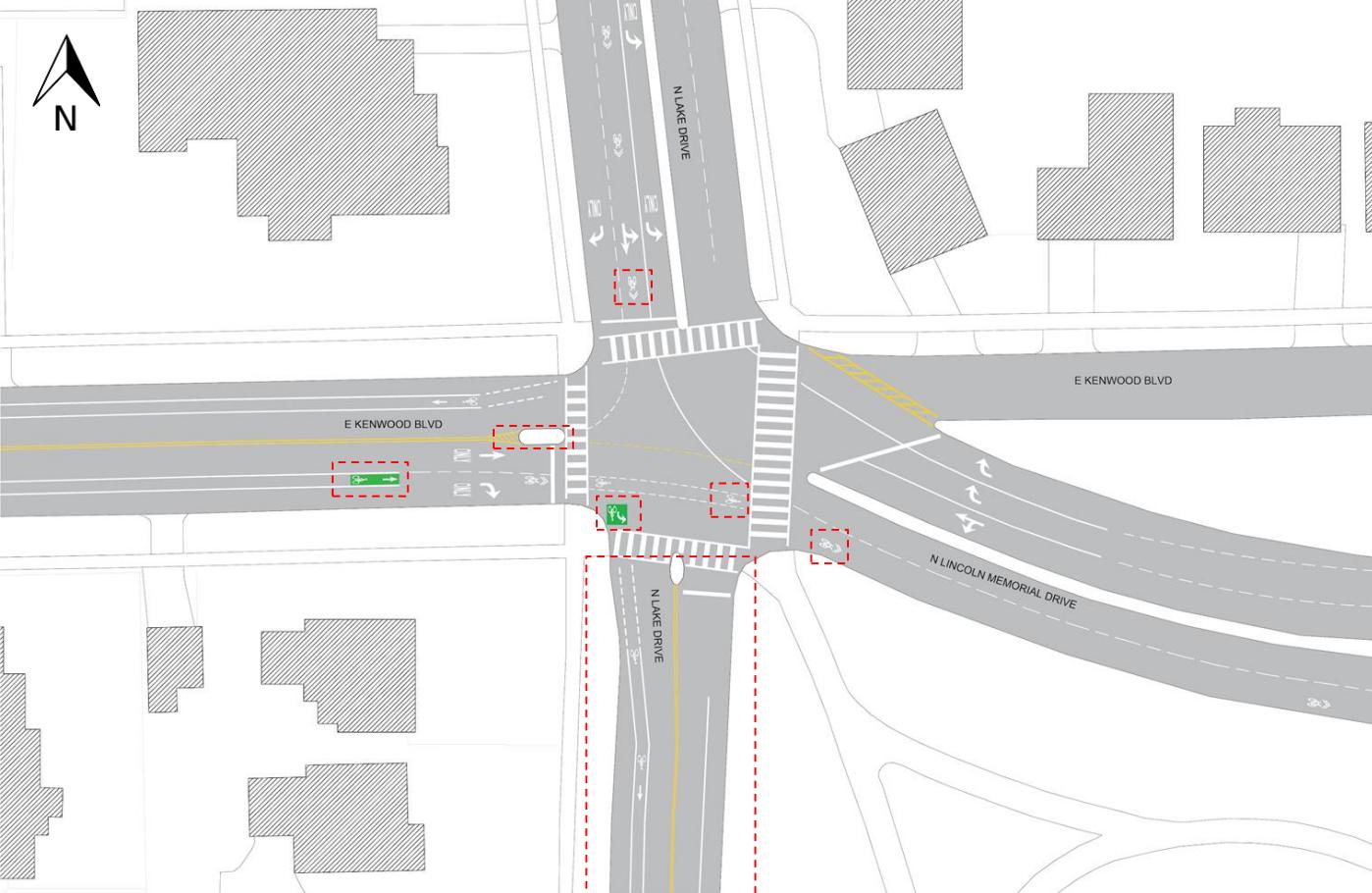
Proposed Intervention



Key Changes

- Continental Crossings
- Green Bike Lane End Warning
- Bike left Turn Box
- Sharrow Markings
- Closing Kenwood - Non rigid bollards
- N. Lake (south) Road Diet & Bike Lane addition
- New Right Turn and Straight Only Markings & E. Kenwood Curb
- Re-Positioned No Left Turn signage

Proposed Intervention



Key Changes

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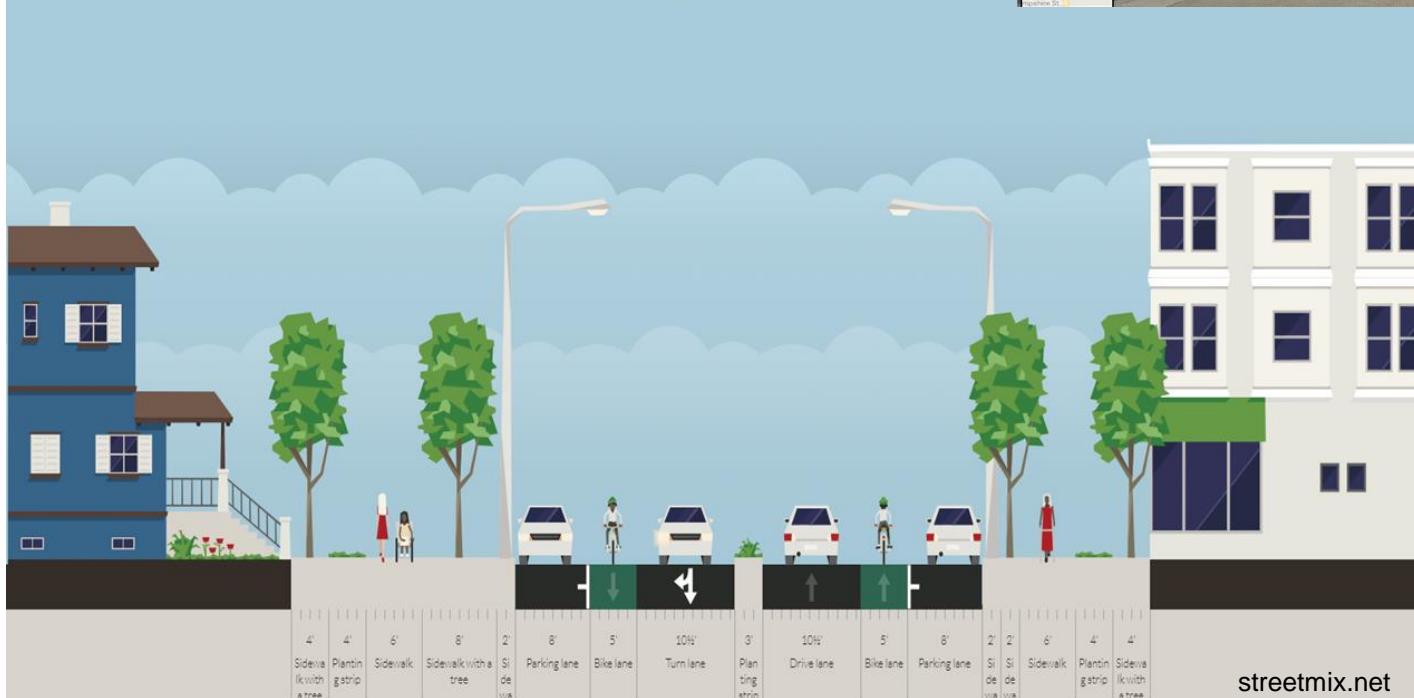
Proposed Section

Proposed E Kenwood Blvd

92' width ▾ · [Add location](#) · A few seconds ago



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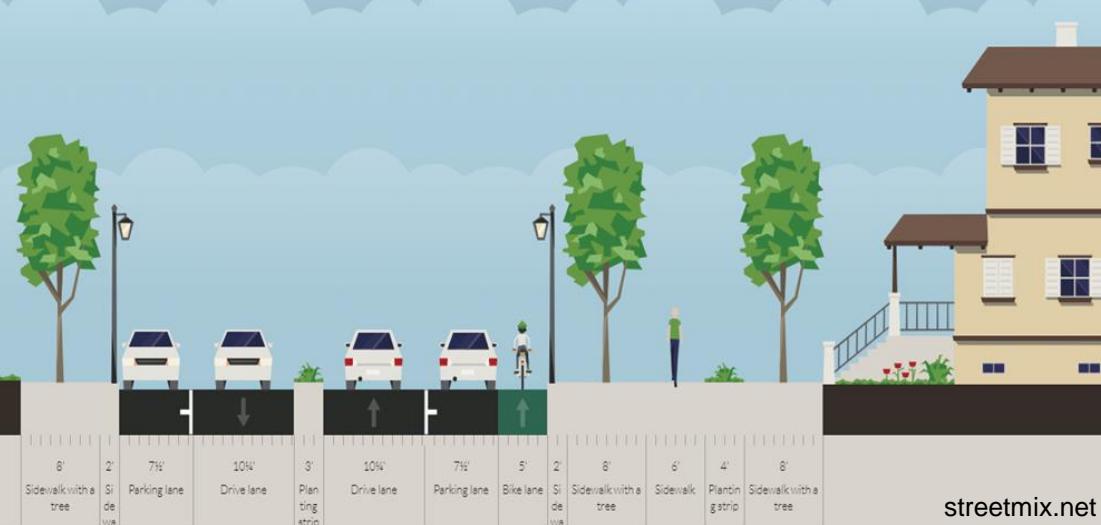
Proposed Section

Proposed N Lake Dr.

81½' width ▾ · Add location · A few seconds ago



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New Level of Service (LoS) - Southbound Lake Dr.

Proposed Pedestrian Level of Service Evaluation

Input Variable Description	Variable	Measurement <small>(Measure to the closest 0.5 feet)</small>	Typical range <small>(1-4)</small>
Number of through lanes in the study direction of travel	Nth	1.0	(0-1)
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0	(5-55)
Motorized vehicle running speed (miles/hour)	Sr	33.0	(100-3000)
Midsegment automobile flow rate (vehicles/hour)	vm	780.0	(9-16)
Width of the outside through lane (feet)	Wol	11.0	(0-7)
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0	(0-10)
Width of the paved outside shoulder or parking area (feet)	Wos	0.0	(0-1)
Curb is present (1 = yes; 0 = no)	C	1.0	(0-0.9)
Adjusted Width of the paved outside shoulder (feet)	Wos*	-1.5	
Proportion of on-street parking occupied (decimal)	ppk	0.00	
Effective width of combined bicycle lane and shoulder or part of shoulder (feet)	W1	-1.5	
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5	
Effective width of outside through lane, BL & shoulder as function of Wt	Wv	9.5	
Buffer width between roadway and sidewalk (ft) (use 0 if no barrier)	Wbuf	5.0	(0-12)
Continuous barrier (1 = Y; 0 = N)	B	0.0	(0-1)
Buffer area coefficient	fb	1.0	
Sidewalk width (not including buffer) (feet) (use 0 if doesn't exist)	Wsw	6.0	(0-16)
Adjusted available sidewalk width	Was	6.0	
Sidewalk width coefficient	fsw	4.2	
Pedestrian LOS score for the roadway link	Ip,link	3.76	
Pedestrian LOS grade for the roadway link	Grade	D	

- Reduction to only 1 lane option for straight through travel.
- Far right lane becomes right turn only for vehicles
- Grade= D* (notes on next page)

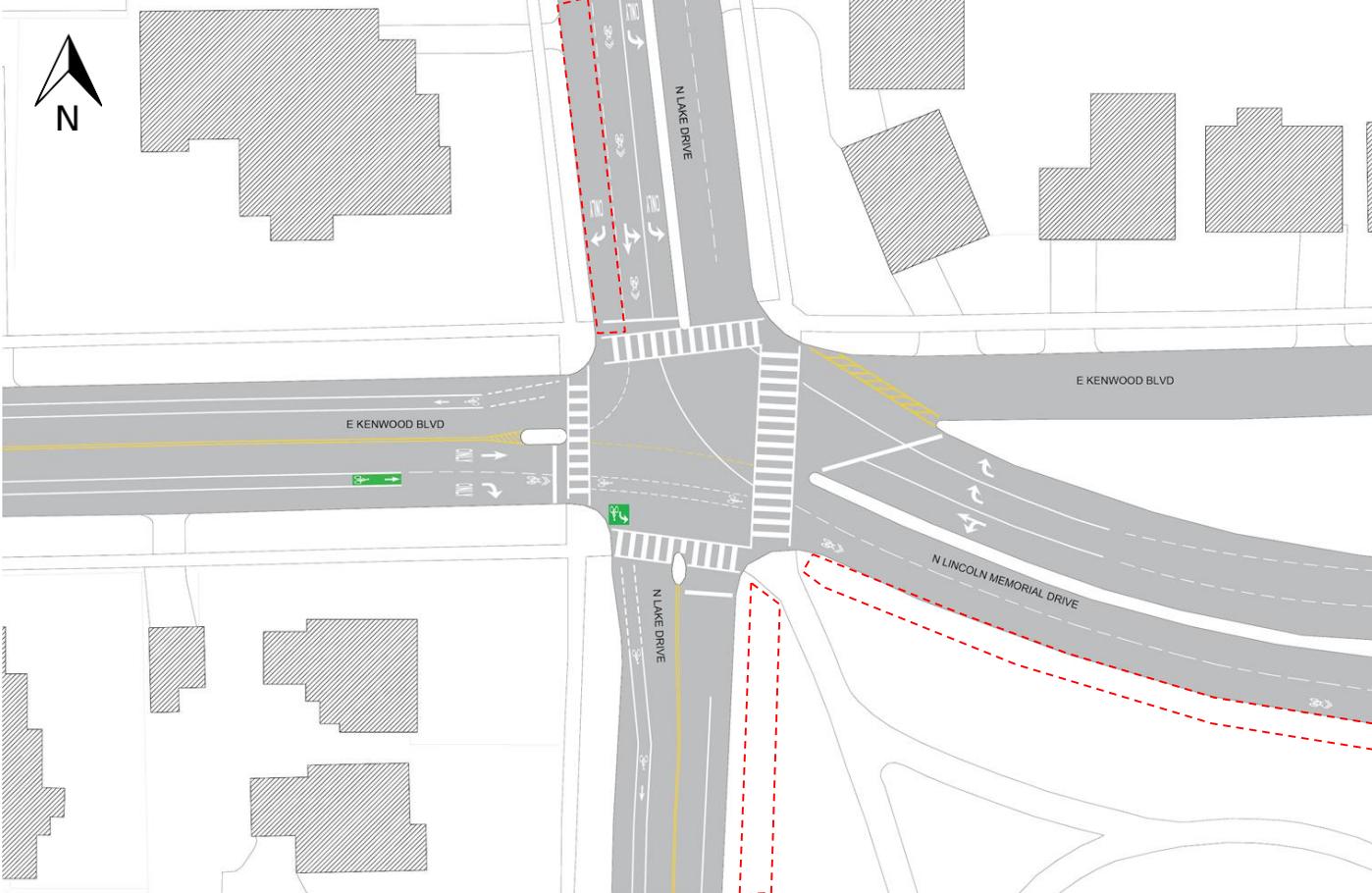
New Level of Service (LoS) - Southbound Lake Dr.

Proposed Bicycle Level of Service Evaluation

Input Variable Description	Variable	Measurement <i>(Measure to the closest 0.5 feet)</i>
Number of through lanes in the study direction of travel	Nth	1.0
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0
Pavement condition rating (5 = excellent to 1 = poor)	Pc	2.5
Motorized vehicle running speed (miles/hour)	Sr	33.0
Adjusted motorized vehicle running speed (miles/hour)	Sra	33.0
Midsegment automobile flow rate (vehicles/hour)	vm	780.0
Adjusted midsegment demand flow rate (vehicles/hour)	vma	780.0
Percent heavy vehicle volume (percentage)	PHV	2.0
Adjusted percent heavy vehicle volume (percentage)	PHVa	2.0
Width of the outside through lane (feet)	Wol	11.0
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0
Width of the paved outside shoulder or parking area (feet)	Wos	0.0
Curb is present (1 = yes; 0 = no)	C	1.0
Adjusted Width of the paved outside shoulder or parking area	Wos*	-1.5
Proportion of on-street parking occupied (decimal)	ppk	0.00
Total width of outside through lane, bicycle lane, & paved shoulder	Wt	9.5
Effective width of outside through lane, BL & shoulder as function	Wv	9.5
Effective width of outside through lane (feet)	We	9.5
Bicycle LOS score for the roadway link	Ib,link	5.18
Bicycle LOS grade for the roadway link	Grade	F

- (Typical range)
- Instead of allowing for straight traffic in right lane, make right turn only
 - Mark center lane as shared bicycle and vehicle traffic lane
 - Grade= F*
- (100-3000)
- (0-100)
- (9-16)
- (0-7)
- (0-10)
- (0-1)
- (0-0.9)
- This Level of Service analysis method does not account for road diets, although NACTO guidelines outline design treatment as a road improvement for bicycle and pedestrian traffic. This analysis assumes all traffic volume will now be condensed closer to bicycle and pedestrian travel. Qualitative elements (such as markings) are also not represented in this model.

Further Proposals



Future Suggestions

- Improved Oak Leaf trail signage with Maps and wayfinding
- Removal of travel lane on N. Lake Dr (north) for protected bicycle lane
- Addition of raised bicycle track along N. Lincoln Memorial
- Re-asses Pedestrian Walk phases
- Full Green Bike Lanes
- Improved Sidewalk / Curb conditions
- New sidewalk along Lake Park

Cost Estimates

Milwaukee by Bike
City of Milwaukee
2010 Bicycle Master Plan
Plan & Maps
September 7, 2010

\$5,337,638 for 138.55 miles of bike path

$5,337,638 / 138.55 = \$38,524.99$ per mile of bike path

$\frac{1}{4}$ mile of bike path = \$9,631.25

\$54,250 per 100 ft of median

10ft of median = \$5,425

Bikeway Wayfinding Signage Design Summary Costing about \$250 each, wayfinding signs are a relatively cost-effective means for improving the walking and bicycling environment.

Total Project Cost= \$15,306.25



Compliance with City of Milwaukee 2010 Bicycle Master Plan

Milwaukee by Bike calls for an increase in the city's bicycle network **from 116 miles to 356 miles**. This increase will include 153 new miles of bike lanes **and shared lanes**, an expanded bike route system and over 70 miles of bicycle boulevards and paved trails.

Facility Recommendations To The On-Street Bicycle Network

Objective 1

Evaluate the bicycle network for new opportunities, **missing links**, and additional needs on an annual basis and add these to the Proposed Bicycle Network Map.

Objective 2

Sign bicycle routes with "Bicycles May Use Full Lane" R4-11 sign and/or add shared lane pavement markings (MUTCD figure 9C-9) on streets needed to connect bicycle lanes or **key destinations** where **bicycle lanes will not fit** due to right-of-way constraints.

Objective 3

Test **bicycle boxes** throughout the city, and Install **shared lane** markings throughout the city.

Compliance with City of Milwaukee 2010 Bicycle Master Plan

Support Infrastructure Goal

Provide the support infrastructure necessary to encourage and support bicycling throughout the City of Milwaukee.

Objective 1

Ensure that the bicycle network is **clearly identified** and easy to use.

Provide ample bike lane and route signage.

Provide ample directional and location signage throughout the bicycle network.

Compliance with City of Milwaukee 2010 Bicycle Master Plan

Enforcement Programs Goal

Increase bicyclist safety by better enforcing the rules of the road for all street users.

Objective 2

- Better enforce existing traffic laws for both motorists and bicyclists.
- Work with MPD to better enforce all **traffic violations**
- Drivers' failure to yield for pedestrians
- over speeding and
- safe passing distance violations.
- Ignoring traffic signs



Compliance with City of Milwaukee 2010 Bicycle Master Plan

Bike Facility Design Options

Shared Use Paths In the absence of city-wide design guidelines for shared use pathways, Milwaukee should adopt Wisconsin State guidelines.

Intersection design (e.g., path-roadway crossings)



Colored Bicycle Lanes In Conflict Areas Colored bicycle lanes alert motorists to approaching conflict areas and help guide bicyclists through difficult transitions.

Sources

https://www.columbus.gov/uploadedfiles%5CPublic_Service%5CTransportation%5CMobility%5CEstimated%20Costs%20FINAL.pdf

<http://city.milwaukee.gov/ImageLibrary/Groups/cityBikePed/MilwaukeebyBike2010-Plan.pdf>

<https://www.sandiego.gov/sites/default/files/sdm116.pdf>

http://www.ocpcrpa.org/docs/projects/bikeped/NACTO_Urban_Bikeway_Design_Guide.pdf

WisDOT crash shapefile (*Wisconsin Pedestrian and Bicycle Crashes - WisDOT: 2012-2018*)

Streets and street intersections shapefiles (*Wisconsin Information System for Local Roads - Dr. Schneider: 2018*)

**Thank
You**



Any Questions??