



CITY OF LONE TREE PAVEMENT UTILITY CUT AND PATCH SPECIFICATIONS

1. General

These specifications are intended to provide guidelines for the removal and replacement of pavement in order to permit placement and repair of utilities in existing roadways, sidewalks, bike paths, driveways, curbs, gutters and other surfaces.

Any improvements in the right-of-way or on private property damaged during construction shall be repaired prior to placement of the permanent pavement patch. Damaged sections of concrete sidewalk curb and/or gutter shall be removed and replaced to the nearest control joint. Replacement of less than a 10-foot length of curb and gutter or sidewalk will not be permitted. Integral curb, gutters, and/or sidewalk shall be replaced in their entirety. Private improvements shall be replaced to equal or better standards.

Cuts over twelve feet (12') in width and two-hundred feet (200') in length shall require the use of a self-propelled paver. All other cuts in asphalt streets shall require the use of a paving box.

Cuts will not be allowed on streets that have been paved, overlaid or sealcoated within 2 years, except for emergency repair of existing facilities or when approved by the City Engineer. When reviewing a request for a street cut on a recently resurfaced street, the City Engineer shall consider factors such as:

- a. Whether the applicant considered the City's anticipated resurfacing schedule prior to planning the proposed street cut,
- b. Alternatives that eliminate the need for the street cut,
- c. Whether the proposed street cut is needed to provide new service to a new customer, and
- d. Additional restoration requirements, beyond the permanent patch requirements of these regulations, may be required to restore ride quality and anticipated pavement life. Additional requirements may include resurfacing an area larger than the street cut, replacing or using paving fabric or other materials, a longer warranty, payment to the City equal to the anticipated restoration remedy, or a reasonable combination thereof.

Cuts of over two-hundred feet (200') in length on streets that have been overlaid within 8 years will require milling and a minimum three inch (3") H.B.P. grading SX overlay (and use of

reinforcement mat per the Asphalt Pavement Patchback Detail) placed with a self propelled paver from the gutter or edge of asphalt to the center line of the street on residential streets, and to adjacent lane lines on collector and arterial streets.

Cuts of over two-hundred feet (200') in length on streets that have been sealcoated within 3 years will require re-sealcoating of the entire street width for the length of the cut.

In lieu of performing the overlaying or sealcoating described above, the Permittee may be allowed to pay the City the cost of overlay or sealcoat of the required street sections using contract unit prices from the City's current year overlay and sealcoating programs, plus an administrative fee of 10% of the cost. The work will then be completed by the City as part of the following year's overlay and sealcoating programs.

Upon completion of the permanent patch, the surface shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, or irregularities and shall not separate from pre-existing adjacent pavement. When a straightedge ten feet (10') long is laid across the permanent patch both parallel to the centerline of the street and in a direction perpendicular to the centerline, the surface shall not vary more than 3/16 inch from the lower edge of the straight edge. Patches exhibiting deviations greater than 3/16 inch shall be replaced prior to acceptance of the patch. Patches separating from pre-existing adjacent pavement more than 3/16 inch shall be replaced or sealed as directed by the City. Patches shall have a cross slope consistent with the design of the existing roadway.

2. Cutting Streets

The Public Works Department shall be notified 24 hours in advance and shall inspect utility cuts whenever they are made in the public rights-of-way. All cuts within the City's right-of-way require a ROW/Construction Permit and approved Traffic Control Plan.

All streets shall be kept open to traffic by the Permittee unless otherwise approved by the City Engineer. Prior to beginning work, a traffic control plan must be submitted to and approved by the Engineering Division. All barricading and traffic control devices shall be in compliance with the approved traffic control plan.

Existing pavements may be removed by jack hammering, line cutting, or saw cutting to straight lines parallel and perpendicular to the flow of traffic. Prior to final patching, asphalt and concrete pavements shall be cut to clean, straight lines. Angled and irregular shaped patches will not be allowed and the edges of patches shall not fall within two feet (2') of existing wheelpaths. Patches shall not leave strips of existing pavement less than three feet (3') in width from the edge of the new patch to the lip of the gutter, edge of paved roadway surface, or edges of existing patches. Patches on all streets shall be four sided, with sides either parallel or perpendicular to the direction of traffic.

Patches on concrete streets shall not be less than five feet (5') in any dimension, and patches shall not leave strips of existing concrete pavement of less than five feet (5') in width from the edge of the new patch to the lip of the gutter, edge of paved roadway surface or adjacent concrete construction joints. Patches within existing patches will not be accepted. Boundaries of the

patches will coincide.

Asphalt and concrete pavements shall be removed by saw cutting prior to final patching (asphalt pavements may also be rotomilled). Care shall be taken to avoid breaking away the edges of the existing pavement or damaging the remaining pavement with heavy construction equipment. Any overbreak or separation outside the original cut shall be re-cut and squared off.

3. Trench Backfill

Excavation, including the manner of supporting excavation and provisions for access to trenches, shall comply with current OSHA regulations for trench safety.

Trench backfill shall consist of a flowable backfill. On-site structural excavated material or approved imported fill may only be used with the approval of the City Engineer and if the trench width is greater than eight feet (8') and a full-size, self-propelled compactor can be utilized to achieve the required compaction.

In areas where lime treated sub-base, cement modified sub-base, soil cement, or similar materials have been used, the Permittee shall replace the material in kind, or provide flowable backfill up to sixteen inches (16") below finished grade.

Flowable backfill shall consist of a controlled low strength, self-leveling concrete material composed of a mixture of cement, fly ash, aggregate, water, and chemical admixtures. Flowable backfill shall have a design compressive strength of between 50 and 150 psi at 28 days when tested in accordance with ASTM D 4832. The mix should have a design slump between 6 and 10 inches.

Flowable backfill shall be discharged directly from the truck into the space to be filled, or by other methods approved by the City. The mix may be placed partial or full depth. When used as backfill in the pipe zone, care should be taken to prevent flotation or misalignment of the pipe by means of straps, soil anchors or other approved means of restraint. Material may be placed in stages with initially less flowability, to prevent movement or flotation of pipe. Compaction of flowable backfill will not be required.

Placement of pavement materials or vehicle traffic shall not be allowed until the flowable backfill has achieved a penetration resistance of at least 600 psi using a hand-held penetrometer, in accordance with ASTM C 403. This penetration resistance shall be considered achieved when a person weighing at least 150 pounds, using their body weight, cannot penetrate the flowable backfill with the square cut end of a No. 4 steel reinforcing bar. A traffic plate or barricading of the patch area will be required until temporary or permanent patching is completed, as per the approved traffic control plan. Traffic will not be allowed directly on the flowable backfill material.

The alternative to the use of flowable backfill is the use of structural on-site excavated material or approved imported fill. On-site excavated material or imported fill used for backfill shall be compacted to the density and moisture content outlined below:

Backfill Compaction and Moisture Requirements

AASHTO CLASSIFICATION	REQUIRED COMPACTION	MOISTURE CONTENT TOLERANCE FROM OPTIMUM
A-1, A-2-5, A-2-7, A-3 A-4, A-5	Min. 95% of AASHTO T180	-3 to +3
A-2-4, A-2-6, A-6, A-7	Min 95% of AASHTO T 99	0 to +3

Backfill material must be placed and compacted in maximum eight inch (8") loose lifts, unless compaction equipment is used that allows larger lift thickness, as approved by the inspector.

The Permittee shall be responsible for testing of trench backfill. Testing shall be done under the direction of a professional engineer licensed in the State of Colorado and practicing in this field. Minimum testing frequency shall be one density test for each two vertical feet of backfill for each one-hundred lineal-feet (100 l.f.) or five-hundred square-feet (500 s.f.) In no case shall there be less than three tests in any trench with the tests distributed from two feet above the utility line to the subgrade. Test results shall be provided to the City prior to placement of the asphalt or concrete pavement. Failure to provide timely documentation of testing will result in removal and replacement of the backfill and pavement at the Permittee’s expense or in-place testing at the Permittee’s expense.

4. Temporary Patch

Temporary patches will not be allowed without prior approval by the City Engineer.

Whenever permanent pavement patches are not constructed immediately following utility cut backfilling operations, temporary pavement patches consisting of minimum of three inches (3") of hot or cold mix asphalt may be utilized to provide the required number of paved travel lanes. Temporary pavement patches may be left in place for a maximum of 14 calendar days, unless otherwise required by the City Engineer, following completion of backfilling operations. Temporary patches must be inspected daily by the Permittee and maintained by the Permittee to the following tolerances at all times.

When a ten foot (10') straight edge is laid across the temporary patch both parallel to the centerline of the street and in a direction perpendicular to the centerline, a rut, hump, or depression of more than one-half inch (1/2") shall not be present. Deteriorated temporary patches exhibiting ruts, humps, or depressions in excess of one-half inch (1/2") shall be repaired or replaced immediately by the Permittee upon notification from the City.

5. Permanent Patch

The Engineering Division shall be notified 24 hours in advance of placement of a permanent patch.

Prior to placing a permanent patch, the existing pavement shall be sawcut or rotomilled to a neat straight line.

Asphalt pavement shall be sawcut or rotomilled as indicated in the Asphalt Pavement Patchback Detail.

Concrete pavement must be sawcut full depth.

Pavement shall be replaced at the minimum thickness shown below.

Minimum Pavement Patch Thickness

Roadway Classification	Asphalt Pavement	Concrete Pavement
Arterial	9"	9"
Collector	7"	7"
Local	5"	5"
In no case shall the patch thickness be less than existing adjacent pavement.		

6. Asphalt Streets

Asphalt pavement shall be neatly sawn or rotomilled and removed as indicated in the Asphalt Pavement Patchback Detail.. Asphalt pavement shall meet CDOT specifications for grading S or SX hot bituminous pavement. Binder material shall be PG 58-28 or 64-22. Compaction shall be between 92 and 96 percent of the maximum specific gravity, CP-51. Average compaction of less than 92 percent will be cause for rejection. A tack coat shall be applied to all edges of the existing pavement prior to final patching. Maximum lift thickness on asphalt patches is three inches (3"). The Permittee shall be responsible for compaction testing on asphalt patching for trenches. A minimum testing frequency shall be one compaction test on each lift placed, for each two-hundred lineal-feet (200 l.f.) or five-hundred square-feet (500 s.f.) of patch. In all cases there shall be at least one test on each lift for any patch that exceeds the size limits shown above.

7. Concrete Streets

Concrete pavement shall be neatly sawn and removed five feet (5') back from each side of the excavation. If a construction, contraction, or expansion joint is less than five feet (5') from the edge of the saw cut, the surface shall be removed back to the joint. All cuts shall be four sided.

All concrete patches shall be doweled into the existing pavement with #5 rebar at 18" O.C. around the perimeter of the patch. The dowels shall be 24" in length with 12" doweled and epoxied into the existing pavement.

Concrete for patching shall meet the specifications for CDOT Class P concrete.

The Permittee shall be responsible for testing of all concrete patching. Testing shall include air content, temperature, slump and 7, 14, and 28 day compressive strength testing on every concrete delivery truck.

Where concrete improvements are removed and replaced adjacent to an asphalt paved surface, a minimum width of two feet (2') of the asphalt paved surface shall be removed and replaced in a manner meeting the permanent patch requirements.

8. Concrete Sidewalks, Bikepaths, Driveway, Curbs and Gutters, and Other Structures

Whenever an excavation cuts a concrete sidewalk, bikepath, driveway, curb and gutter, or other structure, a neat saw cut shall be made one foot (1') back from each side of the excavation to undisturbed soil; the concrete shall be removed to the nearest joint. All broken material shall be removed. Once the excavation is backfilled and subgrade compacted to 95% compaction, the structure shall be replaced with concrete meeting CDOT specifications for Class B concrete.

9. Pavement Markings and Loop Detectors

All traffic control devices removed or disturbed during construction must be replaced upon completion of the permanent patch including but not limited to signs, paint, thermoplastic or pre-formed plastic pavement markings, and traffic signal detector loops. Temporary lane lines and other markings used during construction shall be permanently removed, to the satisfaction of the Engineering Division, prior to placing the new traffic stripes or markings.

10. Other Unpaved Surfaces

If a permit for work in the public way creates any excavations that lie within unpaved areas, the excavated soil shall be carefully deposited and satisfactorily tamped in uniform layers not greater than eight inches (8") in thickness until the backfill reaches the top of the substructure. The remainder of the excavation shall be backfilled in uniform layers not exceeding twelve inches (12") in thickness, and satisfactorily tamped to within one foot (1') of the surface. The backfilling operation shall continue with soil until the backfill remains slightly above the ground level. Excess material shall be disposed of. Granular backfill may also be used; however, topsoil shall be used for the final one foot (1') of backfill.

Excavations will require restoration of the area to original condition, including irrigation system repair, topsoil placement, seeding, sodding and/or replacement of plant materials. It is the responsibility of the Permittee to establish a good stand of grass. The area shall be left free from debris and clods. On steep embankments or upon request of the City Engineer, sod or other erosion control techniques shall be used for restoration. (Erosion control blankets per City GESC requirements shall be installed on all slopes greater than 4:1).

11. Gravel Streets

Excavations in gravel streets and alleys shall be backfilled in the same manner as excavations in paved streets. The final surface shall be six inches (6") of compacted CDOT Class 6 aggregate base course material. Recycled concrete or asphalt will be considered on a case-by-case basis.

12. Warranty

All cuts shall be warranted for two years. During the warranty period, the Permittee shall be required to repair any defects in the final asphalt or concrete patch including, but not limited to:

Asphalt

- Alligator cracking of the asphalt surface
- Excessive stripping of the asphalt surface
- Potholes in the asphalt surface
- Settlement of the asphalt surface greater than or equal to one-half of an inch (1/2")
- Separation of the patch from the existing pavement of more than one-quarter of an inch (1/4")

Concrete

- Any cracking outside of a control joint
- Any scaling or spalling
- Surface damage
- Settlement of the concrete surface greater than or equal to one-quarter of an inch (1/4")

Gravel Streets and Other Unpaved Surfaces

- Settlement of the surface greater than or equal to one-half of an inch (1/2")

13. Erosion and Sedimentation Control

Appropriate erosion and sedimentation control best management practices meeting or exceeding City GESC requirements shall be installed and maintained. In most cases, a full City GESC Permit will not be required for utility repair/street cut work, however, the proposed on-site specific GESC management must be approved by the City Engineering/Public Works GESC Inspector or City Engineer.