STANDARD CONSTRUCTION SPECIFICATIONS

3 - STREETS

Section Page

301 - Subgrade . . . . . Page 3-1

301.01.00 Description . . . . . Page 3-1
301.01.01 Untreated Subgrade . . . . . Page 3-1
301.01.02 Treated Subgrade . . . . . Page 3-1

301.02.00 Materials . . . . . Page 3-1
301.02.01 Soil Stabilizing Materials . . . . . Page 3-1
301.02.02 Water . . . . . Page 3-2

301.03.00 Construction . . . . . Page 3-2
301.03.01 Preparation . . . . . Page 3-2
301.03.02 Untreated Subgrade . . . . . Page 3-3
301.03.03 Treated Subgrade . . . . . Page 3-3
301.03.03A - General . . . . . Page 3-3
301.03.03B - Addition of Stabilizing Material . . . . . Page 3-4
301.03.03C - Mixing . . . . . Page 3-4
301.03.03D - Compaction . . . . . Page 3-4
301.03.04 Tolerances . . . . . Page 3-5
301.03.05 Curing Treated Subgrade . . . . . Page 3-5

301.04.00 Measurement and Payment . . . . . Page 3-6
301.04.01 Measurement . . . . . Page 3-6
301.04.01A - Incidental Work . . . . . Page 3-6
301.04.01B - Work Paid in Other Sections . . . . . Page 3-6
301.04.01C - Untreated Subgrade . . . . . Page 3-6
301.04.01D - Soil Stabilizing Materials . . . . . Page 3-7
301.04.01E - Treated Subgrade . . . . . Page 3-7
301.04.02 Payment . . . . . Page 3-7
301.04.02A - Soil Stabilizing Materials . . . . . Page 3-7
301.04.02B - Treated Subgrade . . . . . Page 3-7

302 - Watering . . . . . Page 3-7

302.01.00 Description . . . . . Page 3-7

302.02.00 Materials . . . . . Page 3-8
302.02.01 Water . . . . . Page 3-8
302.02.02 Binders and Additives . . . . . Page 3-8

302.03.00 Construction . . . . . Page 3-8

302.04.00 Measurement and Payment . . . . . Page 3-8
302.04.01 Measurement . . . . . Page 3-8
302.04.01A - Water by Volume . . . . . Page 3-8
302.04.01B - Water by Weight . . . . . Page 3-9
302.04.01C - Binders and Additives . . . . . Page 3-9
302.04.02 Payment . . . . . Page 3-9
302.04.02A - Water on Incidental Basis . . . . . Page 3-9
302.04.02B - Water by Volume . . . . . Page 3-9
302.04.02C - Water by Weight . . . . . Page 3-9
302.04.02D - Binders and Additives . . . . . Page 3-9

303 - Aggregate Bases . . . . . Page 3-10

303.01.00 Description . . . . . Page 3-10

303.02.00 Materials . . . . . Page 3-10
303.02.01 Aggregate . . . . . Page 3-10
303.02.02 Sand Equivalent . . . . . Page 3-10
303.02.03 Liquid Limit and Plasticity . . . . . Page 3-10
303.02.04 Grading Requirements . . . . . Page 3-10
303.02.05 Acceptance . . . . . Page 3-11

303.03.00 Construction . . . . . Page 3-11
303.03.01 Preparation of Subgrade . . . . . Page 3-12
303.03.02 Mixing . . . . . Page 3-12
303.03.03 Placing . . . . . Page 3-12
303.03.03A - Weather Limitations . . . . . Page 3-12
303.03.03B - Equipment . . . . . Page 3-12
303.03.03C - Thickness of Lifts . . . . . Page 3-13
303.03.04 Reserved . . . . . Page 3-13
303.03.05 Surface Finish . . . . . Page 3-13

303.04.00 Measurement and Payment . . . . . Page 3-13
303.04.01 Measurement . . . . . Page 3-13
303.04.01A - Square Yard (m^2) Basis . . . . . Page 3-13
303.04.01B - Cubic Yard (m^3) in Place Basis . . . . . Page 3-14
303.04.01C - Ton (metric ton) Basis . . . . . Page 3-14

303.04.02 Payment . . . . . Page 3-14

304 - Asphalt Treated Bases . . . . . Page 3-14

304.01.00 Description . . . . . Page 3-14
304.01.01 Reserved . . . . . Page 3-14
304.01.02 Hot Mix . . . . . Page 3-14

304.02.00 Materials . . . . . Page 3-15
304.02.01 Aggregates . . . . . Page 3-15
304.02.02 Asphalt . . . . . Page 3-15
304.02.03 Mix Formulas and Tolerances . . . . . Page 3-16

304.03.00 Construction . . . . . Page 3-16
304.03.01 Preparation of Subgrade . . . . . Page 3-16
304.03.02 Mixing . . . . . Page 3-16
304.03.03 Weather . . . . . Page 3-16
304.03.04 Placing . . . . . Page 3-16
304.03.05 Compaction . . . . . Page 3-17
304.03.06 Density . . . . . Page 3-17
304.03.07 Transverse Joints . . . . . Page 3-17
304.03.08 Surface Finish . . . . . Page 3-17

304.04.00 Measurement and Payment . . . . . Page 3-18
304.04.01 Measurement . . . . . Page 3-18
304.04.01A - Asphalt Treated Base Mixture and Bituminous Cement . . . . . Page 3-18
304.04.01B - Square Yard (m^2) Basis . . . . . Page 3-18
304.04.02 Payment . . . . . Page 3-18

305 - Surface Treatments . . . . . Page 3-19

305.01.00 Description . . . . . Page 3-19
305.01.01 Seal Coat . . . . . Page 3-19
305.01.02 Penetration Macadam . . . . . Page 3-19

305.02.00 Materials . . . . . Page 3-19
305.02.01 Asphalt . . . . . Page 3-19
305.02.02 Aggregates . . . . . Page 3-19

305.03.00 Construction . . . . . Page 3-20
305.03.01 Seal Coat . . . . . Page 3-20
305.03.02 Penetration Macadam . . . . . Page 3-21

305.03.03 Preparation of Base . . . . . Page 3-21
305.03.04 Placing . . . . . Page 3-21
305.03.04A - Weather and Seasonal Limitations . . . . . Page 3-21
305.03.04B - Equipment . . . . . Page 3-22
305.03.04C - Sequence of Operations . . . . . Page 3-22
305.03.04D - Application of Bituminous Material . . . . . Page 3-22
305.03.04E - Hauling and Spreading Aggregates . . . . . Page 3-24
305.03.05 Compaction . . . . . Page 3-24
305.03.06 Curing and Maintenance . . . . . Page 3-24
305.03.07 Removal of Excess Material . . . . . Page 3-25
305.03.08 Surface Tolerance, Penetration Macadam . . . . . Page 3-25

305.04.00 Measurement and Payment . . . . . Page 3-25
305.04.01 Measurement . . . . . Page 3-25
305.04.01A - Aggregate by the Cubic Yard (m^3) . . . . . Page 3-25
305.04.01B - Bituminous Cement . . . . . Page 3-25
305.04.01C - Surface Treatment by the Square Yard (m^2) Page 3-25
305.04.02 Payment . . . . . Page 3-26

306 - Asphalt Concrete Pavement . . . . . Page 3-26

306.01.00 Description . . . . . Page 3-26

306.02.00 Materials . . . . . Page 3-26
306.02.01 General . . . . . Page 3-26
306.02.02 Asphalt . . . . . Page 3-26
306.02.03 Aggregates . . . . . Page 3-27
306.02.04 Mineral Filler . . . . . Page 3-28
306.02.05 Additives . . . . . Page 3-28
306.02.06 Composition and Proportion of Mixtures . . . . . Page 3-28
306.02.07 Mix Formula and Tolerances . . . . . Page 3-29

306.03.00 Construction . . . . . Page 3-30
306.03.01 Preparation of Bases . . . . . Page 3-31
306.03.01A - Joining Existing Pavements . . . . . Page 3-31
306.03.01B - Surface Preparation for Second Lift Paving . Page 3-32
306.03.02 Reconditioning Old Roadbed . . . . . Page 3-32
306.03.03 Prime Coat . . . . . Page 3-32
306.03.04 Tack Coat . . . . . Page 3-32
306.03.05 Mixing . . . . . Page 3-33
306.03.06 Placing . . . . . Page 3-33
306.03.06A - Thin Overlays . . . . . Page 3-35
306.03.07 Compaction . . . . . Page 3-37

306.03.08 Density Requirements . . . . . Page 3-37
306.03.09 Transverse Joints . . . . . Page 3-38
306.03.10 Surface Finish . . . . . Page 3-38

306.04.00 Measurement and Payment . . . . . Page 3-39
306.04.01 Measurement . . . . . Page 3-39
306.04.01A - Asphalt Concrete on a Single Unit Basis . . . Page 3-39
306.04.01B - Asphalt Concrete on Square Yard (m^2) Basis . . . . . Page 3-39
306.04.02 Payment . . . . . Page 3-40

307 - Portland Cement Concrete Pavement . . . . . Page 3-41

307.01.00 Description . . . . . Page 3-41

307.02.00 Materials . . . . . Page 3-41

307.03.00 Construction . . . . . Page 3-41
307.03.01 General . . . . . Page 3-41
307.03.02 Hauling . . . . . Page 3-42
307.03.03 Forms . . . . . Page 3-42
307.03.04 Handling and Placing . . . . . Page 3-42
307.03.05 Slip Form Paving . . . . . Page 3-42
307.03.06 Tamping and Screeding . . . . . Page 3-43
307.03.07 Roadway and Alley Finishing . . . . . Page 3-43
307.03.08 Joints . . . . . Page 3-44
307.03.09 Tolerances . . . . . Page 3-44
307.03.10 Curing . . . . . Page 3-44
307.03.10A - Curing of Concrete . . . . . Page 3-44
307.03.10B - Protection of Concrete . . . . . Page 3-45

307.04.00 Measurement and Payment . . . . . Page 3-45
307.04.01 Measurement . . . . . Page 3-45
307.04.01A - Portland Cement Concrete Pavement . . . . . Page 3-45
307.04.02 Payment . . . . . Page 3-46

308 - Curbs, Gutters, Driveways, Sidewalks, and Pathway . . . . . Page 3-46

308.01.00 Description . . . . . Page 3-46

308.02.00 Materials . . . . . Page 3-47
308.02.01 General . . . . . Page 3-47
308.02.02 Portland Cement Concrete . . . . . Page 3-47

308.02.03 Asphalt Concrete . . . . . Page 3-47
308.02.04 Aggregate . . . . . Page 3-47

308.03.00 Preparation of Base . . . . . Page 3-47
308.03.01 Base Preparation . . . . . Page 3-47
308.03.01A - Earthwork . . . . . Page 3-48
308.03.01B - Aggregate Foundation of Bedding . . . . . Page 3-48
308.03.01C - Base for Portland Cement Concrete . . . . . Page 3-49
308.03.01D - Base for Asphalt Concrete . . . . . Page 3-49
308.03.02 Forms . . . . . Page 3-49
308.03.02A - Forms . . . . . Page 3-49
308.03.02B - Equipment . . . . . Page 3-50
308.03.03 Placing Material . . . . . Page 3-50
308.03.03A - Portland Cement Concrete . . . . . Page 3-50
308.03.03B - Asphalt Concrete . . . . . Page 3-51
308.03.04 Finishing . . . . . Page 3-51
308.03.04A - General . . . . . Page 3-51
308.03.04B - Portland Cement Concrete . . . . . Page 3-51
308.03.05 Curing Portland Cement Concrete . . . . . Page 3-52
308.03.06 Joints in Portland Cement Concrete . . . . . Page 3-52
308.03.06A - Contraction Joints in Walks and Incidental Surfacing . . . . . Page 3-52
308.03.06B - Contraction Joints in Curbs . . . . . Page 3-53
308.03.06C - Expansion Joints . . . . . Page 3-53
308.03.06D - Requirements Near Existing Structures . . . . Page 3-53
308.03.07 Dowels, Tie Bars, Reinforcing . . . . . Page 3-53

308.04.00 Measurement and Payment . . . . . Page 3-54
308.04.01 Measurement . . . . . Page 3-54
308.04.01A - Curb . . . . . Page 3-54
308.04.01B - Combination Curb and Gutter . . . . . Page 3-54
308.04.01C - Sidewalk . . . . . Page 3-54
308.04.01D - Precast Concrete Curb . . . . . Page 3-54
308.04.01E - Concrete Valley Gutter . . . . . Page 3-54
308.04.01F - Traffic Islands . . . . . Page 3-54
308.04.01G - Driveways, Sidewalks, and Pathways . . . . Page 3-55
308.04.01H - Sawed Joints . . . . . Page 3-55
308.04.01I - Aggregate Base . . . . . Page 3-55
308.04.02 Payment . . . . . Page 3-55

STANDARD CONSTRUCTION SPECIFICATIONS

3 - STREETS

301 - Subgrade

301.01.00 Description

This Section covers work necessary for preparation of the subgrade, complete. See also **Section 203 - Clearing and Grubbing**, and **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

Subgrade is defined as the area of new or existing roads, streets, alleys, driveways, sidewalks, or other public places upon which additional materials are to be placed as a part of work covered in other Sections or by future work. Where applicable, subgrade may be considered to extend over the full width of the specified base course. Subgrade is classified as untreated or treated.

301.01.01 Untreated Subgrade

The uppermost material placed in embankments or unmoved from cuts in the normal grading of the roadbed and which is brought to true line and grade, shaped and compacted as necessary to provide a foundation for the pavement structure.

301.01.02 Treated Subgrade

Subgrade which is improved by the addition of stabilizers and prepared as in **Subsection 301.01.01 Untreated Subgrade.**

301.02.00 Materials

301.02.01 Soil Stabilizing Materials

Soil stabilizing materials shall conform to the following requirements:

Material	Type	Gradation
Granular Quicklime (CaO)	AASHTO T 27 and T 219 for grading and hydroxide content, with minimum 85 percent Calcium Hydroxide	100 percent passing 3/8 inch (9.525 mm) sieve maximum 25 percent passing 100 sieve.
Calcium Chloride	AASHTO M 144, sample and testing in accordance with AASHTO T 143	Not Applicable
Sodium Chloride	AASHTO M 143	Not Applicable
Portland Cement	AASHTO M 85	Conform to Portland Cement in **Section 205**

Storage of materials shall conform to **Subsection 106.06.00 Storage and Protection of Materials.**

301.02.02 Water

Conform to the requirements in **Subsection 205.02.11 Water**

301.03.00 Construction

Typical street sections are shown on Standard Plan ST-10. Structural details for residential streets are shown on Standard Plan ST-12, or on project plans.

For new construction, the order of work assumed for progress payment purposes is as listed below. For reconstruction, overlays and other types of projects the order of work shall be proposed by the Contractor in his work schedule and approved by the Engineer.

1) Rough grading precedes installation of water, sewer, drainage lines and appurtenances.

2) Fine grading for streets and curbs and sidewalk shall follow installation of the above facilities and precede curb construction.

301.03.01 Preparation

In advance of setting line and grade, clear and dispose of brush, weeds, vegetation, grass, and debris off the subgrade in preapproved location by the City. Drain all

depressions or ruts which contain water. Blade and drag subgrade to remove irregularities and secure a uniform surface.

Complete all underground work contemplated in the area of the subgrade including backfill before subgrade work is started. This requirement includes work on the contract, work to be performed by the City, or by others.

301.03.02 Untreated Subgrade

When excavating; shape the subgrade to line, grade, and cross section. When filling and/or grubbing; compact the fill material to the existing depth of grubbing or to a minimum of 8 inches (203.20 mm) and to not less than 95 percent of maximum density as specified in **Subsection 303.03.04 Compaction**. Compact the subgrade to the full width of the cut or of the subgrade level on embankment.

Subgrade areas which cannot be compacted to specified density, but which in the judgement of the Engineer otherwise meet the requirements herein, may at the option of the contractor, be removed and aerated or stabilized with an approved soil stabilizing material.

When in the opinion of the Engineer, unsuitable material or other conditions are discovered which render the subgrade, unable to be compacted to the specified density, then the Engineer may order the contractor to use treated subgrade as noted in **Subsection 301.03.03 Treated Subgrade**. All such work ordered by the Engineer will be paid for as in **Subsection 109.05.00 Payment for Extra Work**, unless the unsuitable area was caused by the negligence of the contractor in his/her operations. In such case all such costs shall be borne by the contractor, at no additional expense to the City.

301.03.03 Treated Subgrade

301.03.03A - General

At contractor's option, the subgrade material may be moistened and/or loosened by scarifying to the depth to be treated prior to application of the stabilizing material, as approved.

Dry and reduce cemented soil clods to moisture content and size specified. Shape and size the subgrade material blanket to the size that can pass through the mixing machine. Apply stabilizing materials only when temperature is above freezing, or when wind and other weather conditions are not detrimental to the work or to the public, as approved. Take all precautions necessary to prevent injury to persons, livestock, or property. Any material which is spilled or deposited at places other

than on areas designated to be treated must be immediately picked up, buried, or made harmless.

301.03.03B - Addition of Stabilizing Material

Apply stabilizer at a uniform rate as specified. Use equipment and methods that will ensure the uniformity of stabilizer distribution. Immediately discontinue use of any equipment or method which results in excessive loss or displacement of the stabilizer, as directed. Replace stabilizer lost, displaced by blowing, washing, or misplaced by other causes before it is mixed with or incorporated in the soil, at no expense to the City. The use of blade graders to distribute lime and cement will not be permitted. No equipment except that used for watering and for applying and mixing the stabilizer will be permitted to pass over spread stabilizer until after it is mixed into the soil. If necessary, add water during mixing operations to provide optimum moisture content.

Apply at a uniform rate, as specified, calcium chloride or sodium chloride or Portland Cement to the scarified subgrade in the same manner as for lime.

301.03.03C - Mixing

Spread soil stabilizing material on a treated subgrade with approved equipment which uniformly distributes the required amount of material for the full width of the prepared subgrade. Continue mixing or remixing operations until the mixture is uniform, free of streaks or pockets of soil stabilizing material, and all material other than stones that will pass a 2 inch (50.80 m) sieve and at least 60 percent of which will pass a No. 4 sieve.

The stabilizing material content of samples taken periodically from the spread mixtures shall be within 1 percentage point of the content specified or approved.

301.03.03D - Compaction

Immediately after mixing of a treated subgrade, spread the mixture to specified line, grade, and cross section and compact entire depth of the mixture to not less than 95 percent of maximum density as determined by ASTM D 698. Testing methods for density requirements shall be determined by AASHTO T 191, T 205, or T 238.

Subgrade Preparation

1) Immediately following fine grading operations, proof roll street and curb subgrade areas to achieve 95% of maximum density at optimum moisture

content for a 6 inch (152.40 mm) depth, in accordance with AASHTO T 180.

2) If necessary, scarify and sprinkle water on subgrade to achieve moisture content and compaction.

3) Finish subgrade smooth and uniform to required lines and grades.

Compact and finish the cement treated surface within five hours after cement is applied and compact and finish other treated surfaces within 12 hours after compaction begins. If not compacted and finished within this time period, loosen the mixture and add stabilizing material and water as directed, remix, relay, and compact, all at no additional expense to the City. During compaction, maintain surface of the mixture at proper grade and cross section and lightly water to retain optimum moisture content.

Accomplish final finishing by rolling accompanied by light watering and reshaping to provide a surface free of hairline cracking.

301.03.04 Tolerances

Rework areas found to be deficient in thickness by more than 0.04 foot (0.012 192 m) or excessive in thickness by more than 0.08 foot (0.024 384 m), except that fresh stabilizing material shall be added in an amount equal to one-half of the original amount; as specified. Accomplish all reworking at no expense to the City.

The finished surface of treated and untreated subgrade shall not vary more than 0.04 foot (0.012 192 m) from established grade and cross section at any point. The finished surface, when tested with a 10 foot (3.0480 m) straightedge, shall not vary from the testing edge by more than 0.08 foot (0.024 384 m) at any point.

The Contractor will provide sufficient survey instruments, blue tops, etc. as necessary to transfer lines and grades from staking provided to construct subgrades accurately within above tolerances.

301.03.05 Curing Treated Subgrade

Limit traffic over treated subgrade to wheel loads which do not cause any damage to the subgrade and which do not visibly deflect, ravel, or wear the surface. Keep the finished surface moist and protected from rutting, spalling, and displacement, for a period of seven days or until a subsequent course of planned construction which will prevent drying of the mixture by evaporation or absorption is placed thereon.

301.04.00 Measurement and Payment

301.04.01 Measurement

301.04.01A - Incidental Work

No measurement will be made for work involved in clearing the subgrade of vegetation and other debris, draining water from the subgrade, smoothing the subgrade in preparation for staking, or blading, shaping, and compacting the subgrade including roadbed materials to a depth of 8 inches (203.20 mm) below the subgrade, to final line, grade, and cross section. All work involved in these processes will be considered incidental to and included in the various other items of work in the proposal.

301.04.01B - Work Paid in Other Sections

Excess materials which cannot be disposed of by drifting into low spots during blading and shaping operations will be measured and paid for as provided in **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

Additional materials required for completing the subgrade will be measured and paid for at the unit price for the type of material furnished as provided in **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

Excavation of soft, spongy, or yielding spots, when directed, will be measured and paid for as provided in **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

Suitable backfill material, when furnished and placed as directed will be measured and paid at the unit price of the type of material involved as provided in **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

Water used in the work will be measured and paid for as provided in **Section 302 - Watering.**

301.04.01C - Untreated Subgrade

No measurement and payment will be made for preparation of untreated subgrade unless otherwise provided.

301.04.01D - Soil Stabilizing Materials

Quantities for soil stabilizing materials will be measured by the ton (metric ton), dry weight, to the nearest 0.01 ton (0.009 072 metric ton), for the materials incorporated in the work at the rate and in the quantity specified or directed. Measurement and payment for stabilizing materials will not include any which are lost, displaced, used in reworking, used in restoration work, or used contrary to direction. Packaged materials will be accepted at the net weight shown by the manufacturer, subject to periodic verification and approval. Provide a certificate with each shipment together with a certified copy of the weight of each delivery.

301.04.01E - Treated Subgrade

Quantities for treated subgrade will be measured by the square yard (m^2), to the nearest square yard (m^2), of the finished surface of the treatment within the neat lines shown or established.

301.04.02 Payment

301.04.02A - Soil Stabilizing Materials

Payment for soil stabilizing materials will be made on a ton (metric ton) basis for the type or types specified and used in the work.

301.04.02B - Treated Subgrade

Payment for treated subgrade will be made on a square yard (m^2) basis for the type or types specified and used in the work.

302 - Watering

302.01.00 Description

This Section covers work necessary to furnish and apply water or combinations of water and compatible binders or additives for roadway excavations, embankments, subgrades, roadbeds, backfills, subbases, bases and surfacings, and water for the alleviation or prevention of dust within the project limits, as directed.

Excluded from this Section is watering used in connection with Portland Cement concrete construction, wetting foundations preparatory to placing concrete thereon, curing concrete, and watering which is specified as incidental.

302.02.00 Materials

302.02.01 Water

Water shall be free of silts and other deleterious matter. Make all necessary arrangements and pay all costs for obtaining water. Maintain an adequate supply of water at all times, as approved.

Water shall be obtained at the City Hall fill station, at 930 Chemawa Road N.E. Fire hydrants shall not be used as a source of water.

302.02.02 Binders and Additives

When shown, specified, or directed, use a mixture of water and an approved compatible binder or additive material.

302.03.00 Construction

Watering shall at all times be under the direction and subject to control of the Engineer.

Water by means of tank trucks equipped with spray bars, by hose and nozzle, or by other approved equal means which ensure uniform and controlled application. The use of splash boards will not be permitted without prior approval.

Perform watering at any hour of the day and on any day of the week necessary. Sprinkle directly on the road only when loss by evaporation is at a minimum unless otherwise directed.

When compatible binder material or additive is combined with water in the work, mix in conformance with the manufacturer's directions, as specified or as directed.

302.04.00 Measurement and Payment

302.04.01 Measurement

302.04.01A - Water by Volume

Quantities of water determined by volume will be measured in units of 1,000 gallons (3785 L) to the nearest 0.1 unit, exclusive of binders and additives mixed therewith. Measurement will be made in tanks or tank trucks of predetermined and approved capacities or by approved meters provided by the contractor.

Measurement and payment will be made only for quantities as are approved for use in the work.

302.04.01B - Water by Weight

Quantities of water determined by weight will be measured in tons (metric ton) to the nearest 0.1 ton (0.090 72 metric ton). Measurement will be the actual tons (metric ton) used based on weight tickets from State certified scales presented for approval on the day the water is delivered. No measurement or payment will be allowed on tickets not so delivered and approved.

302.04.01C - Binders and Additives

Quantities of compatible binders or additives combined with water for watering purposes will be determined separately from the water and will be measured as specified and shown on the proposal.

302.04.02 Payment

302.04.02A - Water on Incidental Basis

When neither specified nor shown in the proposal for separate payment, all water will be considered incidental to the other items of work and no separate payment will be made.

302.04.02B - Water by Volume

Payment for water will be made on a 1,000 gallon (3785 L) basis.

302.04.02C - Water by Weight

Payment for water will be made on a ton (metric ton) basis.

302.04.02D - Binders and Additives

Payment for compatible binders or additives combined with water for watering purposes will be paid for at the applicable contract unit price as set forth in the proposal. Payment shall constitute full compensation for the binder material or additive, for the combining of it with the water and for all extra costs involved in the use of the binder material or additive in the watering work.

303 - Aggregate Bases

303.01.00 Description

This Section covers work necessary to furnish and place one or more courses of aggregates and water, as subbase or base, on a prepared surface.

303.02.00 Materials

Aggregates for aggregate base shall be crushed gravel or crushed rock, including sand.

303.02.01 Aggregate

Coarse and fine aggregates shall conform to requirements of **Section 205 - Materials** and to additional requirements contained herein.

303.02.02 Sand Equivalent

Base aggregates to be incorporated in the work shall have a sand equivalent of not less than 30 when tested in conformance with AASHTO T 176.

303.02.03 Liquid Limit and Plasticity

Base aggregate shall meet the requirements for Liquid Limit and Plasticity Index of **Subsection 205.02.12C - Fine Aggregate.**

303.02.04 Grading Requirements

The base aggregates shall be uniformly graded from coarse to fine and shall conform to one or another of the following grading requirements:

Separated Sizes					
	2 1/2"-0 (63.50mm)	2"-0 (50.80mm)	1 1/2"-0 (38.10mm)	1"-0 (25.40mm)	3/4"-0 (19.05mm)
Sieve Size Passing	Percentages (by weight)				
3"(76.20mm)	100				
2 1/2"(63.50mm)	95-100	100			
2"(50.80mm)		95-100	100		
11/2"(38.10mm)			95-100	100	
1 1/4"(31.75)	55-75				
1"(25.40mm)		55-75		90-100	100
3/4"(19.05mm)			55-75		90-100
1/2"(12.70mm)				55-75	
3/8"(9.525mm)					55-75
*1/4"(6.35mm)	30-45	30-45	35-50	40-55	40-60

* Of the fraction passing the 1/4 inch (6.35 mm) sieve 40 percent to 60 percent shall pass the No. 10 sieve.

303.02.05 Acceptance

Materials will be subject to acceptance as follows:

Construction Method	Time of Acceptance
Stationary plant mixed	Immediately following mixing
Travel plant mixed	After mixing and before laying
Road mixed	After mixing and before compacting

Acceptance will be based on periodic samples taken following mixing.

303.03.00 Construction

1) Furnish and lay base and leveling rock to lines and grades shown.

2) Shape and grade each lift to conform to street cross section.

3) Sprinkle water as required for compaction and dust control.

4) Compact to specified density.

303.03.01 Preparation of Subgrade

Ensure that all surfaces and materials on which subbase or base is to be constructed are firm and have been prepared as specified in the applicable portions of **Section 301 - Subgrade.**

303.03.02 Mixing

Mix to provide a homogeneous mixture of unsegregated and uniformly dispersed materials which will compact to not less than 95 percent maximum density as specified in **Subsection 303.03.04 Compaction.** Add water during mixing in amount sufficient to provide optimum moisture content plus or minus two percentage points.

303.03.03 Placing

303.03.03A - Weather Limitations

When, in the judgment of the Engineer, the weather is such that satisfactory results cannot be secured, suspend operations. Place no surfacing materials in snow or on a soft, muddy, or frozen subgrade. The City will not be liable for damages or claims of any kind or description by reason of operations suspended by Engineer.

303.03.03B - Equipment

Furnish equipment that will provide for efficient and continuous operations insofar as practicable.

Aggregate bases shall be deposited on the roadbed at a uniform quantity per linear foot (meter) so that the contractor will not resort to spotting, picking up, or otherwise shifting of aggregate base material. Segregation of aggregates shall be avoided and the material as spread shall be free of pockets of coarse or fine material.

Spreading equipment - Spreading equipment shall have an adjustable screed or strike-off assembly and it may have a receiving, mixing, and distribution system. It may be a complete and integral unit, self-propelled and powered; a crawler-track or wheeled type tractor intimately combined with a receiving, mixing, spreading, and screeding unit attached thereto; or a heavy-duty self-propelled grader, of an

approved type, equipped with at least an 8 foot (2.4384 m) blade. Equipment shall be capable of spreading and striking off material to the designated line, grade, and transverse slope with surface texture of uniform appearance without excessive segregation or fracture of material.

Spreading equipment may be provided with an automatic control system if contractor so elects.

303.03.03C - Thickness of Lifts

Place in lifts not to exceed 6 inches (152.40 mm) in compacted thickness each. Place each layer in spreads as wide as practicable and to full width of the course before a succeeding layer is placed.

303.03.04 Reserved

303.03.05 Surface Finish

Surface of the subbase shall parallel the established cross section and grade for the finished surface within 0.05 foot (0.015 24 m). The finished surface of base, when tested with a 10 foot (3.0480 m) straight edge shall not vary from the testing edge by more than 0.04 foot (0.012 192 m) at any point.

303.04.00 Measurement and Payment

303.04.01 Measurement

303.04.01A - Square Yard (m^2) Basis

Measurement of aggregate base will be made on a square yard (m^2) basis. Measurement will be made of width and length of each separately constructed strip of aggregate base incorporated in the work and accepted, wherein width is the design width or edge-to-edge width of aggregate base, whichever is the lesser, and length is from end to end along the center of the strip. Measurement shall be on the surface of the aggregate base to the nearest 0.1 foot (0.030 48 m) and the square yardage (m^2) shall be to the nearest full square yard (m^2).

Extra thickness of aggregate base, when directed by the Engineer, will be measured by conversion of a proportionate volume basis to an equivalent number of square yards (m^2) of specified standard thickness base.

303.04.01B - Cubic Yard (m^3) in Place Basis

Measurement of aggregate base will be made on a cubic yard (m^3) in place basis by taking depth tests or cores, as directed, at the rate of one depth test for each 300 square yards (250.83 m^2) of base course, or by means of average end areas on the complete work computed from elevations to the nearest 0.01 foot (0.03048 m). On individual depth measurements, thicknesses more than 1/2 inch (12.70 mm) in excess of that shown shall be considered as specified thickness, plus 1/2 inch (12.70 mm) in computing the yardage (meters) for payment.

303.04.01C - Ton (metric ton) Basis

Measurement will be made on a ton (metric ton) basis for the number of tons (metric ton) of aggregate base, as weighed on approved and tested scales. Give trip tickets to the Engineer at the end of each day to verify the material is delivered. Each trip ticket shall show the date and time of delivery, truck number or driver's name, and net weight of material.

303.04.02 Payment

Payment will be made on Square Yard (m^2), Cubic Yard (m^3) or Ton (metric ton) basis as shown on the proposal.

Payment for aggregate base rock to include all incidental costs of water, compaction, subgrade finishing, and grading as required.

304 - Asphalt Treated Bases

304.01.00 Description

This Section covers work necessary for the construction of all types of bituminous bases upon prepared foundations and subgrades.

304.01.01 Reserved

304.01.02 Hot Mix

Hot mix asphalt treated base (ATB) is defined as a mixture of asphalt cement, well graded, high quality aggregate, mineral filler and additives as required, heated and plant mixed into a uniformly coated mass, hot laid on a prepared foundation, and compacted to specified density.

304.02.00 Materials

Aggregate and asphalt will be subject to acceptance prior to mixing. Mixtures will be subject to final acceptance after blending and mixing either at the plant for plant mixes or at the place of delivery for road mixes. Acceptance will be based on periodic sampling of the materials.

304.02.01 Aggregates

Aggregates shall conform to material requirements of **Section 205 - Materials,** with grading requirements conforming to **Section 303 - Aggregate Bases** or to the following gradations:

Separated Sizes				
	1 1/2"-0 (38.10mm)	1"-0 (25.40mm)	3/4"-0 (19.05mm)	1/2"-0 (12.70mm)
Sieve Size Passing	Percentages (by weight)			
1 ½"(38.10mm)	100			
1"(25.40mm)	70-90	100		
3/4"(19.05mm)	65-85		100	
½"(12.70mm)	50-80	45-75	60-80	100
3/8"(9.52mm)				90-100
1/4"(6.35mm)				51-71
No. 4	5-30	5-30	5-35	
No. 10	0-6	0-6	0-10	5-15
No. 40				
No. 200	0-2	0-2	0-2	2-6

Sixty-five percent of the material retained on the 1/4 inch (6.35 mm) screen shall have at least one fractured face.

304.02.02 Asphalt

Conform to requirements of **Section 205 - Materials.**

304.02.03 Mix Formulas and Tolerances

At least 30 days prior to producing any ATB, furnish representative samples of materials to be used in the mix for use in determination of the proportions of aggregate asphalt and any additives, if required. From this, the Engineer will establish a job mix formula comprising a single percentage of aggregate and asphalt and water or other additives if required. This job mix formula shall be held uniform within a tolerance of plus or minus 0.5 percentage point.

Should a change in source of material be made or other conditions arise the Engineer may establish a new job mix formula.

304.03.00 Construction

304.03.01 Preparation of Subgrade

Preparation of subgrade shall conform to the applicable requirements of **Section 301 - Subgrade.**

304.03.02 Mixing

Mix asphalt treated base in an approved stationary or travel plant or road mixing machine. The plant machine shall be equipped with controls to accurately measure and monitor various components of the mix and shall produce a uniform homogeneous mixture. Stationary continuous mixing plants shall be fitted with a hopper or other suitable holding device at the discharge end of the pug mill. The mix so produced shall not exhibit excessive loss or runoff of asphalt or water, shall remain workable during the laydown operation without tearing or dragging under the screed, and shall have a mass viscosity sufficiently low to permit compaction to the required density.

304.03.03 Weather

Weather conditions under which hot mix ATB may be constructed shall conform to the requirements for placing in **Section 306 - Asphalt Concrete Pavement.**

304.03.04 Placing

Placing shall conform to the applicable requirements of **Section 303 - Aggregate Bases.** Use motor graders only when permitted, and then only where conditions preclude the use of other approved types of spreading equipment.

304.03.05 Compaction

Conform to requirements for compaction in **Section 306 - Asphalt Concrete Pavement**, except as follows:

Use static or vibratory steel wheel rollers for breakdown rolling of open graded ATB. As soon as practicable after breakdown rolling, choke material at the rate of six (2.7216 kg) to nine pounds (4.0824 kg) per square yard (m^2) may be applied to the surface to prevent tire pick up if necessary.

304.03.06 Density

Density requirements for dense graded hot ATB shall conform to the applicable requirements of **Section 306 - Asphalt Concrete Pavement.** Achieve maximum density of open graded mixes by rolling until all roller marks disappear.

304.03.07 Transverse Joints

Placing of a course or strip of ATB shall be as nearly continuous as practicable. Construct transverse joints carefully with vertical faces and thoroughly compact to provide a smooth riding surface.

When the end of a course or strip of ATB is to be temporarily subjected to traffic, the end shall be left on a bevel of approximately 20:1 (horizontal to vertical), being later cut back to a vertical edge to provide a fresh surface when construction resumes.

304.03.08 Surface Finish

Final surface course of the asphalt treated base section, whether constructed in one or more lifts, shall not vary more than 0.05 foot (0.1524 m) from plan elevation at any point. Final surface shall not deviate at any point more than 0.03 foot (0.09144 m) from the bottom of a 10 foot (3.048 m) straightedge laid in any direction on the surface on either side of the roadway crown. Failure to meet the above requirement will necessitate sufficient surface correction to satisfy the requirement and shall be done at no expense to the City.

304.04.00 Measurement and Payment

304.04.01 Measurement

304.04.01A - Asphalt Treated Base Mixture and Bituminous Cement

When the pay items in the proposal so indicate, the quantity of ATB mixture and the quantity of bituminous cement contained in the mixture will each be separately measured for payment as follows:

1. The quantity of ATB used in the accepted work as specified will be measured on a ton (metric ton) basis. Tonnage (metric ton) shall be the weight used in the accepted work and no deduction will be made for weight of the bituminous material in the mixture. Measurement will be made on the number of tons (metric ton) of mixture, as weighed on approved and tested scales. Give trip tickets to Engineer each day to verify the material is delivered. Each trip ticket shall show date and time of delivery, truck number or driver's name, and net weight of material.

2. The quantity of each kind of bituminous cement used in the accepted work as specified will be measured on a ton (metric ton) basis. See **Subsection 109.01 Measurement of Quantities.**

304.04.01B - Square Yard (m^2) Basis

Measurement will be made on a square yard (m^2) basis. Measurement will be made of the width and length of each separately constructed strip of ATB wherein the width is design width or edge-to-edge width of ATB whichever is the lesser and length is from end to end along the center of the strip. Measurement will be on the surface of the ATB to the nearest 0.1 foot (0.030 48 m) and the square yardage (m^2) will be to the nearest full square yard (m^2).

Extra thickness of ATB, if directed by the Engineer, will be measured by conversion on a proportionate volume basis to an equivalent number of square yards (m^2) of specified standard thickness ATB.

304.04.02 Payment

Payment will be made for any or all of the following items when listed as pay items in the proposal for any particular contract.

	Payment Item	Unit of Measure
1.	Asphalt-treated Base (specify thickness)	Per S.Y. (m^2) or Ton (metric ton)
2.	Bituminous Cement in Asphalt Concrete	Per Ton (metric ton)

305 - Surface Treatments

305.01.00 Description

This Section covers work necessary to construct asphalt and mineral aggregate surfaces by treating an existing crushed rock, screened gravel, or bituminous roadway surface to obtain a surface thoroughly cemented to the roadway to the contour and section shown and ensuring good riding and nonskid qualities.

305.01.01 Seal Coat

Seal coat is defined as one or more applications of bituminous binder, either with or without a cover of aggregate.

305.01.02 Penetration Macadam

Penetration macadam is defined as asphalt penetration of graded aggregates with bituminous material applied in successive spreads by the penetration method to bind the aggregates together into a firm surfacing.

305.02.00 Materials

305.02.01 Asphalt

Asphalt materials incorporated in the mix shall conform to requirements of **Section 205 - Materials.**

305.02.02 Aggregates

Aggregates shall conform to requirements of **Section 205 - Materials** and to additional requirements contained herein.

Mineral aggregate shall have a record of approved performance, or be subject to the Stripping Test for Bituminous Aggregate Mixtures, AASHTO T 182, using a sample of asphalt to be used in the major portion of the work. When so tested the retention of asphalt shall be above 95 percent. Mineral aggregate failing to

conform to this requirement will not be approved for use in the work except if approved anti-stripping additives or other approved measures correct the deficiency.

The gradings of the several designated sizes that may be required in the work shall be as follows:

Designated Sizes						
	2 ½"-11/4" (63.50-31.75mm)	1 ½"-3/4" (38.10-19.05mm)	1 1/4"-3/4" (31.75-19.05mm)	3/4"-½" (19.05-12.70mm)	½"-1/4" (12.70-6.35mm)	1/4"-No.10 (6.35mm)
Sieve Size Passing	Percentages (by weight)					
3" (76.02mm)	100					
2 ½" (63.05mm)	95-100					
2" (50.80mm)		100				
1 1/2" (38.10mm)		95-100	100			
1 1/4" (31.75mm)	0-10		90-100			
1" (25.40mm)				100		
3/4" (19.05mm)	0-1	0-15	0-15	90-100	100	
1/2" (12.70mm)		0-2	0-2	0-15	85-100	100
1/4" (6.35mm)				0-3	0-15	85-100
No 10					0-4	0-15
No 40						0-5

305.03.00 Construction

305.03.01 Seal Coat

The rates of application for bituminous binders for the various types of seal coats shall be within the ranges specified in the following table. The exact rates will be as directed.

Rate of Application Per Square Yard (0.8361 m²)			
Seal Coat Types	Bituminous Size of Screenings	Screenings (pounds)	Binder (gallons)
Fog	N/A	N/A	0.05 to 0.10 (0.1893-0.3785L)
Fine	1/4" to No. 10 (6.35mm)	12 to 16 (5.4432-7.2576 kg)	0.15 to 0.30 (0.5677-1.1355L)
Coarse	½"-No. 4 (12.70mm)	25 to 35 (11.34-15.876kg)	0.25 to 0.35 (0.9462-1.3247L)
Double			
1st application	½"-No. 4 (12.70mm)	25 to 35 (11.34-15.876kg)	0.20 to 0.35 (0.757-1.3247L)
2nd application	1/4"-No. 10 (6.35mm)	12 to 16 (5.4432-7.2576kg)	0.15 to 0.25 (0.5677-0.9462L)

305.03.02 Penetration Macadam

The order and number of spreads, designated sizes of aggregates, and rates of spreads of aggregate and bituminous material shall be as shown on the table in the ODOT Standard Drawings entitled Asphalt Penetration Macadam.

Rates of spreads and quantities of materials are subject to variance as directed to adjust for variable conditions encountered or experienced during construction. Also, recognize that the nature of the work calls for equipment in varying number and versatility and modification of procedures to some extent. Generally, the ratio of bituminous cement to aggregate shall be held closely constant to that specified.

305.03.03 Preparation of Base

Conform to the applicable requirements for preparation of bases in **Section 306 - Asphalt Concrete Pavement.**

305.03.04 Placing

305.03.04A - Weather and Seasonal Limitations

Do not place asphalt penetration macadam or seal coat on any wet surface, or when air temperature is below 60 degrees Fahrenheit (15.56°C), or when the

Engineer determines that weather conditions are detrimental to proper construction. Normally, work shall be done between May 1 and September 15.

305.03.04B - Equipment

The equipment to be used shall include approved power brooms, self-propelled aggregate spreaders, bituminous material distributor, and hauling vehicles, all of which shall be pneumatic tired. Provide equipment in such number and capacities that will provide coordinated and uniform progress.

Mechanical spreaders for spreading aggregate of less than 1 inch (25.40 mm) in maximum size shall be of a design which will place the larger fraction ahead of the finer fraction of the aggregate.

The bituminous material distributor shall provide controls for regulating and monitoring the spread of bituminous material at even heat on variable widths of surface up to 15 feet (4.572 m) at rates from 0.05 (.18925 L) to 2.0 gallons (7.57 L) per square yard (0.8361 m^2), with uniform pressure, and with an allowable variation from any specified rate not to exceed 0.02 gallon (0.0757 L) per square yard (0.8361 m^2). Distributors shall have a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

Use rollers of self-propelled pneumatic tire type capable of exerting a ground pressure of not less than 80 pounds (36.288 kg) per square inch (645.2 mm^2) of tire contact area. Steel wheel rollers shall be used only with prior approval.

305.03.04C - Sequence of Operations

The order of the several spreads of aggregates and bituminous material shall be as directed. In construction of a seal coat, place spreads of aggregate while the immediately preceding spread of bituminous material is at or near its application temperature. Each spread of designated size aggregate shall be shaped and compacted at established line and grade just prior to being covered. Do not apply the seal coat spread of bituminous material and aggregate until the underlying spreads have been in place for at least three days and have become stabilized.

305.03.04D - Application of Bituminous Material

Engineer may vary the amount of asphalt and aggregates to be applied to give the best results.

To ensure uniform distribution of asphalt, prior to beginning work, operate the distributor bar over a pit or vat. To avoid laps and ridges at transverse junctions of

separate applications of asphalt, spread sufficient building paper over the treated surface to ensure that spray jets will be functioning normally when the untreated surface is reached. Omissions (skips) by the distributor must be immediately covered by hand patching with the same grade of asphalt.

Area covered by any one spread of asphalt shall be no more than can be covered with mineral aggregate within ten minutes from the time of application upon any part of the spread.

Spread asphalt toward the source of mineral aggregate to avoid injury to the freshly treated surface.

Before application to the roadway, heat asphalt materials to the temperatures directed, but within the applicable limits for material used, as shown in the following table:

Type and Grade of Asphalt	Spraying Temperature			
	Minimum		Maximum	
	Degree F	Degree C	Degree F	Degree C
Asphalt Cements:				
AR 1000	275	135.0	325	162.8
AR 2000	285	140.6	350	176.7
AR 4000	290	143.3	350	176.7
Liquid Asphalts:				
MC and RC 250	165	73.9	220	104.4
MC and RC 800	200	93.3	355	179.4
Emulsified Asphalts:				
CRS-1	75	23.9	130	54.4
CRS-2	100	37.8	160	71.1
CMS-2S	100	37.8	160	71.1
CMS-2	100	37.8	160	71.1
CMS-2h	100	37.8	160	71.1
CSS-1	75	23.9	130	54.4
CSS-1h	75	23.9	130	54.4

Building paper shall be placed over the end area of previously placed spreads and the adjoining application shall start on the paper, after which the paper shall be removed. Rates of application shall not vary from prescribed rates by more than 10 percent. Protect structures and vegetation from being splattered, stained, or marred. Remove any stains and remedy disfigurements as approved. Use hand application or other approved means on areas inaccessible to the distributor.

305.03.04E - Hauling and Spreading Aggregates

Do not operate hauling and spreading equipment on uncovered bituminous material. Hand spreading shall be done to correct deficiencies or on areas inaccessible to specified mechanical equipment. Hauling over aggregate-covered bituminous material shall be held to a practicable minimum until the surface has become firm. Perform hauling at moderate speeds on newly placed penetration macadam or seal coat materials to prevent loss of or hazardous movement of materials. Hauling shall be routed as uniformly as is practicable over the full width of material in place.

305.03.05 Compaction

Each spread of each designated size of aggregate shall be shaped and dry rolled until material is interlocked, firm, partially bound with underlying bituminous material, and does not creep or wave ahead of the roller. Begin rolling at the low side of the cross section and progress with passes parallel to roadway centerline, each pass overlapping the preceding pass by at least one-half the roller width. Places not accessible to rollers shall be tamped thoroughly with approved mechanical or hand tampers.

Irregularities in surface smoothness, uniformity of texture, segregations of materials, dirt pockets, spots of excess bituminous material, and other deficiencies and defects shall be corrected by removal, replacement, addition of material, repetition of construction operations, or other suitable means, as directed.

305.03.06 Curing and Maintenance

During the curing period when construction is open to traffic and for three days following completion of the final course, perform the following operations.

1. Blade or broom the course to correct bleeding of asphalt, to provide coverage with aggregates, to keep the surface free of gravel, traffic grooves, holes, and other deformations and to eliminate other defects that may appear.

2. Perform rolling and compacting of materials to maintain or restore firmness and stability to the materials.

3. Trim abutting shoulders. Remove materials which come into side ditches or on to curbs, sidewalks, or driveways and dispose of as approved.

4. Perform above operations under traffic and at frequencies directed to develop and establish the course to uniform firmness and stability throughout.

305.03.07 Removal of Excess Material

Where excess rock has been applied, either remove it or drift it uniformly over the adjacent roadway by using an approved motor patrol grader equipped with a wire broom mold board. Hold this type of brooming to a minimum, and where necessary, perform it very carefully so as not to disturb the mat in any way. Correct thin or bare spots in the spread of cover stone by hand spreading or by use of a grader as described above. The cost associated with removal of excess material as described hereinabove will be considered incidental to other contract items performed under this Section.

305.03.08 Surface Tolerance, Penetration Macadam

The surface of the course, when finished and established, will be tested for trueness to specified grade and transverse slope at selected locations and shall not deviate at any point more than 0.03 foot (9.144 mm) from the bottom of a 10 foot (3.048 m) straightedge.

305.04.00 Measurement and Payment

305.04.01 Measurement

305.04.01A - Aggregate by the Cubic Yard (m^3)

Measurement of aggregate will be made on a cubic yard (m^3) basis for the materials in the hauling vehicle at points of deposit. See **Section 109 - Measurement of Quantities.**

305.04.01B - Bituminous Cement

Measurement of bituminous cements will be made on a ton (metric ton) basis. See **Section 109 - Measurement of Quantities.**

Water added to emulsion will not be paid for as emulsified asphalt. Pay quantity shall be the amount of undiluted emulsion used.

305.04.01C - Surface Treatment by the Square Yard (m^2)

Measurement of surface treatment will be made on a square yard (m^2) basis, complete in place as specified and accepted. Measurement will be made of width and length of each area completed, wherein width is the edge-to-edge width of the surface treatment, and length is from end to end of the area along the centerline.

Measurement shall be on the surface to the nearest 0.1 foot (30.48 mm) and square yardage (m^2) shall be to the nearest full square yard (m^2).

305.04.02 Payment

Payment will be made for any or all of the following items when listed as pay items in the proposal for any particular contract.

	Payment Item	Unit of Measure
1.	Asphalt in Seal Coat	Per Ton (metric ton)
2.	Aggregate (gradation specified) in Seal Coat	Per C.Y. (m^3)
3.	Asphalt in Penetration Macadam	Per Ton (metric ton)
4.	Aggregate (gradation specified) in Penetration Macadam	Per C.Y. (m^3)
5.	Seal Coat in Place	Per S.Y. (m^2)
6.	Asphalt Penetration Macadam in Place	Per S.Y. (m^2)

306 - Asphalt Concrete Pavement

306.01.00 Description

This Section covers work necessary for the construction of hot mix asphalt pavements upon prepared foundations or base surfaces.

Hot mix asphalt concrete is defined as a mixture of asphalt cement; well graded, high quality aggregate; mineral filler and additives as required; heated and plant mixed into a uniformly coated mass; hot laid on a prepared foundation; and, compacted to specified density.

306.02.00 Materials

306.02.01 General

Asphalt and aggregate will be subject to approval preceding mixing. Plant mixed mixtures will be subject to final approval after blending and mixing, either at the plant or at the place of delivery prior to rolling. Approval will be based on periodic sampling of the materials.

306.02.02 Asphalt

Asphalt materials incorporated in the mix shall conform to requirements of **Section 205 - Materials.**

306.02.03 Aggregates

Aggregates shall conform to requirements of **Section 205 - Materials** and to additional requirements contained herein.

Grading of designated sizes of coarse aggregate shall be as follows:

	Designated Sizes		
	3/4"-1/4" (19.05-6.35mm)	½"-1/4" (12.70-6.35mm)	3/8"-1/4" (9.525-6.35mm)
Sieve Size Passing	Percentages (by weight)		
1"(25.40mm)	100		
3/4"(19.05mm)	90-100	100	
½"(12.70mm)	60-75	85-100	100
3/8"(9.525mm)			85-100
1/4"(6.35mm)	0-15	0-15	0-15

Grading of the fine aggregate shall conform to the following:

Percentage passing 3/8 inch (9.525 mm) sieve	100 percent
Percentage passing 1/4 inch (6.35 mm) sieve	85-100 percent

Of the fraction passing the 1/4 inch (6.35 mm) sieve, the following percentages thereof shall pass the No. 10 sieve:

Class "B" Hot Mix	43-57 percent
Class "C" Hot Mix	43-57 percent
Class "E" Hot Mix	7-22 percent

Of the fraction passing the No. 10 sieve, the following percentages thereof shall pass the No. 40 sieve:

Class "B" Hot Mix	30-55 percent
Class "C" Hot Mix	30-55 percent

Of the fraction passing the No. 40 sieve, the following percentages thereof shall pass the No. 200 sieve:

Class "B" Hot Mix	9-19 percent
Class "C" Hot Mix	9-19 percent
Class "E" Hot Mix	20-28 percent

Aggregate grading for Class "D" Hot Mix shall conform to the requirements specified hereinbefore under "Grading of designated sizes of coarse aggregate."

306.02.04 Mineral Filler

Mineral filler shall conform to the requirements of AASHTO M 17.

Collector dust may be used as mineral filler, in whole or in part, provided the dust or the resultant mineral filler mixture conforms to the above requirements.

306.02.05 Additives

Additives and admixtures may be used to prevent stripping or separation of bituminous coatings from aggregates, and to aid in the mixing or use of bituminous mixes, or for experimental purposes. Use admixtures and additives of standard recognized products of known value for the intended purpose and obtain approval on the basis of laboratory tests prior to their use. They shall have no deleterious effect on the bituminous material and shall be completely miscible.

306.02.06 Composition and Proportion of Mixtures

The class of asphalt concrete to be used shall be as shown and shall conform to the following requirements:

	Class "B"	Class "C"	Class "D"	Class "E"
Sieve Size Passing	Percentages of Total Aggregate (by weight)			
1"(25.40mm)	99-100			
3/4"(19.05mm)	90-98	99-100		99-100
½"(12.70mm)	72-90	90-98	99-100	90-98
3/8"(9.25mm)				
1/4"(6.35mm)	45-65	50-70	85-100	25-40
#10	17-37	21-41	37-57	2-12
#40	2-16	6-20	13-29	
#200	2-7	3-8	4-9	1-5
Asphalt Cement	3-8*	4-8*	4-8*	4-8*
Portland Cement or Hydrated Lime**				0.5-1.5*

* The exact percentage used (mix formula) shall be as designed or approved by the Engineer on the basis of preliminary laboratory tests and analysis of aggregate.

** contractor's option.

Class "E" is an open-graded mix and separation of asphalt from aggregate may occur. Any noticeable separation at the point of delivery will be cause for rejection.

Class "B", "C", and "D" asphalt concrete shall meet the following qualifying test requirements:

Test	Test Method	Requirements
Stability, First Compaction	ODOT Standard Test*	32 minimum
Voids, First Compaction	ODOT Standard Test*	7% maximum
Voids, Second Compaction	ODOT Standard Test*	1% minimum
Retained Strength	AASHTO T 165-Mod.	70% minimum

* Available from Engineer of Materials, ODOT, Salem, Oregon 97310.

306.02.07 Mix Formula and Tolerances

At least 15 days prior to producing any of the mixture for use in asphalt concrete pavement, furnish representative samples of acceptable materials proposed for use in determination of the proportions of each of several constituents to be used in the

mixture. The proportions so determined shall be known as the "mix formula" and shall be changed only upon order of the Engineer. No mixture will be accepted for use until the "mix formula" for the project is determined.

After the mix formula is determined, the several constituents shall meet the following tolerances, but always within the range of proportions specified in **Subsection 306.02.06.**

Constituent of Mixture	Tolerance (Plus or minus to mix formula)
All aggregate of sieve sizes specified in **Subsection 306.02.06** except aggregate passing No. 200 sieve	6.0 percent
Aggregate passing No. 200 sieve	2.0 percent
Asphalt Cement	0.5 percent
Temperature of mixture at time of final placement	10 degrees Fahrenheit (3.78 degrees C)

Should a change in source of material be made, or should conditions arise which the Engineer determines to justify, the Engineer may establish a new mix formula.

The materials to be used in the work shall be of such nature that a mixture of them, proportioned in accordance with the mix formula, will have a retained strength of no less than 70 percent when tested in accordance with AASHTO T 165 as modified by ODOT test methods. The Engineer shall be permitted to take as many samples as necessary for checking the uniformity of mixture.

306.03.00 Construction

Pave only after Engineer approves base.

Furnish all material and labor including, but not limited to, asphaltic concrete, tack coat, and joint seal material.

When paving is constructed in two lifts as in new subdivisions. The initial lift of 2 inches (50.80 mm) of B-mix will be placed at the time the subdivision is completed. The final lift of 1 inch (25.40 mm) of C-mix will be placed approximately eleven months later, near the end of the one year warrantee period.

Cut and prepare joints where new paving will meet existing paving.

Adjust all valve boxes, manhole frames and lids, catch basins frames and grates, etc. to conform accurately to finished grade of pavement.

Liberally apply tack coat material to all joints with existing pavement, manhole frames, etc.

Machine lay and compact asphalt concrete paving, all in conformance with current ODOT specifications. Use type, weight and size roller sufficient to achieve specified compaction.

Finish pavement lines and grades to conform accurately with lines and grades shown and as staked in field.

Finish pavement to meet catch basin inlets, existing pavements, warping at intersections, etc.

Protect new pavement from traffic until it is set.

Surface of pavement to be a smooth, well-sealed, and a tight mat.

306.03.01 Preparation of Bases

All pavement bases and foundations constructed under this contract shall be completed and finished as prescribed under the applicable specification for its construction.

Manholes, inlets, and other such structures shall have been completed, adjusted, cured, and otherwise prepared, as applicable, and made clean and ready for asphalt placement. Seal vertical surfaces that will come in contact with asphalt pavement with tack coat material to provide a good bond and seal. Cover top surfaces with paper or other material to prevent adherence of asphalt pavement, tack coat, or prime coat.

306.03.01A - Joining Existing Pavements

All existing pavement edges to be joined with new pavement shall be saw cut such that the cut remains straight and vertical without breakouts at the time of joining the new pavement.

Thoroughly seal the saw cut edge with AR 4000 or PBA-2 asphaltic cement.

Make the finished surface of the new compacted paving flush with the existing surface unless otherwise shown or approved.

Immediately after the new paving is compacted, seal all joints between new and original asphalt pavement with AR 4000 or PBA-2 asphaltic cement and, if

necessary, cover with dry paving sand before the asphalt solidifies to prevent pick-up by traffic.

306.03.01B - Surface Preparation for Second Lift Paving

Prior to laying a second lift, the surface shall be cleaned and a tack coat shall be applied. Apply tack coat per **Section 306.03.04.**

306.03.02 Reconditioning Old Roadbed

This work consists of reconditioning and preparing previously constructed roadbed subgrades, existing stone bases and surfacings, and existing pavements; on which an additional layer or course of material is to be placed.

Existing aggregate subbases, bases, and surfacings shall be bladed, scarified, leveled, and compacted in conformance to lines, grades, and cross sections as established and the density and tolerance requirements of **Section 303 - Aggregate Bases.**

Prelevel uneven or broken bituminous, cement concrete, or brick surfaces with asphalt concrete as specified. Spread and compact preleveling asphalt concrete to the density and surface condition as directed.

306.03.03 Prime Coat

Where specified, construct prime coat in conformance with applicable requirements of **Section 305 - Surface Treatments** with the following modifications: Asphalt shall be spread at a rate normally within a range of 0.25 (0.946 25 L) to 0.40 gallon (1.514 L) per square yard (0.8361 m^2) of surface. Cover aggregate if required shall be spread at a rate of 0.006 (0.004 587 6 m^3) to 0.009 cubic yards (0.006 881 4 m^3) per square yard (0.8361 m^2) and may include one or another of the materials specified in **Section 303 - Aggregate Bases** or **Section 305 - Surface Treatments.**

Following application of the prime coat, it shall be allowed to cure for a period of up to three days before a succeeding course is placed upon it.

306.03.04 Tack Coat

Except as modified herein, apply tack coat in conformance with applicable requirements for Seal Coat in **Section 305 - Surface Treatments.**

Spread asphalt by means of pressure-spray equipment which will provide uniformity of application at prescribed rates. Do not apply aggregate cover material to the tack coat. Normally, asphalt shall be applied to the prepared surface at a rate within a range of 0.02 (0.0757 L) to 0.06 gallon (0.2271 L) per square yard (0.8361 m^2) of surface, actual rate to be as directed. The tack coat shall not be applied during wet or cold weather or during darkness and apply only so far in advance as is appropriate to maintain a tacky, sticky condition of the asphalt. Apply tack coat in such manner as to offer the least interference to traffic and to permit at least one-way traffic without pickup or tracking of asphalt.

306.03.05 Mixing

Mix the asphalt concrete by combining aggregate, asphalt, and additives at an approved central mixing plant equipped with controls to accurately measure and monitor the various components of the mix to produce a uniform homogeneous mixture at the specified temperature.

The discharge temperature of the mix will vary with the type of mixing plant, climatic conditions, and other variables. However, the temperature shall be sufficient to provide thorough mixing and coating and to provide a mass viscosity of the mix on the grade which will permit compaction to required density. Mix temperatures and asphalt in storage shall generally not exceed 325 degrees Fahrenheit (162.8°C).

306.03.06 Placing

Conform to the plan of work, order of paving, and other details of performance as approved. Lift thickness shall be as shown.

The City may specify routing of asphalt trucks from the mixing plant to the job site. Send no loads so late in the day as to prevent the spreading and compacting of the mixture during daylight, unless approved lighting is provided. Deliver trip tickets to the Engineer each day to verify material delivery.

Hot mix asphalt concrete shall normally be placed on dry prepared surfaces and when air temperature in the shade is 40 degrees Fahrenheit (4.44°C) and warmer. Place Class "E" wearing surface only when the existing pavement temperature is at least 60 degrees Fahrenheit (15.55°C). Placing during rain or other adverse weather conditions normally will not be permitted, except that mix in transit at the time these adverse conditions may occur may be laid provided it is of proper temperature, the mix has been covered during transit, and is placed on a foundation free from pools or flow of water. The temperature of hot mix at the time it is spread into final position shall be between 240 and 300 degrees Fahrenheit

(115.56°C-148.89°C), except Class "E" mix shall be between 200 and 250 degrees Fahrenheit (93.33°C-121.11°C).

Lay the mixture in strips of such width as to hold to a practical minimum the number of longitudinal joints required. The longitudinal joints in any layer of pavement shall offset those joints in layers below by not less than 6 inches (152.40 mm). Take special care at longitudinal joints to provide positive bond and required density.

Bituminous paving machines shall be self-contained, power-propelled units, provided with an activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing layers of bituminous mix material in lane widths applicable to the specified typical sections, and to required thicknesses, lines, grades, and cross sections. When paving shoulders or similar work, the contractor will be permitted to place the mixture with a towed-type paving machine provided the machine meets the following requirements:

1. The machine is equipped with a receiving and distribution system of a sufficient capacity for a uniform spreading operation without segregation of materials.

2. The machine is equipped with a screed which will produce a finished surface of the specified thickness and smoothness and will not tear or gouge the mixture.

When the capacity of the paver to properly spread and finish exceeds the rate of delivery of mixture, operate the paver at a reduced and uniform speed to give continuous spreading and finishing.

Take care at all times to prevent segregation in the mixture as evidenced by areas of fine and coarse materials, and correct any such segregation with fresh mixture either spread and worked into the surface or by complete removal and replacement of segregated mixture, as directed, at no expense to the City.

On areas to be patched with asphalt concrete mixture and on areas of irregular shape or limited size, the spreading and finishing requirements may be modified as approved.

Boils and slicks occurring in the pavement must be immediately removed and replaced with suitable materials, at no expense to the City.

306.03.06A - Thin Overlays

Flush and sweep the streets prior to cleaning the road surface. Prior to placing the fiber membrane or thin overlay, the existing pavement shall be cleaned to the satisfaction of the Engineer. All metal structures shall be shot blasted to provide a clean bonding surface. Each manhole, valve cover, inlet grates, etc. shall be free and operable regardless of the preexisting condition. Manholes, water valve boxes, cleanouts, etc., shall be adjusted to the proper finish grade. Raised traffic buttons shall be removed. Asphalt ramps at curbed driveways shall be removed and temporary ramps installed until new A.C. is placed.

A reinforced waterproof membrane shall be placed on the surface to be overlaid, such as Geotac as manufactured by Pave Prep Corporation or approved equal. The membrane shall be waterproof incorporating a high strength, uncoated 6 oz./sq. yd. (170.1 g /0.8361 m^2) polypropylene fabric embedded in a layer of self adhesive rubberized asphalt with the following properties:

TECHNICAL SPECIFICATIONS		
Property	Typical Value	Test Method
Caliper (thickness)	0.080 inch (2.032 mm)	ASTM D1777
Grab Tensile Strength	245.0 pounds (111.132 kg)	ASTM D4632
Puncture Resistance	200.0 pounds (90.72 kg)	ASTM E154
SBS Polymer Content (backing)	15 percent	
Permeance	0.10 (Max.) Perms	ASTM E96, Method B
Elongation	80 percent	ASTM D4632
Strip Tensile	50 (Min.) lbs./in. (22.68 kg/38.10 mm)	ASTM 882 (modified)
Pliability (1/4 inch Mandrel 180° @ -25°F)	No cracks in fabric or rubberized asphalt	ASTM D146 (modified)

The Contractor shall plan for sufficient time for delivery of the waterproof membrane from the manufactureer.

The waterproof membrane shall not be placed when the ambient temperature is below 50 degree F (10.0°C). Install in widths of 24 inch (609.60 mm) and shall be

centered over the joint within an 1 inch (25.40 mm) tolerance, as shown on the drawing. Laps will be permitted in both the transverse and longitudinal direction with a minimum overlap of 2 inches (50.80 mm). The membrane will be installed straight and wrinkle free with no curled or uplifted edges. No prime coat is needed when dry pavement is 60 degrees F (15.55°C) or above. Use of a primer is necessary if pavement temperature is below 60 degrees F (15.55°C). If necesssary, the surface will be primed with a material recommended by the manufacturer prior to placement of the membrane. As soon as the prime coat cures it is ready to receive the water proof membrane.

Placement of the tack coat shall be made only under the following conditions:

1. The ambient air temperature is 60 degree F (15.55°C) and rising.

2. The pavement is absolutely dry and the pavement temperature is above 55 degree F (12.78°C).

The sealant, AR 4000 or PBA-2 shall be uniformly sprayed at a rate of 0.10 gallons per square yard (0.3785 L/0.8361 m^2) residual asphalt. Application by vehicle mounted distributor when possible, use hand sprayer at a minimum. Temperature of the asphalt, minimum 325 degree F (162.78°C), shall allow for a uniform spray pattern. The distributor shall be a pressure type, capable of maintaining an asphalt temperature of 350 degree F (176.67°C) or more for the entire length of the work day. The distributor shall be equipped and calibrated to deliver a uniform application of asphalt cement at the specified rate plus or minus 0.05 gallon per square yard (0.1893 L/0.8361 m^2) Asphalt drools or spills shall be removed from the road surface. Care shall be taken not to splash liquid asphalt on curbs or sidewalks.

Pavement placement, Class "C" asphalt concrete, 1.5 inch (38.10 mm) course shall begin as soon as possible after the tack coat has cured. Place a thin overlay as shown on the typical drawing. Specific locations of the thin overlay is marked in the field. Rake the takeoff and end of each overlaid section to achieve a ramp that has a rise between 0.25 inches (6.35 mm) and 1.5 inches (38.10 mm) in 25 lineal feet (7.62 m). Rake feathered taper at curblines and new pavement ends. Feathered edges shall be raked such that only the fines in the asphalt material are left in place. Feathered edges shall be finished such that the water will drain without leaving pockets of standing water. Use a electronic grade control device that is a minimum of 6 feet (1.8288 m) long when installing the wearing course in order to achieve an average depth of 1.5 inch (38.10 mm). Install more than the average 1.5 inch (38.10 mm) depth in order to smooth any depressions in the exisiting surface. Install asphaltic ramp on all driveways directly affected by the paving project. Ramps shall be 6 feet (1.8288 m) long with a width to match the

width of existing driveway. At driveways where less than 1 inch (25.40 mm) of curb exposure or no curb exposure exists, feather the A.C. pavement over the curb and 6 foot (1.8288 m) maximum into the driveway such that water ponding will not occur. Taper the A.C. pavement thickness to match existing catch basin grate elevations. The length of feathered taper shall be 6 feet (1.8288 m) and the minimum asphalt thickness shall be 0.25 inch (6.35 mm). Longitudinal cold joints shall not be coincident with normal wheel tracks of vehicles. They shall normally be on a lane stripe or mid-way between lane stripes.

On noncurbed sections of the streets bordered by gravel, lawn, or barkdust, the Contractor shall redress these areas adjacent to the final paving with like materials to the satisfaction of the Engineer. Shoulder rock shall be 1/4"-0" (6.35 mm -0) placed approximately 3 feet (0.9144 m) wide. There will be no separate payment for this work, it being understood to be included in and incidental to contract unit prices for Class "C" asphaltic concrete.

306.03.07 Compaction

The contractor will not be permitted to use any equipment which crushes the aggregate to any extent. However he/she will be required to obtain the densities required in **Subsection 306.03.08**.

306.03.08 Density Requirements

The density of asphalt concrete as determined by AASHTO T 230 or AASHTO T 238 (Method A or B) shall be at least 95 percent of the maximum density determined in accordance with AASHTO T 245 or T 246.

Samples and tests will be taken as frequently and at such locations as the Engineer elects, and the results will be made known to the contractor as soon as is practicably possible. However, it shall be the responsibility of the contractor to obtain specified density at all times, and delay in advising the contractor of test results shall not act as a waiver of this responsibility. When it is determined that specified density is not being obtained, discontinue all paving operations until corrective measures have been taken.

Any displacement occurring as a result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture when required. Do not displace the line and grade of edges. Moisten steel roller wheels with water or other approved material to the least extent necessary to prevent pickup of mixture and yet not cause spotting or defacement of the surface of the mixture.

Along curbs and walls, on walks, irregular areas, and other areas not practicably accessible to specified rollers, compact the mixture with small rollers, mechanical tampers, hot hand tampers, or smoothing irons. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is any way defective. Remove and replace any area showing an excess or deficiency of bituminous cement. Removal and replacement under these provisions shall be at no expense to the City unless the Engineer determines that the defects, excesses, or deficiencies are not caused by or the fault of contractor's operations.

306.03.09 Transverse Joints

Unless otherwise approved, form transverse joints by cutting back on the previous run to expose the full depth of the layer or course.

Place a course or strip of asphalt concrete as nearly continuous as practicable. Carefully construct transverse joints using vertical faces and thoroughly compacted to provide a smooth riding surface. Apply a coat of bituminous material to contact surfaces just before mixture is placed against previously rolled mixture.

At bridge ends or at joints with other rigid type structures, existing bases shall be conditioned and compacted, and place asphalt concrete to extra thickness and compact in transverse direction as well as longitudinally, all as directed.

When the end of a course or strip of asphalt concrete is to be temporarily subjected to traffic, the end shall be left on a bevel of approximately 20:1 (horizontal to vertical), being later cut back to a vertical edge.

306.03.10 Surface Finish

The finished surface of each course or layer of mixture shall be of uniform texture, smooth, free of all defects, and shall closely parallel that specified for the top surface of the finished pavements. The surface of each layer will be tested for trueness to specified grade and transverse slope at selected locations with a 10 foot (3.048 m) straightedge. The variation of the surface from the testing edge of the straightedge between any two contact points with the surface shall at no point exceed 0.02 foot (6.096 mm) on the underlying courses of pavements and 0.025 foot (7.62 mm) on the top courses or wearing surfaces of pavements.

306.04.00 Measurement and Payment

306.04.01 Measurement

Pay quantities for hot mix asphalt concrete and other bituminous construction under this Section will be measured by one or another of the methods as set forth hereinafter.

Payment for A.C. pavement to include compensation for all labor, equipment, materials and incidentals specified in this section.

If no bid item is included in the Schedule of Contract Prices, the adjustment of structures such as valve boxes, manhole, catch basins, etc. will be considered incidental to the work and no separate or direct payment will be made therefore.

Payment for waterproof membrane shall be measured in linear feet as placed and accepted on the exisitng pavement. Payment for water proof membrane shall be in the bid item in the proposal Waterproof Membrane. The price shown in the proposal shall be full compensation for furnishing all materials, for all preparation and application of these materials, for all labor, equipment, and incidentals necessary to complete this item.

306.04.01A - Asphalt Concrete on a Single Unit Basis

When pay items in the proposal so indicate, the quantity of asphalt concrete used in the accepted work as specified will be measured on a ton (metric ton) basis. There will be no separate measurement of bituminous cement or additives contained in the mixture or used otherwise in the work. Measurement will be made on the number of tons (metric ton) of asphalt concrete, as weighed on approved and tested scales. Give trip tickets to the Engineer each day to verify material delivery. Each trip ticket shall show date and time of delivery, truck number or driver's name, and net weight of material.

306.04.01B - Asphalt Concrete on Square Yard (m^2) Basis

When the pay items in the proposal so indicate, asphalt concrete, complete in place as specified and accepted, will be measured on a square yard (m^2) basis. Measurement will be made of width and length of each separately constructed strip of pavement, wherein width is the design width or edge-to-edge width of pavement, whichever is the lesser, and length is from end to end of pavement along the center of the strip. Measurement will be on the surface of the pavement to the nearest 0.1 foot (30.48 mm) and the square yardage (m^2) will be to the nearest full square yard (m^2).

The Engineer may take core samples of the pavement or use other methods to determine the actual pavement thickness constructed. Extra thickness of pavement as shown or as directed will be measured by conversion on a proportionate volume basis to an equivalent number of square yards (m^2) of specified standard thickness pavement.

No additional payment over the contract unit price will be made for pavement having a thickness greater than shown or ordered. When the pavement is found deficient in thickness by more than 0.2 inch (5.080 mm), but not more than 1 inch (25.40 mm), as determined by test cores of reasonable test samples, payment for pavement will be made at an adjusted price as specified in the following table:

Deficiency in Thickness Inches (mm)	Proportional Part of contract Unit Price Allowed
0.00 (0.000mm) to 0.20 (5.080mm)	100 Percent
0.21 (7.874mm) to 0.30 (7.620mm)	80 percent
0.31 (7.874mm) to 0.40 (10.160mm)	72 percent
0.41 (10.414mm) to 0.50 (12.700mm)	68 percent
0.51 (12.954mm) to 0.75 (19.050mm)	57 percent
0.76 (19.304mm) to 1.00 (25.400mm)	50 percent

No payment will be made for any area of pavement found deficient in thickness by more than 1 inch (25.40 mm), even though such pavement is permitted by the Engineer to remain in place.

306.04.02 Payment

Payment will be made for any or all of the following items when listed as pay items in the proposal for any particular contract:

	Payment Item	Unit of Measure
1.	Asphalt in Concrete mixture (specify class)	Per Ton (metric ton)
2.	Asphalt Concrete (specify class)	Per Ton (metric ton)
3.	Asphalt Concrete (specify class and thickness)	Per S.Y. (m^2).
4.	Waterproof Membrane	Per L.F. (m)

For Asphalt Concrete a deduction of 1 percent of the in place price will be made for each 1 percent cumulative deviation from the allowable tolerance of each component of the job mix formula required by the specification, except as follows:

1. Deviations in asphalt cement shall be weighted eight times, and deviations in 200-minus material shall be weighted two times the deviation in the other specified aggregate sieve sizes.

2. All materials furnished where the cumulative deviation equals or exceeds 12 percent shall be removed and replaced with acceptable material at no cost to the City.

3. When asphalt paving materials with a cumulative deviation of less than 12 percent are furnished, the City shall notify contractor, in writing, to remove and replace defective materials at no cost to the City or to pay to the City liquidated damages in accordance with the above deduction schedule, as determined by the Engineer.

307 - Portland Cement Concrete Pavement

307.01.00 Description

This Section covers work necessary for construction of Portland Cement concrete pavements, with or without reinforcement, on a prepared subgrade or base course, complete.

307.02.00 Materials

All materials shall conform to requirements of **Section 205 - Materials.**

307.03.00 Construction

307.03.01 General

The plant, equipment, and tools required in the performance of the work must be approved as to design, capacity, and condition to efficiently perform their respective functions of the work. Schedule and coordinate all operations involved in constructing the pavement so that regardless of the daily or seasonal variations in weather, temperature and humidity under which the work is permitted to proceed, such work will result in a finished pavement conforming in all respects to specified requirements. Provide and have available at all times adequate equipment, tools, material, and labor to achieve these results and failure to so provide will be cause for discontinuance of the work upon order of the Engineer. Conform to applicable requirements of concrete construction in **Section 602 - Concrete Structures.**

307.03.02 Hauling

Hauling of Portland Cement concrete mixed at a central plant or in transit will conform to the provisions of **Section 602 - Concrete Structures.**

307.03.03 Forms

Conform to the applicable requirements of Forms in **Section 602 - Concrete Structures.**

307.03.04 Handling and Placing

Conform to requirements for Handling and Placing in **Section 602 - Concrete Structures.**

During the placing of concrete, make provision for the construction of joints and the placing of dowels, tie bars, and the devices as shown or as directed. The contractor is referred to **Subsection 308.03.01C - Base for Portland Cement Concrete.**

307.03.05 Slip Form Paving

Place the concrete uniformly in final position by the slip form method in one complete pass in such a manner that a minimum of finishing will be necessary to provide a dense and homogeneous pavement in conformance to true grade and cross section. The machine shall vibrate the concrete for the full width and depth of the pavement being placed. Such vibration shall be accomplished with vibrating tubes or arms working in the concrete. The sliding forms shall be rigidly held together to prevent spreading of the forms. Use forms of sufficient length so that no appreciable slumping of the concrete will occur.

Operate the slip form paver with as nearly continuous forward movement as possible and coordinate all operations of mixing, delivery, and spreading concrete to provide uniform progress. Stopping and starting the paving machine shall be held to an absolute minimum. If, for any reason, it is necessary to stop the forward motion of the paver, stop the vibratory and tamping elements immediately. Apply no tractive force to the machine, except that which is controlled from the machine.

Ensure that supports of the slip form paver and other equipment which ride on previously placed pavement are offset over that pavement sufficiently to prevent breakage of the edge thereof and provide such supports with suitable protective means to avoid marring or chipping of the previously placed pavement.

307.03.06 Tamping and Screeding

Compact the concrete pavement by means of vibrating screeds, mechanical tampers, tamping templates, and such other implements as approved. A vibrating screed or an automatic screeding and tamping machine may be substituted for a tamping template, subject to approval. Operate the equipment in such a manner that a satisfactory compaction of the concrete is produced and the surface of the pavement is uniform, true to grade, and cross section.

Immediately after placing concrete upon the subgrade and before initial set has occurred, strike off the concrete and tamp by means of a tamping template, used at right angles to the centerline of the street, until the concrete is thoroughly consolidated to specified grade and crown section and sufficient mortar is brought to the surface for finishing purposes. If the design or location of the base is such as to preclude the possibility of tamping as previously described, such as a variable crown section, curb being constructed monolithic with base, in alleys, or where the grade exceeds 10 percent; employ other approved methods to obtain the prescribed results.

307.03.07 Roadway and Alley Finishing

After the concrete is placed and compacted, strike it true to line, grade, and cross section as shown and float to a smooth, even texture with an approved long handled wood float having a troweling or smoothing surface from 6 to 12 inches (152.40 mm to 304.80 mm) wide, or other approved floating device. Apply the float to the surface of the concrete with its length parallel to the centerline of the street and operate it from bridges, planing off the high places, and filling the low places. Lap preceding applications of the float by at least one-half its length. If, after such planing, low places are discovered in the surface of the concrete, add additional concrete to fill in and bring such low places to grade, as approved. Floating shall leave the surface finish at specified grade, cross section, and surface tolerance, with a surface free from laitance, soupy mortar, marks, or irregularities.

Following the float finish and at the proper set, broom finish the surface. Draw the broom transversely across the pavement with not more than one stroke per width of broom. Fill any areas of minor honeycomb or other minor defect in composition of the concrete along the exposed edges with a stiff mortar or cement and fine aggregate applied to the moistened concrete in a workmanlike manner. Areas of affected pavement and replacement with pavement of specified quality for the full width of strip between longitudinal joints or edges and for a length not less than 10 feet (3.048 m).

Tool the free edges of new pavement and joints with previously placed Portland Cement concrete with an approved edging tool to remove laitance and mortar resulting from finishing operations and to provide a clean rounded edge to the new pavement. Tooling shall not form ridges on the surface of the concrete. Perform tooling of edges at transverse joints and longitudinal joints as directed.

307.03.08 Joints

Conform to applicable requirements of **Section 602 - Concrete Structures.**

Place 3/8 inch (9.525 mm) thick expansion joints at a maximum of 25 feet (7.62 m) apart, the depth of the concrete pavement in height and the width of the pavement in width.

307.03.09 Tolerances

At the conclusion of the finishing operation the surface of the pavement shall not vary from a true surface, when tested with a 10 foot (3.048 m) testing straightedge, more than .02 of a foot (60.96 mm) in 10 feet (3.048m).

The finished surface shall not vary more than 0.03 foot (91.44 mm) from the plan elevations at any point.

307.03.10 Curing

307.03.10A - Curing of Concrete

Immediately after the final floating, surface finishing, and edging has been completed and while the concrete surface is still moist, cover the entire exposed concrete and cure in accordance with one of the following provisions as specified:

1. Apply membrane-forming compound of the white pigmented type uniformly to damp concrete by pressure-spray methods at a rate which will form an impervious membrane when tested in accordance with AASHTO T 155.

2. Apply white polyethylene film, waterproof paper, or burlap-polyethylene sheets to damp concrete as soon as it can be placed without marring the surface. Place in intimate contact with the surface, extend over and beyond the sides or edges of the slabs or forms and weight as approved to hold the covering in position as a moisture proof covering. Laps shall be of approved dimensions and design to maintain tightness equivalent to the covering.

3. Apply burlap cloth to damp concrete as soon as it can be placed without marring the surface. Saturate the cloth with water and keep fully wetted during the curing period.

Regardless of which of the above methods the contractor chooses, keep the curing medium intact and effective for a period of not less than 72 hours after application.

307.03.10B - Protection of Concrete

Erect and maintain suitable barriers to protect the concrete from traffic or other detrimental trespass until the pavement is opened to traffic. If necessary, maintain watchmen to ensure that barriers remain effective.

Wherever it is necessary that traffic including contractor's vehicles and equipment be carried from one side of the pavement to the other, construct and maintain suitable bridges over the pavement as directed.

Prior to allowing equipment or traffic on the new surface, the concrete must have attained the specified compressive strength and shall be free from scarring, abrasion, stones, loose mortar, and other matter apt to be deleterious to the concrete surface. Operate all equipment without damage to the new concrete.

Repair or replace any part of the pavement, as directed, which has been damaged by traffic or from any other cause, prior to its official acceptance, at no expense to the City.

307.04.00 Measurement and Payment

307.04.01 Measurement

307.04.01A - Portland Cement Concrete Pavement

Measurement of Portland Cement concrete pavement will be made on a square yard (m^2) basis for the pavement complete in place as specified, and accepted. Measurement will be made of width and length of each separately constructed strip of pavement, wherein the width is the design width or edge-to-edge width of pavement, whichever is the lesser, and the length is from end to end of pavement to the nearest 0.1 foot (30.48 mm) and the square yardage (m^2) shall be to the nearest square yard (m^2).

Extra thickness of pavement, when shown or specifically directed to be placed, will be measured by conversion on a proportionate volume basis to an equivalent number of square yards (m^2) of specified standard thickness pavement.

307.04.02 Payment

Payment will be made for any or all of the following items when listed as pay items in the proposal for any particular contract.

	Payment Item	Unit of Measure
1.	Continuous Reinforced Concrete Pavement (specify class, thickness, reinforcing steel)	Per S.Y. (m^2)
2.	Reinforced Concrete Pavement (specify class, thickness, reinforcing steel)	Per S.Y. (m^2)
3.	Plain Concrete Pavement (specify class, thickness)	Per S.Y. (m^2)

Payment for concrete pavement, whether continuously reinforced, reinforced, or plain shall be full compensation for furnishing and placing all materials including water, reinforcement, joint materials, dowels, tie bars, and performing all work specified to complete the item including preparation of the base.

308 - Curbs, Gutters, Driveways, Sidewalks, and Pathway

308.01.00 Description

This Section covers work necessary for the construction of curbs; gutters; combination curb and gutter; combination curb, gutter and sidewalk; islands; traffic separators; and driveways, sidewalks and pathways, hereinafter referred to collectively as structures.

The respective structure names are specific in their use and refer specifically to those names as shown.

Driveways shall conform to Standard Plan ST-23.

Sidewalks shall conform to Standard Plan ST-21. Curb line sidewalks are preferred and shall be used unless otherwise approved, in writing by the Director of Public Works. Curb Ramps shall conform to Standard Plan ST-22.

Bicycle facilities when included in a project, shall conform to the Oregon Department of Transportation (ODOT) Standards for Bicycle Facilities.

Handicap access shall conform to Standard Plan ST-22 and the Americans with Disabilities Act.

308.02.00 Materials

308.02.01 General

Materials shall conform to requirements of **Section 205 - Materials** and to additional requirements contained herein.

308.02.02 Portland Cement Concrete

Concrete, expansion joint filler, reinforcing steel and aggregates to conform to current ODOT specifications.

Use Minor Structure Concrete (MSC) conforming to ODOT, Section 00440, 3300 psi (22.75 MPa) at 28 days, 4-7% AEA, 5 inch (127.00 mm) slump, 1/2 inch (12.70 mm) max. size coarse aggregate.

Portland Cement concrete shall conform to **Subsection 205.02.02** except that extruded curbs and/or gutters shall have a maximum slump of 2 inches (50.80 mm) as specified in **Subsection 308.03.03A** and sidewalks and pathways may have a design strength of 3,000 psi (20.6685 MPa).

308.02.03 Asphalt Concrete

Conform to Class "C" Hot Mix in **Section 306 - Asphalt Concrete Pavement.**

308.02.04 Aggregate

Aggregate materials for base, foundation courses, leveling courses, or bedding shall conform to 3/4"-0 (19.05 mm-0) gradation in **Section 303 - Aggregate Bases.**

308.03.00 Preparation of Base

308.03.01 Base Preparation

Conform to lines and grades shown or as staked in the field.

Conform to dimensions shown on standard plans or detailed plans, if any.

Construct curbs, sidewalks and driveways on prepared subgrade.

Construct in conformance with current ODOT specifications.

Construct expansion and contraction joints as shown on standard plans or detailed plans, if any.

Install drop curbs per plans.

Curbs to be constructed smooth and uniform to design lines and grades.

Install weep holes per plan details.

308.03.01A - Earthwork

When roadway earthwork is called for in connection with other items of work under the same contract which includes structure construction under this Section, all excavation, backfilling, and berm construction for the structures and in the vicinities thereof as required or as shown shall conform to applicable requirements of **Section 204 - Excavation, Embankment, Bedding, and Backfill.**

When the contract which includes structure construction under this Section does not call for roadway earthwork to be performed as set forth in **Section - 204 Excavation, Embankment, Bedding, and Backfill**, perform required earthwork as follows: make excavation for the structures to required depths and widths and the bottoms thereof to a firm, even surface; remove all soft and unsuitable material and replace with material as directed; backfill prior excavations at sites and in the vicinity of the new structures with approved material placed and compacted in successive layers to a dense and firm condition; and, areas adjacent to the work shall be trimmed and shaped to a neat condition and restore disturbed areas to their original condition.

308.03.01B - Aggregate Foundation of Bedding

Construct sidewalk structures on aggregate foundation course or bedding of selected granular material as specified or directed.

When structures are to be constructed on areas where approved aggregate material is already in place, such materials may be salvaged and reused as bedding.

Foundation courses or beddings involving the furnishing of new materials shall be constructed in conformance to the applicable requirements of **Section 303 - Aggregate Bases.**

308.03.01C - Base for Portland Cement Concrete

All bases upon which new cement concrete structures are to be constructed shall be firm and free of all deleterious matter. Dampen thoroughly surfaces upon which new cement concrete is to be placed. No payment will be made for water and the work of placing base materials. The cost of preparing bases shall be considered as incidental to the construction of structures.

When new concrete is placed by the mechanical extrusion method, vertical dowel fastening to underlying concrete or asphalt may be eliminated and the bond between new concrete and underlying concrete or asphalt provided with epoxy cement applied in conformance with the manufacture's recommendations as approved. Spread epoxy at a rate which will provide a thorough coating to the surface with all voids and depressions filled. Place new structure on the epoxy cement within 15 minutes after spreading.

308.03.01D - Base for Asphalt Concrete

Bring the base of new asphalt concrete structures to proper grade, firm, dry, and free of deleterious matter.

Where asphalt concrete is to come in contact with previously placed Portland Cement concrete, asphalt concrete, or bituminous surfaces, give the area of contact an application of epoxy cement as specified for use with Portland Cement concrete in **Section 205 - Materials**, or a light coating of emulsified asphalt conforming to the requirements for Tack Coat in **Section 306 - Asphalt Concrete Pavement.**

Where dowel fastenings between new asphalt concrete and the underlying foundation are shown, the dowels may be eliminated when the asphalt concrete is placed by mechanical extrusion method provided an application of epoxy cement, as set forth herein for use with Portland Cement concrete, is used to provide positive bond between the new and old materials.

308.03.02 Forms

308.03.02A - Forms

Conform to requirements for Forms in **Section 602 - Concrete Structures.**

308.03.02B - Equipment

Plant and equipment requirements as described in **Section 306 - Asphalt Concrete Pavement** and **Section 307 - Portland Cement Concrete Pavement** may be modified as approved, when circumstances warrant. For asphalt sidewalks or islands, spread asphalt concrete by small or special pavers, by spreader boxes, or by blade graders. Compact with small, self-propelled rollers, vibratory compactors, or mechanical tampers. Spread or compact the mixture by hand methods only when approved.

The machine for extruding cement concrete curb or asphalt concrete curb shall be of the self-propelled type equipped with a material hopper, distributing screw, and adjustable curb forming devices capable of placing and compacting cement concrete or asphalt concrete to the lines, grades, and cross section as shown, in an even homogeneous manner.

Set top of curb grade by an offset guide line using the survey marks established by the Engineer. The forming tube portion of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine to provide, when necessary, a variable height of curb conforming to the predetermined curb grade. A grade line gauge or pointer shall be attached to the machine in such manner that a continual comparison can be made between the curb being placed and established curb grade as indicated by the offset guide line.

In lieu of the above method for maintaining the curb grade, the extrusion machine may be operated on approved rails or forms set at the proper relative grade.

308.03.03 Placing Material

No asphalt or concrete shall be placed until the surface and forms, where used, have been inspected and approved.

308.03.03A - Portland Cement Concrete

Construct Portland Cement concrete structures between approved forms or by an approved mechanical extrusions method, as the contractor may elect. If forms are used, maintain a 2 to 4 inch (50.80 mm-101.60 mm) slump, and thoroughly compact and strike off. If the structures are constructed by an approved mechanical extrusion method, maintain a maximum slump of 2 inches (50.80 mm). Feed cement concrete into the extruding machine at a uniform rate and operate the machine under sufficient restraint in a forward motion to produce a well-compacted mass of concrete.

308.03.03B - Asphalt Concrete

Asphalt concrete curbs may be placed by mechanical extrusion methods or between suitable forms, as the contractor may elect. Spread asphalt concrete for sidewalks, driveways, and pathways, where specified, uniformly by hand or by a paving machine and thoroughly compact in conformance with the requirements in **Section 306 - Asphalt Concrete Pavement.**

308.03.04 Finishing

308.03.04A - General

Construct all structures within 1/4 inch (6.35 mm) of true line, within 1/4 inch (6.35mm) of established surface grade, cross section, and slope, and within 1/8 inch (3.175 mm) of specified thickness, and all finished surfaces shall be free from humps, sags, or other irregularities. When a straightedge 10 feet (3.048 m) long is laid on a finished surface tangent, the surface shall not vary more than 0.02 foot (60.96 mm) from edge of the straightedge.

Where asphalt concrete or Portland Cement concrete sidewalks or pathways are to be placed around or adjacent to manholes, pipe inlets, or other miscellaneous structures, do not construct such structures to final grade until after the sidewalks or pathways have been constructed for an approved distance on each side of the structures.

308.03.04B - Portland Cement Concrete

Sidewalks and Other Structures:

Finish surface of concrete to grade and cross section with a bull float, trowel smooth, score if required, then finish with a broom. Use floats of not less than 10 feet (3.0480 m) in length for straight grade sections and not less than 6 inches (152.40 mm) in width. Finish concrete adjacent to expansion joints with an edger tool. Light brooming shall be transverse to the line of traffic and if water is necessary, it shall be lightly applied to the surface immediately in advance of brooming.

The surface of concrete sidewalks shall be marked into rectangles with a scoring tool which will leave the edges rounded. Scoring and dimensions shall be as shown on the appropriate standard plan or as directed. Sidewalks shall have a slope of 1/4 inch (6.36 mm) per foot (0.3048 m) from the top of curb to the back of walk unless otherwise shown.

Curbs:

Remove forms after the concrete has taken initial set and while the concrete is still green. Minor defects shall be repaired with mortar containing one part Portland Cement and two parts sand. Plastering will not be permitted on the faces and exposed surfaces. Honeycombed and other structurally defective concrete shall be removed and replaced at no expense to the City. While the concrete is still green, finish exposed surfaces as required to provide a uniform texture and smooth surface.

When constructing precast concrete curbs, the proportions of sand, gravel and cement, the type of forms used, and the method of compacting the concrete in the forms shall all be such that as dense, smooth and uniform a surface as is practicable for a concrete masonry unit will be obtained on the finished curb units. The faces that are to be exposed shall be free from chips, cracks, air holes, honeycomb, or other imperfections except that if there be no more than 5 percent of the curb units having slight cracks, small chips not larger than ½ inch (12.70 mm), or air holes not more than ½ inch (12.70 mm) in diameter or depth, the imperfections will not be deemed grounds for rejection.

308.03.05 Curing Portland Cement Concrete

After the concrete has been placed and finished in curb structures, as specified, it shall be cured by application of a white pigmented liquid membrane-forming compound applied uniformly to the damp concrete by pressure spray methods, or by keeping the concrete protected and moist for at least 72 hours. The concrete structure shall be kept from contact and strain for at least seven days.

Curing of concrete in all other structures shall conform to the requirements for Curing in **Section 307 - Portland Cement Concrete Pavement.**

308.03.06 Joints in Portland Cement Concrete

308.03.06A - Contraction Joints in Walks and Incidental Surfacing

Form transverse contraction joints of the weakened plane or dummy type in the exposed surfaces of cement concrete walks and incidental surfacings at such locations as are required to confine the contraction joint spacing to a maximum of 10 feet (3.048 m). The joints shall be formed to a depth of one-third of the thickness of concrete and to a width of about 1/8 inch (3.175 mm). Joint shall be tooled.

308.03.06B - Contraction Joints in Curbs

Place contraction joints in curbs at 10 foot (3.048 m) intervals and coincident to sidewalk joints. Contraction joints shall be of the open joint type and shall be provided by inserting a thin, oiled steel sheet vertically in the fresh concrete to force coarse aggregate away from the joint. The steel sheet shall be inserted one-half the depth of the curb. After initial set has occurred in the concrete and prior to removing the front curb form, the steel sheet shall be removed with a sawing motion. Finish top of curb with a steel trowel and finish edges with a steel edging tool.

308.03.06C - Expansion Joints

Provide expansion joints between driveways and Portland Cement concrete pavements, around poles, boxes, and other fixtures which protrude through, into, or against the structure, and other locations detailed on the plans, or standard plans. Place each expansion joint at right angles to the structure alignment, vertical to the structure surface, and provide complete separation between concrete surfaces.

The width of joints and thickness of filler shall match those of the joints in abutting or underlying concrete; elsewhere it shall be not less than ½ inch (12.70 mm).

308.03.06D - Requirements Near Existing Structures

Cut back existing curbs, walks, driveways, and other such structures to permit the new construction and where the new structures are to be constructed against or within 4 inches (101.60 mm) of the end, edge, or side of other structures, the new construction shall include the construction of approved connections therewith, using the same kind of concrete as is used in the new construction. Make the joint between the old and new material with a saw cut.

In this work, furnish and place preformed expansion joint filler, minimum ½ inch (12.70 mm) thickness, between new and old Portland Cement concrete.

308.03.07 Dowels, Tie Bars, Reinforcing

Provide metal reinforcing bars and wire fabric reinforcement when and as shown. When shown, provide and place dowels with "slip sleeves," as load transfer mediums. Provide and place dowels, but without "slip sleeves," as fastenings or ties between new concrete and existing underlying concrete when shown. Provide tie bars when shown. Place reinforcing, dowels and tie bars in conformance to the applicable requirements in **Section 603 - Reinforcement.**

308.04.00 Measurement and Payment

Payment to be made at unit prices named in proposal for the lineal feet (meter) or square feet (m^2) of curb, sidewalk or driveway actually constructed and accepted, including all miscellaneous work required. No addition or deduction will be made for drop curbs.

308.04.01 Measurement

308.04.01A - Curb

Curb will be measured on a linear foot (meter) basis along the face of the curb for the actual length constructed.

308.04.01B - Combination Curb and Gutter

Combination curb and gutter will be measured on a linear foot (meter) basis along the face of the curb for the actual length constructed.

308.04.01C - Sidewalk

Payment for sidewalk shall be for the lineal feet (m) or square feet (m^2) actually constructed and accepted, including all miscellaneous work.

308.04.01D - Precast Concrete Curb

Precast concrete curb will be measured on a linear foot (meter) basis along the face of the curb constructed, or on a per each basis for the actual number of precast concrete curb sections constructed.

308.04.01E - Concrete Valley Gutter

Concrete valley gutter will be measured on a square yard (m^2) basis for the actual square yards (m^2) of gutter constructed.

308.04.01F - Traffic Islands

Traffic islands will be measured by component parts of curb, and sidewalk as described above for combined curb, gutter and sidewalk.

308.04.01G - Driveways, Sidewalks, and Pathways

Measurement of Portland Cement or asphalt concrete driveways, sidewalks, or pathways will be made on a square yard (m^2) basis on the actual surface of the specified thickness concrete or asphalt completed and accepted.

308.04.01H - Sawed Joints

Sawed joints will be measured on a linear foot (meter) basis for each joint sawed, cleaned, and sealed as specified and directed.

308.04.01I - Aggregate Base

Pay quantities of aggregate bases material will be measured as set forth in **Section 303 - Aggregate Bases.**

308.04.02 Payment

Payment will be made for any or all of the following items when listed as pay items in the proposal for any particular contract:

	Payment Item	Unit of Measure
1.	Curb (specify asphalt or concrete)	Per L.F. (m)
2.	Concrete Curb and Gutter	Per L.F. (m)
3.	Sidewalk (specify asphalt or concrete)	Per S.F. (m^2) or L.F. (m)
4.	Precast Concrete Curb	Per L.F. (m) or EA.
5.	Concrete Valley Gutter	Per S.Y. (m^2)
6.	Driveways, Sidewalks, and Pathways (specify thickness and Asphalt or Portland Cement Concrete)	Per S.Y. (m^2)
7.	Sawed Joints	Per L.F. (m)
8.	Aggregate Base	Per C.Y. (m^3)