SECTION 32 12 16 – asphalt paving for parking lots and driveways

1. General
   1. SUMMARY
      1. Supply and installation of asphalt pavement structures and pavement line markings.
      2. Subgrade preparation and placement of granular base are addressed in Section 31 23 33 – Trenching and Backfilling.
      3. Related Requirements:
         1. Section 31 23 33 – Trenching and Backfilling.
         2. Section 32 16 26 – Concrete Curbs and Sidewalks.
   2. reference standards
      1. American Society for Testing and Materials (ASTM):
         1. ASTM D 242 09, Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
         2. ASTM D 692/D 692M-09, Standard Specification for Course Aggregate for Bituminous Paving Mixtures.
         3. ASTM D 946/D 946 09a, Standard Specification for Penetration Graded Asphalt Cement for Use in Pavement Construction.
         4. ASTM D 979/D 979M-12, Standard Practice for Sampling Bituminous Paving Mixtures.
         5. ASTM D 995 95b(2002), Standard Specification for Mixing Plants for Hot Mixed, Hot Laid Bituminous Paving Mixtures.
         6. ASTM D 1073 11, Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
         7. ASTM D 5581 07ae1, Standard Test Method for Resistance To Plastic Flow Of Bituminous Mixtures Using Marshall Apparatus (6-inch Diameter Specimen).
         8. ASTM D 2027/D2027M-10, Standard Specification for Cutback Asphalt (Medium Curing Type).
         9. ASTM D 3515 01, Standard Specification for Hot Mixed, Hot Laid Bituminous Paving Mixtures.
      2. Asphalt Institute:
         1. Asphalt Institute IS 91, Full Depth Asphalt Pavements for Parking Lots, Service Stations, and Driveways.
         2. Asphalt Institute MS 4, The Asphalt Handbook.
         3. Asphalt Institute SS 1, Model Construction Specifications for Asphalt Concrete.
      3. Canadian General Standards Board (CGSB):
         1. CAN/CGSB 8.2 M88, Sieves Testing, Woven Wire, Metric.
         2. CAN/CGSB 16.1 M89, Cutback Asphalts for Road Purposes.
         3. CAN/CGSB 16.2 M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
         4. CAN/CGSB 16.3 M90, Asphalt Cements for Road Purposes.
         5. CAN/CGSB 1.5 M 91, Low Flash Petroleum Spirits Thinner.
         6. CGSB 1.74 2001, Alkyd Traffic Paint.
   3. qualifications
      1. Asphalt concrete mixing plants shall conform to ASTM D 995.
      2. Provide the equipment, materials, and labour to complete the job. Variations in the size and amount of equipment will depend on the size of the area being paved.
   4. DESIGN
      1. Retain a professional engineer registered in the Province of the Work, to design and establish elevations of asphalt concrete paving.
      2. Design water retention and site grading in accordance with Authorities having Jurisdiction.
   5. BASIS OF PAYMENT
      1. Payment will be on a stipulated price payment that includes for furnishing, hauling and placement of materials, for rolling, compaction and labour, and use of equipment, tools, and incidentals necessary to complete the Work of this Section. Report immediately site conditions that differ significantly from those anticipated. Consultant will provide clarification or request a change to the work for an adjustment to the contract price.
   6. submittals
      1. Provide required product information in accordance with Section 01 33 00 – Submittal Procedures.
      2. Submit asphalt concrete mix design and list of equipment and materials proposed for use to Consultant for review.
      3. Submit a certificate of compliance indicating that the asphalt meets the requirements of the specifications, standards listed above and good local construction practices.
      4. Submit proposed design for grading and pavement construction for Consultants review. Indicated direction of flow, site water retention area meeting City requirements, thickness and types of asphalt, line painting and pre-cast curb placement, stamped and signed by professional engineer.
   7. TESTING
      1. Materials shall be tested by accredited testing laboratory and included in Bid Price.
      2. Sampling will follow recommended practice of ASTM D 979.
      3. Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.
   8. WARRANTY
      1. Provide a materials and workmanship bond for an additional period of three (3) years taking effect after one year warranty required by CCDC 2. Bond shall cover defects in material and workmanship affecting the appearance and long-term performance of the completed installation.
2. Products
   1. HOT‑MIX, HOT‑LAID ASPHALT
      1. Design and prepare plant hot mixed, hot laid pavement mixtures utilizing asphalt cement and aggregate in accordance with ASTM D3515 and the following requirements.
   2. BITUMINOUS MATERIALS
      1. Asphalt Cement:
         1. Parking Areas: Penetration grade of 200 to 300 in accordance with to ASTM D 946.
         2. Aggregates shall be coated with a minimum film thickness of 6.5 mm in accordance with Marshall Mix Design Criteria and requirements of ASTM D 5581.
      2. Tack Coat: Emulsified anionic asphalt, SS 1 or SS 1h mixed with water and meeting the requirements of ASTM D 977.
      3. Primer Coat: medium curing, medium viscosity cutback asphalt, MC 80 meeting the requirements of AASHTO M82 and ASTM D 2027.
   3. MINERAL AGGREGATE
      1. Mineral aggregate for asphalt plant mix shall consist of crushed stone, crushed gravel, sand, mineral filler, to ASTM D 692 and ASTM D 1073 and mineral filler. Mineral filler may be Portland cement, pozzolan, or commercially ground stone dust conforming to ASTM D 242, and as follows:
         1. Coarse aggregate shall be sound, angular crushed stone, crushed gravel, or crushed slag. Uncrushed coarse aggregate may be used in base course mixtures if the mixture meets all design criteria. The fine aggregate shall be well graded, moderately sharp to sharp sands.
         2. Mineral aggregate and asphalt shall be combined in a mixing plant to meet the following nominal gradations for asphalt concrete:

|  |  |
| --- | --- |
| Base and Surface Asphalt for new paving | |
| Sieve Size | % Passing by Weight |
| 3/4" | 100 |
| 3/8” | 60 – 80 |
| #4 | 40 – 65 |
| #8 | 30 – 50 |
| #30 | 15 – 30 |
| #50 | 10 – 25 |
| #100 | 5 – 20 |
| #200 | 3 - 8 |

* + - * 1. Asphalt content as a percentage of weight by total mix shall conform to the requirements of Asphalt Institute MS 4.
  1. accessories
     1. Line Paint: As indicated in Section 32 17 23 – Pavement Markings.
     2. Cast-in-place Concrete Curbs: As indicated in Section 32 16 26 - Concrete Curbs and Sidewalks.
     3. Adjustment Rims: as required to adjust elevation of manhole rims and valve chambers.

1. Execution
   1. preparation
      1. Grades and elevations shall be established by the Contractor, and as follows:
         1. The Contractor shall set grade stakes to the correct elevation.
         2. Coordinate grades with existing features and adjoining properties to ensure proper drainage.
      2. Remove all debris, vegetation, and other deleterious materials from the site, except for trees or shrubs designated for preservation.
      3. Grade site in accordance with required profiles and remove excess material removed from site.
      4. Compact subgrade at the lowest moisture content such that firm closing of hand can mould a handful of soil:
         1. Surface of subgrade after compaction shall be hard, uniform, smooth, and true to grade and cross section. Confirm compaction by driving a heavily loaded truck over subgrade and verify that minimal deflection occurred.
         2. Roll subgrade to correct conditions where significant deflection occurs.
         3. Scarify subgrade to a depth of 150 mm (6") and recompact where rolling does not correct the soft condition.
         4. Remove and replace subgrade with select materials where re compaction does not correct soft condition.
      5. Treat subgrade with a soil sterilant at the rate specified by the manufacturer to prevent the growth of weeds prior to placing base courses.
      6. Prepare granular base courses in accordance with Section 31 23 33.
      7. Apply cutback asphalt prime coat to prepared granular base courses at a minimum rate of 0.7 L/m2 (0.15 gal/yd2).
   2. PAVEMENT CONSTRUCTION
      1. Heavy Traffic Construction: Lay plant hot mixed, hot laid asphalt on prepared subgrade and base courses to a total thickness of 229 mm (9). Place material in a single thick lift during weather colder than 5 deg C (40 deg F).
         1. Asphalt base course shall be laid to a compacted thickness of 127 mm (5”).
         2. Asphalt surface course shall be laid to a compacted thickness of 75 mm (3”).
      2. Light Traffic Construction: Lay plant hot mixed, hot laid asphalt on prepared subgrade and base courses to a total thickness of 178 mm (7"), unless otherwise indicated on Drawings. Place material in a single thick lift during weather colder than 5 deg C (40 deg F).
         1. Asphalt base course shall be laid to a compacted thickness of 50 mm (2").
         2. Asphalt surface course shall be laid to a compacted thickness of 50 mm (2").
      3. Spreading Base and Surface Courses:
         1. For areas greater than 840 m2 (1,000 yd2):
            1. Asphalt base and surface courses shall be spread and struck off with a paver.
            2. Any irregularities in the surface of the pavement course shall be corrected directly behind the paver.
            3. Excess material forming high spots shall be removed with a shovel or a lute.
            4. Indented areas shall be filled with hot mix and smoothed with a lute, or the edge of a shovel being pulled over the surface.
            5. Casting of mix over such areas shall not be permitted.
         2. For areas less than 840 m2 (1,000 yd2) and in areas where it is not practical to use a paver or spreader box:
            1. Spread asphalt base and finish surface courses by hand.
            2. Use rigidly supported wood or steel forms to ensure correct grade and cross section.
            3. Placing by hand shall be performed carefully to avoid segregation of the mix.
            4. Broadcasting of the material will not be permitted.
            5. Any lumps that do not break down readily shall be removed.
      4. Roll and compact hot mix material immediately without displacement; continue rolling until thoroughly compacted and all roller marks have disappeared.
      5. In areas too small for the roller, a vibrating plate compactor or hand tamper shall be used to achieve thorough compaction.
      6. The surface of the completed work shall be level to 6 mm in 3048 mm (1/4" in 10") when tested with a straightedge. Surface shall not contain irregularities that affect drainage, create puddles created than 2 ft2.
   3. APPLICATION OF PAVEMENT LINE MARKINGS
      1. Clean pavement surface in accordance with paint manufacturers written instructions.
      2. Paint lines straight and in uniform width, at locations indicated on Drawings.
      3. Apply paint using marking machine or line stencil, and as recommended by manufacturer, to minimum 0.18 mm (0.007") dry film thickness.
      4. Line Width: Roadways and Parking Areas: As indicated on Drawings.
   4. CLEANING
      1. Remove spillage and over spray of paint from pavement, sidewalks, building and other site features. Use methods and materials without damaging and leaving visible residue on substrates.
   5. PROTECTION OF COMPLETED WORK
      1. Keep traffic off pavement markings for a time as recommended by paint manufacturer.

END OF SECTION