

312 CONCRETE SIDEWALK, PATHWAYS, AND DRIVEWAY APPROACHES

312.1.00 General

312.1.01 Scope

This section covers the work necessary for installing and repaving concrete sidewalk, sidewalk ramps, and driveway approaches. Concrete construction shall be in accordance with these specifications and ACI 318 (Building Code Requirements for Structural Concrete). All concrete unless specified, shall be mixed and deposited in accordance with ASTM C 94 (Specifications for Ready-Mixed Concrete). When a conflict exists between various governing codes, the more stringent code requirement shall be followed.

312.2.00 Materials

312.2.01 Gravel Base

Gravel base shall conform to the 3/4-inch minus grading and compaction requirements of Section 308.0.00.

312.2.02 Concrete

Mix designs shall be submitted to the Engineer for approval a minimum of 7 calendar days prior to placement of concrete. The concrete shall have a minimum compressive strength of 3000 psi, 56 days after placement. Early strength is not required unless specifically approved by the Engineer. An air-entraining admixture shall be used. It shall be added to the mixer at the time of mixing in such a manner as to insure uniform distribution of the admixture throughout the batch. Entrained air (percent of volume) range shall be 4 percent to 7 percent (ASTM C 138, C 173 or C 231). The maximum water/cement ratio shall be 0.55 and the slump range shall be between 3- and 5-inches (ASTM C 143). Temperature of the concrete at time of placement shall range from 50°F to 90°F (ASTM C 1064). Concrete aggregates shall conform to ASTM C 33 requirements. Type 1L(X) Portland Cement is specified for this project. Concrete mixtures may incorporate fly ash, slag cement, natural pozzolans, or other approved supplementary cementitious materials (SCMs). Mixes shall be proportioned to minimize embodied carbon while meeting strength and durability requirements.

312.2.03 Forms

Lumber used in forms shall be S4S, free from loose knots or other defects. Form material shall be 2-inches by 6-inches for driveway approaches. Reuse of thoroughly cleaned form lumber is preferred.

312.2.04 Curing Compound

Liquid curing compound shall meet the requirements ASTM C 309, Type 2, white pigmented.

312.2.05 Wire Reinforcing

Wire reinforcing shall conform to ASTM A 82, 10 gauge.

312.2.06 Polyvinyl Chloride Pipe

PVC pipe shall conform to ASTM D 1785, Schedule 40.

312.3.00 Workmanship

312.3.01 Excavation, Fill, and Sidewalk Base

Excavate and place fill for sidewalks in conformance with Section 304, Road Excavation and Embankment.

Prepare sidewalk base to the thickness shown on the standard drawings and approved plans, and construct in conformance with Section 308, Base and Leveling Courses.

312.3.01A Panel Demolition and Removal

Before removing a sidewalk panel that is to be replaced, sawcut to full depth of existing concrete panel along existing joint on each end of the panel. Remove existing panel carefully to avoid damaging adjacent panels. Replace all sidewalk panels damaged during construction.

312.3.02 Line and Grade

Concrete walks shall be constructed so that they do not deviate more than 1/4-inch laterally or 1/8-inch vertically from the required line and grade.

312.3.03 Forms

Forms shall conform to the shape, lines, grades, and dimensions shown on the Plans, unless the City Engineer requires modifications to conform to existing site or driveway conditions.

312.3.04 Drainage Pipe

Polyvinyl Chloride (PVC) pipe, of 3-inch diameter shall be installed from the concrete curb to the right-of-way line, graded to fall to the curb and 1/2-inch above the gutter invert, at positions shown on the plans or determined by the City Engineer.

312.3.05 Control Joints

Scoring of sidewalk control joints must be traverse to the centerline of the sidewalk at a spacing of 5.0 foot on center. All control joints must be straight, 1/4-inch in depth, and finished with a 1/4-inch radius edge.

312.3.06 Concrete Placement

Before depositing concrete, work crews and all equipment and tools shall be on the job site, all debris shall be removed from the space to be occupied by the concrete, the subgrade shall not be frozen, and all forms and base shall have been approved by the City Engineer. The base shall be thoroughly wetted, but no pools of water will be permitted.

Concrete shall be deposited in proper place without delay in a continuous operation. An interval of more than 45 minutes between any two consecutive batches or loads, or a placing rate of less than 8 cubic yards of concrete per hour, shall constitute cause for a construction joint at the location and of the type directed by the City Engineer. Concrete shall be spread uniformly between forms and thoroughly consolidated with approved methods.

In hot weather, concrete in place shall be protected until final finishing can be completed. With a hot dry breeze, windbreaks may be erected, or fog nozzles may be used. Curing operation should begin as soon as concrete has set enough to avoid surface damage.

Placing concrete during periods of rain will not be permitted. If concrete has been placed and rain commences, it shall be protected by plastic sheeting positioned off the concrete surface, and maintained to prevent ponding.

Concrete shall be placed only when the outside air temperature is 35°F and rising, and is forecast to remain above 35°F.

At time of placement, the temperature of the concrete shall not be less than 50°F nor more than 90°F.

312.3.07 Finish

Construct concrete sidewalks so longitudinal slope, cross slope, surface, and other features do not exceed maximum allowable slope according to the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG).

If the existing adjacent sidewalk cross slope exceeds PROWAG requirements, construct a transition panel that is at least two feet long between the new sidewalk panel and the existing sidewalk. Extend the transition panel to the nearest control joint if less than 2-feet of the existing panel remains. The intent of transitional segments is to smoothly transition between the PROWAG-compliant replacement sidewalk panels

and non-compliant existing sidewalk panels that may be replaced in the future.

After the concrete has been thoroughly consolidated and leveled, float surface with a wood or magnesium float and finish with a steel float at the proper time. Edge joints with 1/4-inch radius edger. Use a fiber hair brush to apply a light broomed finish perpendicular to the centerline of the sidewalk as approved by the City Engineer.

Construct surfaces to be free of humps, sags, or other irregularities. Construct surfaces to within 0.02 feet of the specified line, cross section, and thickness. Grades and slopes may not exceed maximum values required by PROWAG.

312.3.08 Concrete Curing

Protection against loss of moisture shall be accomplished by keeping the surface continuously wet for seven days or by application of an approved curing compound applied immediately after completion of the finishing. Concrete shall be maintained above 50°F for at least the first 7 days after placement.

312.3.09 Protection of Concrete

Until the concrete has set and cured, the Contractor shall erect and maintain suitable barriers to protect the concrete from vandalism, traffic, weather (including rain and freezing temperatures), or other detrimental trespass. The Contractor shall remove and replace those sections of concrete upon which vandalism, trespass, or weather damage occurs.

312.3.10 Backfill

After the concrete has set for at least one day, backfill voids left by edge forms and grade backfill.

Backfill in planter strip areas and behind the sidewalk shall be clean topsoil free of weeds, debris, rock, concrete, and other detrimental or toxic matter.

312.4.00 Quality Assurance/Quality Control

Samples for compressive strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 yd³ of concrete. Compressive strength tests shall consist of one set of nine laboratory-cured specimens with one three-day break, one seven-day break, one fourteen-day break, three twenty-eight day, three fifty-six-day breaks. Samples for compressive strength tests shall be taken in accordance with ASTM C 172. Cylinders for strength tests shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength level of an individual class of concrete shall be considered satisfactory if both the following requirements are met:

- (a) Every arithmetic average of any three consecutive compressive strength tests

- equals or exceeds f'_c ;
- (b) No individual compressive strength test (average of two cylinders) falls below f'_c by more than 500 psi.

Slump (test method ASTM C 143), air content (test method ASTM C 138, C 1730, or C 231) and temperature tests shall be taken when strength specimens are made and at the option of the inspector as often as is necessary for control checks.

Prior to concreting, compliance of the reinforcing steel placement with the contract documents shall be verified. The inspector shall be present continuously during concrete placement. The inspection agency shall promptly notify the contractor and the Engineer of observed irregularities or deficiencies of work or products.

312.45.0 Embodied Carbon Requirements

General.

Pursuant to ORS 184.879 and OAR 731-005-0910, provide an Environmental Product Declaration (EPD) for the following materials: Concrete, including ready mix concrete, shotcrete, precast concrete and concrete masonry units;

Submit an EPD according to the City Engineer.

The most current published PDF version of the ODOT Environmental Product Declaration Manual on the date of Advertisement is the version in effect for the Project.

The EPD must be accepted by the Engineer before the product is incorporated into the Project unless the product is procured under a listed exemption in ODOT's Environmental Product Declaration Manual.

The Contractor shall provide copies of all pour receipts and pour logs that include mix design, quantities, and bid item information to allow for project tracking.

Concrete shall meet MRNCA LCA Report Version 3.2 benchmark values for the Pacific Northwest unless otherwise approved by the Engineer. Contractors are encouraged to submit mix designs with embodied carbon below benchmark values.

312.5.0 Sidewalk Repair

When sidewalk, curb, and gutter require repair, the following requirements apply.

312.5.01 Vertical Separation

General. Grind sidewalk joints and cracks with vertical discontinuities (offsets) between 1/4-inch and 1-inch to reduce trip hazards. The maximum taper of ground areas shall conform to the Americans with Disabilities Act (ADA) requirements. The minimum width of grind shall be 6”.

Height of vertical offset	Requirement
Less than 1/4-inch	No grinding is required
Between 1/4-inch and 1/2- inch	Bevel with a slope not steeper than 50 percent (1:1)
Between 1/2-inch and 1-inch	Do not exceed 8.33 percent (1:12) in the direction of travel

Finish and Appearance. Grind vertical offsets to produce a smooth non-skid surface closely resembling the appearance and skid resistance of the adjacent concrete. Perform grinding so the sidewalk surface has essentially the same or slightly rougher texture as the surface adjacent to either side of the joint or crack. Provide a slip-resistant surface for all ground surfaces.

Perform grinding so the shape of grind is approximately rectangular with a straight back line and no stray grinding marks. Grind bevel uniformly across entire length of vertical offset. Smooth sharp edges left by the grinding operations. Do not grind adjacent concrete. Repair all scars or damage caused by the grinding operation.

Grind and fill holes and cracks as directed in accordance with Public Works Construction Code Section 312.5.02 – Horizontal Separations.

Hand Grinding. Grind areas that are inaccessible to the grinding machine with a hand held grinder to the same standards as required for machine grinding.

Dust Control. Control visible dust from grinding operations by equipping grinding machines with a vacuum dust control system to provide a dust free work area or by using small amounts of water as a dust control agent. Size vacuum dust collection system according to the manufacturer's recommendations with minimum suction sufficient to eliminate visible dust and a 2-inch diameter hose. Apply water to work area using an automatic water feed system designed for use with the grinding equipment or apply water to the work area by hand using a spray nozzle.

Control and Clean up. Throughout all phases of construction keep the work site clean and free from rubbish and debris. If water is used as a dust

control agent, remove slurry using a wet-dry shop vacuum. Do not allow concrete dust or other debris to leave the work area and enter the local storm drainage system including the curb and gutter, roadside ditches, or overland flow.

Ownership and Disposal of Grinding Residue. Before moving on to the next vertical offset, sweep work area clean and vacuum all slurry and dust produced during grinding. Grinding residue becomes the property of the Contractor. Dispose of the residual material in accordance with State and Federal laws.

Public convenience and safety. Meet requirements of Public Works Construction Code Section 302.0.00. When the work requires a section of sidewalk to be closed and pedestrian traffic prohibited, place Type 1 barricades with “sidewalk closed” signs on the sidewalk facing the direction of travel and cone off the work area as need to maintain a safe environment.

Payment. Payment for each “Grind” and “Grind and Fill” shall be made at the unit bid price per each, regardless of the height or horizontal extents of the “Grind” and regardless of the height, horizontal extents, or depth of the “Grind and Fill”.

Payment for each item will include full compensation for furnishing all labor, materials, tools, equipment and backup equipment; mobilization, traffic control, transportation and technical competence for performing all work necessary to complete each item as directed and as specified in these Contract Documents, including but not limited to obtaining all applicable certifications necessary for specialty personnel and equipment and all applicable permits; equipment and materials to be used on the job, disposal of waste materials, and restoration of each work area site.

312.5.02 Horizontal Separation

Sidewalk shall be repaired when the horizontal separation is ½-inch or greater by filling the void with grout.