

# **III. MAINTENANCE & CONSTRUCTION CONSIDERATIONS**





# III.1. BIKEWAY & WALKWAY MAINTENANCE

This section implements Strategy 2C:

**STRATEGY 2C.** *Adopt maintenance practices to preserve bikeways and walkways in a smooth, clean and safe condition.*

## INTRODUCTION

Bikeways and walkways are subject to debris accumulation and surface deterioration, and require maintenance to function well. Maintenance protects the investment of public funds in bikeways and walkways, so they can continue to be used safely. Poorly maintained facilities become unusable and a legal liability,



**Sweeping the outer edge of roadway improves conditions for bicyclists**

as cyclists and pedestrians who continue to use them may risk equipment damage and injury. Others will choose not to use the facilities at all.

## A. USER CHARACTERISTICS & NEEDS

### A.1. BICYCLISTS

Bicyclists ride on two narrow, high-pressure tires. What may be an adequate roadway surface for automobiles (with four wide, low-pressure tires) can be treacherous for cyclists.

Small rocks, branches and other debris can deflect a wheel, minor ridges in the pavement can cause spills, and pot-holes can cause wheel rims to bend. Wet leaves are slippery and can cause cyclists to fall. Gravel blown off the travel lane by traffic accumulates in the area where bicyclists ride. Broken glass can easily puncture bicycle tires.

### A.2. PEDESTRIANS

Pedestrians have little or no protection from the elements. While walking, a person typically looks ahead and around, without noticing cracks and bumps in the sidewalk. A smooth, level surface is critical for disabled, young and elderly pedestrians.

When street snow removal is stored on the sidewalk, conditions are degraded for pedestrians, especially where there is no buffer. Pedestrians depend on motorists respecting traffic signs and signals; these must be properly maintained for pedestrian safety.

## B. RECOMMENDED MAINTENANCE PRACTICES

### B.1. SWEEPING

Bicyclists often avoid shoulders and bike lanes filled with sanding materials, gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface); nor should debris be swept from the sidewalk onto the roadway.



**Debris accumulated on the shoulder forces cyclist into the roadway**

A regularly scheduled inspection and maintenance program helps ensure that travelway litter is regularly picked up or swept. During extended icy conditions, it may not be cost-effective to frequently remove sanding materials; however, they should be swept after the winter season ends or after major storms in high-use areas.

#### Recommendations

- Establish a seasonal sweeping schedule;
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility;
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders;
- Pave gravel driveway approaches to reduce loose gravel on paved roadway shoulders;
- Provide extra sweeping in the fall in areas where leaves or pine cones accumulate in bike lanes; and
- Require parties responsible for debris to either:
  - (1) Prevent problem in the first place (e.g. by placing tarps over trucks loaded with gravel) or
  - (2) Sweep up debris immediately (ORS 822.225 requires tow-vehicle operators to remove glass after crashes).

### B.2. SURFACE REPAIRS

A smooth surface, free of cracks, potholes, bumps and other physical problems should be provided and maintained.

#### Recommendations

- Inspect bikeways and walkways regularly for surface irregularities;
- Respond to citizen complaints in a timely manner;
- Repair potentially hazardous conditions as soon as possible;
- Prevent the edge of a repair from running through a bike lane or shoulder;
- Perform preventative maintenance operations such as keeping drains in operating condition and cutting back intrusive tree roots; and
- Sweep a project area after repairs.



**A rough surface can be treacherous for wheelchair users**

### B.3. PAVEMENT OVERLAYS

Pavement overlays are good opportunities to improve conditions for cyclists if done carefully: **a ridge should not be left in the area where cyclists ride** (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects offer opportunities to widen the roadway, or to restripe the roadway with bike lanes.

#### Recommendations

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge;
- If this is not possible, and there is adequate shoulder or bike lane width, it may be appropriate to stop at the shoulder or bike lane stripe, provided no abrupt ridge remains;
- After overlays, raise inlet grates, manhole and valve covers to within 6 mm (1/4") of the pavement surface;
- In curbed sections, maintain a 180 mm (7") (min. 130 mm [5"]) curb exposure for pedestrian safety;
- Where the existing roadway surface is ground out, grind the entire surface to avoid an exaggerated crown and a steep slope at crosswalks, creating difficulties for the disabled;
- Pave gravel driveways and approaches 4.5 m (15 ft) from the edge of pavement to prevent gravel from spilling onto shoulders or bike lanes (see Figure 16, page 69); and
- Sweep the project area after overlay.



**This overlay project added smooth, paved shoulders**

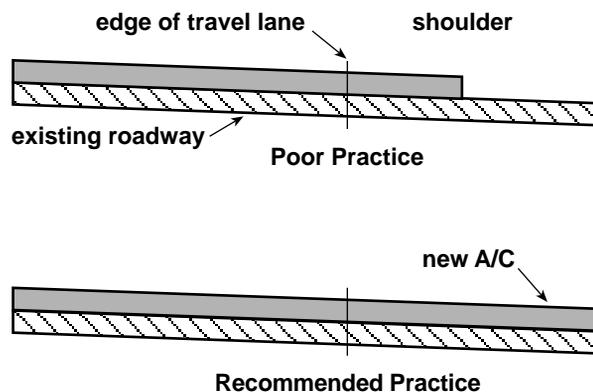
### B.4. VEGETATION

Vegetation encroaching into bikeways or walkways is both a nuisance and a problem. Roots should be controlled to prevent break-up of the surface. Adequate clearances and sight-distances should be maintained at driveways and intersections: pedestrians and bicyclists must be visible to approaching motorists, rather than hidden by overgrown shrubs or low-hanging branches, which can also obscure signs.

Local ordinances should allow road authorities to control vegetation that originates from private property. Some jurisdictions require adjacent land owners to control vegetation, or else maintenance personnel perform the work and bill the property owner.

#### Recommendations

- Cut back vegetation to prevent encroachment; and
- Perform preventative operations such as cutting back intrusive tree roots.



**Figure 159: An overlay should extend over the entire roadway**



**Vegetation obscures visibility**

### B.5. SIGNS, STRIPES & LEGENDS

New bikeway and walkway signs and legends are highly visible, but, over time, signs may fall into disrepair and legends may become hard to see, especially at night. Signs and legends should be kept in a readable condition, including those directed at motorists: pedestrians and bicyclists rely on motorists observing the signs and legends that regulate their movements. Examples include STOP and RIGHT TURN YIELD TO PEDS signs, stop bars, fog lines, etc.



**Thermo plastic stripes increase the visibility of bike lanes**

#### Recommendations

- Inspect signs and legends regularly, including reflectivity at night;
- Replace defective signs as soon as possible; and
- Retrace legends, crosswalks and other pavement markings in the spring; in high-use areas, these may require another paint application in the fall.

### B.6. DRAINAGE IMPROVEMENTS

New drainage facilities function well, but may sink and deteriorate over time. Catch basins may need to be adjusted or replaced to improve drainage. A bike-safe drainage grate at the proper height improves bicycle safety. Curbs used to divert storm water into catch basins should be designed so they do not create hazard for cyclists. At intersections, there should be no puddles in pedestrian crosswalks.



**Poor drainage traps water in crosswalk**

#### Recommendations

- Raise catch basin grates flush with pavement;
- Modify or replace deficient drainage grates with bicycle-safe grates;
- Repair or relocate faulty drains at intersections where water backs up onto the curb cut or into the crosswalk; and
- Remove existing drainage curbs that encroach into shoulders or bike lanes.



**This catch basin should have been raised after pavement overlay**

## C. OTHER MAINTENANCE ACTIVITIES THAT AFFECT BICYCLING & WALKING

The following activities, when performed incorrectly, may degrade conditions for cyclists or pedestrians.

### C.1. CHIP SEALING

Chip seals leave a rough surface for bicycling. Chip seals that cover the travelway and part of the shoulder area leave a ragged edge or ridge in the shoulder, causing problems for cyclists.

#### Recommendations

- Where shoulders or bike lanes are wide enough and in good repair, cover only the travel lanes with chip seal;
- If the shoulders or bike lanes must be chip sealed, cover the shoulder area with a well-rolled, *fine-textured* material: 3/8"-10 or finer for single pass, 1/4"-10 for second pass;
- Sweep the shoulder area following chip seal operations; and
- Ensure that inlet grates, manhole and valve covers are within 6 mm (1/4") of the final surface.



**Chip seal leaves adequate shoulder width**

### C.2. PATCHING ACTIVITIES

Loose asphalt often ends up on the shoulder, adhering to the surface and creating roughness.

#### Recommendation

- Sweep fresh loose materials off the road before they adhere to the pavement.



**Patch extends only halfway into bike lane**

### C.3. BLADE PATCHING ACTIVITIES

Road graders can provide a smooth pavement patch; however, the last pass of the grader sometimes leaves a rough tire track in the middle of the shoulder.

#### Recommendations

- Equip road graders with smooth tires;
- Cover the entire shoulder width;
- Roll the shoulder area after the last pass of the grader; and
- Sweep fresh loose materials off the road before they adhere to the pavement.



**Utility cut is flush with sidewalk**



**Weeds breaking up bike lane**

### C.4. UTILITY CUTS

Utility cuts can leave a rough surface for cyclists if not back-filled carefully. Sidewalk cuts should be finished as smooth as a new sidewalk.

#### Recommendations

- Wherever possible, place cut line in an area that will not interfere with bicycle travel;
- Back fill cuts in bikeways flush with the surface (humps will not get packed down by bicycle traffic);
- Ensure that cuts parallel to bicycle traffic don't leave a ridge or groove in the bicycle wheel track; and
- Back fill cuts in sidewalks with concrete, flush with the sidewalk grade.

### C.5 RAISED PAVEMENT MARKERS

Raised pavement markers (RPM) present many problems for bicyclists. The MUTCD states that "Raised markers generally should not supplement right edge lines."

#### Recommendations

- Remove existing RPM's if not needed for motorist safety;
- If needed, install RPM's on the motorists' side of the stripe.



**Raised pavement markings placed outside of the bike lane**



**Abandoned driveway should be retrofitted with sidewalk**

### C.6. ABANDONED APPROACHES

When accesses are abandoned in urban areas, there is no point in leaving a sidewalk dip or warp at these locations.

**Recommendation**

- Fill in legally abandoned accesses with level sidewalks.

### C.7 SNOW REMOVAL

Snow stored on bike lanes or sidewalks impedes bicycling and walking in winter.

**Recommendations**

- On streets with bike lanes, remove all snow from street surface;
- Do not store snow on sidewalks.



**Sidewalk ramp should be raised**



# III.2. OPERATING BIKEWAYS & WALKWAYS DURING CONSTRUCTION

## INTRODUCTION

The construction of transportation projects can disrupt the public's mobility and access. Efforts should be made to maintain access for pedestrians and bicyclists, who are the most susceptible to disruptions because of their slower speeds and exposure to noise, dirt and fumes.

Temporary lane restrictions, detours and other traffic control measures should be designed to accommodate non-motorized travelers in areas where these modes are normally encountered.

It may not always be possible to ensure a desirable or comfortable route for pedestrians and bicyclists, but their access should not be denied. Some roadways and bridges are the only link between neighborhoods, and their severance cuts off residents dependent on walking or bicycling.

The following recommendations should be incorporated into project construction plans. Workers who routinely perform maintenance and construction operations should also be aware of these considerations.

### A. RURAL HIGHWAY CONSTRUCTION

Construction operations on rural highways affect mostly touring and recreational cyclists; pedestrians are seldom encountered in rural settings.

On low-volume roads, or through short construction zones, standard traffic control practices are usually adequate. Bicyclists can ride through without impeding traffic. Their needs can be met

by maintaining a paved surface and removing temporary signs, debris and other obstructions from the edge of the roadway after each day's work.

On high-volume roads or through long construction zones, enough paved roadway width should be provided for motor vehicles to safely pass bicyclists. Flaggers and pilot cars should take into account the cyclists' lower speed. When cyclists are coming through, radio messages can be relayed to other flaggers.

On highways with very high traffic volumes and speeds, and where construction will restrict available width for a long time, it may be advisable to provide a detour route for cyclists where possible. The detour should not be overly circuitous. Directional signs should guide cyclists along the route and back onto the highway.



**Rural highway construction project with sufficient shoulder width maintained**

## B. URBAN ROADWAY CONSTRUCTION

In urban areas, safe and convenient passage is needed during construction for both pedestrians and bicyclists.

Pedestrians have little tolerance for out-of-direction travel. Pedestrians may ignore signs that reroute them or prohibit their access if it is inconvenient; they might prefer to walk through the construction zone. It is preferable to create a passage that allows pedestrians to proceed as close to their normal route as possible.

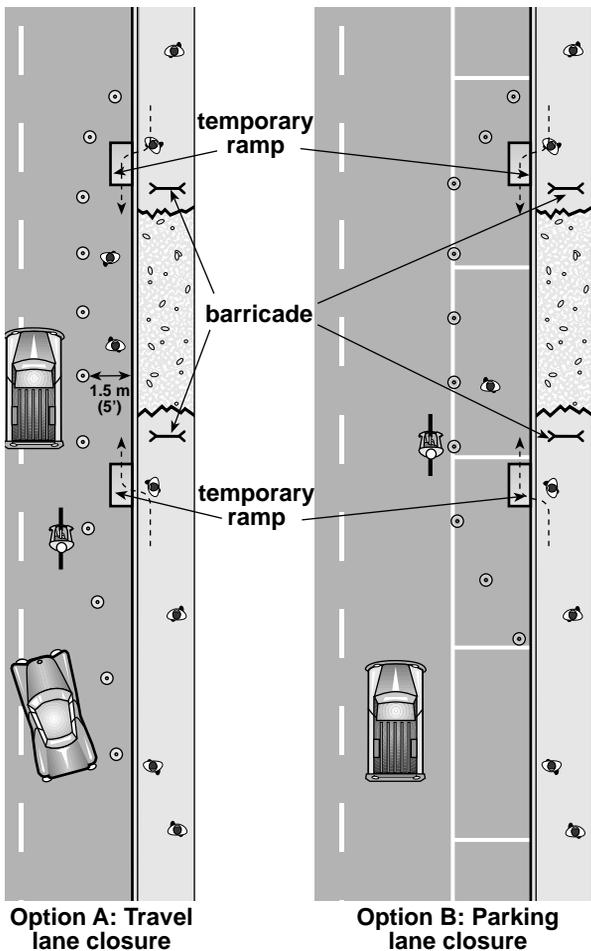
Solutions such as closing a sidewalk or installing signs asking pedestrians to cross a



**Construction operation leaves debris in bike lane**

busy street are undesirable. If a sidewalk must be closed, barricades and cones can be used to create a temporary passageway. This is most practical on streets with parking: the pedestrian passage replaces the parking area.

It may not be possible to maintain standard walkway widths during construction. However,



**Option A: Travel lane closure**

**Option B: Parking lane closure**

Cone taper not to scale. See MUTCD for standard taper lengths, and for standard right lane closure signs.

**Figure 161: Creating passageways for pedestrians during construction**



**Construction signs placed out of bike lane and sidewalk**



**Sidewalk maintained and protected during construction**

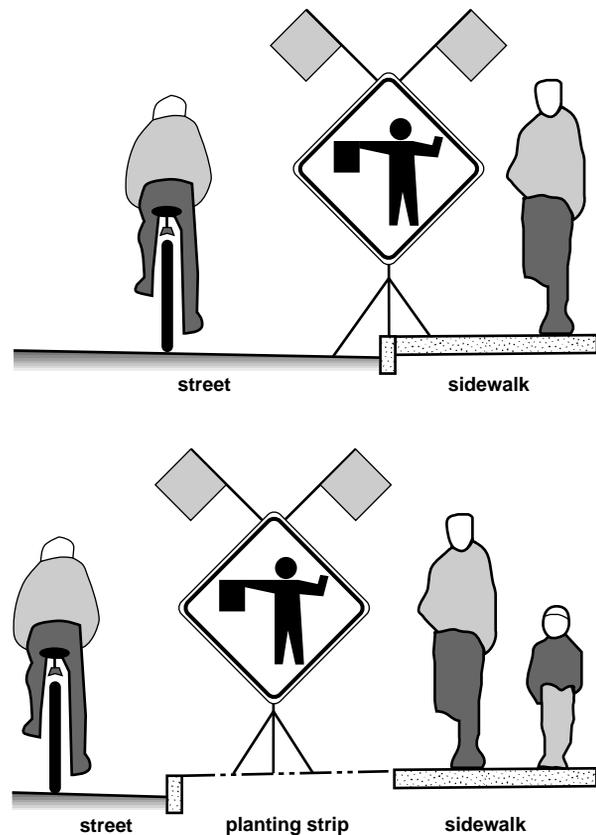
a passage wide enough to accommodate the disabled should be maintained with a surface capable of being negotiated in a wheelchair.

At intersections, it is preferable to keep all crosswalks open. At signalized intersections, temporary crosswalks should be painted if they are relocated. Temporary signals should include pedestrian phases.

Through bicycle movement must also be maintained. Bicyclists can share a lane over a short distance. On longer projects, and on busy roadways, a temporary bike lane or wide outside lane may be provided. Bicyclists should not be routed onto sidewalks or onto unpaved shoulders where possible.

Debris should be swept to maintain a reasonably clean riding surface in the outer 1.5 or 1.8 m (5 or 6 ft) of roadway. Bicyclists have a low tolerance for surface grade changes and excessive bumps should be avoided.

The placement of advance construction signs should obstruct neither the pedestrian's nor the bicyclist's path. Where this is not possible, placing signs half on the sidewalk and half on the roadway may be the best solution.



**Figure 162: Construction sign placement**

### C. OTHER CONSIDERATIONS

Communication with the public is important during construction. Notices in local newspapers and radio announcements can get messages regarding important changes out to users. Construction project managers should consult local groups such as bicycle or pedestrian advisory committees, PTA's, school districts, etc., to find out who will be affected by a disruption.

Bus stops must remain accessible to pedestrians.



**Pavement grinding project left exaggerated lip at this curb cut**



**Pedestrians need access across freeway during construction**