

**SECTION 400
CONSTRUCTION
SPECIFICATIONS**

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4.01 Clearing and Grubbing

401.01. Clearing and grubbing shall consist of the removal and disposal of all organic and other deleterious material from the road section. All material removed under clearing and grubbing shall be disposed of off the right-of-way and in compliance with the State and Local permits. All denuded areas shall be hydroseeded at the end of the project.

402. Subgrade

402.01. The subgrade shall consist of the natural materials remaining after all topsoil and duff (organic material) has been removed and good construction material is remaining. The determination of the extent to which topsoil shall be removed shall be left to the discretion of the Highway District Road Supervisor or his designated representative for the Highway District, who may require soil and compaction test results to document the acceptability for construction.

402.02. In solid rock excavation, the solid rock shall be excavated 6-inches below the finished subgrade elevation and backfilled with approved granular material.

402.03. Unstable subgrade conditions shall be remedied by subexcavation and backfilling with approved granular material under the direction of the Highway District Road Supervisor or his designated representative. Geotextile fabric may be required by the Highway District Road Supervisor or his designated representative if unstable subgrade conditions can not be remedied to their satisfaction. The subexcavated surface shall be observed by the Highway District Road Supervisor or his designated representative prior to the placement of any embankment material. The Supervisor must have at least 24-hours notice prior to the need for observation. Such 24-hour notice shall be given so that the observation can be made during the appropriate Highway District's normal working hours and workweek.

402.04. All construction shall be controlled by slope stakes or grade stakes that have been placed by a Professional Engineer or Surveyor licensed in the State of Idaho prior to the construction operations. Said slope stakes shall conform to the Typical Slope Stake Installation Method shown in the Appendix of these standards.

402.05. Subgrade shall be compacted to a density no less than 95% of an AASHTO T-99 Proctor Density. All utility work within the road prism in fine grained soils (ML, CL, MH, CH, SM, GM, SC, GC) require fill to be placed in lifts only, tested at the time of placing and compacting, placement of material and compaction within 2

percentage points of optimum moisture and observed and tested with a full time technician or engineer.

402.06. The subgrade shall be observed by the Highway District Road Supervisor or his designated representative prior to placing any ballast on the subgrade. The Supervisor must have at least 24-hours notice prior to the need for observation. Such 24-hour notice shall be given so that the observation can be made during the appropriate Highway District's normal working hours and work week.

Prior to requesting observation of the finished subgrade, grade stakes set to finished subgrade elevation shall be in place on 50-foot stationing at centerline and shoulders unless a variance is granted.

403. Ballast

403.01. The ballast material shall be run through a crushing plant. Material that has only been screened will not be accepted. The ballast shall be placed to a minimum of 12-inches in thickness. The material shall be durable, have a sand equivalent not less than 30, and shall meet the following gradations:

Sieve Size	Type 1 Ballast % Passing	Type 2 Ballast % Passing
4"	100	100
3"	98-100	100
2-1/2"	--	100
2"	75-100	90-100
1"	40-80	60-85
#4	25-60	25-40
#200	5-12	3-7

Type 1 or Type 2 ballast material will be used at the direction of the Highway District. Type 1 material will generally be basalt material and Type 2 material will generally be produced from prairie gravel material. Type 1 and Type 2 material must have one or more fractured faces or natural angular faces on 50% of the particles retained on the #4 sieve or above as determined by Idaho T-71 test.

403.02. The ballast material shall be constructed in layers not to exceed 8-inches in thickness and shall be compacted using mechanical methods to at least 95% of the AASHTO T-99 Proctor Density.

403.03. Observation of the ballast is necessary by the Highway District Road Supervisor or his designated representative prior to the placing of base material. The Supervisor must have at least a 24-hour notice prior to the need for the observation. Such 24-hour notice shall be given so that the observation can be made during the appropriate Highway District's normal working hours and workweek. Prior to

requesting observation of the finished ballast, red top stakes set to finished ballast elevation shall be in place on 50-foot stationing at centerline and shoulders.

404. Base

404.01. The crushed aggregate for the base course shall be 4-inches in depth after it has been compacted and shall comply with the following gradations:

Sieve Size	% Passing
1"	100
3/4"	90-100
#4	40-65
#8	30-50
#200	3-9

The crushed aggregate base shall not show more than a loss of 35% under the Los Angeles Abrasion Test and the Sand Equivalent shall not be less than 30. The percentage of aggregate retained on the No. 4 Sieve having at least one fractured face, as determined by Idaho T-71, shall be 60%.

404.02. The material shall be laid in one or more layers to develop the compacted depth of 4-inches minimum. Material shall be mechanically compacted by rolling to 95% of the AASHTO T-99 Proctor Density. Care shall be taken to place the aggregate material in such a manner that it will have a uniform mixture throughout.

404.03. The finished base material must be observed and approved by the Highway District Road Supervisor or his designated representative prior to placing the surface course. The notification for the observation must be 24-hours prior to the observation and must be requested for observation during the appropriate Highway District's normal working hours and workweek.

Prior to requesting observation of the finished base material, blue top stakes will be set to finished base elevations at 25-foot stationing on curves and 50-foot stationing on tangents at centerline and shoulders.

The surface of any base course, when finished, shall be such that when tested with a 10' template placed on the surface with its centerline parallel to and perpendicular to the centerline of the street, the maximum deviation from the surface of the edge of the straightedge shall no where exceed 1/3 of an inch. In addition, the finished grade shall not deviate more than 1/2 of an inch at any point from the staked elevation, and provided further, the algebraic sum of the deviations from two points not more than 30-feet apart shall not exceed 1-1/2 inches.

If asphalt concrete surfacing is to be placed on the base course no portion of the complete surface of the base course shall be more than 1/2 of an inch below the edge of a straight 10-foot in length laid parallel to or perpendicular to the centerline of the

roadway. In addition, the finished grade shall not deviate more than 1/4 of an inch at any point from the staked elevation, and provided further, the sum of the deviations from two points not more than 30-feet apart shall not exceed 1/4 of an inch.

Should patching of the base course be necessary in order to meet the above tolerances, it shall be performed using methods and aggregates approved by the Highway District Road Supervisor or his designated representative.

405. Surfacing

405.01. The surface type shall be approved by the applicable Highway District, but can generally be the triple shot asphalt chip surface or hot mix asphalt concrete.

405.02. Equipment used for asphalt construction regardless of the type of surface treatment shall meet the following criteria for each type of equipment.

405.02.a. The bituminous mixture hauling trucks shall be pneumatic tired and equipped with a smooth-lined tight dump body free from cracks, holes or deep dents capable of hauling material without loss during transit. Dump body and gate shall be capable of control discharge onto the roadbed or into approved spreaders or pavers when required. The dump body shall be constructed or equipped to retain the heat of the mixture above the minimum specified for laydown.

405.02.b. Motor graders shall be a pneumatic tired, self-propelled machine with sufficient power and traction and adequate wheelbase to efficiently perform the work.

405.02.c. Bituminous pavers 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 courses of bituminous plant mix material in lane widths applicable to the specified typical section in thickness as shown on the plans. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. Paver shall be capable of being operated when laying mixtures at forward speeds consistent with satisfactory laying of the mixture. The paver shall be in good working order and subject to the review of the applicable Highway District Supervisor.

405.02.d. Rollers to be of the steel wheel, vibratory or pneumatic tire type. Rollers to be in good condition. Capable of reversing direction without backlash. Operate at speeds low enough to avoid displacement of the mixture. Provide sufficient numbers and compactive force rollers to achieve compaction as

required in Section 405.04e. Equipment which produces excessive crushing of the aggregate is not allowed. Rollers producing pickup, washboard, uneven compaction of the surface or other undesirable results are not allowed. Roller Requirements. Do not use fuel oil or other petroleum based oil as a release agent. Use only release agents consisting of mild lime water (1 part lime to 3 parts water), soap or detergent solution or and approved commercial product.

405.02.d.1. Vibratory Rollers.

- a. Variable amplitude with at least two settings.
- b. Variable frequency with minimum of 2000 VPM.
- c. Maximum rate of travel under vibration to be 2.5 mph – 220 feet/minute.
- d. Vibratory rollers with pneumatic tired drive wheels to have smooth tires that leave no visible tracks.

405.02.d.2. Pneumatic Tired Rollers.

- a. Maximum rate of travel to be 5 mph.
- b. Rollers to be equipped with smooth compactor tires.
- c. Pneumatic tire rollers to be equipped with skirts enclosing the tires on the top and sides and extending within 6 inches of the pavement surface.

405.02.d.3. Steel Wheel Rollers.

- a. Maximum rate of travel to be 4 mph.

405.02.e. The asphalt distributor must be in good working order and shall be designed and operated so a uniform application of asphalt can be applied. It must include a tachometer showing the feet per minute and the number of feet covered, a tank thermometer, and a gauge to measure the quantity of the asphalt in the distributor.

405.02.f. The aggregate spreader shall be a self-propelled machine independent of the truck, supported by at least two axles and four wheels with pneumatic tires and equipped with a means of applying cover material with positive controls so material will be uniformly deposited over the full width of the asphalt application

405.03. Triple Shot Asphalt Chip Surface

405.03.a. The triple shot asphalt and chip course shall be constructed under the direction of the applicable Highway District Road Supervisor or his

designated representative and shall consist of an application of penetration asphalt followed by two applications of chip seal coat.

405.03.b. The previously placed base material shall be shaped and rolled using a tandem steel wheel roller prior to the application of the asphalt penetration coat. The ambient air temperature shall be at least 80 degrees Fahrenheit and rising at the time of the application of the penetration shot.

405.03.c. The type of asphalt to be used for the penetration shot shall be specified by the applicable Highway District. The asphalt material shall be heated to its upper range for spraying temperature as recommended by the Asphalt Institute prior to application. The application rate shall be 0.50 gallons per square yard. The time allowed for the oil to penetrate between the application of the oil and the application of the cover material shall be specified by the Highway District Road Supervisor or his designated representative. The cover coat material shall meet the requirements of the applicable Highway District. The application rate for the cover coat shall be approximately 25 - 30 lbs. per square yard and shall be rolled with a pneumatic wheel roller. Twenty-four hours following the penetration application, the mat shall be rolled with a steel wheel roller.

405.03.d. Curing of the penetration course shall be under the direction of the applicable Highway District Road Supervisor or his designated representative and shall consist of a specified number of days of ambient air temperature above 80 degrees Fahrenheit before placing the first seal coat.

405.03.e. Prior to the first seal coat the roadway shall be power broomed and/or flushed to remove all loose material and dust. The applicable Highway District shall specify the type and application rate of the liquid asphalt. Approved chips shall be applied with a chip spreader and rolled with a pneumatic wheel roller immediately behind the distributor. Application rate for chips shall be 25 - 30 lbs. per square yard.

405.03.f. If this treatment is used, a second chip seal shall be placed on the roadway the following year using the same specification listed on 405.03.e. Also, the use of this arrangement will require an extension of or a second performance bond to be supplied to the Highway District for covering the second year's work.

405.04. Hot Mix Asphalt Concrete.

405.04.a. The hot mix asphalt concrete surfacing may be used providing it meets the following requirements and is constructed under the direction of the applicable Highway District.

405.04.b. The mix used for the hot mix asphalt concrete must be an approved asphalt mix design. Mix design characteristics must be submitted and approved by the applicable Highway District prior to its use.

405.04.c. The District shall specify an Idaho Transportation Department Class 1 or Class 3 mix. The developer shall supply the District with a preapproved Idaho Transportation Department mix design or shall develop a mix design for the District's approval.

405.04.d. Weather limitation and cutoff dates – Do not place plant mix against any material whose temperature is 32°F or less nor on a wet or frozen subgrade and gravel base courses, nor use frozen aggregates in the mix. Do not place plant mix when weather or surface conditions otherwise prevent the proper handling or finishing of the plant mix material. Place plant mix only when the air and surface temperature are 40°F and rising. Do not start plant mix removal or otherwise alter the surface of existing plant mix unless the progress schedule realistically shows that the pavement can be replaced or completed. Conform to the following minimum temperatures for all plant mix pavement operations.

Table 3

AIR AND SURFACE TEMPERATURE LIMITATIONS		
Compacted Thickness Of Individual Courses	Top Course	Leveling and Courses Below the Top Course
Less than 0.1 foot	60°F	50°F
0.1 foot to 0.18 foot	50°F	40°F
Over 0.18 foot	40°F	40°F

405.04.e. Compaction – Compact plant mix as quickly as possible following placement. Follow paver as closely as possible with break down roller. Perform intermediate rolling as near as possible to the optimum temperature for compaction as specified by the Viscosity – Temperature chart. Perform finish rolling at as high a temperature as is practical and all marks from previously rollers are removed. Do not operate vibratory rollers in vibratory mode when internal mix temperature is less than 185°F or when checking or cracking of the mat occurs at a higher temperature. Operate pneumatic rollers at a tire pressure of at least 90 psi unless otherwise directed. When rollers are not operating, park off of new mat, shut off vibrator when roller is not in compactive position. Compaction tests are not required for plant mix leveling course. Independently operate each roller used. Use the same type, weight rolling equipment and operate at the same VPMs for production paving as was established at the beginning of the operation. Begin rolling at the sides and proceed longitudinally parallel to the road centerline, with each trip overlapping ½ of the roller width. When paving operation abuts a previously placed lane, roll the longitudinal joint first, followed by the regular rolling pattern. Start at the low side of super elevated curves and progress to the high side. Do not displace the line and grade of the edges of the pavement. To prevent adhesion of mixture, keep roller wheels

moistened with water or water mixed with very small quantities of detergent or other approved material. Do not use diesel fuel, kerosene or other solvents. In areas where inaccessible to rollers, use mechanical tampers or other approved compactors. Remove all of the mixture from gutter surface prior to rolling. Protect adjoining concrete from damage. Repair all damage to concrete caused by Contractor's operation at Contractor's expense.

When using a Hveem mix design, the pavement shall be compacted to a range between 92.0 percent and 95.0 percent of maximum unit weight from the Hveem mix design for classes I, II, III mix, in accordance with AASHTO T 166, Method C and AASHTO T 209. When using a 50 blow Marshal mix design, the pavement shall be compacted to a minimum of 95 percent for residential streets and a minimum of 97 percent for industrial, arterial and collector streets. The unit weight is derived from the Marshall mix design for classes, I, II, and III mix, in accordance with AASHTO T 166 Method A.

The final mat thickness after compaction shall be no less than the minimum specified depth.

The final surface shall be of a uniform texture and shall conform to line and grade shown on the plans. Before final acceptance of the project or during the progress of the work, the thickness of all courses will be determined by the Highway District Road Supervisor or his designated representative. All unsatisfactory work shall be repaired, replaced, or corrected.

Both density and thickness shall be carefully controlled during construction and shall be in full compliance with plans and specifications.

For the purpose of testing the surface on all courses, a 10-foot straightedge shall be used.

The straightedge shall be held in successive positions parallel and perpendicular to the street centerline in contact with the surface, and the entire areas checked from one side to the other. Advances along the pavement shall be in successive stages of not more than half the length of the straightedge.

Irregularities, which may develop before the completion of rolling, shall be remedied by loosening the surface mix and removing or adding materials as may be required. Any irregularities or defects which are found after the final rolling, which vary more than 1/4 of an inch in 10-feet for surface courses shall be corrected. All minor surface projections, joints, and minor honeycombed surfaces shall be repaired smooth to grade, as may be directed by the Highway District Road Supervisor or his designated representative.