

## SECTION 02800 - RESTORATION WORK

### PART 1 - GENERAL

#### SUMMARY

Work Included. This Work shall include the replacement of all permanent type roadway bases and surfaces, concrete sidewalks, curbs and gutters, trees, lawns, and driveways, damaged or removed due to the construction of the pipe and appurtenant structures. All such Work shall be in accordance with the best modern practice, OWNER's standards and/or as specified herein.

Related Work Specified Elsewhere.

Section	02210	Excavation and Backfill (Sewers and Water Main)
Section	03315	Concrete Work

Reference Standards.

MDOT 4.00	Construction Mix Designs
MDOT 4.00.04	Trench Surface Conditioning
MDOT 4.06	Bituminous Seal Coats
MDOT 4.06.06	Bituminous Seal Coats
MDOT 4.06.09	Application of Cover Material
MDOT 4.06.10	Weather Limitations
MDOT 4.06.12	Maintenance of Surface
MDOT 6AA	Coarse Aggregate
MDOT 7.10	Plant Hot Mix Method

#### SUBMITTALS

Guarantees. Furnish guarantees covering the items included under this Section of the Contract.

Material Certificates. Provide copies of materials certificates signed by materials producer and CONTRACTOR, certifying that each materials item complies with, or exceeds, specified requirements.

#### QUALITY ASSURANCE

Certification. CONTRACTOR shall submit certificates of compliance with applicable MDOT Standard Specifications.

#### SITE CONDITIONS

Weather Conditions. Construct asphalt concrete surface course when atmospheric temperature is above 40 degrees F (4 degrees C), and when base is dry. Bituminous base course over 2 inches thick may be placed when air temperature is above 35 degrees F (-1 degrees C) and rising. Asphalt may not be placed between November 15 and May 5 unless Owner approval is received.

### TREE/SHRUB REPLACEMENT

Trees noted on the Drawing or designated by ENGINEER to be removed shall be replaced with trees of the sizes and types listed in the Tree Schedule. OWNER shall decide which of the six types of trees will be replaced in each location. All ornamental shrubs in private lawn areas that are damaged must be removed and replaced in kind, with the largest available specimen.

## PART 2 - PRODUCTS

### AGGREGATE BASE

Aggregate base shall be constructed with not less than 12 inches of compacted aggregate placed in two 6-inch layers. Aggregate base shall meet requirements of MDOT specification for 21AA, 22A, or 23A, as directed by the Authority Engineer.. Aggregate base shall extend beyond pavements to match existing aggregate or a minimum of 24 inches.

### AGGREGATE SURFACE

Aggregate surface shall be constructed with not less than 12 inches of aggregate placed in two 6-inch layers. Aggregate surface shall meet MDOT Specifications No. 21AA, 22A, or 23A, as directed by the Authority Engineer.

### BITUMINOUS BASE

Bituminous base shall have a completed thickness of 8 inches, placed and compacted in two 4-inch layers. Bituminous base shall meet the requirements of Bituminous Mixture No. 11A of the MDOT Specification 7.10. Asphalt cement shall have an asphalt penetration (viscosity) rate of 120-150. A bituminous bond coat meeting MDOT Specification SS-1h or MS-2a shall be applied to each succeeding layer of bituminous material at the rate of 0 - 0.10 gallons per square yard.

### BITUMINOUS PAVEMENT

Bituminous pavement shall be one of the following types:

Type A. 1-1/2-inch No. 36A leveling course over aggregate base with 1-1/2-inch No. 13A wearing course in trench areas.

Type B. 1-1/2-inch No. 36A leveling course over aggregate base in trench areas with 1-1/2-inch No. 13A wearing course over entire width of pavement.

Type C. 1-1/2-inch No. 36A wearing course on 8-inch concrete base in trench areas.

Type D. 1-1/2-inch No. 26A wearing course in trench areas over bituminous base course No. 11A.

Bituminous mixtures shall be furnished and placed in accordance with MDOT Specification 7.10 with no restriction for the "Aggregate Wear Index." All mix designs shall be provided at least seventy-two (72) hour prior to placement to allow time for review and approval.

Asphalt cement shall have an asphalt penetration (viscosity) rate of 120-150. Aggregate required shall be 20AA. When tested at the optimum asphalt content in accordance with ASTM D1559, the bituminous mixture shall meet the requirements for stability, 1100 pounds, flow, 8-18 hundredths of an inch, and voids in mineral aggregate, 15.0 percent, as specified in Table 7.10-1 of the MDOT Specifications. The maximum allowable

deviations permitted from the approved Job-Mix Formula shall be as shown in Table 7.10-3 of the MDOT Specifications.

At CONTRACTOR's expense, a qualified laboratory shall furnish ENGINEER a Job-Mix Formula in accordance with the above criteria. After the Job-Mix Formula is established, the aggregate gradation and the bitumen content of the bituminous mixture furnished for the Work shall be maintained within the uniformity tolerance limits permitted in Table 7.10-3 and within the master gradation range as specified in Table 7.10-2 of the MDOT Specifications.

#### CONCRETE ROADWAYS

Concrete pavement surfaces shall be replaced with concrete where shown on the Drawings. Thickness shall be equal to that removed but in no cases less than 6 inches.

Concrete for pavements and bases shall be Class A concrete as specified under Section 03315.

Replacement of reinforcing steel shall be similar to that in the existing pavement and shall provide the same cross sectional area of reinforcement per foot as the existing pavement.

#### GRAVEL DRIVEWAYS

Gravel or dirt driveways removed shall be replaced with gravel, and shall be constructed to match existing thickness but with not less than 6 inches of gravel, compacted to 95 percent compaction. Gravel shall meet MDOT Specifications No. 22A.

#### STONE DRIVEWAYS

Existing stone drive surfaces removed during construction shall be replaced with washed stone, pea stone, or limestone of type and thickness that matches the existing surface. Road gravel (22A) shall not be used to replace stone drives unless authorized by OWNER and ENGINEER.

#### BITUMINOUS DRIVEWAYS

All bituminous driveways removed shall be replaced with 3-inch 36A in two lifts on a 6-inch-thick compacted gravel base. If the existing driveway has a thicker bituminous cross section, the difference shall be made up using hot mix bituminous base as after specified under Bituminous Base.

#### CONCRETE DRIVEWAYS

All concrete driveways removed shall be replaced with Class A concrete, as specified under Section 03315, 6 inches thick. Joints shall be as specified in concrete work and/or concrete pavements.

#### CONCRETE CURB AND GUTTER

Concrete curb and gutter to be replaced shall have the same cross section as that removed, or as shown on the Drawings, using Class A concrete and in accordance with OWNER's standards.

#### CONCRETE SIDEWALKS

Concrete sidewalks shall be replaced with walks 4 inches thick (6 inches thick at driveway crossings) and to the same width as the existing walks. Concrete shall be Class A as specified under Section 03315, Concrete Work.

#### CONCRETE RAMPS

Ramps shall be constructed 6 inches thick and to the width and slope shown on the Drawings using Class A concrete as specified under Section 03315, Concrete Work. Type of ramp shall be as noted on the Drawings for different intersection conditions. All concrete ramps shall comply with ADA requirements including truncated domes.

## SEEDING

Seeding shall be one of the following types:

1. Sodded Shoulders, Slope Area, or Flat Field. 4 inches of topsoil, 20 pounds of 10-6-4 commercial fertilizer per thousand square feet of area, 5 pounds of MDOT mixture roadside per thousand square feet of area.
2. Flat Lawn Area. 4 inches of topsoil, fertilizer as specified above, 3 pounds of MDOT mixture Class A per thousand square feet of area.

Sod. Provide strongly rooted sod, not less than 2 years old, free of weeds and undesirable native grasses, and machine cut to pad thickness of 3/4-inch (plus or minus 1/4-inch), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant). Peat sod will not be acceptable.

Provide sod of uniform pad sizes with maximum 5 percent deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10 percent of pad will be rejected.

Provide sod composed principally of following:

Mixed Kentucky Bluegrass (*Poa pratensis*).

## TREE/SHRUB REPLACEMENT

Stakes and Wrap. Trees shall be staked and wrapped. Stakes for guying shall be wood, 2-inch by 2-inch by 30 inches long, minimum size.

Stakes for staking shall be sound, 4-inch-diameter, 9-foot-long cedar posts with bark skinned off for shade trees; 2-inch by 2-inch, 8 feet long for conifers under 5 feet in height.

Staking wire shall be No. 12 gauge galvanized steel.

Hose for covering wire shall be new or used, black or red, two-ply, fiber-reinforced garden hose, not less than 1/2-inch inside diameter. Seconds rejected by factory are acceptable.

Tree wrap shall be treated wrapping Kraft wrap or approved equal.

### Plant Materials

Quality and Size. Plant materials shall be sound, healthy, vigorous, and free from plant diseases and insect pests or their eggs, and shall have normal, healthy root systems. All measurements such as spread, ball size, number of canes, quality designation, etc., shall be in accordance with the latest edition of AAN USA Standard for nursery stock. Trees shall be callipered 6 inches above the ground.

Sources. Must be located in the same or higher hardiness zone as determined by the latest edition of the "Plant Hardiness Zone Map," Agricultural Research Service, U.S. Department of Agriculture.

Plant Material Quality Assurance. Plant Material Selection and Approval Operations. All trees required by this Contract shall be tagged by CONTRACTOR at the source for inspection and approval by ENGINEER in writing at least two weeks prior to each desired inspection date. Photographs of materials may be required for preliminary inspection of materials from remote sources.

Root Protection. Trees and shrubs shall be balled and burlapped. They shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root systems necessary for full recovery of the plant. Balls shall be securely wrapped with burlap and bound with cord. No balled and burlapped plant shall be planted if the ball is cracked or broken.

Protection During and After Delivery. All plant material is to be delivered to the site in closed vehicles or in open vehicles with the entire load properly covered in transit for protection from drying winds. They shall be planted immediately upon delivery. No plant shall be bound with rope or wire in a manner that would damage the bark or break the branches.

### PART 3 - EXECUTION

#### COORDINATION OF WORK

Type of restoration shall be as noted on the Contract Drawings regardless of existing surface.

The placing of base and surface courses shall follow immediately after backfilling the trench so that not more than 600 feet of length of trench shall be incomplete at one time. If areas of trench in excess of 600 feet are left incomplete, then CONTRACTOR shall provide such necessary temporary roadway surface as directed by ENGINEER. Any material placed in the trench other than that specified shall be considered as a temporary surface and shall be removed. No payment will be allowed for temporary roadway construction.

All utilities such as catch basins, manhole castings, water valve boxes, etc., shall be adjusted prior to the installation of the new pavement so that the finished surface will meet such utilities smoothly when surfacing is completed.

#### SAW CUT JOINTS

Damaged areas shall be removed by sawing a straight cut parallel with longitudinal and transverse construction or contraction joints. No saw cuts shall be nearer than 5 feet to a longitudinal or transverse joint or to the edge of the pavement. If the damaged area is less than 5 feet from an existing joint, the existing surface shall be saw cut 5 feet from the damaged area, removed and replaced. If the damaged area is less than 5 feet from the edge of the pavement, the removal and replacement shall be extended to said edge of pavement.

Saw cutting of concrete shall be done with a carborundum saw to a minimum depth of half the slab thickness or that depth required to cut reinforcing steel. Bituminous surfaces shall be cut full depth.

After the trench is backfilled and before the pavement over the trench is replaced, all angular and ragged irregularities on the edges of the cut pavement shall be removed, giving a smooth and regular edge of pavement. Payment for cut joints required shall be included under the unit price of pavement restoration.

#### EXCAVATION

Before repaving is started, all trenches and the area around structures shall be excavated or backfilled to the level of the subgrade as required by the type of pavement replacement and cross section specified. All existing pavement that has been undercut by the excavation for the pipe or structures shall be removed. The finished

subgrade shall be smoothed, trimmed and compacted to the required grade and cross section. Compaction of the finish subgrade shall be obtained by suitable means approved by ENGINEER.

#### AGGREGATE BASE

Place aggregate base on a prepared subbase or subgrade in accordance with construction methods described in Section 3.01 of MDOT Specifications.

#### AGGREGATE PAVEMENTS

Aggregate surfaces shall be replaced with aggregate. After placing aggregate, this surface shall immediately be opened to traffic, and as holes and ruts appear, they shall be filled with aggregate and the surface shall be maintained as a smooth, dust-free street surface until the Work is accepted by ENGINEER and OWNER.

#### BITUMINOUS BASE

Place bituminous base on a prepared subbase or subgrade in accordance with construction methods described in Division 4 of MDOT Specifications.

#### BITUMINOUS PAVEMENTS

General. Pavement surfaces shall be replaced with bituminous concrete of the type and in the locations where shown on the Drawings. This Work shall consist of saw cutting existing surfaces, as hereinbefore specified under Saw Cut Joints, conditioning and treating the base course with prime or bond material and constructing thereon a bituminous concrete surface consisting of mineral aggregate, mineral filler, and bituminous material combined by a plant hot mix method per MDOT Specification. Construction methods and equipment for placing bituminous materials shall be as specified in MDOT Standard Specifications.

Pavement surfaces shall be replaced to match existing widths but new pavements shall not be less than 22 feet wide.

Conditioning of Base. Bituminous base shall be treated with a bond coat applied at the rate of 0 - 0.10 gallon per square yard. Bond coat shall be SS-1h or MS-2a.

Leveling Course. Bituminous leveling course mixture shall be placed in one or more layers to the cross section shown on the Drawings. When the total application rate exceeds 220 pounds per square yard, the leveling course shall be applied in two courses. A bond coat shall be applied at the rate of 0 - 0.10 gallon per square yard between courses.

Wearing Course. Following completion of the leveling course or courses, the surface shall be treated with a bond coat of 0 - 0.10 gallon per square yard. The wearing course mixture shall be placed according to the cross section shown on the Drawings in one or more courses as required.

All joints in the bituminous pavements shall be vertical joints. Where the joints are allowed to set before the adjoining pavement is placed, such joints shall be treated with bond coat material.

Feathering to connect new pavement to an existing pavement will not be allowed.

#### CONCRETE CONSTRUCTION

Pavement. The surface of concrete pavements shall be properly consolidated and struck off to such elevations so as to match adjacent pavement and made uniform by transverse floating. As soon as all excess moisture has

disappeared, the pavement shall be given a final light brooming finish by dragging a seamless strip of damp burlap or cotton fabric. Edges of all joints shall be tooled.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

Curb and Gutter. Concrete curb and gutter shall be placed prior to the placement of other types of roadway surfaces including concrete pavements.

Curb and gutter to be replaced shall be determined by ENGINEER and shall include any cracked or broken sections and any sections which have settled 0.25-inch or more.

Forms shall be complete front and back type. Back forms resulting in hand forming the curb and gutter will not be allowed. Forms shall be of metal, straight and free of distortion and of sufficient strength to resist springing during the placing of concrete. Forms shall be securely staked, braced and tied to the required line and grade. Flexible steel or adequately sized lumber may be used for short radius forms.

One-inch expansion joints shall be placed opposite expansion joints in an abutting pavement. If curb or curb and gutter does not abut a concrete pavement, place expansion joints at all spring lines of street returns. If intersecting streets are more than 300 feet apart, place expansion joints at 200-foot intervals. For MDOT Standard Details A, B, C5, C6 and D curb and gutter, place expansion joints in abutting pavement.

If the structure does not abut a concrete pavement or base, contraction joints shall be placed at approximately 100-foot intervals.

Intermediate plane of weakness joints shall be placed at approximately 10-foot intervals between other joints as called for above.

Curb returns and curb cuts for driveways shall be installed as required.

The gutter and top of curb shall not vary more than 3/16-inch in 10 feet when checked with a 10-foot straightedge.

After the back forms are removed, honeycomb and minor defects shall be filled with mortar, composed of one part Portland cement and two parts sand.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

Sidewalks. Forms shall be of metal or wood, straight and free of distortion, and of sufficient strength to resist springing during the placing of concrete. Forms shall be securely staked, braced and tied to the required line and grade. Flexible steel or adequately sized lumber may be used for short radius forms.

The walk subgrade shall be compacted to 95 percent compaction by tamping. After wetting the subgrade, the concrete shall be placed to the proper depth and spaded along the form faces.

Concrete shall be alternately tamped and screened until all voids are removed and the surface has been brought to the required grade. The surface shall then be floated to produce a smooth, dense surface, free from

irregularities. All edges and joints shall be rounded to a radius of 1/4-inch with an edging tool and trowel. As soon as all excess moisture has disappeared, the surface shall be finished by light brooming.

Walks shall be divided into blocks approximately square, using slab division forms or by cutting joints after floating. These joints shall be 1/2-inch deep by 1/8 to 1/4-inch in width and shall be finished smooth and true to line. Bituminous expansion joints shall be provided at intervals of 50 feet and at junctions with structures and curbs. Control joints shall be located between expansion joints at intervals equal to the sidewalk width.

As soon as concrete surfaces have hardened sufficiently to prevent marring, they shall be covered by an approved curing compound, or they shall be thoroughly wetted and cured by an approved method for a period of six days unless otherwise directed by ENGINEER.

#### SEEDING

Wherever the pipe trench passes through an area to be seeded, the backfilling shall be carried up to the surface except the top 4 inches, which shall be selected topsoil preserved or secured elsewhere for this purpose. This topsoil shall be rich, black surface earth, free from sod, weed stalks or debris. The trench surface shall be carefully raked to an even surface, and all stones, sticks and other debris removed there from.

Seeded areas shall receive a proper mulch of chopped straw, jute matting or woven Kraft paper yarn. Seed shall not be sown between June 15 and August 15, nor between October 15 and April 15, nor at any time when the soil has insufficient moisture to insure proper germination, or CONTRACTOR shall provide sufficient application of water by sprinkling until a growing catch of grass is established.

#### SODDING

Lay sod within 24 hours from time of stripping. Do not plant dormant sod or if ground is frozen.

Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass.

When sod is laid on slopes, the first row of sod shall be laid at the bottom of the slope parallel to it, with subsequent rows laid from bottom to top. On slopes steeper than 3:1, the sod shall be secured with pegs spaced at two feet maximum, vertically and horizontally.

Water sod thoroughly with a fine spray immediately after planting.

Sodded areas shall be kept moist for the maintenance period. After the sod is installed, all areas greater than one foot which fail to show a uniform stand of grass shall be resodded.

#### RECONDITIONING EXISTING LAWNS

Recondition existing lawn areas damaged by CONTRACTOR's operations including storage of materials and equipment and movement of vehicles. Also recondition existing lawn areas where minor regrading is required.

Provide fertilizer, seed or sod, and soil amendments as specified for new lawns, and as required, to provide a satisfactorily reconditioned lawn.

Provide new topsoil, as required, to fill low spots and meet new finish grades.



Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.

Remove diseased and unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from CONTRACTOR's operations, including oil drippings, stone, gravel, and other loose building materials.

Where substantial lawn remains, but is thin, mow, rake, aerate if compacted, fill low spots, remove humps, and cultivate soil, fertilize, and seed. Remove weeds before seeding, or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.

Water newly planted lawn areas and keep moist until new grass is established.

#### TREE/SHRUB REPLACEMENT

Preparation. Tree pits shall be excavated as shown on the Drawings. Subsoil dug from pits, trenches, and beds shall be disposed of by CONTRACTOR.

Topsoil shall be provided in sufficient quantities to be placed (a) in tree pits, six (6) inches in depth below the balled root and one (1) foot in width around the ball; and (b) in shrub pits, six (6) inches in depth below the balled or container root and six (6) inches in width around it.

All other planting beds shall receive a minimum of 6 inches of topsoil.

Planting. CONTRACTOR is responsible for planting to correct grades and alignment and all plants shall be set so that, when settled, they will bear the same relation to finish grade as they did before being transplanted. No filing will be permitted around trunks or stems.

When the plant has been properly set, the pit shall be backfilled with planting mixture, gradually filling, tamping, and settling with water. No soil in a frozen or muddy condition shall be used for backfilling. A ring of soil shall be formed around the edge of each plant to hold water.

CONTRACTOR shall make adjustments in the location of plants where necessary as directed by ENGINEER.

Mulching. All planting shall be mulched with a cover of shredded bark mulch.

Watering. All plants shall be thoroughly soaked after planting. After each watering, all beds shall be raked and left in a complete and finished manner.

Pruning and Repair. Upon completion of planting, all trees and shrubs shall have been pruned and injuries repaired. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots from transplanting. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant, as directed by ENGINEER. All cuts shall be made flush, leaving no stubs. Notify ENGINEER at least one (1) week prior to pruning operations.

Guying, Staking, and Wrapping Trees. Guying and staking shall be completed immediately after planting. Maintain guys and stakes until the end of the guarantee period. The trunks of all deciduous trees larger than 6 feet to 8 feet grade shall be wrapped with standard tree wrap from the first branch down to the ground and secured at every second wrap with twine.

Protection and Maintenance. CONTRACTOR shall assume responsibility for maintaining CONTRACTOR's Work to the end of the guarantee period. During this period, CONTRACTOR shall make a minimum of one maintenance trip every four weeks during the growing season, and as many more as necessary to keep the plantings in a thriving condition.

Maintenance of plants shall consist of pruning, cultivating, weeding, watering, keeping guying taut and trees erect, raising tree balls which settle below grade, and furnishing and applying such sprays as are necessary to keep the planting free of insects and diseases.

Acceptance. At the end of the period of guarantee, final acceptance will be made by ENGINEER and OWNER, provided all requirements of the Specifications have been fulfilled.

Guarantee. CONTRACTOR agrees to guarantee all plants for one year from the time of planting. This guarantee includes furnishing new plants as well as labor and materials for installation of replacements. Replacement plantings shall meet or exceed all requirements for original plant materials as specified herein.

CONTRACTOR shall not assume responsibility for damages or loss of plants or trees caused by fire, flood, lightning storms, freezing rains, winds over 60 miles per hour, or vandalism.

Inspection of the plantings will be made jointly by CONTRACTOR and ENGINEER at the completion of planting. All plants not in a healthy growing condition shall be removed and replaced with plants of like kind, size, and quality as originally specified before the close of the next planting season.

#### Tree Schedule

1. Sugar Maple (Acer, Saccharum) 2-inch diameter (S/PS) Fast growth
2. Red Maple (Acer, Rubrum) 2-inch diameter (S/PS) M-F growth
3. American Ash (Fraxiaus, Americana) 2-inch diameter (S/PS) M growth
4. Eastern White Pine (Pinus, Strobus) 8 feet high (S) Fast growth
5. Colorado Blue Spruce (Picea, Pungens) 7 feet high (S)
6. White Spruce (Picea, Glauca) 7 feet (S)

END OF SECTION 02800