

Sidewalk Repair Manual



**Seventh Edition
April 2013**



The Bureau of Transportation fully complies with Title VI of the Civil Rights Act of 1964, the ADA Title II, and related statutes and regulations in all programs and activities. For accommodations, complaints, and additional information, contact the Title II and Title VI Coordinator at Room 1204, 1120 SW 5th Ave, Portland, OR 97204, or by telephone at 503-823-5185, City TTY 503-823-6868, or use Oregon Relay Service: 711.

INTRODUCTION

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.

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 looked at 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 ones 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

Stub Toes (Grade/Step Separation)

All "Stub Toes," latitudinal as well as longitudinal in the City right-of-way that are hazardous, shall be posted for repair. A guideline of 1/2 inch vertical separation for all sidewalk and driveway areas will be used in determining 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 1/2 inch depth and/or 1/2 inch width will be used in determining 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 1/2 inch width and/or 1/2 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. A guideline is that the uppermost point of the raised area being greater than 4 inches from grade shall be used in determining when a raised area is 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 shall 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 the course of repairs made by the second property owner.

In some cases it may be necessary to install a transition area on the abutting property. This process allows repairs to be made without installing a hazard at the property line. Verify with a posting 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 as a result 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.

Bike Racks

If a hazard is found around a City installed bike rack, the removal and replacement of the rack will be

referred to the Maintenance Operations Structures Section for repair.

Corners

Guidelines for posting and replacement of corners shall be the same as the guidelines used for sidewalks and driveways. 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. 1933/2004. Existing dates and street names will be re-stamped as they existed in the sidewalk corner. This includes miss-spelled words and names that are not longer used for the street name, per City specification 00759.50 (<ftp://ftp02.portlandoregon.gov/PBOT/CDS/2010%20Standard%20Specifications/Parts/Part%200700%20-%20Black.pdf>). Contractor names will not be replaced.

Curbs

Curbs that are separate from the sidewalk are the City's responsibility. Curbs that are connected and part of the sidewalk – there is no space between the curb and sidewalk – are the responsibility of the adjacent property owner. Also, when curbs have been willfully damaged or damaged by tree roots, the adjacent property owner is responsible for any fixes. More information about curbs may be found in City Code 17.28.020B.

Trees and tree roots will be protected and left undisturbed. The person(s) making the repair will contact the Urban Forestry Division 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.

Vault Doors

Vault access doors that are considered hazardous will be posted for repair. Criteria of a 1/2 inch stub toe, 1/2 inch opening, raised/sunken, or generally in a deteriorated and/or hazardous condition shall apply.

SIDEWALK REPAIR METHODS

Method 1: Grind

Concrete grinding is a method typically used to remove “stub toes” that are 1 inch high or less, perpendicular to the flow of pedestrian traffic. Prior to performing work, verify with the posting Sidewalk Inspector to determine if grinding would be an acceptable repair method.



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 permit fee associated with the permit. Check with the Sidewalk Maintenance Office for more details. If you hire a

contractor, the contractor will be responsible for obtaining the permit.

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 repair shall not exceed 1 inch vertically. Grinding repair 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. Refer to Standard Detail number P-553 section A-A, at [P-400 through P-599 Pavement Markings, Curbs, Sidewalks, Driveways and Pavements | Standard Drawings/Details \(BES & Transportation\) | The City of Portland, Oregon.](#)

Verify with the posting Sidewalk Inspector to determine if grinding would be an acceptable repair method. In some areas, sidewalk sections are lifted up 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 stub toe so that the concrete and/or sidewalk has a gradual slope or transition. For 1/2 an inch of rise, grind back 6 inches. For a (maximum) 1 inch rise, grind back 12 inches.

Equipment Needed	
Hand Tools	Gloves, Goggles, Hearing Protection, Eye Protection
Power Tools	Masonry Grinder

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

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 to be corrected by 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 defects: Openings, Raised Areas, Sunken Areas, Unused Driveway Approaches, Root Damage.



The following steps describe the process to successfully remove and replace sidewalk and other non-conforming items.

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 permit fee associated with the permit. Check with 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.

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, or 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.



When sidewalk removal is needed for repair, the City requires a minimum 3 square foot area to be replaced. If a defect is confined to a circumscribed section of concrete that is less than 3 square feet, with the approval of a Sidewalk Inspector, repair may be approved.

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 installing 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 Existing Concrete

Saw cut all sections to be removed sections using a concrete or masonry blade. Crossing existing score lines is okay. 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 | Standards for Design &](#)

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 Plan RD720 requires sidewalks to be a consistent depth of 4 inches. City Standard Plan P-528 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.

The bare soil shall be firm and undisturbed to prevent future settling. Remove any muddy spots, rock and compact the area to 95% of maximum density at the required depth per City Standard Drawings and Specifications located 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.

Equipment Needed	
Hand Tools	Gloves, Goggles, Shovel, Sledge Hammer, Axe, Pry Bar, Rake, Pick, Broom
Power Tools	Concrete Saw, Circular Saw w/masonry blade, Jackhammer, Truck or Trailer

Time Needed (2 people working)				
Number of Squares	1	2	3	4
Hours	1.5	2.5	3.5	4.5

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 503-823-4489 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 Sidewalk Maintenance office at 503-823-1711 and 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 cut and 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 and pavers are permitted. See Standard Drawing P-554 and P-572 for information on unit pavers.

Note: A separate permit is required to prune, plant, remove, or treat trees growing in the City right-of-way. Contact Urban Forestry at 503-823-4489 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 3 to 4 feet apart, and nail the form to grade. The stakes will keep the forms straight and secure. Stakes may be placed slightly lower than the form so they won't 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 Blockouts

To reduce the width of the sidewalk where roots have encroached into the sidewalk, use a radius blockout. 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 roots to be cut and removed. Sidewalks can be reduced to 4 foot wide in extreme cases.



Ramp Over Roots

When the grade of the sidewalk is elevated over existing roots, which cannot be cut and removed as determined by the Urban Forestry Inspector, build a ramp over the roots.



Drop Curbs

Standard Plan RD700-Curb Ending. Asphalt curbing is used when the replacement of concrete curbing could damage the tree or tree roots. Asphalt is flexible and allows movement while controlling drainage.



Equipment Needed	
Hand Tools	Tape Measure, Hand Saw, Hammer, String Line, Level
Materials	Lumber, Survey Stakes, Nails, Black Felt Expansion

Time Needed (2 people working)				
Number of Squares	1	2	3	4
Hours	0.25	0.5	0.5	0.75

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, call the Sidewalk Maintenance office at 503-823-1711 and request a form inspection. Provide the posted address and the affidavit number. 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 problem(s) needs 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.

The forms and finals inspector will advise whether expansion or contraction joints (deep joints) will be installed and where they will be installed within the repair site. Concrete replacement will be tooled to match existing patterns and have a broomed finish per City Specifications <http://www.portlandoregon.gov/transportation/article/288576>.

Contraction Joints

As required by inspector, construct contraction joints (deep joints) in the exposed surfaces of the concrete structures. Refer to City of Portland Standard Construction Specifications Section 00759.

Expansion Joints

Construct expansion joints of the pre-formed filler type in concrete structures. 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 as it decays over time. Expansion material will be used under the direction of 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 that protrude into or are against the edge of the sidewalk 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.



Placing and Finishing Concrete

Once you know how much and what kind of concrete to use, and get it ready to place, the next steps come fast. Make sure you understand beforehand what you will be doing. Have the necessary tools handy and the steps clearly in mind.

Equipment Needed	
Hand Tools	Rubber Boots, Gloves, Mortar Box, Wheelbarrow, Shovel, Water Hose, Steel Trowel, Jointer Tool, Screed Board, Bull Float, Hand Float, Broom, 0.25" Radius Edger Tool (3" typical match existing)
Materials	Ready Mixed Concrete, Dry Concrete Mix (Premix or Sakcrete)

Time Needed (2 people working)				
Number of Squares	1	2	3	4
Hours	2	2	2.5	2.5

Determine How Much Concrete is Needed

Measure the width and length of the area(s) you have to 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.

Concrete Needed							
Area (square feet)	9	18	27	36	80	160	240
4"-Deep Sidewalk (cubic yards)	0.11	0.25	0.33	0.5	1	2	3
6"-Deep Driveway (cubic yards)	0.17	0.33	0.5	0.66	1.5	3	4.5

Concrete Options

City Standard Construction Specification Section 00756.00 requires Portland Cement Concrete used in the construction and repair of sidewalks, driveways, and curbs shall have a minimum specified compressive strength of 3000 psi with a slump of 4 inches maximum. 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 or purchase ready-mixed concrete from a company that specializes in small jobs.

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 3000 psi minimum strength. You can use a mortar box or a wheelbarrow to put it in and a square point shovel or garden hoe for mixing. When ready, add water a little at a time until the cement is workable. Concrete should be poured immediately after mixing.

Note: Do not pour concrete when freezing weather is expected, as it will not cure correctly and will have 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.

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 the 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 at 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 have to add any concrete to fill low areas, push the float across again.



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.

Skin

There is lime in concrete which can hurt human skin and animals. 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.

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 techniques 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 soft 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.



Shine the Edges

Draw the finish edger along all outside edges formed, including both sides of any expansion joints.

Control Joints

Control joints are the grid lines or score lines in a sidewalk, across the width and length. If the sidewalk does crack, control joints help to control the cracking along the control joint itself.

Match the existing control joint pattern in your sidewalk. Use a jointing tool to put in the control joints. Use a back and forth rocking motion. This tool also rolls the edge down, which prevents future flaking.

CURB REPLACEMENT

Curbs that are separate from the sidewalk are the City's responsibility. Curbs that are connected and part of the sidewalk – there is no space between the curb and sidewalk – are the responsibility of the adjacent property owner. Also, when curbs have been willfully damaged or damaged by tree roots, the adjacent property owner is responsible for any fixes. More information about curbs may be found in City Code 17.28.020B.

Setting Curb Forms

You will need to place forms to hold the concrete. The specification for curb in the City of Portland is 16 inches overall; 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 a $\frac{3}{4}$ inch piece of 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.

Placing 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 ¼ 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.

CLEAN UP

Leave the barricades up for about two days. The time it takes concrete to cure depends on the weather and size of the job. A minimum of two days must elapse between the day the concrete was poured and the day of the final inspection. When repairs are made in driveway areas, we recommend not driving over the new concrete for at least seven consecutive days to assure proper curing. This prevents cracking.

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.



FINAL INSPECTION

Call the Sidewalk Maintenance Office at 503-823-1711 and request a final inspection. Please provide the posted address and the affidavit number. If the work is found satisfactory, a "Repairs are Complete" card will be left at the door, excluding businesses and rental properties, and the posting will be closed.

If work is found unsatisfactory, a "Repairs Not Acceptable" card will be left at the door, excluding businesses and rental properties, listing corrections that need to be made. Another final inspection, and possibly another form inspection, will have to be requested.

Inspection cards for businesses and rental properties will be brought back to the office and filed with the corresponding posting

APPENDIX I - CITY SPECIFICATIONS

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 18 feet apart in 6-foot wide sidewalks and no further than 20 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.
6. 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.

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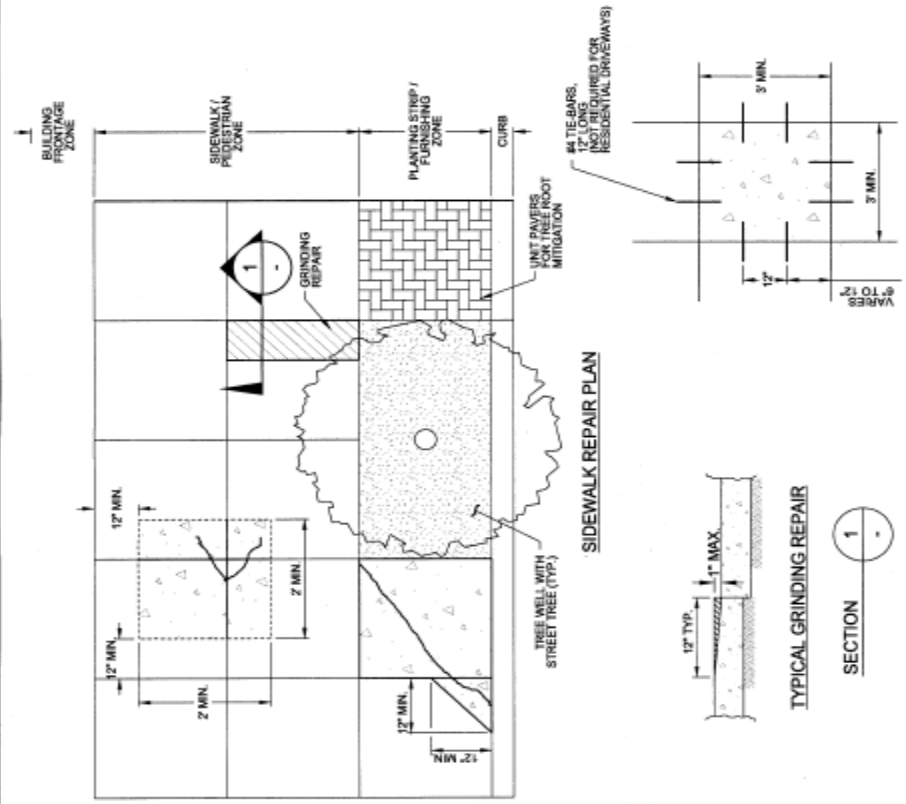
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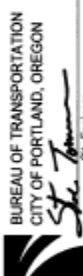
Sidewalk Width	Scoring Grid/Pattern
5'	5' x 5' or 2.5' x 2.5'
6'	3' x 3'
7'	3.5' x 3.5'
8'	4' x 4'
10'	5' x 5'
12'	4' x 4'

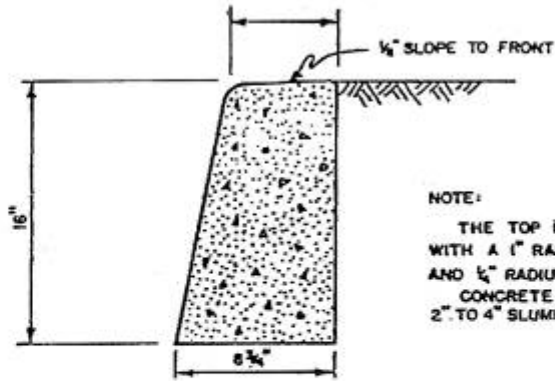
NOTES:

1. SIDEWALK REPAIRS ARE REQUIRED BY THE CITY FOR HORIZONTAL AND VERTICAL DISPLACEMENT 1/2" OR GREATER AND FOR SUNKEN OR RAISED SIDEWALKS EXCEEDING 4" FROM ORIGINAL GRADE. GENERAL SURFACE DETERIORATION AND OTHER CONDITIONS MAY ALSO REQUIRE SIDEWALK REPAIRS.
2. SAWCUT ALL SIDEWALK SECTIONS TO BE REMOVED. ALL SAW OVERTCUTS SHALL BE A MINIMUM OF 12" FROM EDGE OF WALK AND EXISTING JOINTS.
3. REPAIR SIDEWALK AND DRIVEWAYS USING ALL APPLICABLE CITY STANDARDS.
4. USE 2' X 2' MINIMUM REPAIR SIZE IN SIDEWALKS AND 3' X 3' MINIMUM REPAIR SIZE IN DRIVEWAYS. ALIGN REPLACEMENT SECTIONS PARALLEL OR PERPENDICULAR TO EXISTING SCORING / JOINTS TO MAXIMUM EXTENT'S PRACTICABLE.
5. REPLACE ALL SCORE LINES PER EXISTING SCORING PATTERNS.
6. CROSSING EXPANSION JOINTS IS NOT ALLOWED. IF REPAIRS ABOUT EXISTING EXPANSION JOINT ON BOTH SIDES, FORM / POUR SECTION MONOLITHICALLY AND REPLACE EXPANSION JOINT WITH SCORE LINE(S).
7. GRINDING SHALL ONLY BE ALLOWED BY PRIOR APPROVAL. GRINDING REPAIR SECTION SHALL NOT EXCEED 1" VERTICALLY. SEE TYPICAL SECTION 1.
8. GRINDING REPAIR SECTION SURFACE FINISH SHALL CONFORM TO THE NON-SLIP COEFFICIENT OF FRICTION PER STANDARD SPECIFICATION SECTION 02484.35(j). THIS CAN BE ACHIEVED BY ROUGHENING THE SURFACE WITH A SAW-BLADE OR OTHER APPROVED METHOD.
9. CONCRETE PAVEMENT REPAIR SECTION SHALL BE A MINIMUM OF 6' X 6' OR TO THE NEAREST JOINT. COMPLETE REPAIR TO THE NEXT FULL JOINT AND 6"x6" MIN. AREA. SEE STD. DWG. NO. P-572 FOR UNIT PAVEMENT DETAILS.
11. SKIN PATCHING / PLASTERING IS ONLY ALLOWED AT VAULTED AREAS OF SIDEWALK. 1" DEPTH MINIMUM REPAIR. COORDINATE WITH CITY ENGINEER AND/OR INSPECTOR.
12. TRIANGULAR REPAIRS SHALL:
 - HAVE TWO SIDES NO LESS THAN 1' AND NO GREATER THAN 3'
 - NOT CONTAIN ANGLES GREATER THAN 90 DEGREES
 - BE LESS THAN OR EQUAL TO 1/3 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 OF SIDEWALKS (I.E. ROOTS ARE IN THE SIDEWALK SECTION), ROOT INSPECTION BY THE CITY FORESTER IS REQUIRED BEFORE CUTTING AND/OR REMOVING ANY ROOTS.
14. FOR DRIVEWAY REPAIRS:
 - WHEN EXISTING CURB EXPOSURE IS 5' OR LESS, OMIT THE 1" LIP IN DRIVEWAY APRON.



NOT TO SCALE

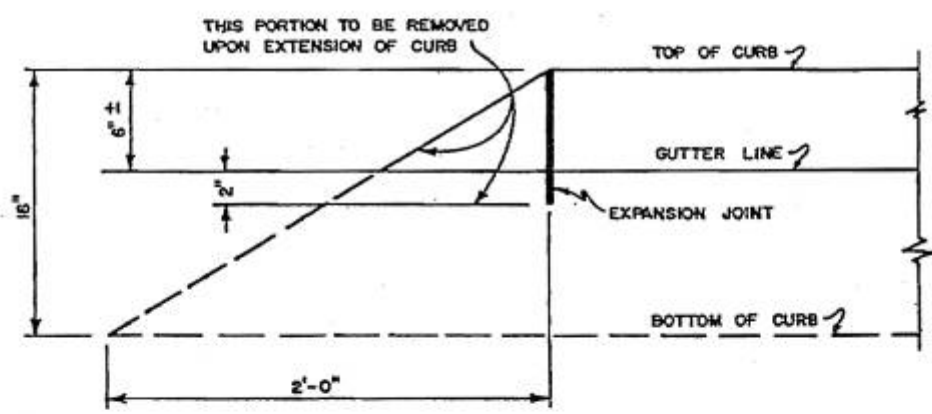
 <p>BUREAU OF TRANSPORTATION CITY OF PORTLAND, OREGON</p>	<p>Standard Drawing Title TYPICAL SIDEWALK & DRIVEWAY REPAIR (BY PROPERTY OWNER)</p>
<p>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.</p>	<p>Effective Date: 03/01/2012 Calc. Book No.: Baseline Report Date: *</p>
<p>Note: All materials and workmanship shall be in accordance with the Standard Construction Specifications.</p>	
<p>Standard Drawing No. P-554</p>	



NOTE:
 THE TOP EDGE TO BE ROUNDED OFF WITH A 1" RADIUS ON THE STREET SIDE AND 1/4" RADIUS ON THE PROPERTY SIDE.
 CONCRETE SHALL BE 3000 P.S.I., (6.15ACK) 2" TO 4" SLUMP.

CONCRETE CURB SECTION

⚠ NOTE: This standard is not allowed for street grades of less than 1%. See details 3-131 and 3-132.



CURB ENDING
 TO BE PAID FOR AS 1 ft. OF STANDARD CURB

CITY OF PORTLAND, OREGON

TITLE OF STANDARD PLAN		STANDARD PLAN NO.	
CONCRETE CURB		3-130	
APPROVED	NO.	REVISION	DATE
<i>Richard O. Schmitt</i>	21	REVISED	5/98
CITY ENGINEER	DATE	NOTE	BY
			SBT

APPE

APPENDIX II - 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.

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

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



Axe



Boots



Bull Float



Concrete Broom



Concrete Edger



Concrete Grover



Concrete Hand Float



Gloves



Finishing Trowel



Hammer



Hand Saw



Level



Mortar Box



Pick Mattock

Pry Bar



Rake



Sledge Hammer



Round Point Shovel



Safety Glasses



Screed Board



Sledge Hammer



Square Point Shovel



Tape Measure

Water Hose



Wheelbarrow



APPENDIX III - GRAFFITI and FOOTPRINTS

To remove unwanted graffiti 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.