PART 00600 - BASES

Section 00620 - Cold Plane Pavement Removal

Description

00620.00 Scope - This work consists of removing existing pavement and bridge deck surfaces to prepare a foundation for placing new surfacing.

Equipment

00620.20 Equipment - Provide self-propelled planing machines or grinders:

- Capable of loosening pavement material
- Capable of accurately establishing profile grades within a tolerance of 0.02 foot by reference from either the existing pavement or from independent grade control
- With a positive means for controlling cross-slope elevations
- With a totally enclosed cutting drum with replaceable cutting teeth
- With an effective means of removing loosened material from the surface and preventing dust from escaping into the air
- Capable of providing a true cross-slope grade that will allow placement of overlay pavement to a uniform thickness

Construction

00620.40 Pavement Removal:

(a) General - Remove the existing pavement to the depth, width, grade and cross section shown or as directed. The use of a heating device to soften the pavement is not allowed.

(b) Depth 1 inch to 2 inches - If the depth of the existing pavement to be removed is 2 inches or less, but more than 1 inch and the section will be under traffic, schedule the work so the full width and length of travel lanes pavement can be removed during the same shift. Remove the shoulder area within 24 hours.

(c) Depth over 2 inches - If the depth of the existing pavement to be removed is over 2 inches and the section will be under traffic, schedule the work so the full width and length of the travel lanes and shoulders can be removed, leaving no longitudinal or transverse drop-offs, during the same shift.

(d) Pavement Removal Alternative - If unable to complete the pavement removal according to 00620.40(b) and (c), then within the same day construct a wedge of asphalt concrete, at a slope of 1V:10H or flatter along each exposed longitudinal drop-off, and 1V:50H or flatter along each exposed transverse drop-off. Place wedges completely across the milled area at intersections, points of beginning and ending of the milling operation, and around manholes, valve boxes and other structures. Longitudinal drop-offs of 1 inch or less do not require a wedge. Maintain wedges as long as the area remains under traffic or until pavement is replaced. Remove and dispose of wedges before placing new pavement.

(e) Warning Signs - Provide warning signs as required where abrupt or sloped drop-offs occur at the edge of the existing or new surface according to Section 00225.

00620.41 Surface Tolerance - Test with a 12 foot straightedge furnished and operated by the Contractor, as directed. The variation of the top of the ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed 1/4 inch.

00620.42 Disposal of Materials - Dispose of all materials according to 00290.20.

00620.43 Maintenance Under Traffic - If the cold-planed pavement surface will be exposed to traffic, sweep and clean prior to allowing traffic to use the roadway.

Measurement

00620.80 Measurement - The quantities of cold plane pavement removal will be measured on the area basis in place.

When depth of pavement to be removed is variable, the depth as shown is an estimate and is approximate only. No guarantee is made that the actual depth will be the same as the estimated depth.

Payment

00620.90 Payment - The accepted quantities of work will be made at the Contract unit price per square yard for the item "Cold Plane Pavement Removal, _____ Deep".

The depth will be inserted in the blank. If the depth is variable, the range will be inserted in the blank.

Payment will be payment in full for furnishing all equipment, labor and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for temporary wedges constructed, maintained, and removed under 00620.40(d) or for replacement of cutting teeth.

Section 00640 - Aggregate Base and Shoulders

Description

00640.00 Scope - This work consists of furnishing and placing one or more courses of aggregate base or shoulders on a prepared surface to the lines, grades, thicknesses and cross sections shown or established.

Materials

00640.10 Materials:

(a) Base and Shoulders Aggregate - Aggregate for bases and shoulder shall be either 1" - 0 or 3/4" - 0 as the Contractor elects or sized as specified. Base aggregate shall be dense-graded unless otherwise specified. Shoulder aggregates shall be either 1" - 0 or 3/4" - 0 size as the Contractor elects.

Furnish base and shoulder aggregates meeting the following requirements:

Dense-Graded Base Aggregate	02630.10
Open-graded aggregate	02630.11
Shoulder Aggregate	02640

(b) Subbase Aggregate - Aggregate subbase will be accepted based on the Engineer's visual inspection. Samples will be obtained and tested for compliance by the Engineer if it is suspect that the material does not meet Specifications.

Maximum size aggregate shall not exceed 75% of the compacted thickness of the layer in which it is incorporated. Aggregates passing the 1/4 inch sieve shall not be less than 10% nor more than 50% of the whole, by weight. No more than 10% of the aggregate shall pass the No. 100 sieve. Within these limits, the subbase aggregate gradation shall be adequate to produce a dense, firm base when placed and compacted.

All of the grading requirements are given as percentages by weight. The gradation will be determined by sieve analysis according to AASHTO T 27.

00640.12 Limits of Mixture - Provide a mixture of aggregate and water having a uniform moisture content sufficient to obtain the required compaction. Water may be introduced in a mixing plant, or on the grade. Determine the proportion of aggregate and water according to AASHTO T 99 and AASHTO T 224. Proportions will be in percentages by weight and will be known as the "Mix Design". The amount of water required in the mix design will normally be within a range of 5% to 10% of the mixture, based on dry weight of the aggregates. The mixture furnished shall conform to the mix design with a tolerance in optimum water content of plus or minus 2%. Any mixture having water content in excess of 2% over the Mix Design may be accepted for use if approved.

00640.16 Acceptance of Aggregates - Acceptance will be visual by the Engineer.

Equipment

00640.21 Hauling Equipment - Provide mixture hauling vehicles capable of hauling and depositing the mixture with a minimum of mix segregation.

00640.22 Spreading Equipment - Provide equipment capable of spreading the material and striking it off to designated line, grade, and transverse slope without segregation, dragging, or fracture of aggregate.

00640.24 Compacting Equipment - Provide self-propelled rollers and compactors capable of reversing without backlash. Rollers and compactors shall have a gross static weight of at least 8 tons, and shall be capable of compacting to specified density while the mix is still moist.

Construction

00640.40 Preparation of Foundation - Provide a firm surface on which aggregates are to be placed according to Sections 00320 or 00330 as applicable.

00640.41 Hauling and Placing - Transport the aggregate to the job site, add water to obtain proper moisture content, and place on the prepared surface or material by means acceptable to the Engineer.

Do not place shoulder aggregates on the top lift of newly constructed EAC or open-graded pavement.

00640.42 Thickness and Number of Layers:

(a) Base - If the required compacted depth of the base course exceeds 6 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

Place each layer in spreads as wide as practical and to the full width of the course before a succeeding layer is placed.

(b) Shoulders - Place shoulder aggregates in a single layer, or two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 9 inches.

00640.43 Shaping and Compacting - Compact each layer of material placed in shoulder and base areas as directed.

(a) Aggregates Base Courses:

(1) Dense-graded Aggregates - Begin compaction of each layer of dense-graded aggregates immediately after the material is spread and continue until a density of not less than 95% of the maximum density has been achieved when tested according to the MFTP.

(2) Dense-graded Aggregates (Small Quantities) - Begin compaction of each layer of dense-graded aggregates immediately after the material is spread. Roll until there is no appreciable reaction or yielding under the compactor.

(3) Open-graded Aggregates - Compact the surface of each layer of open-graded aggregates using rollers conforming to 00640.24. Roll until there is no appreciable reaction or yielding under the compactor.

Shape and maintain the surface of each layer during the compaction operations to meet the requirements of 00640.44. Produce a uniform texture and firmly key the aggregates.

Apply water over the materials for proper compaction according to Section 00340, and as directed.

(b) Aggregate Subbase and Shoulder Courses - Compact each layer of aggregate subbase and shoulder material until no reaction or yielding is observed under the compactor.

00640.44 Surface Tolerance - The finished surface and the surface of each underlying layer of the aggregate shall parallel the established grade and cross section for the finished surface within 1/2 inch.

The finished surface of the compacted aggregate base, when tested with a 12 foot straightedge, shall not vary from the testing edge by more than 1/2 inch at any point. Furnish and operate the straightedge as directed.

Maintenance

00640.60 Care of the Work - After construction of each layer and completion of base, maintain the layer to specified conditions and prevent or repair segregation, raveling, or rutting, until it is covered with a following layer or until all work is completed.

Measurement

00640.80 Measurement - The quantities of aggregate will be measured on the weight basis, on the volume basis or on the area basis according to the following:

(a) Weight Basis - When measurement is by weight, quantities will be measured in the hauling vehicle, after mixing.

(b) Volume Basis - When measurement is by volume, quantities will be measured in the hauling vehicle.

(c) Area Basis - When measurement is by area, the quantity will be the number of square yards of aggregate base constructed to the full thickness. The surface area will be determined by horizontal measurements. Each area constructed with varying thicknesses, as directed or shown, will be adjusted by converting it to an equivalent area at the pay item thickness on a proportionate volume basis.

(d) Adjustment of Water in Mixture - If the water in the aggregate mixture placed exceeds the percentage established in the mix design by more than 2%, the excess percentage of water will be deducted from the measurement of the mixture. Determination of excess water will be made by the same procedure used in setting the water content of the Mix Design.

Payment

00640.90 Payment - The accepted quantities of aggregates will be paid for at the Contract unit price per unit of measurement, for the following item(s):

	Pay Item	Unit of Measurement
(a)	Aggregate Base	Ton or Cubic Yard
(b)	Aggregate Shoulders	Ton or Cubic Yard
(c)	_____ Aggregate Base	Ton or Cubic Yard
(d)	Plant Mix Aggregate Base	Ton or Cubic Yard
(e)	Plant Mix _____ Aggregate Base	Ton or Cubic Yard
(f)	Aggregate Shoulders	Ton or Cubic Yard
(g)	Aggregate Base, _____Inches Thick	Square Yard

Items (b) and (d) will apply when the Contractor has the option of furnishing one or another of two or more designated sizes of aggregates.

In items (c) and (e), the designated size of aggregate to be used will be inserted in the blank.

In item (g), the depth of aggregate base will be inserted in the blank.

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for water used to obtain proper compaction and in the care of the work.

00640.91 Material on Hand - Payment for stockpiled materials on hand may be allowed according to 00195.50(i)(5).

Section 00646 – Recycled Concrete and Asphalt Products

Description

00646.00 Scope - This work consists of furnishing and placing one or more courses of recycled concrete and asphalt products (RCAP), mixed with water, on a prepared surface to the lines, grades, thicknesses and cross sections shown or established.

Materials

00646.10 General - Base RCAP shall be 1 1/2” - 0 or 1” - 0 and shoulder RCAP shall be either 1" - 0 or 3/4" - 0 as the Contractor elects. Use 50% each of recycled concrete and asphalt materials in the mixture. RCAP shall conform to grading requirements of Section 02630 for bases and Section 2640 for shoulders.

00646.12 Limits of Mixture - Provide a mixture of RCAP and water having uniform moisture content sufficient to obtain the required compaction. Water may be introduced in the mixing plant, or on the grade.

00646.15 Quality Control - Provide quality control according to Section 00165.

00646.16 Acceptance of Aggregates - Acceptance will be visual by the Engineer.

Equipment

00646.21 Hauling Equipment - Provide RCAP hauling vehicles capable of hauling and depositing the RCAP material with a minimum of material segregation.

00646.22 Watering and Spreading of Material - Provide equipment to add water to the RCAP and spread to the lines and grades shown or directed.

00646.23 Compacting Equipment - Provide self-propelled rollers and compactors capable of reversing without backlash and meeting the following requirements.

- A gross static weight of at least 10 tons
- Adequate to compact to specified density while the RCAP is still moist

Labor

00646.30 Quality Control Personnel - Provide a certified technician in the following field:

- CAgT

Construction

00646.40 Preparation of Foundation - Provide a firm surface or material on which RCAP is to be placed according to 00320 and 00330 as applicable.

00646.41 Mixing, Hauling and Placing - Add water to RCAP while mixing to provide moisture content according to 00646.12.

Thoroughly mix the combined RCAP and water for as long as necessary to produce a homogenous mixture. Mix, haul, and place the material by one of the following methods:

(a) Stationary Mixing Plant - Combine materials in a pug mill or rotary mixer.

Deliver and deposit the moisture without delay. Deliver the mixture to the spreading equipment by direct deposit into its receiving device, or by placing in uniform windrow(s) in front of equipment.

(b) Road Mix - Place materials for each layer, add water, and mix with a motor grader until a homogenous mixture is achieved.

Do not place RCAP shoulder material on the top lift of newly constructed open-graded pavement.

00646.43 Thickness and Number of Layers:

(a) Base - If the required compacted depth of the base course exceeds 6 inches, construct it in two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

Place each layer in spreads as wide as practical and to the full width of the course before a succeeding layer is placed.

(b) Shoulders - Place shoulder aggregates in a single layer, or two or more layers of nearly equal thickness. The maximum compacted thickness of any one layer shall not exceed 9 inches.

00646.44 Shaping and Compacting - Begin compaction of each layer immediately after the material is spread. Determine optimum roller pattern according to ODOT TM 306 C “Control Strip Method of Compaction”. Maintain optimum roller pattern throughout.

Shape and maintain the surface of each layer during the compaction operations to meet the requirements of 00646.45.

Apply additional water over the materials for proper compaction.

00646.45 Surface Tolerance - The finished surface of the RCAP and the surface of each underlying layer shall parallel the established grade and cross section for the finished surface within 5/8 inches.

The finished surface of the compacted RCAP base, when tested with a 12 foot straightedge, shall not vary from the testing edge by more than 5/8 inch at any point. Furnish and operate the straightedge as directed.

Maintenance

00646.60 Care of the Work - After construction of each layer and completion of base, maintain the layer to specified conditions and prevent or repair segregation, raveling, or rutting, until it is covered with a following layer or until all work is completed.

Measurement

00646.80 Measurement - The accepted quantities of RCAP will be measured by the ton according to Section 00190. No separate measurement will be made for water used to obtain proper compaction according to 00646.44 or in the care of the work according to 00646.60.

Payment

00646.90 Payment - The accepted quantities of RCAP will be paid for at the Contract price per unit of measurement for the following items:

Pay Item	Unit of Measurement
(a) Recycled Concrete and Asphalt Products Base	Ton
(b) Recycled Concrete and Asphalt Products Shoulders	Ton

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for water used to obtain proper compaction according to 00646.44 or in the care of the work according to 00646.60.

Section 00680 - Stockpiled Aggregates

Description

00680.00 Scope - This work consists of furnishing crushed rock or other aggregates in stockpiles at the places and in the manner specified.

Materials

00680.10 Sources of Material - Obtain the material to be furnished in stockpiles from sources according to 00160.60.

00680.11 Aggregates - Furnish aggregates meeting the following requirements:

(a) Aggregate Base and Shoulder Aggregate - Furnish aggregates in stockpiles of the sizes specified and conforming to the requirements of 00640.10.

(b) Emulsified AC Aggregate - Furnish aggregates in stockpiles of the following sizes or as specified:

1" - 1/2"
3/4" - 1/2"
1/2" - 1/4"
3/8" - 1/4"
3/8" - No. 4
3/8" - No. 8

Aggregates in stockpiles shall conform to the following requirements:

(1) Quality - Provide aggregates meeting the requirements of 00715.10(a), (c), (d), (e) and (f).

(2) Grading - Perform sieve analysis according to AASHTO T 27 and AASHTO T 11. Provide grading for the designated size aggregate according to the following:

Sieve Size	1" - 1/2"	3/4" - 1/2"	1/2" - 1/4"	3/8" - 1/4"	3/8" - No. 4	3/8" - No. 8
	Percent Passing (by weight)					
1"	100	100				
3/4"	95 -100	90 - 100	100			
1/2"	60 - 90	0 - 10	85 - 100	100	100	
3/8"	---	---	---	85 - 100	80 - 100	100
1/4"	15 - 30	0 - 2	0 - 15	0 - 15	10 -40	---
No. 4	---	---	---	---	---	45 -65
No. 8	0 - 7	---	0 - 4	---	0 - 6	0 -10
No. 30	---	---	---	0 -2	0 -2	---
No. 200	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
No. 200*	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1

* In gravels

00680.15 Aggregate Production Quality Control - Provide quality control during production of aggregate according to Section 00165. Sampling and testing shall be performed by a CAgT at the minimum frequency schedule indicated in the MFTP for Section 00640, or according to Section 00715, as applicable. Aggregates will be evaluated for compliance according to the following:

(a) Gradation - Analyze gradation statistically according to Section 00165. A stockpile contains specification aggregate when the Pay Factor (PF) for each sieve size calculated according to 00165.40 is equal to or greater than 1.00. Each required sample represents a sublot.

When the results from Table 00165-2 yield a Pay Factor of less than 1.00 for any sieve size, the material is non-specification. The Engineer will reject any stockpile of aggregate containing non-specification material unless the non-specification material is removed from the stockpile. Do not add additional material to such a stockpile until enough non-specification material is removed so that the PF for each sieve size is equal to or greater than 1.00.

(b) Other Tests - Stop production, make appropriate operational adjustments, and remove all failing material from the stockpile whenever a quality control test result, other than sieve analysis, does not meet Specifications. Document operational adjustments made and notify the Engineer prior to resuming production.

00680.16 Acceptance of Aggregate - The Contractor's quality control tests will be used for acceptance of aggregates if verified by the City's quality assurance program.

Equipment

00680.20 Rock Crusher - Comply with the following:

(a) Permits - Before crushing rock for the Project, provide the City with copies of permits according to 00160.70.

(b) Crusher - Furnish rock crusher(s) capable of producing rock meeting these Specifications. Use an impact crusher of sufficient size and capable of producing aggregate in cubical form, free from sharp points or slivers.

00680.21 Conveyor - Provide conveyor(s) capable of reaching a minimum distance of 70 feet, to stockpile sanding materials in sand sheds without segregation during stockpiling.

00680.22 Hauling Equipment - Provide vehicles for hauling aggregates capable of discharging the materials without segregation.

Labor

00680.30 Quality Control Personnel - Provide a Certified technician in the following field:

- CAgT

Construction

00680.40 Preparation of Sites:

(a) Source Sites - Prepare and develop the source site according to the terms of the source permit and source development plan in the Special Provisions.

(b) Stockpile Sites - Clear, level and prepare stockpile sites as directed.

00680.41 Piling of Materials - Place each separate designated size of material to be stockpiled at a given site in a separate stockpile. Locate each stockpile to occupy as small an area as practical, and separate each pile so that working room will be adequate for removing the materials later. Height of the piles shall not be greater than 8 feet, nor side slopes flatter than 1V:1.5H, unless directed. Except in sand sheds, stockpile sanding materials to a height of 15 feet, or as directed.

Place the material in stockpiles with a minimum of segregation. Unless otherwise allowed, place the material in stockpiles in horizontal layers not more than 4 feet in thickness.

00680.42 Places of Delivery - Places of delivery and the tentative plans of distribution of the materials will be shown or specified.

00680.43 City's Right to Materials - If the Engineer finds it necessary, the City may take materials from stockpiles before the stockpiles have been completed and measured, or may take a part of the materials intended for placement in stockpiles, in trucks or other vehicles at the plant.

Finishing and Cleaning Up

00680.70 Cleaning Up Source Sites - Clean up the source sites according to the terms of the source permit and source development plan in the special provisions.

Measurement

00680.80 Measurement - The quantity of each designated size of material will be measured according to the following:

- **Weight Basis** - When measurement is by weight, the quantities of each designated size of material will be measured on the weight basis, in the hauling vehicle.
- **Volume Basis** - When measurement is by volume, the quantities of each designated size of material will be measured on the volume basis, by cross-section measurement of the completed stockpiles, with no allowance for settlement or shrinkage.

00680.81 Materials Taken from Stockpiles Prior to Completion - Materials taken by the City according to 00680.43 will be measured in the City's hauling vehicles. If measurement is on the volume basis, the vehicle measurement will be converted to equivalent stockpile measurement at the ratio of 1.00 cubic yard, vehicle measurement to 0.95 cubic yard, stockpile measurement. If measurement is on the weight basis, the weight will be determined in the same manner and by the same means as used in determining the weight of materials stockpiled and paid for under the Contract.

Payment

00680.90 Payment - The accepted quantities of each size of specified material will be paid for at the Contract unit price, per ton or cubic yard for the item "_____ Material In Stockpile".

The respective sizes of stockpiled aggregates will be inserted in the blank.

Payment will be payment in full for furnishing and placing materials in stockpiles and sand sheds, and for furnishing all equipment, labor and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for source development and clean-up, preparation of stockpile sites, hauling of stockpile materials, or placing materials in sand sheds.