The City of Portland complies with all non-discrimination, Civil Rights laws including Civil Rights Title VI and ADA Title II. To help ensure equal access to City programs, services and activities, the City of Portland will reasonably modify policies/procedures and provide auxiliary aids/services to persons with disabilities. Call 503-823-5185, TTY 503-823-6868 or Oregon Relay Service: 711 with such requests, or visit http://bit.ly/13EWaCg
INTRODUCTION

The City of Portland is committed to providing safe sidewalks for all. Maintaining Portland is a matter of pride. It is important to preserve the community for the future, and protect the community's investments in streets, sewers and sidewalks by keeping them clean, safe, looking good and working well.

Title 17 of Portland City Code identifies property owners as responsible for the construction, reconstruction and maintenance of the sidewalk system abutting their property.

Property owners have the option to make the repairs themselves; however, placing concrete is difficult work and requires an advanced skill set and knowledge of City codes and standards. Consider hiring a professional for the best results.

There are repair options available, depending on the amount of damage and the type of hazards. This repair manual will take you through each method, step-by-step. Each posted area in your sidewalk should be evaluated separately, to decide which repair method would be most effective. Sidewalk Inspectors are available to meet with property owners to discuss repair options.

A permit is required to work in the City right-of-way. Permits can be obtained at the Sidewalk Maintenance Office, located at 2929 N Kerby Avenue, Portland, OR 97227. There is a permit fee associated with the permit.

Permit fees are evaluated yearly and may change each July 1st. For current fee schedule information, please contact the Sidewalk Maintenance Office. If you hire a contractor, the contractor will be responsible for obtaining the permit.

The tools needed for making repairs will be listed in each step. In the back of this repair manual, there is a tool glossary with pictures to help you identify the tools you will need.

If you have any questions, please contact our office at 503-823-1711 or sidewalkrepair@portlandoregon.gov.

Thank you.
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SIDEWALK POSTING TYPES AND CRITERIA
(See Appendix I)

All hazards in the City right-of-way, latitudinal and longitudinal, shall be posted for repair.

Stub Toes (Grade/Step Separation)
A guideline of ½ -inch vertical separation for all sidewalk and driveway areas will be used to determine if a stub toe is hazardous.

Openings (Holes, Wide Cracks, Concrete Separations)
All openings, in the City right-of-way, that are considered hazardous shall be posted for repair. A guideline of ½- inch depth and/or ½- inch width will be used to determine if an opening is hazardous.

Spalled sidewalks and driveways, where the concrete is chipped to the point of creating a trip hazard, shall be posted for repair. A guideline of ½- inch width and/or ½- inch depth will be used in determining if a spalled area is hazardous.

Raised Areas
Raised sidewalks and driveways shall be posted when the raised area is hazardous. As a guideline, when the uppermost point of the raised area is greater than 4 inches from the original grade, the area may be considered hazardous.

Sunken Areas
Sunken sidewalks and driveways may be posted when it causes a trip hazard or has sunken 4 inches below the original grade.

Unused Driveway Approaches
All driveway approaches are constructed under a revocable permit and may be posted for closure if permanently unused or hazardous. Permanently unused driveway approaches, not serving legal maneuvering space on a property, as set forth in planning codes, may be closed. Examples are driveways blocked by fences, walls, landscaping, or driveways to illegal parking areas in yards.

Root Damage at Adjoining Properties
Where a tree root has lifted the sidewalk or driveway on either side of the property line, both properties may be posted to correct and maintain the grade of the sidewalk, or driveway, for both properties. Each posted property will have a notation about the adjoining property. To maintain quality of work, the properties should be repaired together. They could be repaired separately, by installing a temporary transition area, that would later be replaced during repairs made by the second property owner. In cases where it is necessary to install a transition area on the abutting property, repairs can be made without creating a hazard at the property line. Verify with a Sidewalk Inspector the area needed to make a proper transition.

Tree Wells
Hazards found in and around tree wells will be posted for repair. If, during an inspection, trees are found to be missing from tree wells, a notation is made on the posting to contact the Urban Forestry Division for tree replacement information.
Bolts in Sidewalk
Traffic sign bolts, and bases, in the City right-of-way, will be inspected and referred to the Traffic Maintenance Section to install missing signposts or eliminate the hazard. Hazardous bolts found because of City installed bike racks will be inspected and referred to the Maintenance Operations Structures Section for repair. The adjacent property owner will not be charged for this work.

Corners
City corners installed by City crews, or contractors, will comply with ADA specifications. Historical dates in existing corners will be preserved by City crews, or contractors, whenever possible, or stamped with the addition of the current year, i.e. 1933/2017. Existing dates and street names will be re-stamped as they existed in the sidewalk corner. This includes misspelled words and names that are no longer used for the street name, per City specification 00759.50(d) (Appendix II) (ftp://ftp02.portlandoregon.gov/PBOT/CDS/2010%20Standard%20Specifications/Parts/Part%200700%20-%20Black.pdf). Contractor names will not be replaced.

Curbs
Curbs shall be maintained by the City, except when in combination with the sidewalk, when willfully damaged, or when damaged by tree roots. See Portland City Code 17.28.020. (Appendix III)

Trees and tree roots will be protected and left undisturbed. The person(s) making the repair will contact the Urban Forestry Division at 503-823-TREE (8733) to request a root inspection, if necessary, after the curb has been excavated. Asphalt curbing will be installed, when replacement of concrete curbing could possibly damage trees and tree roots. Asphalt is flexible, allowing movement while controlling drainage.

Horse Rings
Existing horse-rings are considered historical, and are to be replaced during curb repair projects. Contact the Sidewalk Maintenance Office if existing horse-rings are damaged to the point where re-installation is not possible.

Vault Doors
Vault access doors that are considered hazardous will be posted for repair. Criteria of a ½- inch stub toe, ½-inch opening, raised/sunken, or generally in a deteriorated and/or hazardous condition shall apply.

SIDEWALK REPAIR METHODS

Obtain Permit
A permit is required to work in the City right-of-way. Permits can be obtained, in person, from the Sidewalk Maintenance Office, located at 2929 N Kerby Avenue, Portland, OR 97227. There is a fee associated with the permit. Contact the Sidewalk Maintenance Office at 503-823-1711 or sidewalkrepair@portlandoregon.gov for current office hours and permit fees. If you hire a contractor, the contractor will be responsible for obtaining the permit.
**Method 1: Grinding**

Concrete grinding is one method used to remove “stub toes” that are 1 inch high or less and perpendicular to the flow of pedestrian traffic. Verify with the posting Sidewalk Inspector to determine if grinding would be an acceptable repair method.

“Stub toes” are areas in the sidewalk, where part (or all) of one square is higher than the one next to it, causing a tripping hazard for pedestrians. It may be possible to eliminate the “stub toe” hazard by grinding down the high edge.

Grinding repairs shall not exceed 1 inch vertically. The repaired section surface finish shall conform to the non-slip coefficient of friction, per standard specification section 2484.35(a). This can be achieved by roughening the surface with a saw blade or other approved method. Verify with the posting Sidewalk Inspector to determine if grinding would be an acceptable repair method. In some areas, sidewalk sections are lifted due to the growth of tree roots. If you grind down a stub toe caused by tree roots, the repair may only be temporary. Grind off the hazard so that the walk has a gradual slope or transition. For a ½-inch of rise, grind back 6 inches. For a (maximum) 1 inch rise, grind back 12 inches.
Tools Needed for Grinding Repair

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Power Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves, Goggles, Hearing Protection, Eye Protection, Dust mask or respirator</td>
<td>Masonry Grinder</td>
</tr>
</tbody>
</table>

You will need a masonry grinder, which can be rented. See Appendix IV for rental information. Grinding concrete is noisy and dusty. Remember to wear hearing and eye protection.

If the sidewalk is raised 1 inch or less, and the concrete edges are solid, the concrete may be ground to remove the stub toe hazard. Sidewalks raised greater than 1 inch cannot be ground, as this would compromise the structural integrity of the sidewalk.

If, during grinding, aggregate becomes dis-lodged, or edges becomes spalled, or deteriorated, full depth repair will become necessary.

Areas raised in the sidewalk greater than 1 inch are to be removed and replaced at full depth.

Request a final inspection, if all posted hazards are approved for grinding. If posted hazards are to be corrected by a combination of grinding and removing and replacing concrete, a final inspection will be required after all repairs have been completed.
Method 2: Remove and Replace

Removal and replacement is typically used to repair the following types of hazards:

Deteriorated sidewalk

Sidewalk raised more than 1”
**Barricades**
A permit to work, in the City right-of-way, requires permit holders to erect freestanding barricades on work sites in the sidewalk, driveway, curb, and street, to warn pedestrian and/or vehicular traffic. Excavated portions of sidewalk, at entry areas, within the work site shall have barricades during construction, to prevent possible injury to pedestrian and/or vehicular traffic. The liability for an accident or injury, during construction, is the responsibility of the permit holder.

Barricades can be built out of scrap lumber, but must be a minimum of 36 inches tall. Barricades can also be rented from rental equipment businesses.

![Barricades Image](image)

**When Transition Areas are Needed**
In some cases, it may be necessary to install a transition area onto the neighboring property. This process allows repairs to be made without creating a hazard at the property line. Verify with a Sidewalk Inspector to determine the area needed to make a proper transition. If adjacent properties are repaired at the same time, a transition would not be necessary.

**Saw Cut and Break Up Existing Concrete**
Saw cut all sections to be removed, using a concrete or masonry blade. Break up and excavate sections to the proper depth, per City Standard Drawings and Specifications, located on the City’s website at: [2010 City of Portland Standard Specifications | Design + Construction | The City of Portland, Oregon](#)

**Remove All Debris and Prepare the Base**
All debris must be removed from the City right-of-way and barricades placed prior to requesting a form inspection. Some people use broken concrete for garden pathways or retaining walls. If you don’t use it, debris can be taken to a landfill or be recycled.

City Standard Drawing P-541 (Appendix VI) requires sidewalks to be a consistent depth of 4 inches. City Standard Drawing P-528 (Appendix VII) requires driveways, including the area where it crosses the sidewalk, to be a consistent depth of 6 inches to support the weight of motor vehicles. The curb line area in driveway approaches is required to be 10 inches below street grade.

To prevent future settling, pouring concrete on bare soil is only allowed, if firm and undisturbed. For larger
excavations, it may be a requirement, that 2” crushed aggregate be placed as a base first. Also, remove any soft or muddy areas, then rock and compact. All aggregate must be compacted to 95%. City Standard Drawings and Specifications can be found on the City’s website at: P-400 through P-599 Pavement Markings, Curbs, Sidewalks, Driveways and Pavements | Standard Drawings/Details (BES & Transportation) | The City of Portland, Oregon If rock is needed, it shall be 1"- 0 crushed rock, which will need to be compacted (using a plate compactor) to the required depth. Pea gravel is not acceptable because it does not compact.

Tools Needed to Remove Concrete

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Power Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves, Goggles, Shovel</td>
<td>Concrete Saw</td>
</tr>
<tr>
<td>Sledge Hammer, Axe</td>
<td>Circular Saw w/ masonry blade</td>
</tr>
<tr>
<td>Pry Bar, Rake</td>
<td>Jackhammer</td>
</tr>
<tr>
<td>Pick, Broom</td>
<td>Truck or Trailer</td>
</tr>
</tbody>
</table>

Time Estimate (in hours) for two persons:

<table>
<thead>
<tr>
<th>Number of Squares</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours to Prepare the Site</td>
<td>1 ½</td>
<td>2 ½</td>
<td>3 ½</td>
<td>4 ½</td>
</tr>
</tbody>
</table>

When Tree Roots Are Involved

When tree roots are exposed in excavated areas, a root inspection is required before tree roots can be cut and removed. Contact Urban Forestry at 503-823-TREE (8733) to request a root inspection. The root inspection will be made 1 to 2 business days after the request is made. A notice regarding root removal will be attached to a barricade on site.

If there are questions about forming around roots, after the root inspection has been made, contact the posting inspector, or the Sidewalk Maintenance office at 503-823-1711 to request a form consultation. When repairing sidewalks, and driveways, that have been damaged by tree roots, it may be necessary to replace additional concrete, depending on the size and location of tree roots that are not allowed to be removed. If a transition area is needed, refer to “Transition Areas” on page 8 for information.

Unit Pavers may be used to mitigate sidewalk lifting caused by tree roots. Urban Forestry will determine when a tree and/or tree roots can be saved. A Sidewalk Inspector can determine if pavers are a good alternative, and will be permitted. See City Standard Drawings P-554 and P-572 for information on unit pavers. (Appendix V & IX)

Note: A separate permit is required to prune, plant, remove, or treat trees growing in the City right-of-way. Contact Urban Forestry at 503-823-TREE (8733) for permit information.
Placing Forms
You will need to place forms to hold the newly mixed concrete. A form is simply a 1" x 4", or 2" x 4", piece of lumber slightly longer than the excavated area, to hold the concrete in place until it hardens or cures. Drive wooden stakes into the ground on the outside of the form, every 2 to 3 feet apart, and nail the form to grade. The stakes will keep the forms straight and secure. Stakes should be placed slightly lower than the form to not cause interference when the concrete is screeded.
When repairing sidewalks and curbs damaged by tree roots, a form consultation will be necessary to discuss the following options:

**Radius Block outs**
To reduce the width of the sidewalk, where roots have encroached into the sidewalk, use a radius block out. This will also leave room for root expansion, when the Urban Forestry Inspector will not allow roots to be cut and removed.
Reduce Sidewalk
Sidewalks that are 6-foot-wide may be reduced 1 foot, if necessary, in cases where roots are encroaching into the sidewalk, and the Urban Forestry Inspector will not allow root removal. Sidewalks can be reduced to 4-foot-wide in extreme cases, only with approval of a Sidewalk Inspector.
Ramp Over Roots
When roots cannot be removed, as determined by the Urban Forestry Tree Inspector, the grade of the sidewalk may need to be elevated, building a ramp over the roots. Consult with a Sidewalk Inspector.

Note: It may be necessary to utilize the set-back area of the public right-of-way, to install sidewalk, when trees are involved.
Drop Curbs
See Appendix VIII - City Standard Drawing P-540-Curb
Asphalt curbing is used when the replacement of concrete curbing could damage the tree or tree roots. The asphalt is flexible and allows movement while controlling drainage.
Tools Needed to Form Concrete

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape Measure, Hand Saw</td>
<td>Lumber, Survey Stakes</td>
</tr>
<tr>
<td>Hammer, String Line, Level</td>
<td>Nails, Black Felt Expansion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Estimate (in hours) for two persons:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Squares</td>
<td>1</td>
</tr>
<tr>
<td>Hours to Prepare the Site</td>
<td>1/4</td>
</tr>
</tbody>
</table>

Request Form Inspection
After all posted areas have been excavated to proper depth, forms have been set, barricades are in place, and all debris has been removed from the City right-of-way, fill out the online form at: [www.portlandoregon.gov/transportation/sidewalks](http://www.portlandoregon.gov/transportation/sidewalks) to request a form inspection. You can also call the Sidewalk Maintenance Office at 503-823-1711 to request a form inspection. Provide the posted address and the affidavit number. Inspections will be made Monday through Friday, excluding holidays. Requests must be received by 6:30 am to obtain an inspection that day. Requests made after 6:30 am, will be inspected the next business day. An inspection card will be attached to a barricade on site indicating whether the formwork passed inspection.

If an inspection card reading "Do Not Pour Concrete" is given, the deficiencies need to be corrected and another form inspection requested. Once an approved form inspection card is issued, “Permission Granted to Pour Concrete,” concrete may be poured.

Concrete replacement will be tooled to match existing patterns and have a broomed finish per City Specifications. [P-400 through P-599 Pavement Markings, Curbs, Sidewalks, Driveways and Pavements | Standard Drawings/Details (BES & Transportation) | The City of Portland, Oregon](http://www.portlandoregon.gov/transportation/sidewalks)

Contraction/Expansion Joints
Place joints at the direction of the Sidewalk Inspector.

Expansion material is a pre-molded strip, made of tar-impregnated black felt like material, that can be purchased in most building supply stores. Gray recycled paper expansion material is not acceptable. Wood strips, including cedar and pressure treated lumber, are not acceptable at it decays over time. Expansion material will be used as directed by the Sidewalk Inspector.

Typical locations for expansion joints, or contraction joints, are as follows:

1. Between different thicknesses of concrete: to separate a 4-inch sidewalk from a 6-inch driveway.
2. Continuation of existing expansion joints or contraction joints.
3. Grade breaks: where the concrete grade will change, or be different i.e. ramping over tree roots.
4. Expansion material or bond breaker will need to be used around objects such as buildings, retaining walls, or utility poles.
5. Deep joints are typically spaced at a dimension twice the width of sidewalk.
Use a straight 1" x 4", or 2" x 4", backboard slightly shorter than the length of the expansion material to place behind the expansion material and stake into place. Place fresh concrete on both sides of the expansion joint and then remove the backboard and the stakes. The concrete will hold the expansion straight and to grade.

**After Permission Granted to Pour Concrete:**

**Tools Needed for Placing and Finishing Concrete**

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber Boots and Gloves</td>
<td>Screed Board</td>
</tr>
<tr>
<td>Mortar box or Wheelbarrow</td>
<td>Bull Float</td>
</tr>
<tr>
<td>Shovel, Water Hose</td>
<td>Hand Float, Broom</td>
</tr>
<tr>
<td>Steel Trowel, Jointer Tool</td>
<td>3/8” Radius Edger Tool (3” typical-match existing)</td>
</tr>
<tr>
<td></td>
<td>Ready Mixed Concrete</td>
</tr>
<tr>
<td></td>
<td>Dry Concrete Mix (Premix or Sakcrete)</td>
</tr>
<tr>
<td></td>
<td>Dry Cement for Sakcrete</td>
</tr>
</tbody>
</table>

**Time Estimate (in hours) for two persons:**

<table>
<thead>
<tr>
<th>Number of Squares</th>
<th>Placing, Leveling Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>2.5</td>
</tr>
</tbody>
</table>

**Determine How Much Concrete is Needed**

Measure the width and length of the area(s) you must fill with concrete. This will give you the area in square feet. Refer to the chart below and figure out about how many cubic yards of concrete you will need. An average city sidewalk square is 9 square feet (3 foot by 3 foot). Sidewalks are 4 inches deep; so, for one repair area you would need 1/9 of a cubic yard of concrete.

<table>
<thead>
<tr>
<th>Depth of Concrete</th>
<th>Area (width x length) In Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td>4” Sidewalk (In Cubic Yds.)</td>
<td>1/9</td>
</tr>
<tr>
<td>6” Driveway (In Cubic Yds.)</td>
<td>1/6</td>
</tr>
</tbody>
</table>
Placing and Finishing Concrete
Once you know how much, and what kind of concrete to use, and are ready to place the concrete, the next steps come fast. Make sure you understand beforehand what you will be doing. Have the necessary tools ready and the steps clearly in mind.

Concrete Options
City Standard Construction Specification Section 02001.10 requires Portland Cement Concrete used in the construction and repair of sidewalks, driveways, and curbs, shall have a minimum specified compressive strength of 3300 psi, with a 4-inch maximum slump. Slump is a measurement of the consistency of concrete. The addition of too much water (higher slump) will weaken concrete.

If you need 3 to 7 cubic yards or more, concrete can be purchased from a local source and be delivered. Some companies will not deliver on the weekend, so schedule accordingly.
If you need 1 to 3 cubic yards or less, you may want to mix it yourself, purchase ready-mixed concrete that you haul yourself in a supplied trailer, or utilize a meter mix truck that mixes the concrete on-site.

To mix it yourself you will need dry concrete mix such as “Premix” or “Sakcrete”, which can be purchased from a building supply store. Check the specifications on the bag to determine if the concrete mix meets the 3300-psi minimum strength. You can use a mortar box or a wheelbarrow to mix in, and a square point shovel or garden hoe for mixing. When ready, add water a little at a time until workable. Concrete should be placed immediately after mixing.

Note: Do not place concrete when freezing weather is expected, as it will not cure correctly and will need to be replaced.

It is not recommended to pour concrete if very hot weather is expected, as it will cure too quickly and may have to be replaced.

When pouring concrete during rainy weather, be prepared to tent areas with plastic while finishing concrete, to prevent water damage.

Skin
There is lime in concrete which can harm human and animal skin. Wash it off as soon as possible, with soap and water, or wear rubber gloves and boots to prevent direct contact with the concrete.

Clothing
Let the concrete dry if it gets on your clothing, and then brush it off. Be sure it is all brushed off before putting your clothes into the washing machine or it could damage the machine.

Wet Down/Soak the Base
Keep the base moist until the concrete is poured. Dry ground will draw moisture from the concrete and the concrete will cure too quickly. The base needs to be soaked but not so much that it holds water or becomes extremely muddy. If this occurs, or there have been several days of rain, the excess water and/or mud should be removed, rocked, and then compacted again before pouring concrete.
Placing and Leveling the Concrete
After you pour the concrete into the form, spread it out as evenly as you can with a shovel, leaving it slightly higher than the existing sidewalk.

Next use the edge of a 2" x 4" board or “screed”, that reaches across the entire width of the formwork and move it across the surface in a sawing motion. Concrete should be the same grade as the existing formwork, which should be at existing grade of abutting sidewalk.
Floating
Next, level off any high areas of concrete and fill in any low areas, before the concrete begins to harden. Use a bull float. Push it back and forth across the width of the area you are replacing. Then push it back and forth across the length of the area being replaced. If you must add any concrete to fill low areas, push the float across again. After floating, surface should not have holes or high spots.

Use the magnesium hand float for small areas, perimeters, and around obstructions.

Caution
Concrete can easily be overworked. Do not pass the float over the slab more than a few times because this can produce a weak surface with low wear resistance.
Breaking the Edges
You’ll need an edger tool. Draw it along all outside edges that were formed, including both sides of any expansion joints. This pushes larger rock pieces down, and prepares the edges for final finishing.
**Note:** The following steps must be done AFTER the water on top of the concrete has evaporated and the sheen has vanished.

**Troweling**
Take a steel finishing trowel and slide it straight across the top. This step brings water to the surface and seals the concrete. To finish, take the steel trowel and work it in arcs, with each new arc removing the heel mark from the arc before.
**Brooming**
Take a concrete broom or paint brush and draw it across the new concrete transverse to (opposite of) the direction of travel to give the concrete a light broom finish. The broom finish creates traction, making the sidewalk less slippery for pedestrians. Timing for this step is critical. If the surface is broomed too soon, it will deteriorate prematurely. If the surface is broomed too late, it won’t have enough traction.
Shine the Edges
Draw the finish edger along all outside edges that were formed, including both sides of any expansion joints.
Shallow/Decorative Joints
Shallow joints are the grid, or score lines, across the width and length of a sidewalk. Match the existing joint pattern in your sidewalk. Using a back and forth rocking motion, place the shallow joints with a jointing tool. (Appendix X)
CURB REPLACEMENT
Curbs shall be maintained by the City, except when in combination with the sidewalk, when they have been willfully damaged, or when damaged by tree roots. See Portland City Code 17.28.020 (Appendix III)
Curbs that are separated from the sidewalk by a planting strip, and that have not been willfully damaged or damaged by tree roots are the City’s responsibility. PBOT crews will maintain curb, as resources allow, at no cost to property owners.

Setting Curb Forms
You will need to place forms to hold the concrete. The specification for standard curb in the City of Portland is 16 inches overall (Appendix VIII); 6 inches exposed/above the existing street and a minimum 10 inches below the existing street. For the backside of the curb place forms that will cover the entire height and length. The form for the back is usually ¾-inch plywood. Place wooden or metal stakes behind the form spaced approximately 2 feet apart and then nail the form to proper grade.

The form for the face of curb will vary in height; depending on the height of the curb being replaced. The face form is usually a 2 x 6 inch or 2 x 8-inch piece of lumber cut slightly longer than the open area and placed against the face of the existing curb on both ends. Wooden or metal braces are then used to hold the top and bottom of the face form in place. The stakes and braces will hold the forms straight and secure. If there is sidewalk abutting the back of the curb you will only need a form for the face of the curb.

Place Concrete in Curb Forms
You will need to spray or brush a form release agent on the inside of the forms to prevent the concrete from sticking. After you pour the concrete into the forms, level and strike off the concrete even with the top of the back form. Then place an edge on the top of the curb while the concrete is still wet. Use a ¾ inch radius edger for the top front of the curb and a 3/8-inch edger for the top back of the curb.

After the concrete has lost the watery sheen on top, use the float to smooth and level the concrete once more then use both edgers again. When the concrete is firm enough to stand on its own remove the face form. Once the form is removed fill in any voids with some of the concrete spillage, smoothing the front of the curb as you go. Then use a curb broom or a stiff bristled paint brush to put the final finish on the curb.

GRAFFITI, VANDALISM AND FOOTPRINTS
To remove unwanted graffiti, vandalism, and footprints in wet concrete, proceed as follows:

1. Use the edge of your hand float and plane off any high spots.

2. Pat the concrete with your float to draw moisture.

3. If necessary, mix up a tiny batch of concrete to fill in any holes.

4. Use a steel finishing trowel to seal the concrete surface.

5. Take a soft broom or paint brush and draw it across the concrete transverse to (opposite of) the direction of travel to give the concrete a light broom finish.
To address graffiti, vandalism, or footprints in freshly cured concrete, it may be necessary to use a grinder to remove the high spots. Then mix a small batch of 2 parts sand, to 1 part Portland Cement to fill any holes, and then follow steps 4 & 5 above.

**CLEAN UP**
Leave the barricades up for about 2 days. The time it takes the concrete to cure varies depending on the weather, and the size of the job. A minimum of 2 days must elapse between the day the concrete was poured, and the day of the final inspection. When repairs are made in driveway areas, it is recommended that the new concrete not be driven on for at least 7 consecutive days, to ensure proper curing. This will help to prevent cracking.

Request a Final Inspection when the project is finished. Concrete work must be completed, all forms removed, all voids are backfilled with dirt and compacted, and job site has been cleaned up.

**REQUEST FINAL INSPECTION**
When concrete work is completed, all forms are removed, all voids are backfilled with dirt, and compacted to the top edge of the new concrete, and job site has been cleaned up, a final inspection must be requested. Fill out the online form at: [www.portlandoregon.gov/transportation/sidewalks](http://www.portlandoregon.gov/transportation/sidewalks) to request a final inspection. You can also call the Sidewalk Maintenance Office at 503-823-1711 to request a final inspection. Provide the posted address and the affidavit number. Inspections will be made Monday through Friday, excluding holidays. Requests must be received by 6:30 am to obtain an inspection that day. Requests made after 6:30 am, will be inspected the next business day. An inspection card will be attached to a barricade on site indicating whether the formwork passed inspection. If the work is found satisfactory, a "Repairs are Complete" inspection card will be left at the door, excluding businesses and rental properties, and the Sidewalk Repair Notice will be closed. If work is found unsatisfactory, a "Repairs Not Acceptable" inspection card will be left at the door, excluding businesses and rental properties. The card will specify any corrections that need to be made. Another final inspection, and possibly another form inspection, must be requested.

Inspection cards for businesses and rental properties will be brought back to the office and filed with the corresponding posting.
APPENDIX I – SIDEWALK POSTING STANDARDS

SIDEWALK MAINTENANCE STANDARDS
July 2017

Any one or more of the below criteria applies to sidewalk, driveway and driveway setback areas in the city right of way where concrete or asphalt exists. These are general guidelines and the Sidewalk Inspector will use his/her professional judgment to determine additional needed repairs.

1. **Trip hazard.**
   Sidewalks will be posted for hazards when there is a vertical step separation equal to or greater than ½”.

   ![Trip hazard illustration]

2. **Openings or cracks.** Sidewalks will be posted for hazards when openings or holes in the sidewalk equal or exceed ½”.

   ![Openings or cracks illustration]

3. **Spalling sidewalks.**
   Sidewalks will be posted for hazards when the sidewalk surface is chipped or deteriorated to a depth equal or greater than ½”

   ![Spalling sidewalks illustration]
APPENDIX II – EXCERPT FROM CITY OF PORTLAND CONSTRUCTION SPECIFICATIONS:
SURFACE FINISHING

00759.50 Surface Finishing:

(a) General - Remove forms, if any, from structures after the concrete has taken its initial set and while the concrete is still green. Repair minor defects with mortar containing one part portland cement and two parts sand. Do not plaster exposed surfaces.

The top and face of structures shall be true and straight, free from humps, sags, or other irregularities. The surface shall not vary more than 1/4 inch from the edge of 12 foot long straightedge laid on the top or face of the structure, except in curves. Furnish the straightedge and operate it as directed. Unless otherwise shown or directed, tool edges to 1/4 inch radius.

(b) Curbs, Islands, and Stairs - While the concrete is still green, finish the exposed surfaces as required to produce a smooth surface and uniform texture.

(c) Driveways, Walks, and Surfacing’s - Finish concrete surfaces to smooth and uniform texture by troweling, floating and cross brooming. Lightly groove or mark surfaces into squares or other shapes to match markings on similar existing surfaces in the vicinity, as directed. On all sidewalk ramps and accessible route islands, install truncated domes as shown. Place according to the manufacturer's recommendation.

(d) Historic Dates and Names - Historic dates and street names in existing sidewalk corners will be preserved or restamped into the new concrete. Stamp the dates or names in the curb as close to the original location as practical. Restamp the dates and names exactly as they existed in the sidewalk corner. This includes misspelled words and names that are no longer used for the street name. However for dates, the original date with a slash and the current date are required to be restamped into the new corner curb. Do not preserve or re-stamp Contractor names.

A set of stamping tools is available for loan through the Street Construction Office on a first-come, first-serve basis.
APPENDIX III – RELATED EXCERPTS FROM CITY CODE

17.28.020 Responsibility for Sidewalks and Curbs.

(Amended by Ordinance Nos. 182760, 183397 and 184957, effective November 25, 2011.)

A. The owner(s) of land abutting any street in the City shall be responsible for constructing, reconstructing, maintaining and repairing the sidewalks, curbs, driveways and parking strips abutting or immediately adjacent to said land, except as provided in Subsections B. and C. Said property owner(s) shall be liable for any and all damages to any person who is injured or otherwise suffers damage resulting from the defective condition of any sidewalk, curb, driveway or parking strip adjacent to said land, or by reason of the property owner’s failure to keep such sidewalk, curb, driveway or parking strip in safe condition and good repair. Said property owner(s) shall be liable to the City of Portland for any amounts which may be paid or incurred by the City by reason of all claims, judgment or settlement, and for all reasonable costs of defense, including investigation costs and Attorney fees, by reason of said property owners’ failure to satisfy the obligations imposed by the Charter and Code of the City of Portland to maintain, construct, and repair such sidewalks, curbs, driveways and/or parking strips.

B. Curbs shall be maintained by the City, except when in combination with the sidewalk and when they have been willfully damaged or damaged by tree roots. Intersection corners and curbs adjacent thereto may be installed by the City when sidewalks and curbs are constructed up to the intersection on the same side of the street.

C. Green street or other public stormwater management facilities located within the right-of-way shall be modified or repaired only by the City or under an appropriate permit from the Bureau of Environmental Services.

D. The City Engineer shall maintain general construction and maintenance specifications for sidewalks, curbs, driveways and/or parking strips. The City Engineer shall use the specifications to determine compliance with this Chapter of Code. The Director of the Bureau of Transportation shall provide copies of the specification to any person upon request, and make the specifications available for public inspection during normal office hours.

17.28.080 Permit for Sidewalk and Curb Repairs.

(Amended by Ordinance Nos. 183348 and 186083, effective July 12, 2013.) After notice to repair defective sidewalk or curb, or both, has been posted, the owner, agent or occupant shall make the repairs within 60 calendar days from the date of posting. Any person desiring to repair a defective sidewalk, curb or both, either before or after notice to repair has been posted, shall first obtain a permit. The permit shall prescribe the kind of repair to be made, the material to be used, and specifications therefore, including the location and size. Any person desiring to construct or reconstruct sidewalk or curb, or both, shall first obtain a permit therefore and pay the fees elsewhere prescribed in Chapter 17.24.
APPENDIX IV - MATERIALS, SERVICES, and TOOLS

What to Use and Where to Find Them
Many of the tools and materials used in sidewalk repair are not normal household items. Due to legal restrictions, we the City are not allowed to recommend specific contractors or specific stores which might have the best deals or the most knowledgeable sales people.

Product and Service Classifications in the telephone book is where you will find everything you need. Time spent on the telephone or internet doing some comparison-shopping could save you time and money.

<table>
<thead>
<tr>
<th>Product and Service Classifications</th>
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<tbody>
<tr>
<td>Barricades</td>
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<tr>
<td>Building Materials Retail</td>
</tr>
<tr>
<td>Concrete Contractors</td>
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<tr>
<td>Concrete-Ready Mixed</td>
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<tr>
<td>Garbage &amp; Rubbish Collection/Drop Boxes</td>
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<tr>
<td>Landfills and Transfer Sites (Dump)</td>
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<tr>
<td>Recycling Services</td>
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<tr>
<td>Rental Service Stores</td>
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<tr>
<td>(Equipment and Tools)</td>
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<tr>
<td>Sand and Gravel</td>
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<tr>
<td>Stump Removal</td>
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<tr>
<td>Tree Service</td>
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<tr>
<td>Tools, Used</td>
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<tr>
<td>Trailer and Truck Rental</td>
</tr>
</tbody>
</table>

Following is a tool glossary with pictures to identify the types of tools needed to make sidewalk, driveway and curb repairs.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Image</th>
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<tbody>
<tr>
<td>Axe</td>
<td><img src="image" alt="Axe" /></td>
</tr>
<tr>
<td>Boots</td>
<td><img src="image" alt="Boots" /></td>
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<tr>
<td>Bull Float</td>
<td><img src="image" alt="Bull Float" /></td>
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<tr>
<td>Concrete Boom</td>
<td><img src="image" alt="Concrete Boom" /></td>
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<tr>
<td>Concrete Edger</td>
<td><img src="image" alt="Concrete Edger" /></td>
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<tr>
<td>Concrete Grover</td>
<td><img src="image" alt="Concrete Grover" /></td>
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<tr>
<td>Concrete Hand Float</td>
<td><img src="image" alt="Concrete Hand Float" /></td>
</tr>
<tr>
<td>Gloves</td>
<td><img src="image" alt="Gloves" /></td>
</tr>
<tr>
<td>Finishing Trowel</td>
<td><img src="image" alt="Finishing Trowel" /></td>
</tr>
<tr>
<td>Hammer</td>
<td><img src="image" alt="Hammer" /></td>
</tr>
<tr>
<td>Hand Saw</td>
<td><img src="image" alt="Hand Saw" /></td>
</tr>
<tr>
<td>Level</td>
<td><img src="image" alt="Level" /></td>
</tr>
<tr>
<td>Mortar Box</td>
<td>Pick Mattock</td>
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</tr>
<tr>
<td>Round Point Shovel</td>
<td>Safety Glasses</td>
</tr>
<tr>
<td>Square Point Shovel</td>
<td>Tape Measure</td>
</tr>
</tbody>
</table>
APPENDIX V – TYPICAL SIDEWALK & DRIVEWAY REPAIR

1. SIDEWALK REPAIRS ARE REQUIRED BY THE CITY FOR HORIZONTAL AND VERTICAL DISPLACEMENT S" OR GREATER AND FOR SUNKEN OR RAISED SIDEWALKS EXCEEDING 4" FROM ORIGINAL CHAR. GENERAL SURFACE DEFORMATION AND OTHER CONDITION MAY ALSO REQUIRE SIDEWALK REPAIR.

2. SAWCUT ALL SIDEWALK SECTIONS TO BE REMOVED. ALL SAW OVERCUTS SHALL BE A MINIMUM OF UP FROM EDGE OF WALK AND SAWING JOINTS.

3. REPAIR SIDEWALK AND DRIVEWAYS USING ALL APPLICABLE CITY STANDARDS.

4. USE X MINIMUM REPAIR SIZE IN SIDEWALKS AND X MINIMUM REPAIR SIZE IN DRIVEWAYS. ALLOW REPLACEMENT SECTIONS PARALLEL OR PERPENDICULAR TO EXISTING SCORING / JOINTS TO MAXIMUM EXTENTS PRACTICAL.

5. REPLACE ALL SCORING LINES PER EXISTING SCORING PATTERNS.

6. CROSSING EXPANSION JOINT IS NOT ALLOWED. IF SHOWN ABUT EXISTING EXPANSION JOINT ON BOTH SIDES, FORM POLY sulfate CALCIUM AND REPLACE EXPANSION JOINT WITH SCORE LINE.

7. GRINDING SHALL ONLY BE ALLOWED BY PRIOR APPROVAL. GRINDING REPAIR SECTION SHALL NOT EXCEED 8' VERTICALLY, SEE TYPICAL SECTION 1.

8. GRINDING REPAIR SECTION SURFACE FINISH SHALL CONFORM TO THE NO. 8 FINEST COARSE OF SANDING SPECIFICATION SECTION 08100. THIS CAN BE ACHIEVED BY SANDING THE SURFACE WITH A SIMILARLY ORDERED APPROVED METHOD.

9. CONCRETE REPAIR הוא shall be a minimum of 8' x 8' or to the nearest joint.

10. UNIT PAVERS MAY BE USED TO MITIGATE SIDEWALK LIFTING AND TREE ROOT PROBLEMS.

11. SIGN NUMBERS ON PLASTERING IS ONLY ALLOWED AT VAULTED AREAS OF SIDEWALK. 1" DEPTH MINIMUM REPAIR COORDINATE WITH CITY ENGINEER / INSPECTOR.

12. TRANSITIONAL REPAIRS SHALL:
- HAVE TWO SIDES NO LESS THAN 4" AND NO GREATER THAN 8"
- HAVE TWO SIDES WITH SAWING PERPENDICULAR OR PARALLEL TO EXISTING JOINTS OR MOTOR BY PRIOR APPROVAL.
- NOT CONTAIN ANGLES GREATER THAN 90 DEGREES
- BE LESS THAN OR EQUAL TO 90% OF ANY SIDEWALK PANEL DEFINED BY A SCORE LINE OR JOINT.
- NOT BE USED IN DRIVEWAYS.

13. WHEN TREE ROOTS ARE IN CONFLICT WITH THE REPLACEMENT ST OF SIDEWALK OR DRIVEWAY IN THE SIDEWALK SECTION, ROOT INJECTION BY THE CITY FORESTER IS REQUIRED BEFORE CUTTING ANY ROOTS.

14. FOR DRIVEWAY REPAIRS:
WHEN EXISTING PIPED CURB EXPOSURE IS 8" OR LESS, OMIT THE 1" UP IN DRIVEWAY APRON.
APPENDIX VII - TYPICAL SEPARATED SIDEWALK/DRIVEWAY

NOTES:
1. WHERE DRIVEWAY CONNECTION TO PROPERTY IS A NEGATIVE GRADE, THE GUTTER FLOW IDENTITY MEASURED FROM GUTTER LINE TO BACK OF SIDEWALK ELEVATION SHALL HAVE A MINIMUM OF 3" VERTICAL RISE TO ASSURE THAT STORMWATER WILL NOT OVERTOP THE BACK OF SIDEWALK. IF THIS CONDITION CANNOT BE MET, PLACE AN INLET AT UPSTREAM SIDE OF DRIVEWAY OR OTHER APPROVED DESIGN MITIGATION.
2. STANDARD SIDEWALK SCORING SHALL CONTINUE THROUGH DRIVEWAY TO DELINEATE SIDEWALK/PEDESTRIAN ZONE PER DRG. NO. P-651.
3. A MINIMUM OF 3' DRIVEWAY CONNECTION SHALL BE鋪PAVED BEHIND THE SIDEWALK TO PREVENT TRACKING OF GRAVEL OR DIRT ONTO THE SIDEWALK PER DRG. NO. P-536.
4. PAY LIMIT FOR DRIVEWAYS IS THE OUTER LIMIT OF THICKER STRUCTURAL SECTION THAT IS SUBJECTED TO VEHICLE LOADS.
5. DRIVEWAYS SHALL BE Poured MONOLITHIC WITH CURBS.
6. IF APPROVED, WHERE EXISTING DRIVEWAY IS IN GOOD CONDITION AND MEETS SLOPE REQUIREMENTS, MAY CONSTRUCT ONLY AS REQUIRED FOR SATISFACTORY CONNECTION WITH NEW WORK.
7. DRIVEWAY APRON SLOPE SHALL BE MAXIMIZED WHILE STILL ALLOWING THE DRIVEWAY TO FUNCTION PROPERLY BEFORE DEPRESSING THE SIDEWALK/PEDESTRIAN ZONE AS SHOWN IN THE ALTERNATIVE DEPRESSED SEPARATED SIDEWALK DRIVEWAY, DRG. NO. P-529.
8. WHEN COMBINATION CURB AND GUTTER IS USED, THE GUTTER PAN SHALL BE INCLINED IN THE PAY LIMITS FOR THE DRIVEWAY.
9. WHEN EXISTING CURB EXPOSURE IS 6" OR LESS, OMIT THE 1"LIP IN DRIVEWAY APRON.
10. NO VERTICAL IMPEDIMENT (POLES, SIGNS, TREES, ETC.) WITHIN 3' OF THROAT.
**APPENDIX VIII – CURBS**

**GENERAL NOTES:**

1. **Curb Exposure is 8'**. Vary standard curb only as approved.
2. **When matching into existing curb with less than 6 inches of curb exposure**. Transition at a rate of 1' horizontal for each 3' of vertical curb difference. Transitions shall be done using standard curb.
3. **Construct contraction joints at 15' maximum spacing and at ends of each inlet and ramp**.
4. **Tops of all curbs shall slope toward the roadway at 2% normal**.
5. **Gutter pan shall slope between 2% and 4% to match crown slope of street**.
6. **Use 12” gutter pan when using curb and gutter adjacent to a brick lane**.
7. **2” inches of aggregate base under curb unless otherwise specified**.

---

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

**PORTLAND BUREAU OF TRANSPORTATION**

City Engineer

Signed Drawing Title

CURBS

**Note:** All materials and specifications shall be in accordance with the City of Portland Standard Construction Specifications.
NOTES:
1. CONCRETE PAVERS MAY BE USED IN THE PEDESTRIAN ZONE ONLY TO ADDRESS TREE ROOT CONFLICTS AND REQUIRE PRIOR APPROVAL BY CITY ENGINEER.
2. PAVERS SHALL BE GRAY EXCEPT FOR DESIGN DISTRICTS THAT REQUIRE OTHERWISE.
3. MINIMUM SHOULDER AREA IN PEDESTRIAN AREA.
The sidewalk inspector will use the following requirements to determine if your hard work meets City specifications and approval to place and finish the concrete:

1. Sidewalk cross slope shall be 2% (1/4 inch per foot) towards the curb, unless directed otherwise by the sidewalk inspector.

2. Control joints must be spaced no further than 12 feet apart in 6-foot wide sidewalks and no further than 10 feet apart in 5-foot wide sidewalks.

3. Minimum thickness shall be a consistent depth of 4 inches for sidewalks and 6 inches for driveways.

4. Soil shall be firm or plate compacted if crushed rock is used for base material.

5. All spalls (chipped edges) are to be saw cut and removed and all edges are to be vertical.

It is required to provide a soft broom finish and match the existing grid pattern, where there are existing sidewalks, unless otherwise directed by the Sidewalk Inspector.

<table>
<thead>
<tr>
<th>Sidewalk Width</th>
<th>Scoring/Grid Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'</td>
<td>5' x 5' or 2.5' x 2.5'</td>
</tr>
<tr>
<td>6'</td>
<td>3' x 3'</td>
</tr>
<tr>
<td>7'</td>
<td>3.5' x 3.5'</td>
</tr>
<tr>
<td>8'</td>
<td>4' x 4'</td>
</tr>
<tr>
<td>10'</td>
<td>5' x 5'</td>
</tr>
<tr>
<td>12'</td>
<td>4' x 4'</td>
</tr>
</tbody>
</table>