

INFRASTRUCTURE MAINTENANCE

Bicycle and pedestrian use does not impact pavement nearly as heavily as motor vehicles do. However, bicyclists and pedestrians are more sensitive to pavement irregularities than drivers and require a smooth surface. Pavement maintenance should focus on maintaining a surface free of potholes, cracks and lifts, such as those often caused by adjacent tree roots along Class I multi-use paths, especially asphalt paths.

Besides maintaining pavement quality, debris will need to be periodically removed from separated bikeways. As the City's active transportation system is implemented, especially Class I multi-use paths and Class IV cycletracks, specialized maintenance equipment will be needed to fit within them because they are usually narrower than standard vehicle lanes. Most cities employ compact street sweepers designed for this purpose, with adjustable pickup brushes that can be aligned to match the width of specific bikeways.

Cleaning schedules should be evaluated based on typical use levels and adjacent trees. Eucalyptus trees, for example, shed leaves and bark throughout the year, which can accumulate against the curbs along Class IV cycle tracks.



Specialized compact sweeper

SIGNAGE AND WAYFINDING GUIDELINES

Wayfinding is a fundamental part of a functional and comprehensive bicycling, walking, and trail network. Effective wayfinding systems create well-structured corridors and pathways that help travelers to:

1. Identify their location
2. Assure that they are traveling in the desired direction
3. Navigate junctions and other decision-making points
4. Identify their destination upon arrival

The following wayfinding system guidelines address active transportation corridors and pathways and how it can improve the experience for people already riding and walking as well as to help encourage people to begin riding and walking altogether. Wayfinding signage design is intended to readily orient users to their location. It is likely that wayfinding signage will occur along the network's existing and proposed routes, as well as within zone with high usage such as shopping centers, schools, and parks.

The guidelines closely follow San Diego Association of Governments (SANDAG) "Best Practices in Developing and Implementing Bicycle Wayfinding Signage" (October 2014) and "Way-

finding Design Guidelines" (October 2015). Although these two documents are intended primarily for bicycling wayfinding, the principles discussed can be applied to create a successful wayfinding signage program for both pedestrians and cyclists. The content discussed in SANDAG's guidelines can also be applied to any city wishing to begin a wayfinding signage programs as the principles and ideas in the document are generally universal and supported by professionals and other municipalities.

DESTINATION DRIVEN

Wayfinding signage guides users to the destinations displayed on the signage. Destinations noted on wayfinding signage should be immediately recognizable and meaningful to the majority of users. As users approach a given sign, it presents a set of destinations accessible from that point. Destinations also serve a broader role by painting a general picture of the route, the areas it serves, and the terminus. Signage also provides useful orientation information for people are not going to the destination. They can use the signage to approximate their path to their own destination.





DESTINATION HIERARCHY

Destinations should be assigned a hierarchical level based on their regional significance. Major destinations such as cities should be listed in the highest level meanwhile local destinations such as parks and community centers should be in the lowest levels.

Tier I

1. Up to five miles
2. Cities

Tier II

1. Up to two miles
 - a. Airports, colleges, neighborhoods/districts, transit centers, regional landmarks, etc.

Tier III

1. Up to one mile
 - a. Major bikeways, high schools, regional parks, hospitals, etc.

Tier IV

1. Up to one-half mile
 - a. Community Centers, elementary/middle schools, local parks, public facilities, etc.

NAMING ROUTES

Naming routes simplifies navigation. Routes such as bikeways that follow only one street can be named after the street, but corridors with many turns often require a broader name. One approach is to name routes based on key attributes such as level of difficulty or the terminus.

INFORMATION HIERARCHY

Because our eyes tend to scan information from top to bottom and left to right, wayfinding signs should be arranged as a hierarchical information flow that takes this into account. This means that the most important information should be near the top and left and displayed in the largest size. Information of lesser importance is placed below that and in smaller sizes, located toward the right and bottom portions of the sign.

THE FOUR D'S

In the context of a route wayfinding signage system, fundamental information includes designation, destination, direction, and duration. Each individual sign should first designate itself as a piece of route wayfinding information, typically with a recurring and prominent icon or text, such as the City's active transportation or parks logo. This information is displayed prominently at the top of the sign.

People using a sign first need to identify the destination most relevant to them before they proceed to direction or distance information. Destination information is generally presented along the left side of the sign. Direction and distance information are shown on the same line as the destination. Directional arrows should be prominent.

SIGN TYPES

There are four basic route wayfinding sign types: confirmation, decision, turn and off-route. Each type has a unique purpose, location, and message. The first three sign types direct people along a designated route network. The fourth sign type directs them onto the route network from adjacent streets.

Confirmation:

2. Indicates to users which designated corridor or pathway they are on
3. Includes destinations and distance or time, but no arrows
4. May be stand-alone or be combined with decision signs

Decision:

1. Marks junctions of two or more corridors or pathways
2. Informs users of designated routes to access desired destinations
3. Displays both destinations and arrows
4. Intended to be used in sets or combined with confirmation signs
5. When combined, confirmation signs should be mounted above decision signs. Decision signs should be mounted in order of distance from destinations listed, with closest first

Turn:

1. Indicates where a corridor or pathway turns, either from one street onto another street or through a difficult or confusing area

Off-route:

1. Informs people that are currently not on a designated corridor or pathway that one exists nearby

A large key map that displays all routes in the network can also be implemented. The map can be combined with “You Are Here” labels to help users orient themselves or help them decide on a new destination. These maps can be located at major intersections, where two or more corridors or pathways meet, or at popular local destinations such as community centers and parks.

On a street, wayfinding signs are placed in both directions unless the street is one-way or the route only travels in one direction. Typically, a mile of route will include four to five wayfinding signs in each direction.

PREDICTABILITY AND REDUNDANCY

Users should become familiar with the signs’ position, shape, color, and font. Consistently repeating these features helps users anticipate where signs will be placed and the messages the signs will convey. The City’s logo and colors should consistently be applied across the network’s signage system.

DESIGNING FOR HUMAN SCALE

Signs need to be designed for immediate legibility from the perspective of a person riding a bicycle or walking. Factors like a rider’s intended lane position or height can inform sign design. However, the cardinal design consideration is speed. Based on guidance from Portland, Oregon, people riding bicycles should be able to see an upcoming sign from about 100



feet away. Cyclists should not have to stop to read a sign, so signs must clearly convey their message, ideally within a seven second envelope. The following principles help to achieve this goal:

TEXT

Signs should be visible from roughly 100 feet away, so capital letters should be 2 to 2.5 inches tall. Signs should be mixed-case rather than all upper case, and minimize the number of lines of text (five maximum recommended).

CONTRAST AND PROXIMITY

There should be high contrast between text and background colors. Related pieces of information should be grouped and assigned similar sizes and shapes.

CONSISTENCY AND REPETITION

Signs should maintain a consistent color, font, and iconographic scheme. City should strive to position signs at consistent heights and locations on standard mounting devices.

SIMPLICITY AND LEGIBILITY

Signs should use the shortest, most concise phrasing whenever possible. Consider using icons to supplement text for people not fluent in English.

DISTANCE MEASUREMENTS

Confirmation, decision, and off-bike route signs should convey distances measured spatially (miles) or temporally (minutes), or both.

SIGN DESIGN AND COLOR

The Manual on Uniform Traffic Control Devices (MUTCD) establishes standards for traffic signs and related traffic control devices and MUTCD-compliant signs are familiar to nearly all roadway users. The MUTCD should therefore govern sign design and placement technical aspects, such as dimensions, font size and ground clearance. However, signs do not have to be bland to accomplish this goal. Route wayfinding signs often include some aesthetic cues and place a stronger emphasis on graphic design.

SIGN MATERIALS

Signs can be manufactured from a variety of substrate materials, including wood, metals, plastics and fiberglass. The message or artwork is usually either painted or printed (usually by silk screening) or applied as adhesive vinyl film. Some commonly used substrates are described below, but in general, most small to medium sized directional signs are now made of aluminum substrate panels covered with printed adhesive vinyl overlay, on one or both sides, which are often digitally printed.

Aluminum

Common substrate for routine, small signs. Message usually silk screened onto substrate. Easily and significantly damaged by bullets and other forms of vandalism, but has good weather resistance. Medium initial and replacement costs.

Aluminum-clad plastic

Similar in character to aluminum signs. The plastic core adds strength. This substrate is highly durable and light weight, making it ideal for kiosk panels or other signs mounted with a backing. Moderate cost.



Aluminum-clad plywood

Similar in character to aluminum signs. Plywood backing adds support to the aluminum to provide stability/rigidity for larger size signs. Moderate to high initial and replacement costs.

Porcelain enamel on steel

This material is highly resistant to scratches, impacts and weathering. Most often used on interpretive signs, it offers a very appealing appearance, but at a high initial and replacement cost. It lends itself well to graphic displays. High cost, but has a lifetime of 20 years or more.

Fiberglass embedment

In this process, an image is embedded in a fiberglass/epoxy-resin panel. While initial image cost is high, additional copies can be cheaply made at the time of the original and put aside for later embedment at relatively low cost to replace a damaged or stolen original. The fiberglass resists scratching, impact and weathering very well. High initial cost, but long lived.

Metal

Engraved or acid etched metals, aluminum and stainless steel have a long service life, are generally good or very good in their resistance to weather, and fair or poor in their resistance to scratching or impact. Medium to high initial and replacement cost.

High-density overlay (HDO) plywood

Marine-quality, 3/4-inch plywood with one side covered with a high density, slick material (the overlay), to which adhesives cling quite strongly. Commonly used as the substrate for pressed-on materials such as reflective vinyl. It weathers well, and holes in the vinyl can be easily repaired.

Plastics

Sign making can involve a variety of plastics:

1. Acrylic, or Plexiglas, is a hard, rigid material that withstands abrasion well but breaks easily. It is often used as a clear protective covering over another sign.
2. Polycarbonate, or Lexan, is similar to the acrylic panel but is softer, with a greater flex. Its softness makes it more likely to be marred by dust and blowing sand.
3. Polyethylene and polypropylene are fairly common materials suitable for most routine sign applications. They are soft materials that have sufficient rigidity to stand up as small signs, but not so rigid that they are easily broken.

They come in basic colors, and accept paint (silk screening) well. Generally, they weather well, but their softness makes them easy prey to vandals wielding sharp or pointed instruments. Initial and replacement costs are low.

Carsonite

Carsonite is a patented material that combines fiberglass and epoxy resins to make a strong but flexible substrate. Used most often in a thin, vertical format that may be useful for confirmation signs between destinations. Its hard, impervious surface is best used as a substrate for decals, although silk screening is possible. Very resistant to impact and weather with low initial and replacement costs.



SIGN MOUNTING AND PLACEMENT

As a general rule, signs should be mounted in consistent, conspicuous locations. Clear sight-lines, free of vegetation and other obstructions, need to be maintained between the path of travel and the signs. Along roadways, best practice is to mount wayfinding signs on their own poles. It is recommended that there be a minimum seven foot clearance between the ground and the bottom of the sign. Signs should never be mounted to traffic signals, lighting, utility or transit stop poles.

Manual on Uniform Traffic Control Devices (MUTCD) Chapter 9B should be consulted for shared-use path signage placement guidance. For consistency, signage on other facilities, such as natural surface trails, should also generally follow these guidelines.

SIGN IMPLEMENTATION

1. Define the route network to be signed, including trunk and connecting routes, as well as route names (if desired)
2. Establish a master list of destinations and assign each to a hierarchical level, if needed
3. Establish signage design and placement guidelines
4. Display destinations and route network together on maps
5. Divide the routes into segments bookended by major destinations. These destinations will be used as control locations (termini) when creating signs
6. Identify junctions, turns and other decision points where turn or decision signs will be necessary
7. Prepare signage plan, including placement and content of individual signs. Ideally, create a GIS database to manage content and location details for each sign, and to support future system management
8. Prioritize implementation
9. Implement signs