

**PART 4
STANDARD SPECIFICATIONS
FOR PAVEMENTS**

CITY OF ONALASKA, WISCONSIN

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SECTION 401: CRUSHED AGGREGATE BASE COURSE

401.1 DESCRIPTION

This item shall consist of furnishing and installing materials to result in a dense compacted base course composed of two or more courses or layers of coarse crushed stone aggregate, fine aggregate, and binder or filler blended as necessary to produce an intimate mixture, of the required gradation and stability, constructed on the prepared foundation in accordance with the specifications and in conformity with the lines, grades, thickness and typical cross sections shown on the plans or established by the Engineer.

401.2 MATERIALS

The materials shall comply with Section 301 of the State of Wisconsin Latest Edition for Standard Specifications for Highway and Structure Construction. The aggregates shall consist of hard, durable particles of crushed stone resulting from the artificial crushing of rock, boulder or large cobblestones substantially all faces of which have resulted from the crushing operation. The material shall be free from dirt, debris, frozen materials, vegetable matter, shale, and lumps or balls of clay.

The determination of the acceptability of the aggregates will be made by field evaluation and/or laboratory test. The Engineer reserves the right to prohibit the use of material from any source, plant, pit, quarry or deposit where the character of the material or method of operation is such as to make improbable the furnishing of aggregates conforming to the requirements of these specifications, unless satisfactory evidence is shown that material conforming to specification requirements is produced.

Unless specified in the Contract or permitted by the Engineer, crushed concrete, crushed bituminous pavements, and mixtures thereof shall not be used for constructing Crushed Aggregate Base Course.

A certified analysis of the material to be supplied shall be submitted to the Engineer ten days in advance of the furnishing of any material. The analysis shall be dated within 90 days of the delivery date, the tests and analysis shall be performed on material from the same pit/quarry from which the material will be supplied. The aggregates shall be well graded between the limits specified and shall conform to the following gradation requirements:

PERCENTAGE BY WEIGHT PASSING

SIEVE SIZE	CLEAR BREAKER (3" MAXIMUM)	GRADATION NO. 1 (1-1/4 MAXIMUM)	GRADATION NO. 2 (3/4 MAXIMUM)
3"	100	--	--
2-1/2"	--	--	--
2"	--	--	--
1-1/2"	75-80		--
1-1/4"		95-100	
1"	--		100
3/4"	--	70-93	90-100
1/2"	--	--	--
3/8"	--	42-80	40-75
No. 4	0-25	25-63	25-60
No. 10	--	16-48	15-45
No. 40	--	8-28	--
No. 200	0-10	2-12	3-12

Unless otherwise provided in the Contract, aggregates for the top layer of base course shall be Gradation No. 1, and the aggregates for the bottom layer shall be Clear Breaker (3+maximum). Gradation No. 2 shall be used for top dressing and final finishing.

401.3 EQUIPMENT

Equipment and tools necessary for performing and maintaining all parts of the work, satisfactory as to design, capacity and mechanical condition for the purpose intended, must be on the job before the work is started. Any equipment which is not maintained in full working order or which as used by the Contractor is inadequate to obtain the results prescribed, shall be repaired, improved, replaced or supplemented to obtain the progress and quality of work contemplated by the Contractor.

401.4 CONSTRUCTION METHODS

401.4.1 PREPARATION OF FOUNDATION

The foundation shall be so prepared and constructed so that it will have uniform density throughout. It shall be brought to the required alignment and cross section with equipment and methods adapted for the purpose. Upon completion of the shaping and compacting operations, the foundation shall be smooth, at required density, and at the proper elevation and contour to receive the course to be constructed on it.

The right is reserved to make such minor adjustments in the finished grade line from that shown on the plans as may be necessary or desirable to maintain the characteristics of a stabilized foundation, provided such adjustments do not impair the riding qualities, drainage, or appearance of the finished pavement or cause, in effect, a deviation from a grade established by the appropriate municipal ordinance. Upon completion of checking the subgrade elevations, the Engineer shall order a ~~test~~ roll+ of the finished street subgrade. The Contractor shall cooperate in this test and furnish a loaded truck of not less than 60,000 pounds gross weight. Areas of yielding or unstable material shall be excavated and backfilled with appropriate material as ordered by the Engineer. This work shall be measured and paid for under the appropriate Contract items, as street undercut and street undercut fill.

Base material shall not be placed on a foundation that is soft or spongy or one that is frozen, or is covered by ice and snow. Base material shall not be placed on a dry or dusty foundation where the existing condition would cause rapid dissipation of moisture from the base material and hinder or preclude its proper compaction. Such dry foundations shall have water applied to them and shall be reworked or re-compacted if necessary.

401.4.2 SPREADING AND SHAPING

Equipment used for spreading and shaping the crushed aggregate base course shall be designed and operated so as to spread the material in uniform layers without undue segregation. Power graders and blade graders used for spreading and shaping shall have weight, rigidity and design suitable for the work. Power graders shall have sufficient power to properly perform the work. Other types of equipment for spreading and shaping the material will be permitted, provided the work performed or produced by them is equivalent to or better than the work obtainable from the blade machines. All equipment necessary for spreading and shaping, compaction and water sprinkling of the base material shall be on the site prior to beginning the work of installing the base material.

Curb and gutter shall be installed prior to the full width placement of the crushed aggregate base course. The subgrade between the curbs shall be graded, checked, and test rolled prior to placing the base course material in this area. Crushed aggregate base course shall not be installed until curbs and gutters and other concrete structures have cured sufficiently as determined by the Engineer, to withstand hauling and placing operations.

The material shall be deposited on the foundation or previously placed layer in a manner to minimize segregation and to facilitate spreading to a uniform layer of the required dimensions. Excessive manipulation which will cause segregation between the coarse and fine materials shall be avoided. No crushed aggregate shall be placed between the curbs until the curbs have been adequately backfilled. The work shall, in general, proceed from the point on the project nearest the source of supply of the aggregate in order that the hauling equipment will travel over the previously placed material, and the hauling equipment shall be routed as uniformly as possible over all portions of the previously constructed courses or layers of the base course. Stockpiling of the aggregates shall not be allowed unless approved or ordered by the Engineer.

401.4.3 COMPACTION AND WATER SPRINKLING

Prior to and during compaction operations the material shall be shaped and maintained to proper dimensions and contour by means of blade graders or other suitable equipment. The surface of each layer shall be kept true and smooth at all times.

All crushed aggregate shall be thoroughly water sprinkled to the satisfaction of the Engineer to provide the required compaction. After leveling and water sprinkling, each layer of crushed aggregate shall be compacted to the degree that no further appreciable consolidation or movement of the base is evidenced under the action of the compaction equipment. The required compaction shall be attained for each layer before any material for a succeeding layer is placed thereon.

The compaction shall be performed by means of tamping rollers, pneumatic rollers, vibratory rollers, or other types of equipment which will produce the required results in the materials encountered, and be subject to the approval of the Engineer. Tandem or three wheel rollers, if used on the project, shall weigh at least ten (10) tons. Hauling and

leveling equipment shall be routed and distributed over each layer of crushed aggregate in such a manner as to make use of the compaction afforded thereby.

The crushed aggregate base course shall be shaped and compacted to the proper alignment and cross section. Upon completion of checking the base course elevations, the Engineer shall order a ~~fast~~ roll+ of the finished street base course. All areas where proper compaction is not attainable due to secretions of materials, excess fines, or their deficiencies in the crushed aggregate, shall be reworked as necessary to the material in them removed and replaced with material that will yield the required results. The complete cost of such reworking and replacement shall be at the Contractor's expense.

401.4.4 DRIVEWAYS

Where shown on the plans or directed by the Engineer, the Contractor shall construct driveways of Gradation No. 1 (1-1/4+ maximum size) crushed aggregate. Unless otherwise specified, driveways shall be six (6) inches in depth.

401.4.5 ALTERNATIVE ROAD BUILDING METHOD

The Contractor may, with permission of the City Engineer, use other methods of constructing street base course based on geotechnical reports certified by a licensed geotechnical engineer. At a minimum, the street cross section shall be as outlined in the City Unified Development Code. Alternative methods must be approved by the City Engineer prior to construction.

401.4.6 STREET BUILDING – A TWO PHASE APPROACH

Construction of asphaltic concrete pavements shall be done in two phases. Phase one consists of placing bituminous binder course material. Phase two, placement of the wearing course, will be delayed for a period of approximately one year. The following is the sequence for new street construction.

PHASE I:

Placement of Binder

1. All manholes get set to binder grade. Binder shall be placed so the finish rolled grade is 0.25+ above the casting. All manholes that are located on the centerline shall be set to surface grade. A binder wedge is required around all centerline manholes. The wedge shall have a minimum radius of four feet centered on the manhole casting.
2. All manholes that do not fall on the centerline shall be set to binder grade. Binder shall be placed so the finish rolled grade is 0.25+ above the casting. Manholes that are located in areas where wedging is needed for drainage shall be set by Engineer.
3. A binder wedge is required at all intersections to eliminate damage to the curb & gutter pan from snowplowing procedures. The wedging will be placed concurrently with the placement of the binder by adjusting the paving screed. The length of run-out for this wedge shall be sufficient enough to allow the plow operator to run the plow blade up onto the pan of the curb & gutter before reaching the intersection. Wedging curb pans will be done at all approaches to the intersection and extend around each radius. The wedge will vary in width with a maximum of +/- 10qin width. The wedge width may need to be adjusted at intersections to eliminate any ponding

in the intersection. There shall be no ponding in intersections after the binder and the binder wedge are in place.

4. A binder wedge is required at all sags so that the runoff from rain events can enter the storm inlets rather than ponding along the edge of the gutter pan in the street. The actual cross slope at the sag is expected to be 1.25%, enough to prevent water from ponding in the street. The extent of wedging, run-out, must be long enough to allow the stormwater the concentrates along the pan edge to eventually flow into the gutter and into the storm inlet(s) at the sag. Stated in another way, the wedging shall extend far enough upstream of the sag to obtain an elevation at the end of the run-out which is higher than the elevation at the top of the flag at the sag.
5. The cross slope of the binder shall be 2.00%. However, the cross slope in sags and intersections will be 1.25% in order to raise the binder course to an elevation that will allow water to flow into the gutter and inlets.

PHASE II:

Placement of Wearing Course

1. Mill off binder wedge at intersections, sags, and manholes to the full depth of the specified wearing course thickness. If any binder is left at the face of the curb pan it will be removed before the wearing course is placed.
2. Manholes that are not on the centerline shall be adjusted to surface grade. If such manhole is a sanitary manhole, the chimney boot shall be removed and reinstalled.
3. The binder surface will be swept and clear of all debris and a tack coat applied immediately prior to the placement of the wearing course of asphalt.
4. Wearing course shall be placed to obtain the following cross slope.

2% on all streets unless otherwise noted on the plans or approved by the Engineer.
5. The wearing course shall be placed on or prior to September 15th of the year following project acceptance.

401.5 PAYMENT

The item Crushed Aggregate Base Course shall be measured by the ton. The quantity to be measured for payment shall be the amount of material required and incorporated in the work in accordance with the Contract. The Contractor shall provide copies of all material tickets prior to payment.

The quantity of crushed aggregate measured as provided above will be paid for at the Contract unit price per ton for Crushed Aggregate Base Course, complete in place, which price shall be full compensation for furnishing, placing, watering, drying, compacting, and maintaining the crushed aggregate base course; for preparing foundation; for stockpiling, if required; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

SECTION 402 – BITUMINOUS CONCRETE

402.1 GENERAL

This work shall consist of furnishing, placing, and constructing bituminous concrete surface and base courses and/or resurfacing in accordance with the Contract documents.

The preparation of mixtures for bituminous Base, Binder, and Surface courses shall comply with the requirements of the latest amended edition of the Standard Specifications for Highway and Structure Construction of the State of Wisconsin, Department of Transportation, Division of Highways, except as modified herein or in the Special Provisions of the Contract.

402.2 PRIME AND TACK COAT

This work shall be consistent with the latest edition of the D.O.T. Standard Specifications, including the latest supplemental specifications, along with the following additions.

- A. In situations where traffic must be maintained, tack coat shall not be placed on the traveled half of the street until traffic can be switched to the new pavement.
- B. All joints in the surface layer (excluding the flag of the concrete curb and gutter) shall be tack coated by use of a hose and spray nozzle attachment to ensure a tight bond and sealed joint.
- C. Payment for Prime and Tack Coat shall be included in price for bituminous pavement and shall not be paid for separately.

402.3 ASPHALT CONCRETE PAVEMENT

This work shall be consistent with the latest edition of the DOT Standard Specifications, including the latest supplemental specifications, along with the following additions:

- A. Asphalt Concrete Pavement shall be Type E-1 on all residential streets and Type E-3 on arterial streets, unless otherwise noted.
- B. Asphaltic material shall be PG58-28 for E-1, unless otherwise noted.
- C. Trucks transporting the asphaltic material shall be covered with a tarp at all times until paving operations begin for that load. The material shall have a temperature of 270°F - 300°F at time of paving. Loads of asphalt that are less than 250°F or more than 350°F shall be rejected.
- D. Upon request, the contractor shall provide samples of the asphaltic mixture being used on the project. The contractor shall provide the Resident Project Representative one bag per day up to 1000 tons, and an additional one bag per 1000 tons thereafter.
- E. The Contractor shall submit to the City an asphaltic mix design as specified in Section 460.2.7. Cost for submitting said mix design should be included in other unit prices.
- F. The Contractor shall notify neighboring residents with a ~~hand~~ delivered, written notice+48 hours prior to surface course paving operations. The Contractor shall also

obtain No Parking signs from the Engineering Department and have them in place eight hours prior to surface course paving operations.

- G. No vehicular traffic shall be permitted until the following day after paving operations are completed for the bituminous asphalt binder course unless otherwise directed by the City Engineer. The Contractor shall provide sufficient barricading and fencing to assure compliance of this requirement. Cost for providing said protection shall be included in other unit prices.
- H. Payment for Asphalt Concrete Pavement shall be at the unit price bid per square yard.

402.4 SAWING & SEALING JOINTS

Sawing & sealing of joints shall be performed when called out for in the contract. The work shall consist of saw cutting, cleaning, drying, and sealing transverse joints for new bituminous surfaces.

402.4.1 MATERIALS

402.4.1.1 JOINT SEALANT MATERIAL

The Contractor shall provide certification that the sealant meets the requirements of ASTM D-3405 with the following modifications:

- Penetration at 77 degrees F
- 90-150 Bond at . 20 degrees F
- Standard Specimen
- 3 cycles
- 200% extension

The sealant material shall weigh not less than 9.00 nor more than 9.35 lbs/gallon.

Mixing of different Manufacturers brands or different types of sealants shall be prohibited.

402.4.1.2 BOND BREAKER TAPE

Bond breaker tape shall consist of regular masking tape or other suitable bond breaker tape designed for use with hot pour sealants. The width of the tape may be equal to but not more than 1/8 inch narrower than the width of the saw cut.

402.4.2 WEATHER LIMITATIONS

Sealant materials may be placed during a period of rising temperature after the air temperature in the shade and away from artificial heat sources has reached 40 degrees F and indications are for a continued rise in temperature. During a period of falling temperature, placement of the sealant material shall be suspended until the above conditions are met.

402.4.3 EQUIPMENT REQUIREMENTS

The melting kettle shall be double jacketed boiler type, equipped with both agitation and recirculation systems capable of melting and applying the sealant through a pressure-fed hose and wand. The melter shall be capable of starting at ambient temperature and bringing the sealing material to application temperature within an hour or less, while

continuing agitating and recirculating the sealant. The melter shall be equipped with automatic thermostatic controls and temperature gages to monitor the sealant temperature in applicator lines and temperature of heat transfer oil in the kettle jacket.

A self-propelled power saw capable of providing a straight cut uniform depth and width shall be used. Diamond saw blades with either single or gang blade arrangements shall be used. The saw blade or blades shall be of such size and configuration such that the desired joint reservoir shape and deep saw cut are achieved in one pass of the saw. Two pass cutting will not be allowed. No spacers between blades shall be allowed unless the Contractor can show that the desired reservoir and saw cut can be obtained with them. Either wet or dry sawing will be permitted provided the above conditions are met.

The air compressor shall be capable of producing a continuous stream of clean, dry air through the nozzle at 100 psi and 125 cubic feet per minute minimum. The compressed air unit shall be equipped with water and oil traps and must produce sufficient air volume pressure to remove all debris from the sawed joint and all adjacent road surfaces in a manner such that the debris will not re-enter the joint prior to the sealing operation.

The heat lance shall operate with propane and compressed air in combination and be capable of achieving a temperature of heated air at the exit orifice of 1,800 degrees F and a discharge velocity of 3,000 ft/s.

402.4.4 CONSTRUCTION

402.4.4.1 GENERAL

The Contractor shall conduct the operation so that the saw cutting of transverse joints, cleaning, and sealing are a continuous operation. Traffic shall not be allowed to knead together or damage the sawed joints. Sawed joints not sealed before traffic is allowed on the pavement shall be re-sawed, if necessary, when sawing and sealing operations resume at no additional cost to the City. Saw cutting, cleaning, and sealing shall not be done within 48 hours of placement of the wear course.

402.4.4.2 SAW CUTTING OF TRANSVERSE JOINTS

The transverse saw cut joints shall normally extend the full width of the pavement and shall extend into the asphalt shoulder a distance of 1 foot beyond the edge of the mainline pavement, unless otherwise detailed on the Plans, in the proposal or directed by the Engineer. The transverse saw cut joints shall be spaced at 40 feet intervals.

402.4.4.3 CLEANING OPERATION

Dry sawed joints shall be thoroughly cleaned with an air compressor meeting the requirements previously outlined. Cleaning shall continue until the joint is dry and all dirt, dust, or deleterious matter is removed from the joint and adjacent pavement to the satisfaction of the Engineer.

Wet sawed joints and adjacent pavement shall be thoroughly cleaned with a water blast (50 psi minimum) immediately after sawing to remove any sawing slurry, dirt, or deleterious matter adhering to the joint walls or remaining in the joint cavity. The joints shall then be dried with an air compressor. Cleaning shall continue until the joint is dry and all dirt, dust, or deleterious matter is removed to satisfaction of the Engineer. If the air compressor produces dirt or other residue from the joint cavity, the Contractor may be required to reclean the joint with a water blast.

Following cleaning, the sawed joints shall be dried and warmed with a hot air lance. The Contractor shall be careful not to burn the pavement surface. After the hot air lance has been used to warm and fry the joint, the backer tape shall be placed into the bottom of the reservoir.

402.4.4.4 SEALING OPERATION

The joints shall be sealed when the sealant material is at the potting temperature recommended by the manufacturer. The Contractor shall fill the joint such that after cooling, the sealant is flush with the adjacent pavement along the edges and the center does not sag more than 1/8 inch below the pavement or shoulder surface. Care shall be taken in the sealing of the joints so that the joints are not overfilled and the final appearance shall present a neat fine line.

The Engineer may require the Contractor to use a squeegee to force the sealant material into narrow joint shapes if in the opinion of the Engineer the sealant material is not flowing into the joint properly. Sand shall not be spread on the sealed joints to allow for opening to traffic. The sealant shall be tack free before opening to traffic.

END OF SECTION