Alta Planning + Design

Creating active communities where bicycling and walking are safe, healthy, fun and normal daily activities

www.altaplanning.com
Four Types of Transportation Cyclists
By Proportion of Population

Based on surveys conducted in Portland, OR
Safety in Numbers

Bicycle Ridership and Casualties, NYC

- **Ridership**
- **Casualties**

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily Ridership</th>
<th>Annual Casualties</th>
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<tbody>
<tr>
<td>1998</td>
<td>80,000</td>
<td>1,000</td>
</tr>
<tr>
<td>1999</td>
<td>70,000</td>
<td>1,200</td>
</tr>
<tr>
<td>2000</td>
<td>60,000</td>
<td>1,500</td>
</tr>
<tr>
<td>2001</td>
<td>50,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2002</td>
<td>40,000</td>
<td>2,500</td>
</tr>
<tr>
<td>2003</td>
<td>30,000</td>
<td>3,000</td>
</tr>
<tr>
<td>2004</td>
<td>20,000</td>
<td>3,500</td>
</tr>
<tr>
<td>2005</td>
<td>10,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2006</td>
<td>20,000</td>
<td>4,500</td>
</tr>
<tr>
<td>2007</td>
<td>30,000</td>
<td>5,000</td>
</tr>
<tr>
<td>2008</td>
<td>40,000</td>
<td>5,500</td>
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</tbody>
</table>
Safety in Numbers

Combined Bicycle Traffic over Four Main Portland Bicycle Bridges Juxtaposed with Bicycle Crashes

- **Cyclists per Day**
- **Crashes and Indexed Crash Rate**

<table>
<thead>
<tr>
<th>Year</th>
<th>Bridge Bicycle Traffic</th>
<th>Reported Bicycle Crashes*</th>
<th>Indexed Bicycle Crash Rate (Trend Line)</th>
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<tbody>
<tr>
<td>1991</td>
<td>2,850</td>
<td>155</td>
<td>344</td>
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<tr>
<td>1992</td>
<td>3,555</td>
<td>163</td>
<td>459</td>
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<td>1993</td>
<td>3,885</td>
<td>171</td>
<td>440</td>
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<td>1994</td>
<td>3,880</td>
<td>189</td>
<td>493</td>
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<td>1995</td>
<td>3,207</td>
<td>195</td>
<td>514</td>
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<tr>
<td>1996</td>
<td>4,520</td>
<td>160</td>
<td>354</td>
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<td>1997</td>
<td>5,225</td>
<td>167</td>
<td>320</td>
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<td>1998</td>
<td>5,690</td>
<td>166</td>
<td>292</td>
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<td>1999</td>
<td>5,910</td>
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<td>6,015</td>
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<td>298</td>
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<tr>
<td>2001</td>
<td>6,788</td>
<td>175</td>
<td>230</td>
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<td>2002</td>
<td>7,686</td>
<td>173</td>
<td>210</td>
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<td>2003</td>
<td>8,250</td>
<td>164</td>
<td>192</td>
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<tr>
<td>2004</td>
<td>8,562</td>
<td>174</td>
<td>196</td>
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<tr>
<td>2005</td>
<td>8,875</td>
<td>188</td>
<td>184</td>
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<td>2006</td>
<td>10,192</td>
<td>203</td>
<td>168</td>
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<td>2007</td>
<td>12,046</td>
<td>203</td>
<td>128</td>
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<td>2008</td>
<td>14,563</td>
<td>213</td>
<td>159</td>
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<tr>
<td>2009</td>
<td>16,711</td>
<td>203</td>
<td>182</td>
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<tr>
<td>2010</td>
<td>15,794</td>
<td>186</td>
<td>182</td>
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</tbody>
</table>

* Indexed Bicycle Crash Rate (Trend Line)
Bozeman Bike Count

11%
BFC Rankings

- Diamond (new for 2013)
- Platinum
- Gold
- Silver
- Bronze
American Community Survey – Journey to work

- **Billings, Montana**: 0.7% Bicycle, 3.2% Walk
- **Missoula, Montana**: 5.8% Bicycle, 6.9% Walk
- **Great Falls, Montana**: 0.8% Bicycle, 2.7% Walk
- **Bozeman, Montana**: 6.3% Bicycle, 9.4% Walk
- **Butte-Silver Bow, Montana**: 4.6% Bicycle, 3.0% Walk
- **Helena, Montana**: 10.1% Bicycle, 0.0% Walk
- **Kalispell, Montana**: 1.9% Bicycle, 3.4% Walk
Estimate of overall mode share (NHTS)

Overall Mode Share Based on NHTS

- Billings, Montana: 6.6%
- Missoula, Montana: 13.8%
- Great Falls, Montana: 5.5%
- Bozeman, Montana: 17.8%
- Butte-Silver Bow, Montana: 9.6%
- Helena, Montana: 5.1%
- Kalispell, Montana: 7.3%
Biking and Walking Potential

• Montana cities and towns are ideally sized to maximize bicycling and walking potential
• Average walking trip in US = 1.2 miles (50% less than half mile)
• Average bicycling trip in US = 4 miles (60% less than 2 miles)
Montana distances

• Greatest distance from city center to city limit
  – Helena—2.5 miles
  – Kalispell—2.5 miles
  – Bozeman—4.0 miles
  – Butte—4.5 miles
  – Missoula—5.5 miles
  – Great Falls—6.0 miles
  – Billings—7.0 miles
Montana- Primed for Success

- Compact Cities
- Short overall distances
- High existing mode share
- Low overall level of accommodation and investment
Montana- Primed for Success

2012

2013

Montana
Building Active Communities Resource Guide

Montana Complete Streets Toolkit
For Cities, Small Towns and Tribal Communities

Communities Transforming
To make healthy living easier

alta
PLANNING + DESIGN
Active & Healthy Community

- Subdivision Regulations
- Growth Policy
- Safe Routes to Schools
- Transportation Plans
- Maintenance Procedures
- Recreation Planning
- Design Manuals / Typical Sections

Policy = Support
The need to facilitate balance
The need to facilitate balance

Change in VMT/Capita Centered on End of Recession

Source: USDOT (miles), Census (population), NBER (recession dates)
Growth Policy

• Sets **VISION** for community.
• Where does the community want to be in 20-30 years?
• Should have strong emphasis on quality of life including convenient and attractive availability of bicycling and walking.
Growth Policy
Growth Policy
Transportation Plans

• Provides recommendations for projects
  – New roads, spot improvements and what will be included in those projects.
  – Can include typical sections (should have sidewalks and bike lanes/trails)

• Many have non-motorized sections
  – Pedestrian circulation
  – Bicycle facilities
  – Traffic calming
  – Can include brief design guidelines
Recreation / Trail Plans

• Establishes vision for recreation service
• Plans facilities to give residents satisfactory access to parks, trails, open space and other regional amenities.
• Guide for developers when planning projects.
Recreation / Trail Plans
Recreation / Trail Plans
Subdivision Regulations

• Control the standards by which land is subdivided and developed.
• Provision of sidewalks, multi-use paths, parks, connectivity, etc.
• Ties into Transportation Plan and Parks/Trails Plans
Design Standards

- Govern the exact design of most new infrastructure built in the jurisdiction.
Design Standards
Design Standards
Design Standards
On-Street Bicycle Facilities

- We have an established network of arterials/collectors and other streets
- Need to retrofit for bicyclists if possible
- Can be standalone projects, but typically less expensive when combined with resurfacing or restriping projects.
- How is the road performing?
Bike Space Through Lane Narrowing

Before
24’ Travel/Parking

After
8’ Parking  6’ Bike  10’ Travel
Bike Space Through Lane Diet/Reduction

Before

11-12’ Travel
11’ Travel

After

6’ Bike
10-12’ Travel
10-12’ Turn
Bike Space Through Parking Removal

Before

20’ Parking/Travel

After

8’ Parking  6’ Bike  10’ Travel  10’ Travel  6’ Bike
Bike Space Through Parking Removal
Bike Space Through Shoulder Widening
Bike Space Through Shoulder Widening
Shoulders

YES!

NO!

NO!

YES!
Traditional Bike Lanes – No Parking

High-speed traffic may encourage motor vehicle use of bike lane. See Buffered Bicycle Lanes when a wider facility is desired.

- 6-8” white line
- 3’ minimum rideable surface outside of gutter seam
Traditional Bike Lanes – Parallel Parking

Greater widths may encourage vehicle loading in bike lane. Consider providing a striped buffer on wider facilities.

A marked separation can reduce door zone riding.

6-8” white line

4” white line or parking “Ts”

12’ min, 14.5’ desirable to curb face

MUTCD R3-17 (optional)
Traditional Bike Lanes – Angled Parking
Traditional Bike Lanes – Angled Parking – Missoula, MT
Buffered Bike Lanes

Parking side buffer designed to discourage riding in the "door zone"

Color may be used at the beginning of each block to discourage motorists from entering the buffered lane

MUTCD R3-17 (optional)
Buffered Bike Lane (Travel Lane Side), Billings MT
Buffered Bike Lane (Parking Side), Missoula MT
Cycle Tracks

Openings in the barrier or curb are needed at intersections and driveways or other access points to allow vehicle crossing. Parking should be set back 30 feet from minor intersections or driveways to provide improved visibility for bicyclists.
Raised Cycle Track, Missoula MT
Raised Cycle Track, Missoula MT
One-Way Protected Cycle Track, Salt Lake City, UT
Two-way Cycle Track

Two-way cycle tracks work best on one-way streets. Single direction motor vehicle travel minimizes potential conflict with bicyclists.
2-Way Cycle Track, Missoula MT
Bike Boxes

May be combined with intersection crossing markings and colored bike lanes in conflict areas.

Colored pavement can be used in the box for increased visibility.

Wide stop lines used for increased visibility.

If used, colored pavement should extend 50' from the intersection.
Bike Box, Missoula MT
Bike Box, Missoula MT
Intersection Crossing Markings

- **Chevrons**
- **Shared Lane Markings**
- **Colored Conflict Area**
- **Elephant’s Feet**

- 2’ stripe
- 2-6’ gap
Higgins Avenue, Missoula MT
Higgins Avenue, Missoula MT

Markings after 3 years
Through Bike Lanes

Colored pavement may be used in the weaving area to increase visibility and awareness of potential conflict.

Optional dotted lines

MUTCD R4-4 (optional)

BEGIN RIGHT TURN LANE
yield to bikes
Through Bike Lanes – Bozeman, MT
Combined BL/TL

1. A dotted 4 inch line and bicycle lanemarking should be used to clarify bicyclist positioning within the combined lane.

2. Minimum width: 4 feet

3. Width of combined lane should be 9 feet minimum, 13 feet maximum

4. A shared lanemarking (MUTCD figure 9C-9) may be used as an alternative to dotted striping to clarify bicyclist position within the combined lane.
Combined Bike Lane/Turn lane, Bozeman MT
Combined Bike Lane/Turn lane - Billings, MT
Shared Lane Markings

Optional Shared Lane Marking Applications

Door Zone
Shared Lane Markings, Missoula & Billings MT
Shared Lane Markings, Bozeman & Ennis
Wayfinding Signage
Wayfinding Signage – Jackson, WY – 2013 Implementation
Wayfinding Signage – Jackson, WY
### Pedestrian facilities

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Parking Lane/Enhancement Zone</th>
<th>Furnishing Zone/Landscape Buffer</th>
<th>Pedestrian Through Zone</th>
<th>Frontage Zone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Streets</td>
<td>Varies</td>
<td>2 - 5 feet</td>
<td>4 - 6 feet</td>
<td>N/A</td>
<td>6.5 - 10 feet</td>
</tr>
<tr>
<td>Main Street Areas</td>
<td>Varies</td>
<td>4 - 6 feet</td>
<td>6 - 12 feet</td>
<td>2.5 - 10 feet</td>
<td>11 - 28 feet</td>
</tr>
</tbody>
</table>
Design Standards
Crossings

The crosswalk should be located to align as closely as possible with the through pedestrian zone of the sidewalk corridor.

‘Piano key’ or ‘ladder’ style markings provide additional visibility.

Transverse lines are the most basic crosswalk marking type.
Active Warning Beacon
Active Warning Beacon - RRFB

Providing secondary installations of RRFBs on median islands improves driver yielding behavior.

Rectangular Rapid Flash Beacons (RRFB) dramatically increase compliance over conventional warning beacons.
Active Warning Beacon

Motor Vehicle Yielding Compliance

Active Warning Beacon – Billings, MT
Active Warning Beacon – Bozeman, MT
Active Warning Beacon – Billings, MT
Hybrid Beacon

May be paired with a bicycle signal head to clarify bicycle movement

Hybrid Beacon

Push button actuation

W11-15

Should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs
Hybrid Beacon – Billings, MT
Full Signal – Bozeman, MT
Policy = Support

Active & Healthy Community

- Subdivision Regulations
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- Design Manuals / Typical Sections
Policy = Support in Jackson
Policy = Support in Jackson

Jackson public works employee Tom Patterson places stencils in one of the new bike boxes being painted in bike lanes around town Thursday. The boxes allow cyclists to stop at intersections ahead of vehicles, which should make riders more visible to drivers. About 17 are planned around town.
JACKSON HOLE BIKE ROUTE

GRAND LOOP

Library
0.3 miles
2 min

Snow King
1.4 miles
8 min

Downtown
1.7 miles
10 min

Library

Snow King

Downtown