STREET CUT PAVEMENT REPAIR STANDARDS

DURHAM

1 8 6 9

CITY OF MEDICINE

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

JANUARY 2009

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ATTACHMENTS

NCDOT FLOWABLE FILL SPECIFICATIONS

NCDOT ASPHALT SPECIFICATIONS

LINK TO THE OPERATION GREEN LIGHT ON THE CITY WEB SITE.
Street name can be typed in to check the latest pavement condition information (PCI). Go to find a street and then click on the block in question and the rating will appear on the screen under condition from survey in the information box.

Purpose

The purpose of this document is to protect and improve City of Durham streets by providing clear, consistent pavement repair standards for street cuts. This document specifies the size, shape, quality and general materials required to repair street cuts. It is not intended as a complete guide to pavement structures or materials standards.

Impact

Adoption of these standards will increase the initial repair costs for the City and private utilities and contractors. However, these standards are necessary to preserve the original investment of the streets within the City, should save funds for the City in the long term and minimize the costs for the private sector by avoiding the costs to fix poor repairs.

Applicability

These standards apply to anyone cutting and excavating City of Durham streets, regardless of the reason for the cut and excavation. The standards apply to private and public utilities and contractors as well as the City of Durham. These standards are not intended to supersede more substantial repair or resurfacing requirements on projects where specified repairs are shown on approved construction drawings or otherwise directed by Public Works Engineering or City/County Planning.

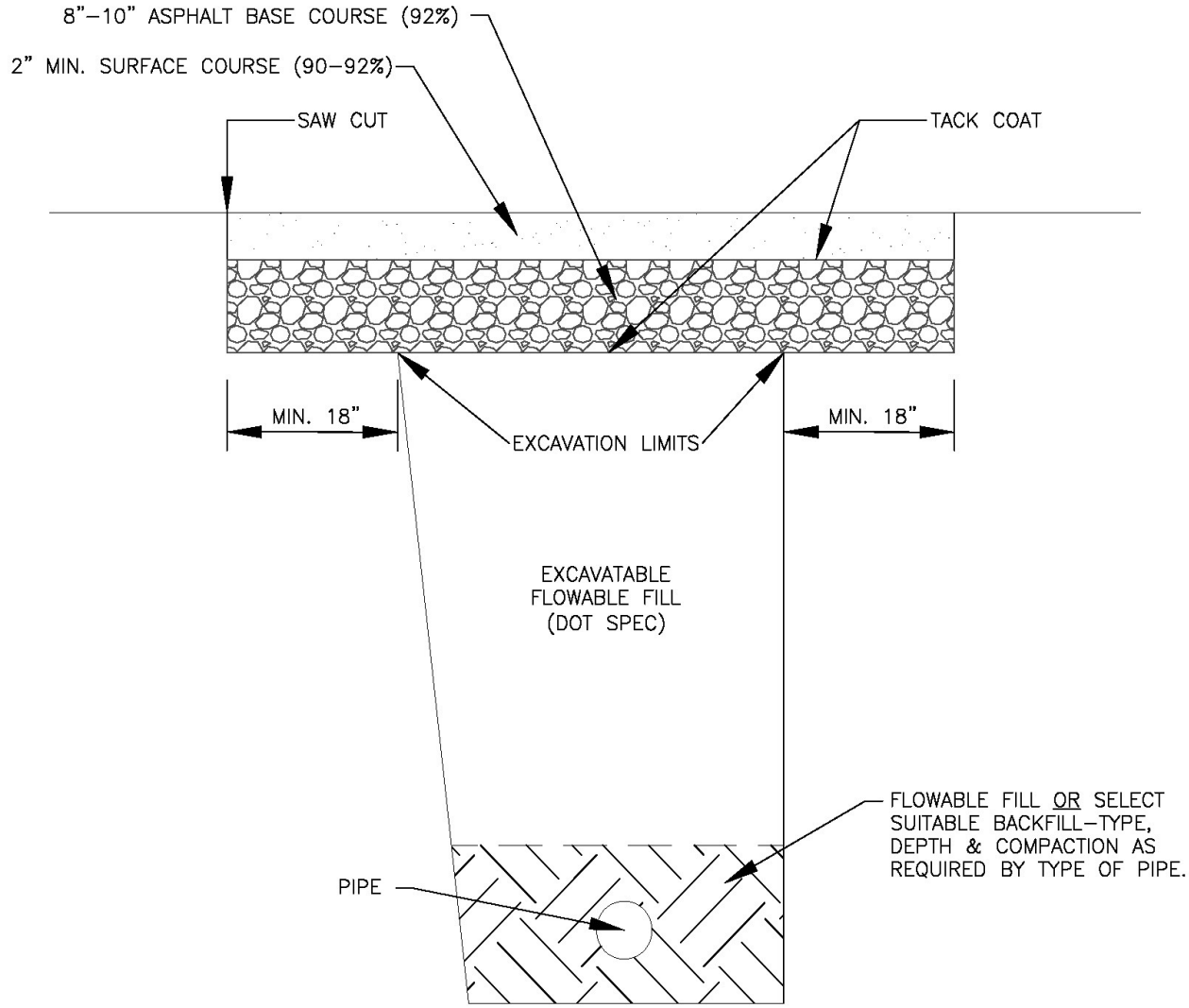
General Requirements

Street cuts cause damage that reduces the level of service of the street on which they are made. To minimize this damage, and in some cases actually improve the street conditions where cuts are made, the City is adopting the backfill, patch and surface repair standards as described in the following sections. In general, the repair standard will be what is termed a "T-patch", which includes flowable fill and a minimum bench (or key) of 18 inches beyond the edges of the excavation. This 18-inch bench will define the width of the required surface repair (if applicable) measured parallel to the travel direction of the street. The length of the surface repair (if applicable) measured perpendicular to the street will be at a minimum the full width of a travel lane (from curb or edge of pavement to the crown or edge of travel lane). If the edge of the excavation crosses or is less than 2 feet from the crown or edge of travel lane, the surface repair must extend to the full width of the street or edge of the next travel lane. The cost of all repairs shall be borne by party cutting the streets.

The full resurfacing area requirements specified herein (page 3) shall apply to City streets with Institute for Transportation Research and Education (ITRE) pavement condition ratings (PCI) of 50 or higher. The full-depth structural repair (page 2) is required on all City streets. The most current list of ITRE ratings for City streets is attached. The City typically retains an independent consultant every two to three years to update the ratings. The next PCI study is due by Summer 2009. The most current PCI ratings are posted on the City website.

Resurfacing requirements could possibly be reduced or increased, at City Engineering's discretion, in situations where extenuating circumstances exist such as pending resurfacing or road widening projects, safety and traffic flow issues, speed humps, adjacent pavement features or the condition of adjacent pavement.

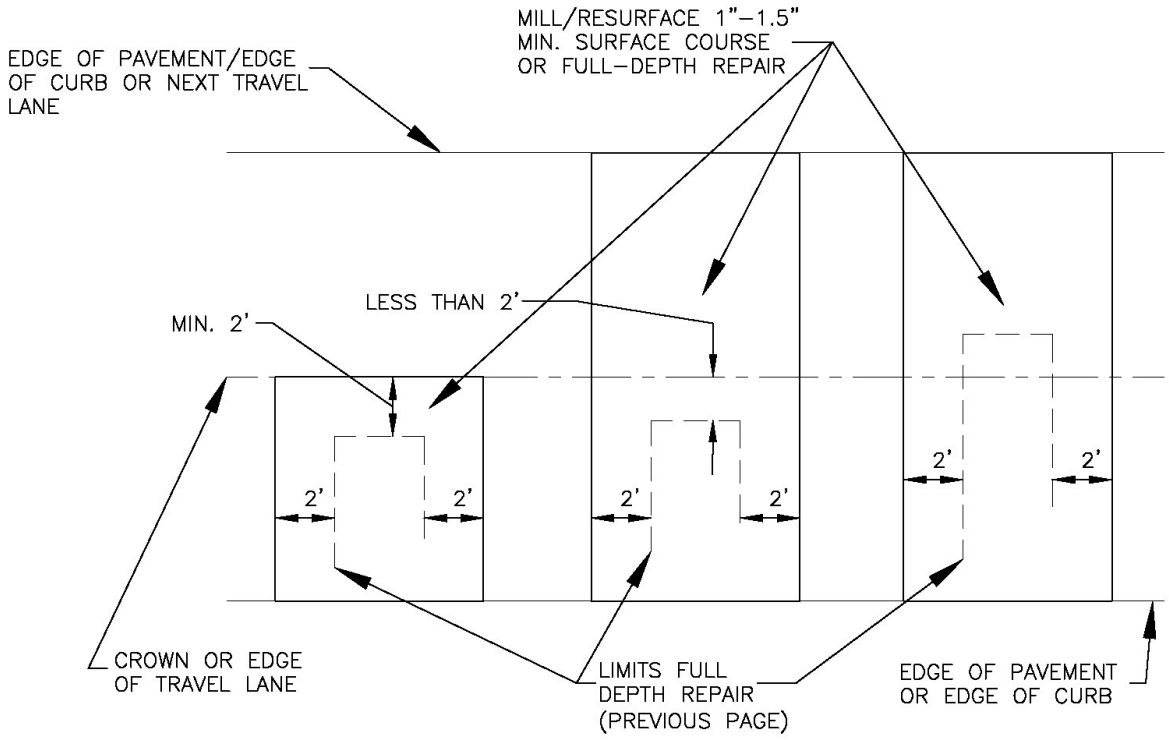
Street Cut Repair Detail Cross Section (All Repairs)



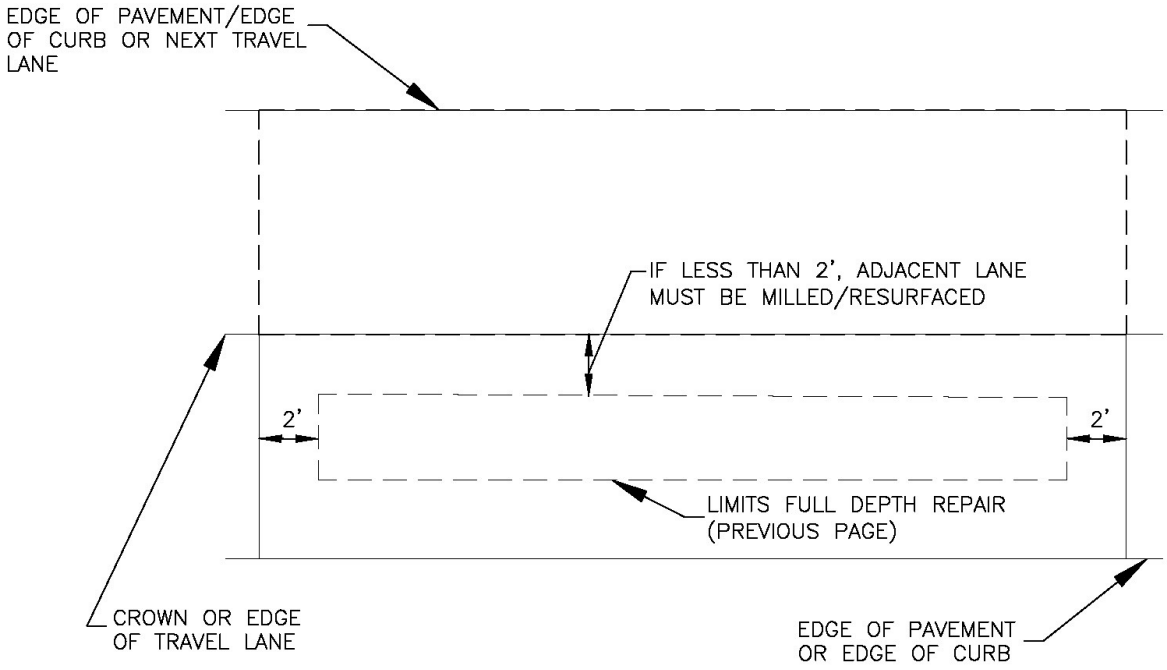
GENERAL NOTES:

1. SAW CUT EDGES MUST BE STRAIGHT AND CLEAN.
2. PATCHES MUST BE REGULAR, SQUARE OR RECTANGULAR WITH (4 STRAIGHT SIDES).
3. FINAL SURFACE COURSE MUST BE FLUSH WITH THE EDGE OF EXISTING PAVEMENT, VERTICALLY AND HORIZONTALLY, WITH NO SPILLOVER OF ASPHALT OR TACK COAT.
4. CARE MUST BE TAKEN NOT TO DAMAGE INTEGRITY OR APPEARANCE OF SURROUNDING PAVEMENT. IF DAMAGED, THE ENTIRE SURFACE PATCH MUST BE EXPANDED TO COVER DAMAGES.
5. ALL STREET STRIPING IMPACTED BY THE REPAIRS MUST BE REPLACED TO CITY OF DURHAM AND/OR NCDOT STANDARDS.
6. PROPER TRAFFIC CONTROL AND PLATING OF THE ROAD DURING CURE TIME FOR FLOWABLE FILL MUST BE CONDUCTED APPROPRIATELY AND TO CITY, STATE AND FEDERAL STANDARDS.
7. THE MAXIMUM TIME TO COMPLETE THE FULL REPAIR SHALL NOT EXCEED 10 WORKING DAYS.
8. FOR SMALLER REPAIRS, SURFACE ASPHALT MAY BE SUBSTITUTED FOR BASE COARSE, BUT MUST BE COMPACTED IN 2"–2.5" LIFTS.

Surface Repair Plan Views (PCI ≥ 50)

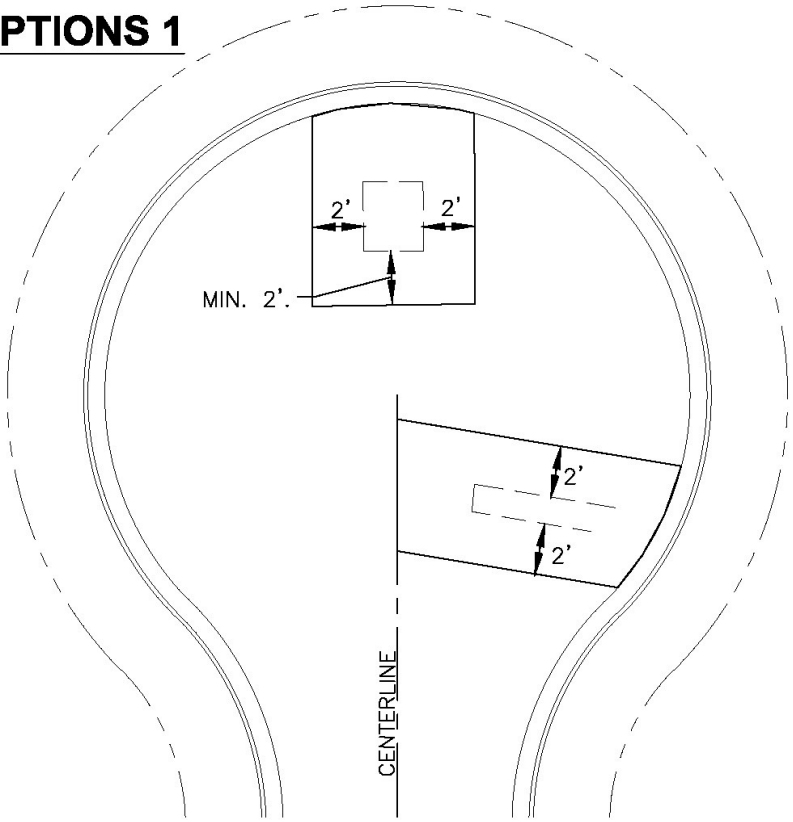


LATERAL (PERPENDICULAR) CUTS

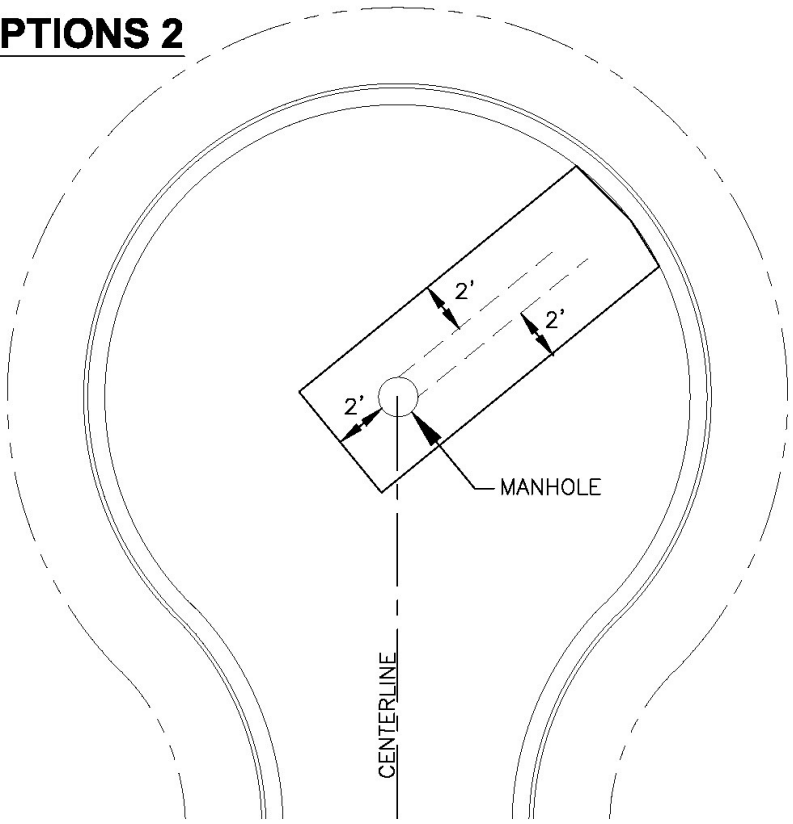


LONGITUDINAL (PARALLEL) CUTS

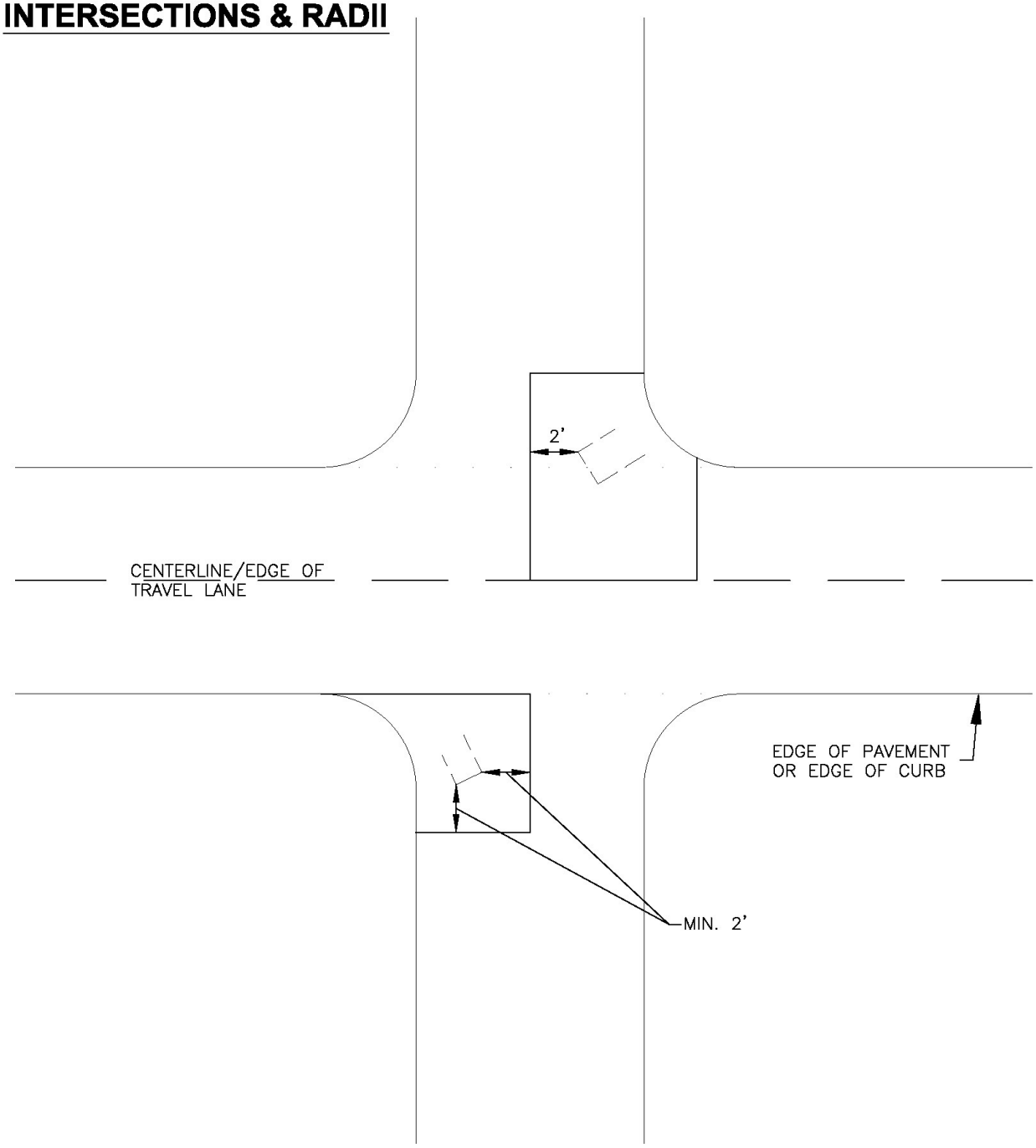
CUL-DE-SAC OPTIONS 1



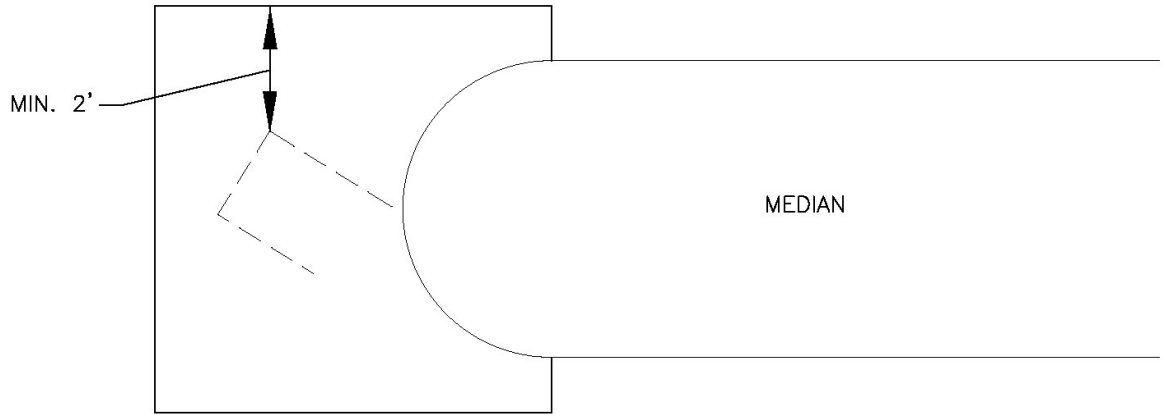
CUL-DE-SAC OPTIONS 2



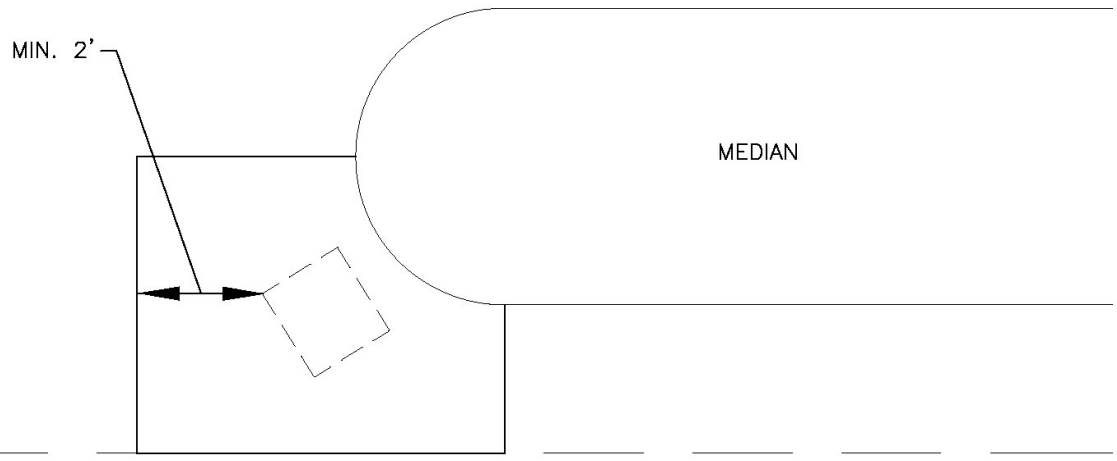
INTERSECTIONS & RADII



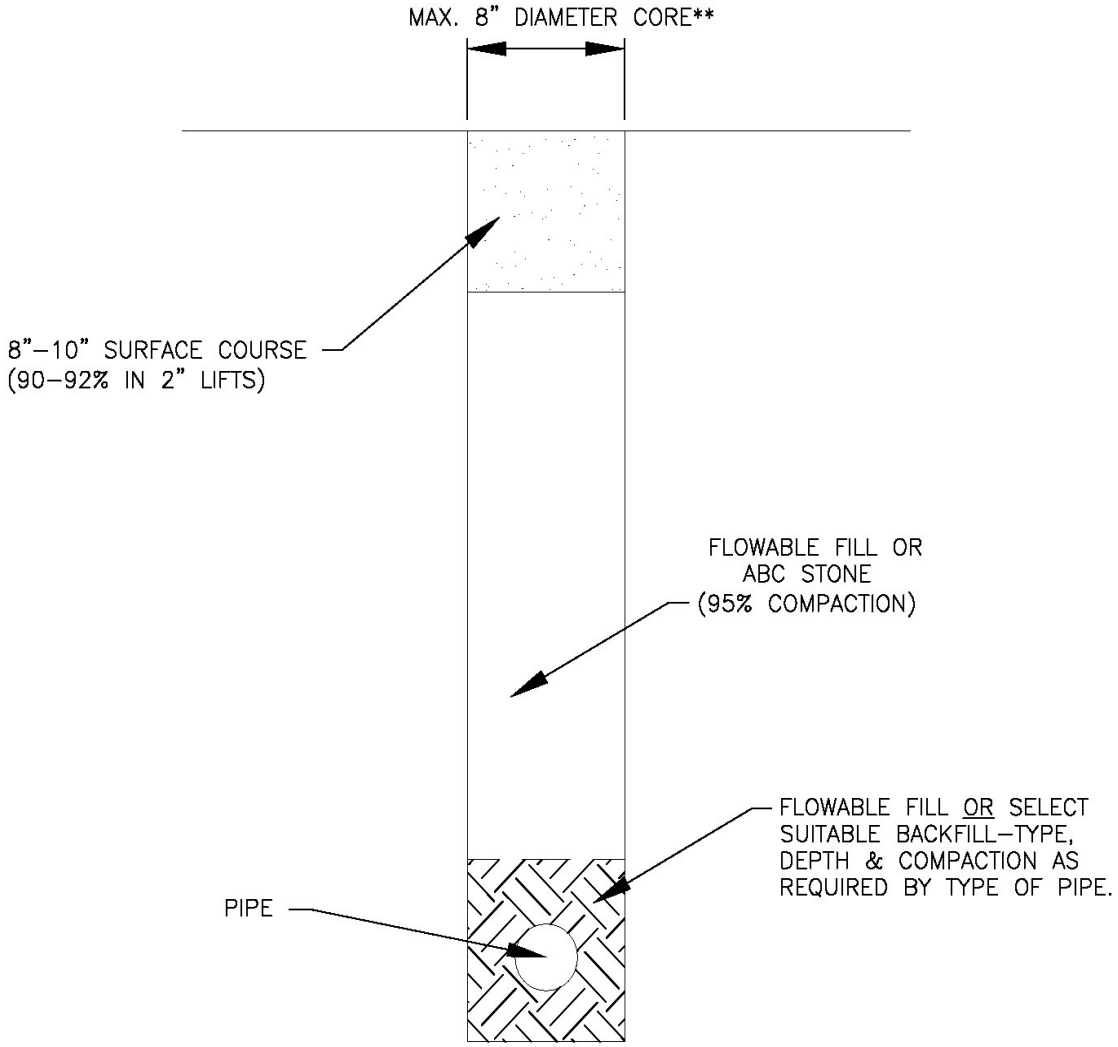
MEDIAN 1



MEDIAN 2



UTILITY SPOT CORES (LOCATES)



** LARGER CORES MAY REQUIRE MORE STRINGENT REPAIRS SUCH AS CORE REPLACEMENT WITH EPOXY BONDING GROUT AND SEALANT.

Examples

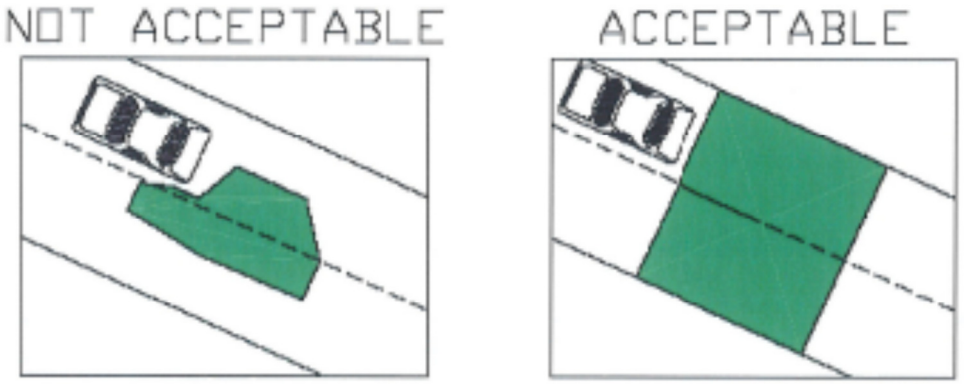
(adopted from Nashville, TN)

Utility Cut Repair Details

Some examples of repair methods that are not acceptable and the corresponding acceptable method are provided in the following examples. These examples must also apply the requirements given in Figures below. Some of the examples apply only to streets with PCR 50 and

Example 1

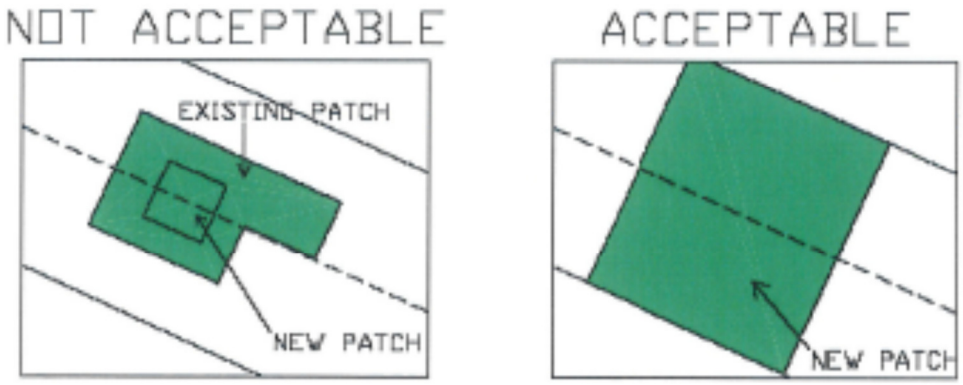
Existing pavements should be removed to clean, straight lines parallel and perpendicular to the flow of traffic. Do not construct patches with angled sides and irregular shapes. All repairs should be full lane width.



Example 1: Do not construct patches with angled sides and irregular shapes.

Example 2

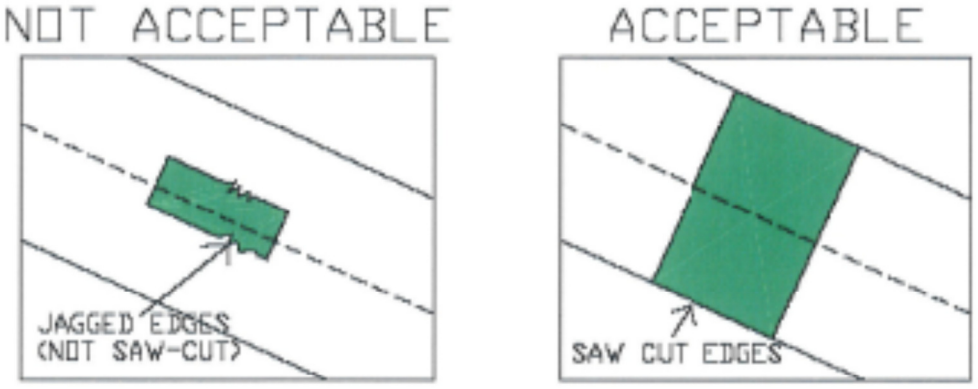
Avoid patches within existing patches. If this cannot be avoided, make the boundaries of the patches coincide. All repairs should be full lane width.



Example 2: Avoid patches within existing patches.

Example 3

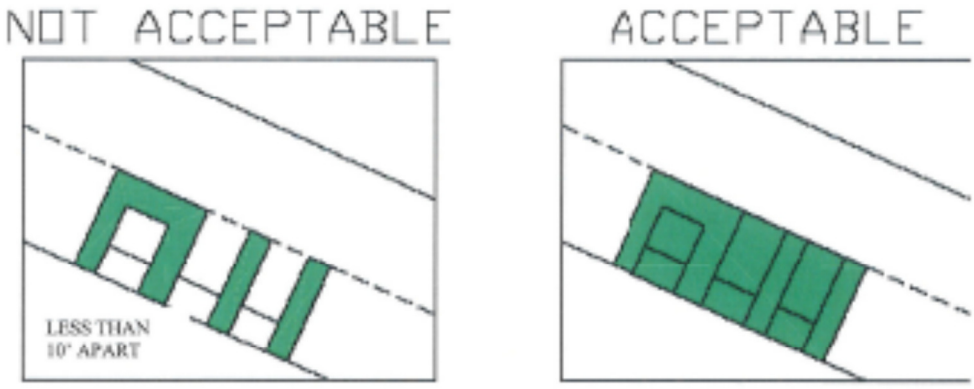
Asphalt and concrete pavements should be removed by saw cutting or grinding. Avoid breaking away the edges of the existing pavement or damaging the remaining pavement with heavy construction equipment.



All edges shall be saw cut.

Example 4

In the case of a series of patches or patches for service lines off a main trench, repair the pavement over the patches by grinding and overlay when the spacing between the patches is less than 10 feet.

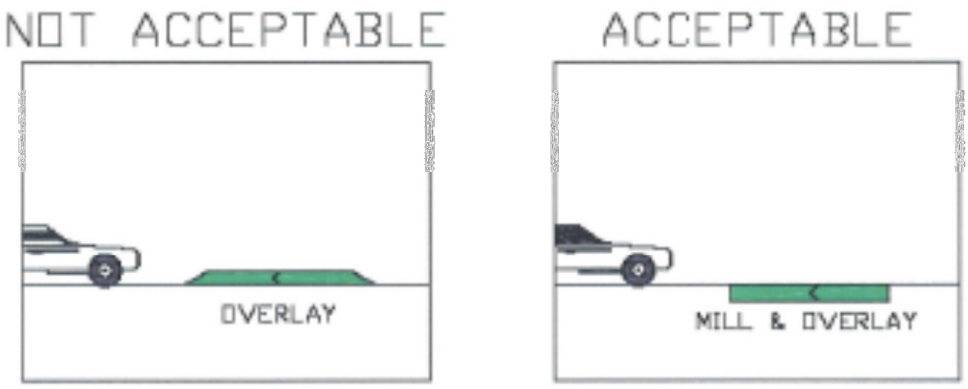


The patched area must include any existing patches within 10 feet.

This requirement applies when the patches are placed by the

Example 5

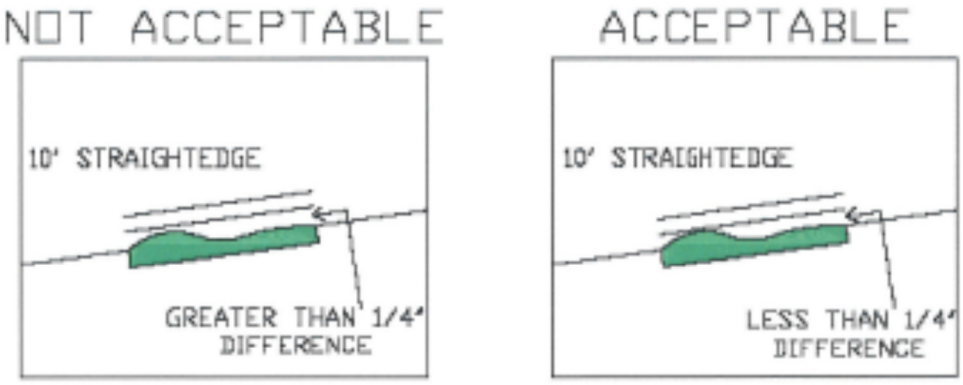
Completed street repairs should have rideability at least as good as, if not better than, the pavement prior to the repairs. A driver may be able to see a street repair, but in the case of a quality repair, should not be able to "feel" it in normal driving. A patch should provide a smooth ride with smooth transitions on and off the repair and all joints should be located outside the wheel path. Overlays should be placed by first removing the existing pavement to the desired depth by grinding or milling, and then placing the pavement flush with the adjacent surfaces. Overlays with feathered edges are not acceptable.



Patches may not decrease rideability.

Example 6

Surface tolerances for street repairs should meet the standard for new construction. That is, the finished surface of the street repair should be tested with a ten (10) foot straightedge parallel to the centerline or perpendicular across joints. Variations measured from the testing face of the straightedge to the surface of the street repair should not exceed one-quarter (1/4) inch.

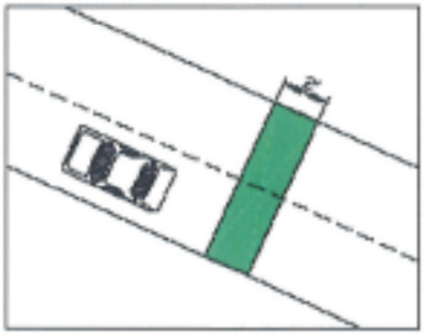


Surface tolerances for street repairs should meet the standard for new construction.

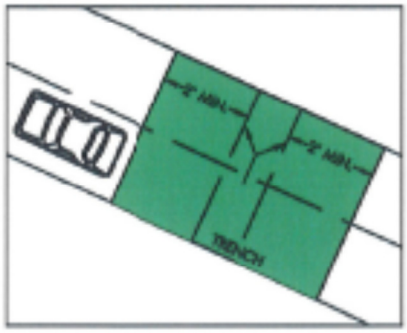
Example 7

Transverse patches on arterial and collector streets shall be overlaid across the entire street width for a distance of two (2) feet minimum on all sides of the trench using a T-Patch.

NOT ACCEPTABLE



ACCEPTABLE

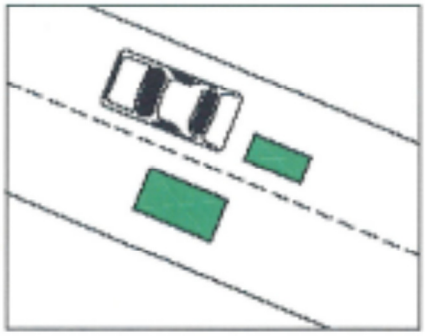


Trenches must be patched using a T-Patch.

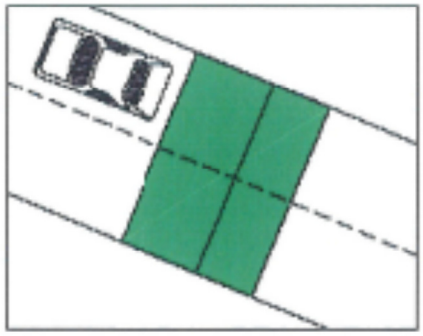
Example 8

Do not allow the edges of patches to fall in existing wheel paths. The edges of patches parallel to the direction of traffic shall be limited to the boundaries of lanes or to the centerline of travel lanes.

NOT ACCEPTABLE



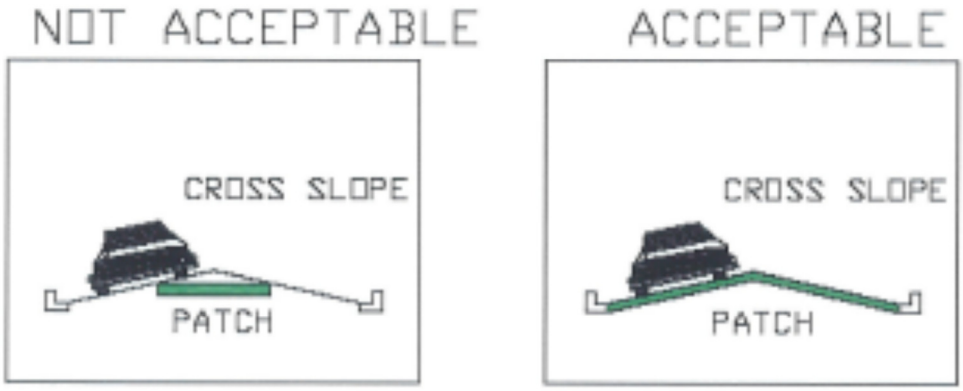
ACCEPTABLE



Do not allow the edges of patches to fall in wheel paths.

Example 9

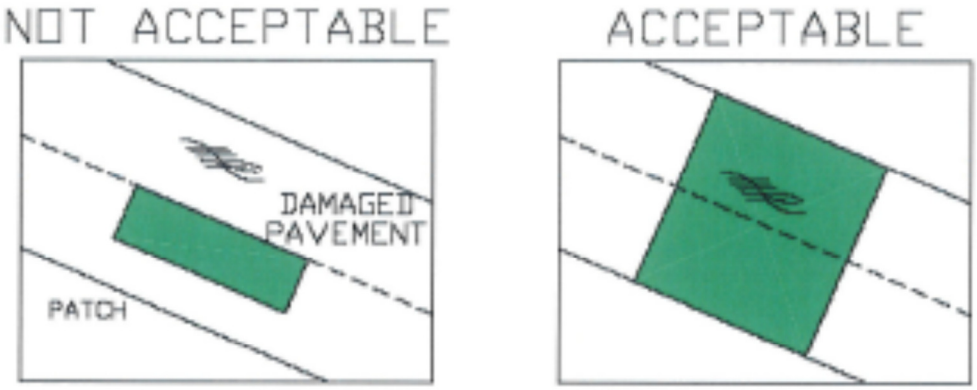
Patches should have a smooth longitudinal grade consistent with the existing roadway. Patches should also have a cross slope or cross section consistent with the design of the existing roadway.



Patch slope and grade must match existing pavement.

Example 10

When the proposed excavation falls within ten feet of a section of pavement damaged during the utility repair, the failed area shall be removed to sound pavement and patched. Scarring, gouging, or other damaged pavement adjacent to a patch shall be removed and the pavement repaired to the satisfaction of **Public Works Engineering.**

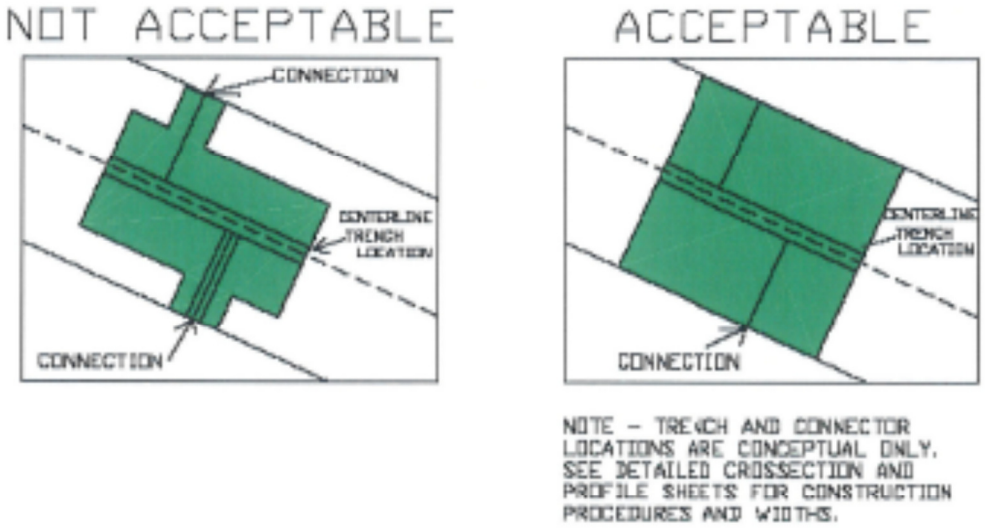


Damaged pavement within 10 feet of a patch must also be patched.

This requirement applies to the party responsible for the

Example 11

For patches in asphalt, a tack coat shall be applied to all edges of the existing asphalt before placing the new pavement. After placing the new asphalt, all seams (joints) between the new and existing pavements shall be sealed with an asphalt tack coat or rubberized crack seal material. Avoid frequent changes in width of patches. For future maintenance, this simplifies removal of adjacent pavement failures.



Patches must avoid frequent width changes.

Example 12

Not Acceptable

Acceptable

Example 13

Not Acceptable

Acceptable

ATTACHMENTS

Section 1000

1000-5 CONCRETE FOR MACHINE PLACED CURB, CURB AND GUTTER, AND PAVED DITCH

Use Class B Slip Form.

1000-6 HIGH EARLY STRENGTH PORTLAND CEMENT CONCRETE

Use high early strength portland cement concrete when required by contract. When not required, it may be used at the Contractor's option with approval of the Engineer.

For all classes of concrete, high early strength concrete may be produced by using Type III portland cement. To produce high early strength concrete with regular cement, use a higher class of concrete as follows:

For Class A and Class B, use Class AA with a minimum cement content of 677 pounds per cubic yard; for Class B Slip Form, use Class AA Slip Form with a minimum cement content of 677 pounds per cubic yard. Other classes that lend themselves to high early strength with regular cement will be reviewed by the Engineer on a case-by-case basis.

1000-7 FLOWABLE FILL

Flowable fill consists of portland cement, water, pozzolan and/or fine aggregate, and, optionally, conventional concrete admixtures and/or a high-air entraining agent or foaming agent. Use it for filling underground storage tanks and pipe culverts and for backfilling culverts, bridge substructures, retaining walls, roadway trenches and for other applications where conventional fill material has traditionally been used.

1000-8 LATEX MODIFIED CONCRETE

(A) Materials Use materials that meet the requirements for the respective items in the *Standard Specifications* with the following exceptions:

Cement - Do not use Type III (high early strength).

Aggregate – Follow Section 1014 of the *Standard Specifications*, except provide coarse aggregate that meets the gradation for standard size No. 78M.

Fine Aggregate – Follow the *Standard Specifications*.

Latex Emulsion Admixture – Use a formulated latex admixture that is a non-hazardous, film forming, polymeric emulsion in water and is homogeneous and uniform in composition. Add all stabilizers at the point of manufacture.

Use a latex modifier conforming to the following requirements:

Polymer Type	Styrene Butadiene 68 ± 4% Styrene 32 ± 4% Butadiene
Average Polymer Particle Size	1500 to 2500 Angstroms
Emulsion Stabilizers	Anionic and non-ionic surfactants
Percent Solids	46.5 to 49.0
Weight per gallon, lbs at 75°F	8.40 to 8.80
pH	8.5 to 11.0

Table 1000-1

Requirements For Concrete

Class of Concrete	Minimum compressive Strength at 28 days, psi	Maximum Water-Cement Ratio				Consistency Max. Slump, Inches				Min. Cement Content, Lbs/Yd³	
		Air-Entrained Concrete		Non Air-Entrained Concrete		Vibrated		Non-Vibrated		Vibrated	Non-Vibrated
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate						
AA	4500	0.381	0.426	---	---	3.5		---		639 - 715	---
AA Slip Form	4500	0.381	0.426	---	---	1.5		---		639 - 715	---
Drilled Pier	4500	---	---	0.450	0.450	---		5 - 7 dry	7 - 9 wet	---	640 - 800
A	3000	0.488	0.532	0.550	0.594	3.5		4		564	602
B	2500	0.488	0.567	0.559	0.630	2.5		4		508	545
B Slip Formed	2500	0.488	0.567	---	---	1.5		---		508	---
Sand Lightweight	4500	---	0.420	---	---	4		---		715	---
Latex Modified	3000 (7day)	0.400	0.400	---	---	6		---		658	---
Flowable Fill excavatable	150 (max. @ 56 days)	as needed	as needed	as needed	as needed	---		flowable		---	40
excavatable											
Pavement	650 (flexural)	0.559	0.559	---	---	1.5 slip form	3.0 hand placed			526	---
Precast	See Table 1077-1	as needed	as needed	---	---	8		as needed		as needed	as needed
Prestress -6000	6000 or less	0.450	0.450	---	---	8				564	---
Prestress +6000	greater than 6000	0.400	0.400	---	---	8				564	---

610-10 DENSITY REQUIREMENTS

TABLE 610-4
MINIMUM DENSITY REQUIREMENTS

MIX TYPE	MINIMUM % of G_{mm}
SUPERPAVE MIXES	**(Maximum Specific Gravity)**
S 4.75A	85.0[a,b]
SF 9.5A	90.0
S 9.5X, S 12.5X, I 19.0X, B 25.0X, B 37.5X	92.0

(a) All S 4.75A pavement will be accepted for density in accordance with Article 105-3

(b) Compaction to the above specified density will be required when the S 4.75 A mix is applied at a rate of 100 lbs/sy or greater

Compact the asphalt plant mix to at least the minimum percentage of the maximum specific gravity listed in Table 610-4, except as noted below. Perform density sampling and testing on all pavements listed below unless otherwise approved.

(A) Full width travel lane pavements, including normal travel lanes, turn lanes, collector lanes, ramps and loops, and temporary pavements,

(B) Pavement widening 4.0 feet or greater,

(C) Uniform width paved shoulders 2.0 feet or greater,

(D) and wedging as outlined in the HMA/QMS Manual

Compact base and intermediate mix types (surface mixes not included) utilized for pavement widening of less than 4.0 feet and all mix types used in tapers, irregular areas and intersections (excluding full width travel lanes of uniform thickness), using equipment and procedures appropriate for the pavement area width and/or shape. Compaction with equipment other than conventional steel drum rollers may be necessary to achieve adequate compaction. Occasional density sampling and testing to evaluate the compaction process may be required. Densities lower than that specified in Table 610-4 may be accepted, in accordance with Article 105-3, for the specific mix types and areas listed directly above.

610-11 JOINTS

(A) Transverse Joints

When the placing of the mixture is to be suspended long enough to permit the mixture to become chilled, construct a transverse joint.

If traffic will not pass over the end of the paving, a butt joint will be permitted, provided proper compaction is achieved. If traffic will pass over the joint, construct a sloped wedge ahead of the end of the full depth pavement to provide for proper compaction and protection of the full depth pavement. Construct the joint square to

LINK TO THE OPERATION GREEN LIGHT ON THE CITY WEB SITE.

http://gisweb2.durhamnc.gov/durhammaps/operationgreenlight/viewer/index.html

Note: Street name can be typed in to check the latest pavement condition information (PCI). Go to find a street and then click on the block in question and the rating will appear on the screen under condition from survey in the information box.