

1 GENERAL

- 1.1 The work of this section includes the provision of all design, labour, materials, equipment and services required to fabricate and install roadways as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
- 1.1.1 Roadway Base Courses.
 - 1.1.2 Flexible Roadway Pavement.
 - 1.1.3 Roadway Curb and Gutter.
 - 1.1.4 Roadway Appurtenances.
- 1.2 Definitions:
- 1.2.1 Heavy Vehicles: Private vehicles up to 23 000 kg.
 - 1.2.2 Light Vehicles: Private vehicles up to 3 000 kg.
- 1.3 References:
- 1.3.1 Sub-surface investigation report is provided to *[Design Builder]* for their use. The report is provided as a guide only. It is left to the *[Design Builder]* to formulate his own conclusions as to the extent of existing conditions and the accuracy of the report for proper design and construction of the roadways. Determine adequacy of sub-surface investigation report, and make additional engineering investigations at no extra cost if deemed necessary.
- 1.4 Reference Standards:
- 1.4.1 OPSS – Ontario Provincial Standard Specifications
 - 1.4.2 *[OPSS 1010 – Aggregates, March 1993]* – Granular A, B, M and select subgrade material.
 - 1.4.3 *[OPSS 1101 – Asphalt Cement, October 1989]* – Asphalt surfaces.
- 1.5 Make good all existing roadways from damage arising from the work of this contract including necessary roadway cuts, required alterations to grades, and reconfigurations of roadways proposed by the *[Design Builder]*.
- 1.6 Quality Assurance:
- 1.6.1 Roadway Base Courses: Submit reports from independent testing firm certifying material gradation and compaction results obtained on site. Reports to bear the signature and stamp of a Professional Engineer licensed in the Province of Ontario.
 - 1.6.2 Flexible Road Pavement: Submit reports from independent testing firm certifying material gradation, asphalt cement extraction, and compaction

results obtained on site. Reports to bear the signature and stamp of a Professional Engineer licensed in the Province of Ontario.

2 DESIGN

- 2.1 Design roadway alignment and cross section in accordance with the Manual of Geometric Design Standards for Canadian Roads including the Urban Supplement.
- 2.2 Design and construction to comply with recommendations of Geotechnical Engineer for heavy and light duty vehicle structures.
- 2.3 Design asphalt mix to OPSS standard for commercial sources.
- 2.4 Specify granular base and sub-base to OPSS standard for commercial sources.
- 2.5 Coordinate design of roadway entrances to public road system with local road authority, where applicable.
- 2.6 Coordinate grading and drainage design with the Stormwater Management Plan prepared for the project site. Comply with criteria established in the Master Servicing Report. Coordinate design of roadway with site services requirements.
- 2.7 Each drawing and specification submission to bear the signature and stamp of a Professional Engineer licensed in the Province of Ontario.

3 MATERIALS

- 3.1 Roadway Base Courses:
 - 3.1.1 Crushed pit run or screened stone, gravel or sand consisting of hard durable angular particles free of clay lumps, cementation, organic material, and other deleterious materials.
 - 3.1.2 Gradations to be within specified limits when tested to *[ASTM C136]* and *[ASTM C117]*. Sieve sizes to *[CAN/CGSB-8.1]*.
 - 3.1.3 Liquid Limit: to *[ASTM D4318]*, Maximum 25.
 - 3.1.4 Los Angeles Abrasion: to *[ASTM C131]*, Gradation 'A', Maximum % Loss by Mass: 40.
 - 3.1.5 Particles smaller than 0.02 mm: to *[ASTM D422]*, Maximum 3%.
 - 3.1.6 Soaked CBR: to *[ASTM D1883]*, Minimum 40.
- 3.2 Flexible Roadway Pavement:
 - 3.2.1 Asphalt Materials:
 - 3.2.1.1 Asphalt Cement: to *[CAN/CGSB-16.3]*.
 - 3.2.1.2 Reclaimed Asphalt Pavement: Crushed and screened to 100% passing 50 mm screen before mixing.

- 3.2.1.3 Asphalt Concrete Aggregates:
 - 3.2.1.3.1 Crushed or screened stone, gravel and sand.
 - 3.2.1.3.2 Gradations to be within limits specified when tested to *[ASTM C136]* and *[ASTM C117]*. Sieve sizes to *[CAN/CGSB-8.1]*.
 - 3.2.1.3.3 Sand equivalent: to *[ASTM D2419]*. Maximum 50.
 - 3.2.1.3.4 Magnesium Sulphate Soundness: to *[ASTM C88]*. Maximum % loss by weight: coarse aggregate 12, fine aggregate 16.
 - 3.2.1.3.5 Los Angeles Degradation: to *[ASTM C131]*. Maximum % loss by weight: coarse aggregate 35.
 - 3.2.1.3.6 Absorption: to *[ASTM C127]*. Maximum % by weight: coarse aggregate 1.75.
 - 3.2.1.3.7 Lightweight particles: to *[ASTM C123]*. Maximum % by mass, with less than 1.95 relative density: 1.5.
 - 3.2.1.3.8 Flat and elongated particles: to *[ASTM D4791]*. Maximum % by weight: coarse aggregate 15.

3.2.1.4 Mineral filler: finely ground particles of limestone, Portland cement or other non-plastic mineral matter.

3.2.1.5 Tack Coat: to *[CAN/CGSB-16.2, grade SS-1]*.

3.3 Roadway Curb and Gutter:

- 3.3.1 Acceptable materials: cast-in-place concrete to match Owner's standard and match in with existing conditions.
- 3.3.2 Provide adequate protection for winter construction.
- 3.3.3 Minimum compressive strength to be 20Mpa on 28 days, air entrainment for concrete to be 7% in curbs and sidewalks.

3.4 Roadway Appurtenances:

3.4.1 Traffic Paint Materials:

- 3.4.1.1 Flat finish organic solvent based traffic paint film visible under daylight and artificial light with addition of overlay glass beads.
- 3.4.1.2 Flat finish water based traffic paint film visible under daylight and artificial light with addition of overlay glass beads.
- 3.4.1.3 Colour:
 - 3.4.1.3.1 White: *[CGSB 1-GP-12C]*, white 513-301

3.4.1.3.2 Yellow: U.S. Federal Standard 595B, yellow 33538

3.4.1.3.3 Black: *[CGSB 1-GP-12C]*, black 512-301

4 INSTALLATION

4.1 Roadway Base Courses:

4.1.1 Place and shape granular material to lines and grades as required.

4.1.2 Compact granular material to 98% corrected maximum dry density in accordance with *[ASTM D698]*.

4.2 Flexible Roadway Pavement:

4.2.1 Place asphalt pavement with mechanical self-powered pavers capable of spreading hot mixes to lines and grades required.

4.2.2 Compact hot mix with sufficient numbers of rollers of type and weight required to obtain density of 95% of density obtained in accordance with Marshall specimens prepared in accordance with *[ASTM D1559]*.

4.3 Painting:

4.3.1 Equipment to conform to requirements of Manual for Uniform Traffic Control Devices for Canada.

4.3.2 Apply solvent based or water based traffic paint with uniform stripe of required width and thickness, with sharp edges without excessive splatter or over spray.

4.3.3 Apply glass bead overlay with spray equipment dispenser at recommended rate.

End of Section