

CITY OF CHARLESTON
DEPARTMENT OF PUBLIC SERVICE
ENGINEERING DIVISION



Steel Plates Requirements
Used in
Connection with Roadway
Utility Excavations

APRIL 2013



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1. PURPOSE

The purpose of this document is to establish and promote uniform policies for the placement, identification and removal of steel plates over open excavations within the public right-of-way in the City of Charleston. In determining these requirements, State and other cities transportation agencies were contacted to evaluate their practices and determine how we can benefit from their experiences.

2. OBJECTIVE

These requirements are intended to provide a high level of service of City streets by ensuring that the streets are left in the same condition in which they were found before the excavation and to establish criteria for the use of steel plates during the cutting of pavement, excavating, backfilling and repairing of pavements cuts. This will reduce congestion and hazards along with increasing public service and safety in and out of construction sites.

3. BACKGROUND

Steel plates are used primarily in urban areas where an excavation is made in the roadway for utility work, such as installing or replacing utility lines, pipes and conduits. Steel plates are positioned on the roadway to cover the excavation and allow traffic to proceed when utility work is not underway.

The use of steel plates by utility companies and their contractors in the City of Charleston as a temporary cover over an excavated area in a vehicular travel lane can present safety hazards and other problems if allowed to remain in place for extended periods and not properly secured. Some of the problems include:

- Plates being installed incorrectly resulting in the loud rattling of the plates.
- Plates not clearly marked in a location easily visible with no way of determining the owner of the plate.
- Motorcyclists are challenged when they traverse an unexpected plate.
- Plates being used as a permanent roadway fix.

The City of Charleston grants permission for placement of all proposed utilities and for all construction and maintenance work in public rights-of-ways and easements by issuing a permit from the Engineering Division, as specified under Article II, Section 28.21 of the Charleston City Code.



4. PERMIT APPLICATION AND NON-CONFORMANCE

4.1. Permitting

Any work in City maintained street, alley, or right-of-way requires an engineering permit from the Engineering Division. This permit allows the utility company or a contractor hired by the utility company or an individual to conduct the work within the right-of-way. Approval of the Engineering Division is required prior to the starting the work. Construction drawings and a site specific traffic control plan issued by the City’s Traffic and Transportation Department must be submitted with the permit application form. The placard issued by the Engineering Division authorizing the work, must be visible on the job site at all times. If the work involves work within the SCDOT rights-of-way, an approved SCDOT encroachment permit is also required.

Permit application form and applicable fees can be found at:

<http://www.charleston-sc.gov/DocumentCenter/View/67>

4.2. Non-Conformance

Failure to comply with applicable permitting requirements would be considered a violation of City Ordinance Section 21-52, Public Nuisance, as defined in Section 21-51(f) (10), “All obstructions of streets, alleys, sidewalks or crosswalks and all excavations in or under the same, except as permitted by the ordinances of the city or which, although made in accordance with such ordinances, are kept or maintained for an unreasonable length of time after the purpose thereof has been accomplished.”

5. USE OF STEEL PLATES IN THE TRAVELED WAY

When backfill operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging will be required to preserve unobstructed traffic flow in City streets and roadways. In such instances the following applies:

5.1. Steel Plates Requirements

- Steel plates must be able to withstand H-20 traffic loading without any movement.
- Steel plates shall be fabricated to meet ASTM A36 steel requirements.
- When two or more of plates are used, the plates shall be tack welded together at each corner to reduce or eliminate vertical movement. Alternative methods to accomplish this, such as metal connectors, will be considered for approval on case by case basis.
- Steel plates shall be installed to resist bending, vibrations, etc., under traffic loads and shall be anchored securely to prevent movement. If these conditions are not met, the applicant will be required to backfill and pave the excavation daily, or use alternative methods such as “Plate Locks” which are designed to secure the plates with minimum noise and vibration.
- All steel plates shall be properly marked with the utility and contractor name, after-hours contact phone number in the event the plates need to be secured.



- All steel plates within the right-of-way, whether used in or out of the traveled way, shall be without deformation. The plate surface must not deviate more than 1/4 inch when measured with a 10-foot straight edge along the length of the plate.
- It is the responsibility of the permittee to perform and document daily inspections of all active plate(s) or unattended plate(s) location(s), and where necessary take appropriate measures to protect the public safety until work is completed. This documentation shall be available to the City inspector upon request. No un-plated excavation shall be left unattended overnight.
- In the event of improper installation of the steel plates that presents a nuisance or a public safety problem, the permittee shall respond to all excavation restoration requests by the City immediately upon notification. Non-responses will result in the required restoration work being done by the City, with all expenses to be paid by the permittee.
- Steel plates must extend a minimum of 12-inches beyond the edges of the excavation.
- Before steel plates are installed, the excavation shall be adequately shored to support the bridging and traffic loads.
- Temporary paving with a cold asphalt mix should be used to feather the edges of the plate to form a wedged taper to cover the edges of the steel plate. Other alternative methods to accomplish this will be considered for approval.
- Wedges or other non-asphaltic devices shall be used for leveling as required to eliminate rocking of the plates. Compacted temporary asphalt shall be used to fill all gaps between the plates and existing pavement surfaces.

5.2. Typical Steel Plates Details

Temporary steel plates installed on roadways open to vehicular traffic should be marked with a durable and highly reflective white pavement marking tape no less than 4 inches in width. The marking pattern used should, at a minimum, include all four corners of the plate, similar to the pattern shown in Figure 1. The marking tape dimensions should not be less than those shown in Figure 1. The 3-inch distance from the plate's edge to the tape may be varied depending on the conditions.

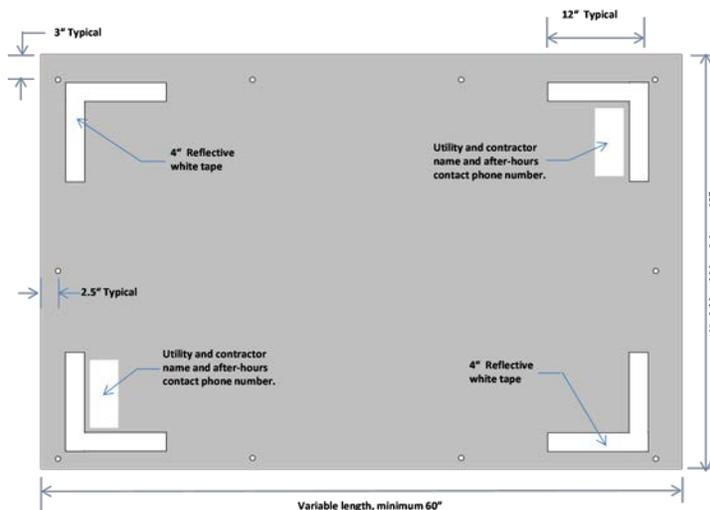


Figure 1 – Steel Plate



5.3 Installation

Steel plate placement on traverse and longitudinal excavations shall be in accordance with the following:

Steel Plate Installation	Street/Road Type	Posted Speed Limit	Steel Plate Thickness
TYPE 1	Urban/Residential	35 MPH or Less	1-inch minimum
TYPE 2	Arterial/Collector	Greater than 35 MPH	1-1/4-inch minimum

5.3.1 Type 1 Installation

Type 1 installation shown in Figure 2, shall be used in areas where backfilling operations of an excavation in the traveled way, whether traverse or longitudinal cannot be properly completed within the same day, and the posted speed limit is 35 MPH or less. The steel plate shall be anchored securely to prevent movement. Temporary paving with a cold asphalt mix, or approved equal, should also be used to feather the edges of the plate to form a wedged taper to cover the edges of the steel plate.

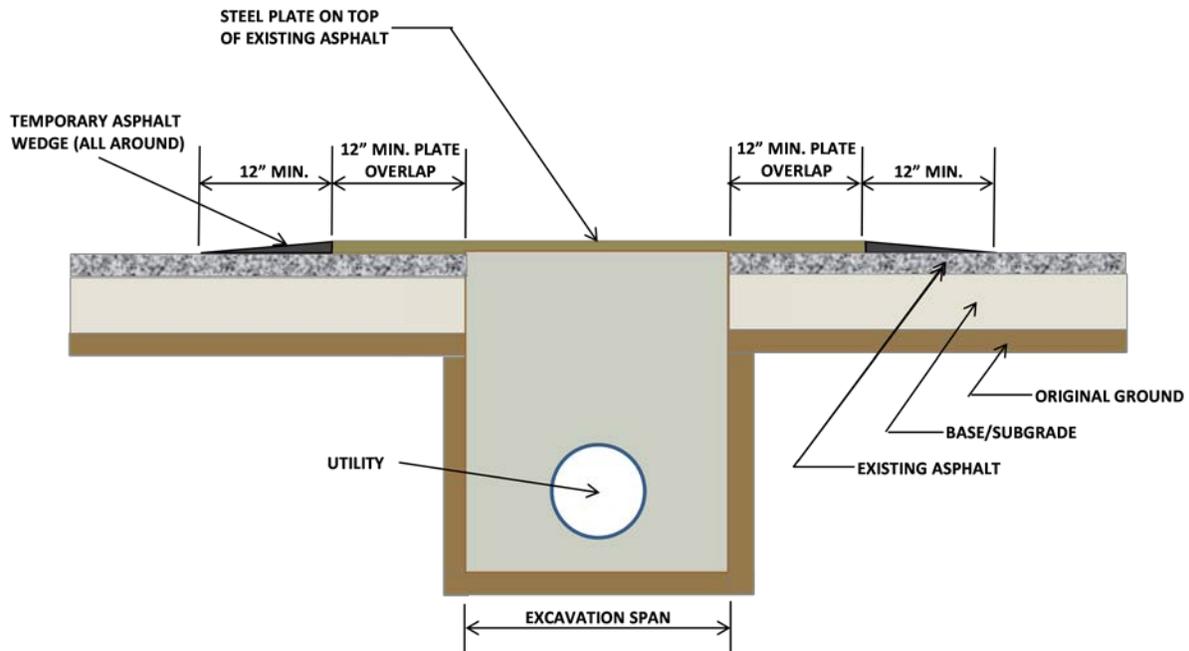


Figure 2 – Type 1 Installation



Type 2 installation shown in Figure 3, shall be used in areas where backfilling operations of an excavation in the traveled way, whether traverse or longitudinal cannot be properly completed within the same day and the posted speed limit is greater than 35 MPH. The steel plate for type 2 installations shall be recessed by milling into the existing asphalt to set flush with the surface of the existing asphalt. The pavement shall be cut and cold planed to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate. Full depth cutting of the asphalt section of excavation is not allowed. The steel plate shall be anchored securely to prevent movement. The gap between the edge of the plate and the adjacent existing asphalt pavement must be filled with temporary asphalt patch (cold mix). Wedges or other non-asphaltic devices shall be used for leveling as required to eliminate rocking of the plates. Compacted temporary asphalt shall be used to fill all gaps between the plates and existing pavement surfaces.

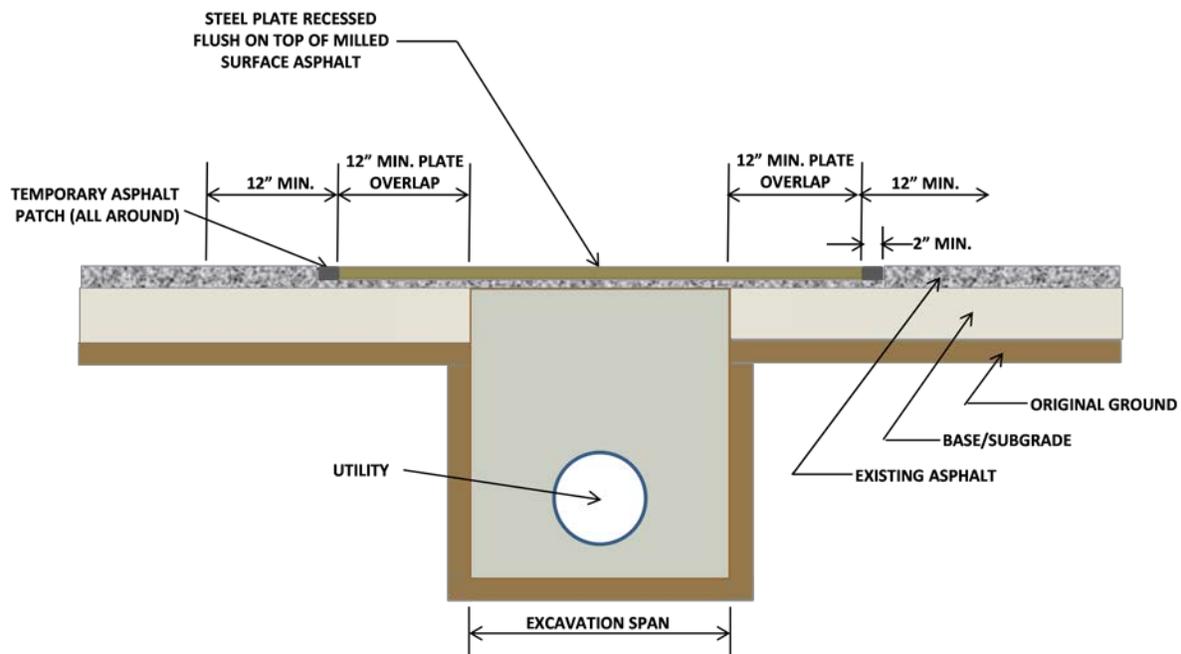


Figure 3 – Type 2 Installation Detail



Provisions should be made for the safety and protection of vehicular and pedestrian traffic during the construction period as follows:

- The permittee shall be responsible for the furnishing, erection and maintenance of all required traffic control devices. All signs and devices shall conform to the requirements of the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).
- When in the opinion of the City Inspector, the work constitutes a hazard to traffic in any area of the work, the permittee may be required to suspend operations during certain hours and to remove any equipment from the area of work
- The roadway surface shall be kept clean of debris at all times and should be thoroughly cleaned at the completion of the work.
- The permittee shall be responsible to replace all pavement markings in kind which have been disturbed as a result of the utility work

6.1 Signage

In addition of the traffic control devices required by the Engineering Division Permit, warning signs advising motorists that they should expect to encounter steel plates, shall be placed at approximately 100 feet in advance of the steel plate location. The W8-24 warning sign, “STEEL PLATES AHEAD” meeting the requirements of the MUTCD, is shown in Figure 4 below. Plates left overnight may require, at the discretion of the Engineering Division Inspector, that the sign be supplemented with a Type “A” Low-Intensity-flashing warning light mounted on the sign support.



Figure 4 – Steel Plate Ahead Sign Detail

A	B	C	D	E	F	G	H	J	K	L	M	N
30	0.5	0.75	4 D	3	2.5	7.214	7.713	7.374	7.874	8.356	8.855	1.875
36	0.625	0.875	5 D	3.5	3.5	9	9.659	9.28	9.78	10.5	11.014	2.25
48	0.75	1.25	7 D	4.5	4.75	12.561	13.561	12.842	13.842	14.560	15.559	3

COLORS: LEGEND, BORDER – BLACK



6.2 Night Visibility

Temporary steel plates installed on roadways open to vehicular traffic should be marked with a durable and highly reflective white pavement marking tape no less than 4 inches in width. The marking pattern used should, at a minimum, include all four corners of the plate, similar to the pattern shown in Figure 1.

7. UTILITY CUT RESTORATION

Pavement settlement occurring in and around utility cuts in the City is a common problem, resulting in uneven pavement surfaces, annoyance to drivers, and ultimately, further maintenance by the City.

Factors influencing the performance of a patch include:

- Pavement material, soil conditions, climate, traffic and repair techniques.
- Poor construction techniques which damage the area adjacent to the cut and further degrade the patch and surrounding pavement.
- Pavement cut repairs made using quality materials and sound engineering and construction techniques tend to perform as well as the surrounding pavement.
- Poor performance of the patch tends to be a result of inadequate compaction of the materials, insufficient thickness of materials, poor quality of materials, and damage to the side of the cut.

7.1 Excavation/Backfill

- The surface of the roadway to be excavated for the utility work shall be saw-cut in reasonably straight and parallel lines. The cutting excavation should not be done with a backhoe, gradeall or any other type of ripping equipment.
- Existing pavements, bases, curbs/gutters and sidewalks shall be cut and brought to a neat line. Expansion joints removed shall be replaced. The cutting and replacement of concrete curbs/gutters and sidewalks shall be from joint to joint and of complete panels.
- Backfill material shall meet the applicable requirements of the current edition of the South Carolina Department of Transportation, Standard Specifications for Highway Construction for backfill material. Unsuitable material will not be allowed for backfill.

7.2 Pavement Restoration

The permittee shall be responsible to replace all pavement disturbed with a homogeneous and in-kind asphalt mix, and the details shown in Figure 5.

- All existing pavement surface should be swept clean of dirt, dust and debris prior of patching
- The existing vertical pavement shall be tack coated with an appropriate asphalt tacking material prior to patching
- When the pavement remaining between the excavation and the edge of the roadway is less than to 2 feet, the remaining area shall be removed in conjunction with the permanent repair.
- The work performed shall be free from workmanship defects for a period of two (2) years after date of acceptance by the Engineering Division.
- If permanent pavement restoration cannot be completed within three (3) days, then temporary patch of 2-inches of cold asphalt mix over compacted granular stone will be allowed. Permanent pavement repair to be completed within the time period required by the inspector.



- Any disturbed pavement markings must be restored to match adjacent striping.
- Crack seal around asphalt patch may be required at the discretion of the Inspector when there is a gap present.
- Spoil piles must be removed and the area must be cleaned and restored to like kind or better condition.
- Traffic control devices removed.

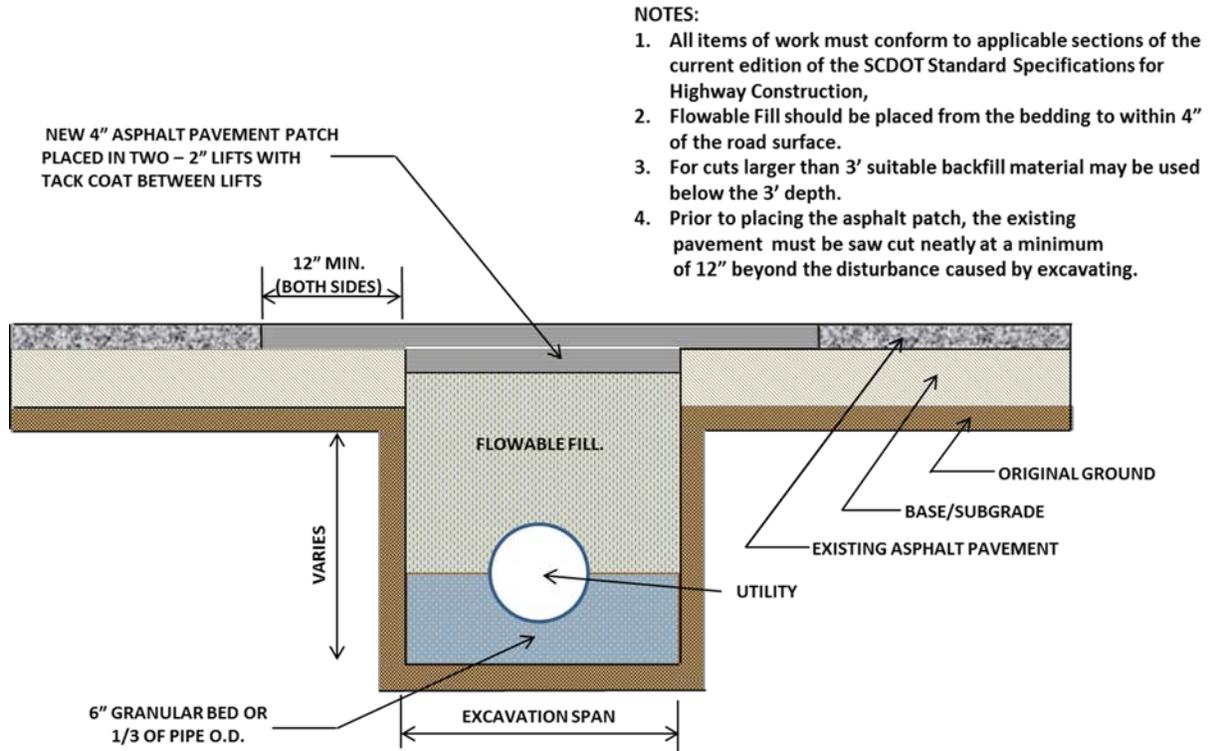


Figure 5 – Utility Cut Restoration Detail