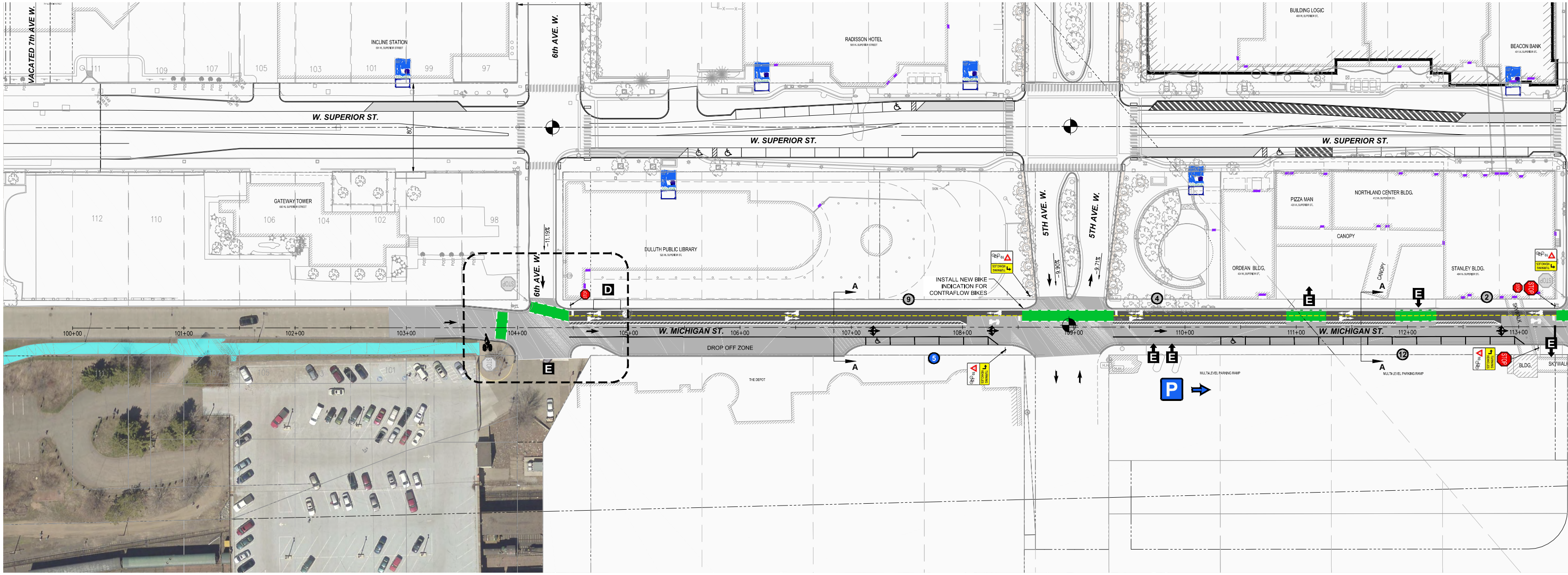
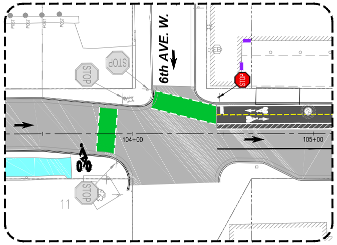
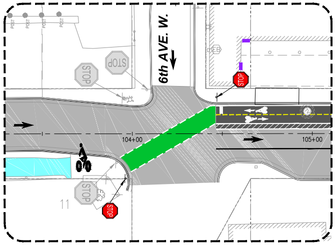
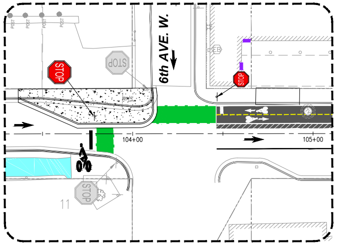
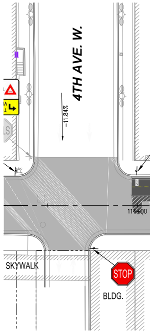

VACATED 7th AVE W.
INCLINE STATION
6th AVE. W.
RADISSON HOTEL
BUILDING LOGIC
BEACON BANK
W. SUPERIOR ST.
W. SUPERIOR ST.
W. SUPERIOR ST.
GATEWAY TOWER
112
110
106
104
102
100
98
109
107
105
103
101
99
97
DULUTH PUBLIC LIBRARY
5TH AVE. W.
5TH AVE. W.
NORTHLAND CENTER BLDG.
PIZZA MAN
CANOPY
ORDEAN BLDG.
STANLEY BLDG.
INSTALL NEW BIKE INDICATION FOR CONTRAFLOW BIKES
6th AVE. W.
D
E
A
A
9
4
2
5
12
W. MICHIGAN ST.
W. MICHIGAN ST.
DROP OFF ZONE
THE DEPOT
MULTI-LEVEL PARKING RAMP
P
BLDG.
SKYWALK
STOP
100+00
101+00
102+00
103+00
104+00
105+00
106+00
107+00
108+00
109+00
110+00
111+00
112+00
113+00


6th AVE. W.
STOP
STOP
STOP
STOP
104+00
105+00
11

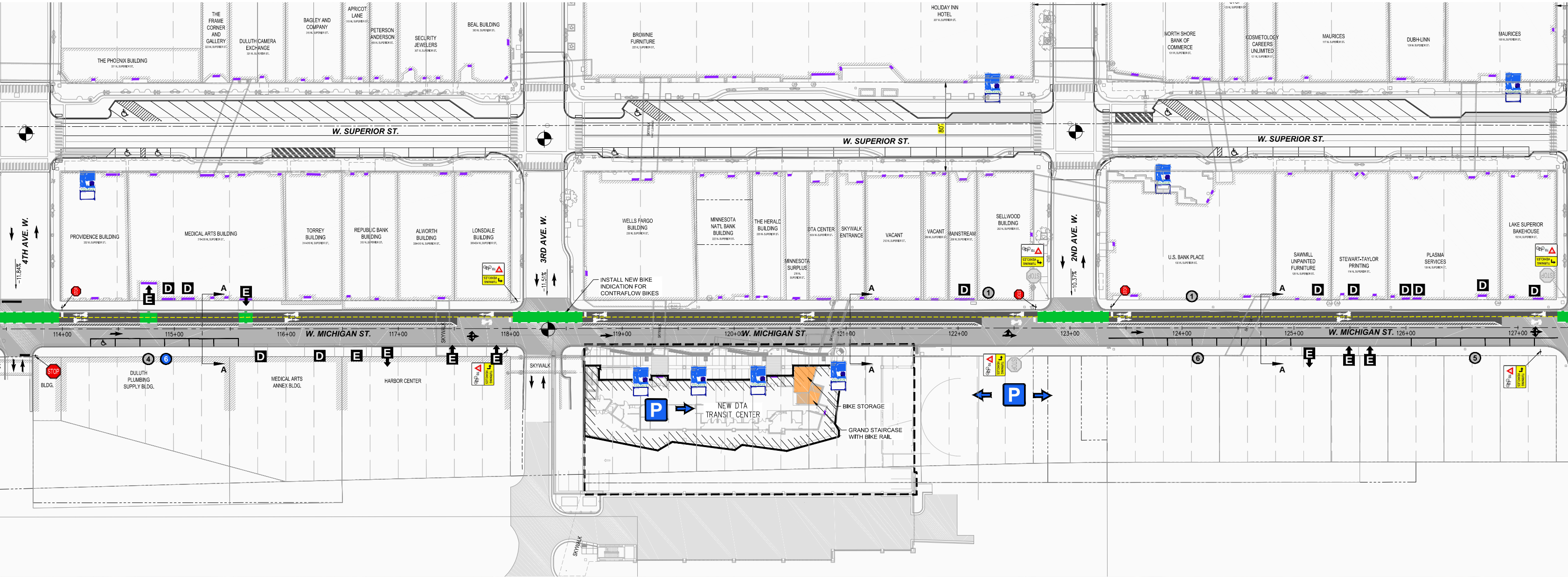

6th AVE. W.
STOP
STOP
STOP
STOP
STOP
104+00
105+00
11

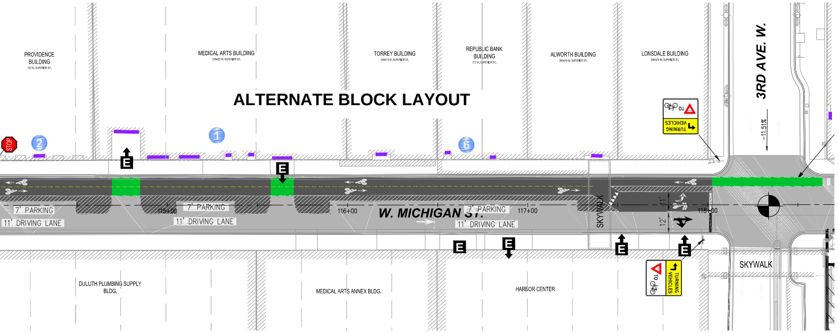

6th AVE. W.
STOP
STOP
STOP
STOP
104+00
105+00
11

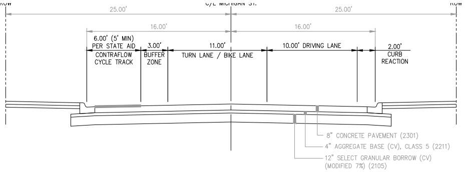

4TH AVE. W.
SKYWALK
STOP
BLDG.
114+00

BIKEWAY FEASIBILITY LAYOUT *<DRAFT 9/8/2015>*

MICHIGAN STREET | LHB | SRF Consulting Group | City of Duluth

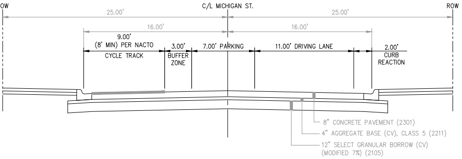

THE PHOENIX BUILDING
THE FRAME CORNER AND GALLERY
DULUTH CAMERA EXCHANGE
BAGLEY AND COMPANY
APRICOT LANE
PETERSON ANDERSON
SECURITY JEWELERS
BEAL BUILDING
BROWNIE FURNITURE
HOLIDAY INN HOTEL
NORTH SHORE BANK OF COMMERCE
COSMETOLOGY CAREERS UNLIMITED
MAURICES
DUBH-LINN
MAURICES
W. SUPERIOR ST.
W. SUPERIOR ST.
W. SUPERIOR ST.
4TH AVE. W.
3RD AVE. W.
2ND AVE. W.
PROVIDENCE BUILDING
MEDICAL ARTS BUILDING
TORREY BUILDING
REPUBLIC BANK BUILDING
ALWORTH BUILDING
LONSDALE BUILDING
WELLS FARGO BUILDING
MINNESOTA NATL BANK BUILDING
THE HERALD BUILDING
MINNESOTA SURPLUS
DTA CENTER
SKYWALK ENTRANCE
VACANT
VACANT
MAINSTREAM
SELLWOOD BUILDING
U.S. BANK PLACE
SAWMILL UNPAINTED FURNITURE
STEWART-TAYLOR PRINTING
PLASMA SERVICES
LAKE SUPERIOR BAKEHOUSE
INSTALL NEW BIKE INDICATION FOR CONTRAFLOW BIKES
D
E
A
STOP
114+00
115+00
116+00
W. MICHIGAN ST.
117+00
118+00
119+00
120+00
W. MICHIGAN ST.
121+00
122+00
123+00
124+00
125+00
W. MICHIGAN ST.
126+00
127+00
SKYWALK
DULUTH PLUMBING SUPPLY BLDG.
MEDICAL ARTS ANNEX BLDG.
HARBOR CENTER
NEW DTA TRANSIT CENTER
BIKE STORAGE
GRAND STAIRCASE WITH BIKE RAIL
P
TURNING VEHICLES
SKYWALK
80'
-11.84%
-11.51%
-10.37%
1
2
4
5
6


ALTERNATE BLOCK LAYOUT
PROVIDENCE BUILDING
MEDICAL ARTS BUILDING
TORREY BUILDING
REPUBLIC BANK BUILDING
ALWORTH BUILDING
LONSDALE BUILDING
3RD AVE. W.
-11.51%
STOP
1
2
6
E
7' PARKING
11' DRIVING LANE
7' PARKING
11' DRIVING LANE
7' PARKING
11' DRIVING LANE
115+00
116+00
W. MICHIGAN ST.
117+00
118+00
SKYWALK
11'
12'
TURNING VEHICLES
SKYWALK
DULUTH PLUMBING SUPPLY BLDG.
MEDICAL ARTS ANNEX BLDG.
HARBOR CENTER


ROW
C/L MICHIGAN ST.
ROW
25.00'
25.00'
16.00'
16.00'
6.00' (5' MIN) PER STATE AID
CONTRAFLOW CYCLE TRACK
3.00'
BUFFER ZONE
11.00'
TURN LANE / BIKE LANE
10.00' DRIVING LANE
2.00'
CURB REACTION
8" CONCRETE PAVEMENT (2301)
4" AGGREGATE BASE (CV), CLASS 5 (2211)
12" SELECT GRANULAR BORROW (CV) (MODIFIED 7%) (2105)

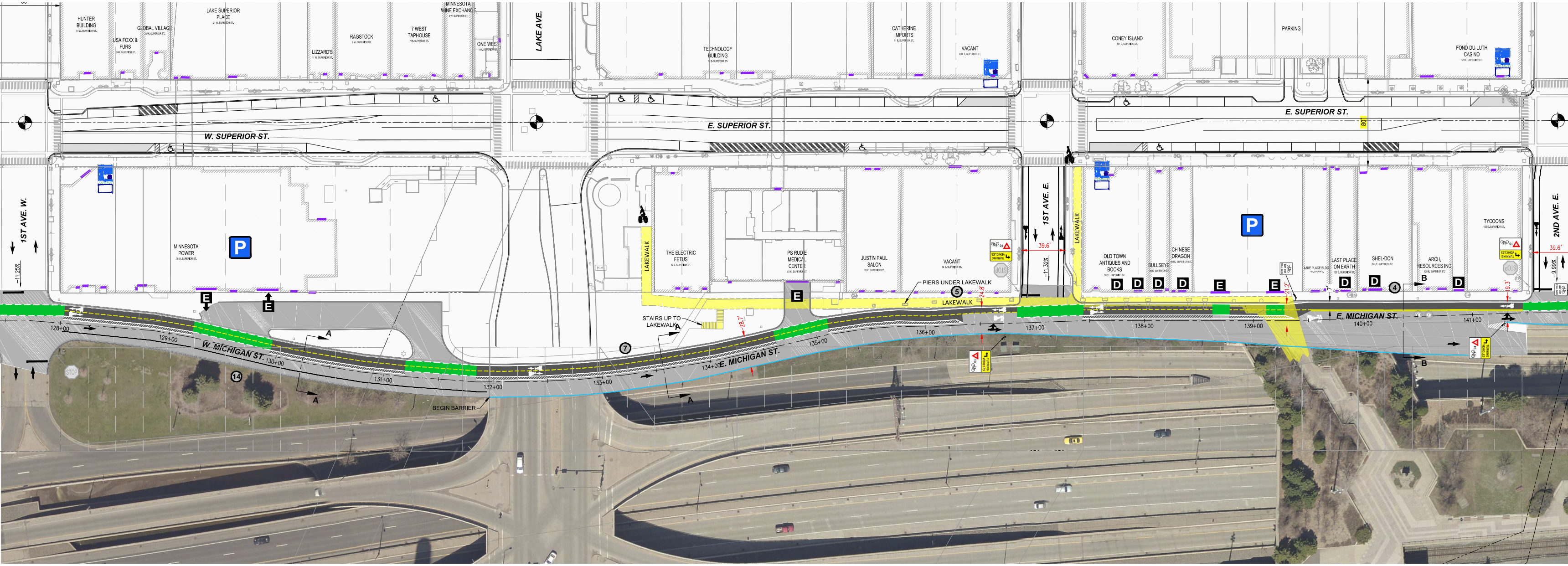
PROPOSED TYPICAL SECTION – ALTERNATE BLOCK LAYOUT AT TURN LANE

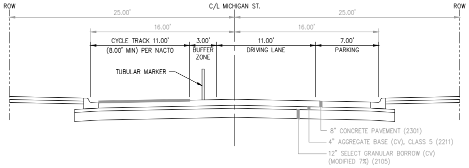
6TH AVE W TO LAKE AVE


ROW
C/L MICHIGAN ST.
ROW
25.00'
25.00'
16.00'
16.00'
9.00' (8' MIN) PER NACTO
CYCLE TRACK
3.00'
BUFFER ZONE
7.00' PARKING
11.00' DRIVING LANE
2.00'
CURB REACTION
8" CONCRETE PAVEMENT (2301)
4" AGGREGATE BASE (CV), CLASS 5 (2211)
12" SELECT GRANULAR BORROW (CV) (MODIFIED 7%) (2105)

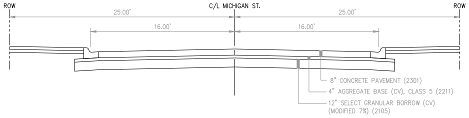
PROPOSED TYPICAL SECTION – ALTERNATE BLOCK LAYOUT

6TH AVE W TO LAKE AVE

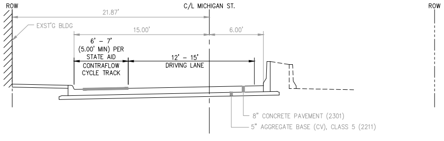

HUNTER BUILDING
USA FOXX & FURS
GLOBAL VILLAGE
LAKE SUPERIOR PLACE
LIZZARD'S
RAGSTOCK
7 WEST TAPHOUSE
MINNESOTA WINE EXCHANGE
ONE WEST
LAKE AVE.
W. SUPERIOR ST.
E. SUPERIOR ST.
TECHNOLOGY BUILDING
CATHERINE IMPORTS
VACANT
CONEY ISLAND
PARKING
FOND-DU-LUTH CASINO
1ST AVE. W.
-11.25%
MINNESOTA POWER
P
E
E
A
A
128+00
129+00
130+00
131+00
132+00
W. MICHIGAN ST.
STOP
14
BEGIN BARRIER
LAKEWALK
THE ELECTRIC FETUS
PS RUDIE MEDICAL CENTER
JUSTIN PAUL SALON
VACANT
STAIRS UP TO LAKEWALK
28.7'
7
133+00
134+00
E. MICHIGAN ST.
135+00
136+00
137+00
PIERS UNDER LAKEWALK
5
LAKEWALK
24.8'
STOP
TO
TURNING VEHICLES
1ST AVE. E.
39.6'
-11.32%
LAKEWALK
OLD TOWN ANTIQUES AND BOOKS
BULLSEYE
CHINESE DRAGON
D
D
D
D
E
E
21.2'
LAKE PLACE BLDG
LAST PLACE ON EARTH
SHEL-DON
ARCH. RESOURCES INC.
TYCOONS
D
D
D
4
B
B
7'
80'
E. MICHIGAN ST.
138+00
139+00
140+00
141+00
19.3'
2ND AVE. E.
39.6'
-9.99%


ROW
C/L MICHIGAN ST.
ROW
25.00'
25.00'
16.00'
16.00'
CYCLE TRACK 11.00'
(8.00' MIN) PER NACTO
3.00'
BUFFER ZONE
11.00'
DRIVING LANE
7.00'
PARKING
TUBULAR MARKER
8" CONCRETE PAVEMENT (2301)
4" AGGREGATE BASE (CV), CLASS 5 (2211)
12" SELECT GRANULAR BORROW (CV) (MODIFIED 7%) (2105)

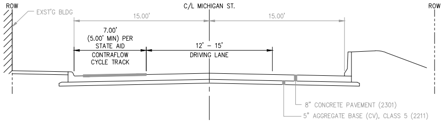
PROPOSED TYPICAL SECTION A–A: MICHIGAN STREET
6TH AVE W TO LAKE AVE


ROW
C/L MICHIGAN ST.
ROW
25.00'
25.00'
16.00'
16.00'
8" CONCRETE PAVEMENT (2301)
4" AGGREGATE BASE (CV), CLASS 5 (2211)
12" SELECT GRANULAR BORROW (CV) (MODIFIED 7%) (2105)

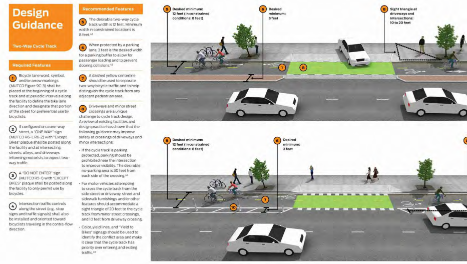
EXISTING TYPICAL SECTION – MICHIGAN STREET
1ST AVE W TO 7TH AVE W


ROW
C/L MICHIGAN ST.
ROW
21.87'
EXST'G BLDG
15.00'
6.00'
6' – 7'
(5.00' MIN) PER STATE AID
CONTRAFLOW CYCLE TRACK
12' – 15'
DRIVING LANE
8" CONCRETE PAVEMENT (2301)
5" AGGREGATE BASE (CV), CLASS 5 (2211)

PROPOSED TYPICAL SECTION C–C: MICHIGAN STREET
3RD AVE E TO 4TH AVE E


ROW
C/L MICHIGAN ST.
ROW
EXST'G BLDG
15.00'
15.00'
7.00'
(5.00' MIN) PER STATE AID
CONTRAFLOW CYCLE TRACK
12' – 15'
DRIVING LANE
8" CONCRETE PAVEMENT (2301)
5" AGGREGATE BASE (CV), CLASS 5 (2211)

PROPOSED TYPICAL SECTION B–B: MICHIGAN STREET
1ST AVE E TO 3RD AVE E



Design Guidance

Two-Way Cycle Track

Required Features

① Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility to define the bike lane direction and designate that portion of the street for preferential use by bicyclists.

② If configured on a one-way street, a "ONE WAY" sign (MUTCD R6-1, R6-2) with "Except Bikes" plaque shall be posted along the facility and at intersecting streets, alleys, and driveways informing motorists to expect two-way traffic.

③ A "DO NOT ENTER" sign (MUTCD R5-1) with "EXCEPT BIKES" plaque shall be posted along the facility to only permit use by bicycles.

④ Intersection traffic controls along the street (e.g., stop signs and traffic signals) shall also be installed and oriented toward bicyclists traveling in the contra-flow direction.

Recommended Features

⑤ The desirable two-way cycle track width is 12 feet. Minimum width in constrained locations is 8 feet.[42]

⑥ When protected by a parking lane, 3 feet is the desired width for a parking buffer to allow for passenger loading and to prevent dooring collisions.[43]

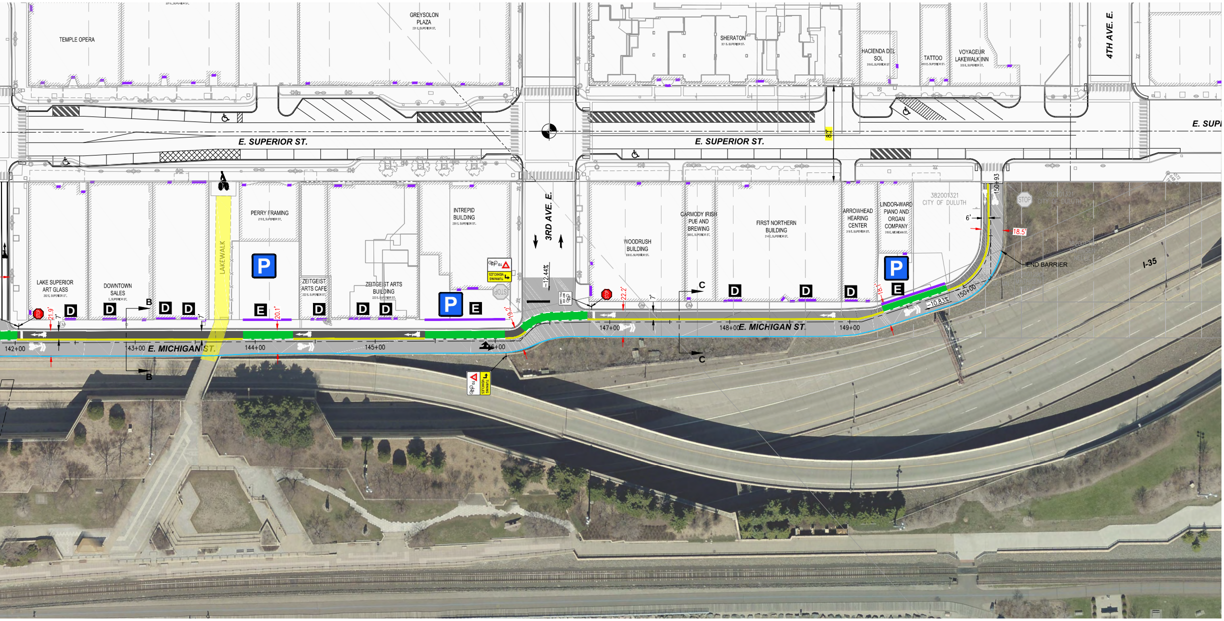
⑦ A dashed yellow centerline should be used to separate two-way bicycle traffic and to help distinguish the cycle track from any adjacent pedestrian area.

⑧ Driveways and minor street crossings are a unique challenge to cycle track design. A review of existing facilities and design practice has shown that the following guidance may improve safety at crossings of driveways and minor intersections:

- If the cycle track is parking protected, parking should be prohibited near the intersection to improve visibility. The desirable no-parking area is 30 feet from each side of the crossing.[44]
- For motor vehicles attempting to cross the cycle track from the side street or driveway, street and sidewalk furnishings and/or other features should accommodate a sight triangle of 20 feet to the cycle track from minor street crossings, and 10 feet from driveway crossing.
- Color, yield lines, and "Yield to Bikes" signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic.[45]

5 Desired minimum: 12 feet (in constrained conditions: 8 feet)
6 Desired minimum: 3 feet
8 Sight triangle at driveways and intersections: 10 to 20 feet
1
8
5 Desired minimum: 12 feet (in constrained conditions: 8 feet)
6 Desired minimum: 3 feet
7
10

TWO-WAY CYCLE TRACK AT ENT


TEMPLE OPERA
GREYSOLON PLAZA
SHERATON
HACIENDA DEL SOL
TATTOO
VOYAGEUR LAKEWALK INN
4TH AVE. E.
E. SUPERIOR ST.
E. SUPERIOR ST.
E. SUP
LAKE SUPERIOR ART GLASS
DOWNTOWN SALES
LAKEWALK
PERRY FRAMING
ZEITGEIST ARTS CAFE
ZEITGEIST ARTS BUILDING
INTREPID BUILDING
3RD AVE. E.
WOODRUSH BUILDING
CARMODY IRISH PUB AND BREWING
FIRST NORTHERN BUILDING
ARROWHEAD HEARING CENTER
LINDGRWARD PIANO AND ORGAN COMPANY
382001321 CITY OF DULUTH
STOP
END BARRIER
I-35
P
E
D
B
C
21.9'
20.1'
19.2'
22.2'
18.1'
18.5'
6'
7'
−12.44%
−10.83%
142+00
143+00
144+00
145+00
146+00
147+00
148+00
149+00
150+00
150+93
E. MICHIGAN ST.
E. MICHIGAN ST.

LEGEND

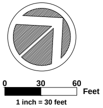
OFF STREET PARKING	P
BUS STOP	
ACCESSIBLE PARKING	♿
LOADING ZONE OR FIRE LANE	▨
TRAFFIC FLOW ARROW	→
ENTRANCE LOCATION	E
DRIVEWAY LOCATION	D
CURB & GUTTER	═
EXISTING ROADWAY	▭
PROPOSED BIKE LANES	▬
PROPOSED 3-FT BUFFER	▨
GREEN PAINT ON PAVEMENT AT BIKE/VEHICLE CONFLICT AREAS	🟩
EXISTING RIGHT OF WAY	— - - —
EXISTING STREET ENTRY POINT (DRIVE / DOOR / THRESHOLD)	▬

DESIGN DESIGNATION

MICHIGAN STREET

SPEED
LIMIT
30

FUNCTIONAL CLASS: MAJOR COLLECTOR
ADT: 4000 – 4500 VPD WEST OF LAKE AVE
2500 VPD EAST OF LAKE AVE


0
30
60
Feet
1 inch = 30 feet

- Motor vehicle traffic crossing the cycle track should be constrained or channelized to make turns at sharp angles to reduce travel speed prior to the crossing.
- If configured as a raised cycle track, the crossing should be raised, in which the sidewalk and cycle track maintain their elevation through the crossing. Sharp inclines on either side from road to sidewalk level serve as a speed hump for motor vehicles.[45]

⑨ Two-stage turn queue boxes should be provided to assist in making turns from the cycle track facility.

Optional Features

⑩ Tubular markers may be used to protect the cycle track from the adjacent travel lane. The color of the tubular markers shall be the same color as the pavement marking they supplement.[47]

⑪ Cycle tracks may be shifted more closely to the travel lanes on minor intersection approaches to put bicyclists clearly in the field of view of motorists.[48]

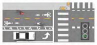
⑫ A raised median, bus bulb or curb extension may be configured in the cycle track buffer area to accommodate transit stops. Cyclists should yield to pedestrians crossing the roadway at these points to reach the bus stop. A two-way cycle tracks may be configured on the left side of a one-way street to avoid conflicts at transit stops.

⑬ May be configured as a raised cycle track.

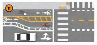
Parking should be prohibited near the intersection to improve visibility.

Intersection Configuration Alternatives

See the Cycle Track Intersection Approach and Bicycle Signals sections for details on design strategies at intersections.



Bicycle Signal Phase
A dedicated bicycle signal phase can eliminate conflict between turning automobiles and bicyclists.



"Bend In" Crossing
Using a curb extension or painted buffer, the cycle track may be bent-in to promote visibility of bicyclists in advance of the intersection.

RANCES

BIKEWAY FEASIBILITY LAYOUT <DRAFT 9/8/2015>

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