

**1. GENERAL**

1.1 DESCRIPTION

- .1 The work described under this section includes the supply of materials and installation of painted and hot thermoplastic pavement markings on asphalt concrete pavement at the locations indicated on the Drawings and/or designated by the Engineer.
- .2 The Work described under this section includes the supply of materials and installation of cold plastic pavement markings on Portland Cement Concrete Pavement (PCCP) at the locations indicated on the Drawings and/or as designated by the Engineer.

1.2 MEASUREMENT AND PAYMENT

- .1 Measurements for painted, hot thermoplastic, or cold plastic pavement markings:
  - .1 Centre lines, lane lines, stop lines, crosswalk lines, and pavement edge lines shall be either per lump sum or lineal metres at the specified width, as specified within the Bid Forms.
    - .1 If per lineal metre, the measurement for dashed lines will be continuous.
  - .2 Pedestrian "zebra" crosswalks, arrows, symbols, etc. shall be either per lump sum or per each unit completed, as specified within the Bid Forms.
  - .3 Pavement markings in parking lots shall be either per lump sum or lineal metres of painted/placed lines at the specified width, as specified within the Bid Forms.
- .2 The unit or lump sum price shall include the supply of all materials, equipment, labour and supervision, and tools required to prepare the surface, grinding, painting or placing the lines and other pavement markings, providing and setting forms, providing traffic control devices such as barricades, cones, etc., final cleanup and all other related or incidental tasks necessary to satisfactorily complete the Work.

**2. PRODUCTS**

2.1 PAINTED MARKINGS

- .1 To CGSB 1-GP-74M, alkyd traffic paint.
- .2 To CGSB 1-GP-149M, alkyd reflectorized traffic paint.
- .3 Colour: to CGSB 1-GP-12C yellow 505-308 white 513-301.
- .4 Thinner: to CAN/CGSB-1.5.

2.2 HOT THERMOPLASTIC MARKINGS

- .1 The marking materials shall be manufactured to be applied onto the pavement material in liquid form with glass spheres both mixed in and dropped onto the material after application. The markings shall be hot-extruded, having a specific gravity of 2.0 minimum at 25°C, having a softening point of 90°C according to ASTM E28.

- .2 No change in formulation is to be made unless approved by the Engineer. Any significant change will be subject to field trials.
- .3 The material, while on the roadway surface and at any natural ambient temperature shall exist as a solid line with cold ductility that permits normal movement with the road surface without chipping or spalling. Propagation of a pavement crack through the lane marking material shall be excluded from this requirement.
- .4 Composition
  - .1 The material shall be free from all skins, dirt, and foreign objects.
  - .2 The compound shall be resistant to the effect of ultra-violet light. This includes material degradation, discolouration, and bond failure.
  - .3 Material shall be non-toxic and not harmful to persons or property when in hardened state.
  - .4 Water Absorption:
    - .1 0.5% maximum by mass retained water after twenty-four (24) hour immersion, according to ASTM D570 Procedure A.
  - .5 Impact Resistance:
    - .1 Minimum 1.13J at 25°C when material is cast into bar of 25mm<sup>2</sup> cross-section by 75mm long, with 25mm extending above the vice jaws in a cantilever beam (Izod type) tester using the 2.82J scale, according to ASTM D256 Method C.
  - .6 Abrasion Resistance:
    - .1 Maximum weight loss of 0.50g when subjected to two hundred (200) revolutions on the Taber abrader at 25°C using H-22 Calibrate wheels weighted to 500g with sample kept continuously wet with distilled water. Prepare the test sample with the representative material placed on a 100mm square plate, 3mm±0.1 thick.
  - .7 Indentation Resistance:
    - .1 The reading of the Shore Durometer, Type A2 as described in ASTM D1706, after fifteen (15) seconds and using a 0.907kg weight, after heating shall not be less than 65 ±2 at 46°C, and 90 ±2 at 25°C.
- .5 Colour
  - .1 Yellow: Conforming to CGSB Colour #505-308 or U.S. Federal Standard 595a Colour chip 33538, 45% minimum when measured with the Gardner Multi-Purpose Reflectometer 0, 45° daylight luminous directional reflectance with a green filter. Colour tolerance shall fall within the limits of U.S. Department of Transport yellow tolerance chart, PR colour #1.
  - .2 White: Brilliant white, 70% minimum when measured with the Gardner Multi-Purpose Reflectometer 0, 45° daylight luminous directional reflectance with a green filter, or match CGSB Colour #513-301 or U.S. Federal Standard 595B Colour 17886. The white material shall not exceed a yellowness index of 0.15 (AASHTO T250).
- .6 Retroreflectivity
  - .1 The initial reflectance for the in-place marking, measured seven (7) to ten (10) Days after application, shall have the minimum reflectance values shown as follows, as obtained with a MiroLux 30 retroreflectometer:

<b>Dry Night</b>	
White	200 mcd / lux / m <sup>2</sup>
Yellow	175 mcd / lux / m <sup>2</sup>

.2 Failure to meet these requirements shall require the Contractor to replace the portion of the material shown to be below these minimums.

.1 Retained Retroreflectivity

.1 The retained reflectance for longitudinal lines, for at least sixty (60) months after placement, shall have the minimum reflectance values shown as follows as obtained with a Mirolux 30 Retroreflectometer:

<b>Dry Night</b>	
White	200 mcd / lux / m <sup>2</sup>
Yellow	175 mcd / lux / m <sup>2</sup>

.2 Failure to meet these requirements shall require the Contractor to replace the portion of the material shown to be below these minimums.

.2 Chemical Resistance

.1 Test samples of 50mm square should show no signs of degradation after exposure to:

- .1 5% NaCl (twenty-four (24) hour immersion)
- .2 5% CaCl (twenty-four (24) hour immersion)
- .3 One (1) hour spot test with mineral oil
- .4 No deterioration when in direct contact with asphalt cement in asphaltic materials or with sodium chloride or potassium chloride or other de-icing materials.

.3 Bond Strength

.1 The material shall be suitable for application on old and new asphalt concrete pavement. Bond strength shall be sufficient for the material to remain in place for a minimum of five (5) years.

.4 Skid Resistance

.1 Minimum vehicle skid resistance of the in-place markings shall not be less than 45 based on Portable Skid Resistance Tester, Road Research Laboratory, Road Note Number 27, British Standards Institution.

.5 Premarking Paint

.1 As approved by the Engineer.

.6 Glass Beads

.1 Minimum 80% true spherical shape; clear of cloudiness, dark inclusions, trapped air, or other defects; and conforming to the following:

- .1 Index of Refraction: 1.5 minimum when tested in liquid immersion at 25°C according to CGSB 1-GP-71 Method 49.1.
- .2 Glass sphere content: minimum 20%, maximum 30% by mass of thermoplastic material.

- .3 Gradation of glass beads for mixing with and for surface application on thermoplastic material, tested according to ASTM D1214:

Sieve Size (mm)	% Passing by Mass
0.85	90 - 100
0.3	15 - 50
0.18	0 - 10

- .7 Other Requirements
  - .1 Material shall be suitable for application in film thickness from 1.0mm up to 7.0mm. Normal surface applications will be from 1.5mm to 3.0mm thick.
  - .2 Material when cured shall be flexible when cast into film thickness of 2.0mm to 5.0mm.
  - .3 Material shall contain no solvents.
  - .4 The compound shall not deteriorate by contact with chemicals used against formation of ice on roadways, or because of oil content in pavement materials, or oil dropping from traffic.
  - .5 The curing time shall be controllable by workers. Normal curing time shall be less than forty (40) minutes. Total, 100% curing must be complete within one (1) hour.

1.2 COLD PLASTIC MARKINGS

- .1 The material shall be manufactured for application by extrusion onto pavement in liquid form with glass spheres both mixed in and dropped onto the material after application.
- .2 Materials shall be available in both white and yellow colours.
- .3 The material, while on the roadway surface and at any natural ambient temperature shall exist as a solid line with cold ductility that permits normal movement with the road surface without chipping or spalling. Propagation of a pavement crack through the lane marking material shall be excluded from this requirement.
- .4 The material shall be free from all debris, dirt, and foreign objects.
- .5 The compound shall be resistant to the effect of ultra-violet light. This includes material degradation and discoloration.
- .6 Material shall be non-toxic and not harmful to persons or property.
- .7 Colour
  - .1 Yellow: Conforming to CGSB Colour #505-308 or U.S. Federal Standard 595B Colour Chip 33538, 45% minimum when measured with the Gardner Multi-Purpose Reflectometer at 45o - 0o of luminous directional reflectance with a green filter. Colour tolerance shall fall within the limits of U.S. Department of Transport yellow tolerance chart, PR colour #1.
  - .2 White: Brilliant White conforming to U.S. Federal Standard 595B Colour Chip 37925, 70% minimum when measured with the Gardner Multi-Purpose Reflectometer at 45o - 0o daylight luminous directional reflectance with a green

filter or match U.S. Federal Standard 595B Colour 17886. The white material shall not exceed a yellowness index of 0.15 (AASHTO T250).

- .8 Water Absorption
  - .1 Materials shall have no more than 0.5% by weight of retained water when tested by ASTM designation D-570, "Water Absorption of Plastics," procedure (A) (24-hour immersion).
- .9 Softening Point
  - .1 Materials shall not have a softening point
- .10 Specific Gravity
  - .1 Specific gravity of the plastic compound at 25°C, shall be from 1.9 to 2.2.
- .11 Impact Resistance
  - .1 Shall not be less than 1.13 newton-metres at 25° C after the material has been heated for four hours at 204°C, and cast into bars of 25 mm cross-sectional area, 75 mm long and placed with 25mm extending above the vice in a cantilever beam tester using the 2.82 newton-metre scale. This instrument is described in ASTM designation D-246.
- .12 Abrasion Resistance
  - .1 Materials shall have a maximum weight loss of 1.0 grams when subjected to 200 revolutions on a Taber Abrader at 25°C using H-22 Calibrade wheels weighted to 500 grams. The test samples shall be prepared by forming representative lots of materials at a thickness of 3mm ±0.1mm on a 100mm square plate. The test surface shall be kept wet during the test.
- .13 Indentation Resistance
  - .1 The reading of the Shore Durometer, Type A2 as described in ASTM designation D-1706, after fifteen (15) seconds and using a 0.907kg weight shall not be less than the amounts specified below when the material is tested after heating for temperatures:

Temperature	Reading
46°C	65 ±2
25°C	90 ±2
0.18	0 - 10

- .14 Chemical Resistance
  - .1 Test samples of 50mm square should show no signs of degradation after exposure to:
    - .1 5% NaCl (twenty-four (24) hour immersion)
    - .2 5% CaCl (twenty-four (24) hour immersion)
    - .3 One (1) hour spot test with mineral oil
    - .4 No deterioration when in direct contact with sodium chloride or potassium chloride or other de-icing materials.

.15 Glass Beads

- .1 Imperfections: The surface of the spheres shall be smooth and free from film, scratches, and pits. At least 80% shall be of true spherical shape, and free from milkiness, dark or air inclusions, and other defects.
- .2 Index of Refraction: The liquid immersion method at 25°C may be used to determine the refractive index of glass spheres. A refractive index of 1.5 to 1.6 is required.
- .3 Gradation: The spheres shall meet the following gradation requirements when tested in accordance with ASTM designation D-12214.
- .4 Spheres included in manufacture and application on liquid material shall meet the following standards:

Sieve Size (mm)	% Passing by Mass
0.90	90 - 100
0.30	20 - 50
0.20	0 - 10

.16 Retroreflectivity

- .1 The initial reflectance for the in-place marking, measured seven (7) to ten (10) days after application, shall have the minimum reflectance values shown as follows, as obtained with a Mirolux 30 Retroreflectometer.

Dry Night	
White	200 mcd / lux / m <sup>2</sup>
Yellow	175 mcd / lux / m <sup>2</sup>

- .2 Failure to meet these requirements shall require the Contractor to replace the portion of the material shown to be below these minimums.

.17 Retained Retroreflectivity

- .1 The reflectance for longitudinal lines, for at least thirty-six (36) months after placement, shall have the minimum reflectance values shown as follows, as obtained with a Mirolux 30 Retroreflectometer:

Dry Night	
White	75 mcd / lux / m <sup>2</sup>
Yellow	60 mcd / lux / m <sup>2</sup>

- .2 Failure to meet these requirements shall require the Contractor to replace the portion of the material shown to be below these minimums.

- .18 Failure to meet these requirements shall require the Contractor to replace the portion of the material shown to be below these minimums.

.19 Bond Strength

- .1 The material shall be suitable for application on old and new Portland cement concrete. Bond strength shall be sufficient for the material to remain in place for a minimum five (5) years.

- .20 Skid Resistance
  - .1 Minimum vehicle skid resistance of the in-place markings shall not be less than 45 based on Portable Skid Resistance Tester, Road Research Laboratory Road Note Number 27, British Standards Institution.
- .21 Other Requirements
  - .1 Material shall be suitable for application in film thickness from 1.0mm up to 7.0mm. Normal surface applications will be from 1.5mm to 3.0 mm thick.
  - .2 Material when cured shall be flexible when cast into film thickness of 2.0mm to 5.0mm.
  - .3 Material shall contain no solvents.
  - .4 The compound shall not deteriorate by contact with chemicals used against formation of ice on roadways or because of oil content in pavement materials or oil dropping from traffic
  - .5 The curing time shall be controllable by workers. Normal curing time shall be less than forty (40) minutes.
  - .6 Total, 100% curing must be complete within one hour.

## **2. EXECUTION**

### 2.1 GENERAL

- .1 The Contractor shall assume all costs resulting from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work, agrees to indemnify and save harmless the Owner and its duly authorized representatives from all suits at law, or action of every nature for or on account of the use of any patented materials, equipment, devices, or processes.

### 2.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator is to be an approved pressure type distributor capable of applying paint in single and dashed lines and that will ensure uniform application and having a positive shut-off.
- .2 Grooving machine shall be subject to the Engineer's approval.

### 2.3 CONDITIONS OF THE SURFACE

- .1 Pavement surface is to be free from surface water, frost, ice, dust, oil, grease and other foreign material.
- .2 Remove conflicting markings as shown on the Drawings, or as directed by the Engineer.

### 2.4 PAVEMENT CLEANING

- .1 It will be the Contractor's responsibility to co-ordinate its pavement marking scheduling with the Owner, and to eliminate any debris before painting. A minimum of five (5) working Days' notice must be provided. The Contractor at its cost shall undertake any

hand sweeping required. Under no circumstances shall the Contractor paint over an unsuitable surface.

## 2.5 TRAFFIC CONTROL AND WORK AREA

- .1 The Contractor shall, at all times, keep traffic congestion to a minimum. Unless otherwise directed by the Engineer, the Work shall be undertaken from one lane only, and all labourers, materials, and Equipment shall be contained as much as possible in the lane. The work shall be carried out as quickly as possible to prevent excessive delay and inconvenience to traffic.
- .2 It is the intent that all pavement markings shall be installed prior to the opening of the road to traffic. If this cannot be achieved for whatever reason, the Contractor shall provide temporary markings at no additional cost. These temporary markings shall be removed when the permanent markings are installed. Permanent markings shall be placed no more than two (2) weeks after the temporary markings have been placed.

## 2.6 PAINT APPLICATION

- .1 Centre line, lane line and edge line pavement markings are to be laid out by the Contractor unless otherwise directed by the Engineer. The Contractor shall lay out all other pavement markings. All layouts are to be approved by the Engineer prior to the application of paint.
- .2 Unless otherwise approved by the Engineer, apply paint only when the ambient air temperature is above 10°C, wind speed less than 20km/h and no rain is forecast.
- .3 Apply traffic paint evenly to achieve a 15mil wet thickness.
- .4 Do not thin paint.
- .5 The traffic paint shall be uniformly applied at a minimum rate of not less than 38L/km of solid 100mm wide line.
- .6 Symbols and letters to conform to dimensions indicated.
- .7 Painted lines must be of uniform colour and density with sharp edges.
- .8 Thoroughly clean distributor tanks before refilling with a different colour.
- .9 Apply glass beads at a rate of 600g/L of paint.
- .10 The Contractor may heat the paint prior to application to the roadway surface to reduce the drying time, but under no circumstances shall the paint be heated to a temperature in excess of 65°C.

## 2.7 HOT THERMOPLASTIC APPLICATION

- .1 Pre-marking



- .1 The Contractor is responsible for pre-marking all work.
  - .2 Pre-marking must be done on a clean, dry road surface with pre-marking paint.
  - .3 Unless authorized by the Engineer, pre-marking shall be within 100mm accuracy of plan dimensions; notwithstanding this, pre-marking shall indicate straight lines and smooth curves.
  - .4 Pre-marking shall be reviewed by the Engineer prior to the installation of the markings. Changes in the alignment of the markings that do not correspond to the plans may be made in the field only by the Engineer. Any changes made in the field must be recorded by the Contractor on plans issued by the Owner or the Engineer and returned to the Owner.
  - .5 The markings shall not be installed over a longitudinal joint or seam except transverse markings such as stop lines and crosswalk lines.
- .2 Grooving
- .1 Cut a groove into the pavement surface to the designated width and depth. Remove the grindings and haul to a designated location. Sweep or airblast the groove clean and dry.
  - .2 If the lane marking system involves grooving/grinding of the roadway, no grooving/grinding of the roadway will be permitted in any one day beyond what can be cleaned and inlaid with material in that same day.
- .3 Heat material and apply according to manufacturer's hot extrusion process.
- .4 To ensure the best possible adhesion, the material shall be applied in a molten state at a minimum temperature of 190°C for white markings and 165°C for yellow markings, or as per the manufacturer's recommendations.
- .5 Apply glass beads to the surface of the extruded material while it is still molten at a rate of 140g/m<sup>2</sup> to 250g/m<sup>2</sup>.
- .6 Thickness
- .1 The thermoplastic material shall completely fill the groove and extend not less than 1.0mm but not more than 3.5mm above the surface.
  - .2 The thickness of all longitudinal pavement markings shall be 7mm: 5mm below, and 2mm above the pavement surface.
  - .3 The thickness of all lateral pavement markings shall be 12mm: 10mm below, and 2mm above the pavement surface.
  - .4 The thickness of all arrow pavement markings shall be 7mm: 5mm below, and 2mm above the pavement surface.
- .7 Trim surplus material to give clean straight edges.

## 2.8 TEST SECTION FOR HOT THERMOPLASTIC MARKINGS

- .1 Prior to the commencement of surface overlay paving, the Contractor shall demonstrate the effectiveness and ability of the lane markings. This shall be achieved by a test section of at least 50m length that demonstrates the Contractor's ability to meet the requirements of these project Specifications. Lane markings previously constructed in by the Contractor in an environment the Engineer deems similar to Lloydminster, using

the same equipment and techniques as proposed for this Bid, may be accepted by the Engineer.

## 2.9 COLD PLASTIC APPLICATION

- .1 Pre-marking
  - .1 The Contractor is responsible for pre-marking all work.
  - .2 Pre-marking must be done on a clean, dry road surface with pre-marking paint.
  - .3 Unless authorized by the Engineer, pre-marking shall be within 100mm accuracy of plan dimensions; notwithstanding this, pre-marking shall indicate straight lines and smooth curves.
  - .4 Pre-marking shall be reviewed by the Engineer prior to the installation of the markings. Changes in the alignment of the markings that do not correspond to the plans may be made in the field only by the Engineer. Any changes made in the field must be recorded by the Contractor on plans issued by the Owner or the Engineer and returned to the Owner.
- .2 The cold plastic material shall be installed on top of the Portland cement concrete surface which has been prepared in accordance with the manufacturer's recommended procedures.
- .3 The longitudinal markings shall not be installed within 50mm of a longitudinal joint and the lateral markings shall not be installed within 50mm of a transverse joint.
- .4 All work must be done on a clean, dry road surface.
- .5 The cold plastic material shall be applied in accordance with the manufacturer's recommended application/installation procedures.
- .6 Surface Preparation
  - .1 The Portland Cement Concrete Pavement (PCCP) surface shall be prepared in accordance with the manufacturer's recommendations.
- .7 Thickness
  - .1 Pavement markings shall be applied in thicknesses recommended by the manufacturer to meet all the requirements of this specification.

## 2.10 TEST SECTION FOR COLD PLASTIC MARKINGS

- .1 Prior to the commencement of surface overlay paving, the Contractor shall demonstrate the effectiveness and ability of the lane markings. This shall be achieved by a test section of at least 50m length that demonstrates the Contractor's ability to meet the requirements of these project Specifications. Lane markings previously constructed in by the Contractor in an environment the Engineer deems similar to Lloydminster, using the same equipment and techniques as proposed for this Bid, may be accepted by the Engineer.

## 2.11 PROTECTION OF WORK COMPLETED AND CLEANUP

- .1 Protect pavement markings until dry with cones or barricades complete with flashers and advance warning signs where required.
- .2 Repair any damage as directed by the Engineer.
- .3 Upon completion of the Work, clean up and leave the Site free of debris and waste matter.

## 2.12 TOLERANCE

- .1 Paint markings
  - .1 Width to be within  $\pm 5$ mm of dimensions specified.
- .2 Hot Thermoplastic Markings
  - .1 Measurement:
    - .1 The quality assurance laboratory will core suspect markings. The average thickness of three (3) cores will represent 300m of marking, or one (1) job site, whichever is less.
  - .2 Overfill Thickness:
    - .1 That portion of marking above pavement surface will receive no additional payment. If overfill exceeds 3.0mm, in excess of the required thickness as stipulated in Section 3.7, the Engineer may order the removal and replacement of the marking.
  - .3 Groove Thickness Deficiencies:
    - .1 Where a significant number of deficiencies occur, involving average thicknesses less than 70% of that specified, the Engineer may order the complete removal and replacement.
  - .4 Surface Dishing:
    - .1 If surface dishing deeper than 0.5mm occurs, the Engineer may order removal and replacement. Variations in the asphalt surface profile may be taken into consideration.
  - .5 Groove Width Deficiencies:
    - .1 The quality assurance laboratory will determine the groove width of suspect markings by average measurement of three (3) cores representing 300m of marking, or one jobsite, whichever is less.
- .3 Cold Plastic Markings
  - .1 In accordance with the manufacturer's recommended tolerances.

## 2.13 CORRECTION OF FAULTY WORK

- .1 All lines that are incorrectly painted or placed with respect to hot thermoplastic or cold plastic pavement markings by the Contractor, or painted/placed where no lines are specified, shall be removed by the Contractor at its own expense and to the satisfaction of the Engineer. The method and equipment used by the Contractor to remove incorrectly painted/placed lines will be subject to the approval of the Engineer.

- .2 Faulty markings must be redone within five (5) Days at the Contractor's expense.

#### 2.14 TYPES OF MARKINGS

- .1 The pavement markings shown on the plans were designed, where possible, in compliance with the Manual of Uniform Traffic Control Devices for Canada. If conflict arises as to the interpretation between the plans and the Manual of Uniform Traffic Control Devices for Canada, precedence shall be given to the plans.
- .2 Arrows shall be white and designed according to the Manual of Uniform Traffic Control Devices for Canada.

#### 2.15 TEMPORARY PAVEMENT MARKINGS

- .1 The Contractor shall provide interim pavement markings on all cold milled surfaces, on all newly constructed asphalt concrete pavement surfaces or on tacked surfaces that are to be exposed overnight as well as Portland Concrete Cement Pavement (PCCP) surfaces.
- .2 Prior to the start of the construction, the Contractor is responsible for measuring and confirming the type, size and location of all pavement markings on the site and for establishing field references for the layout of temporary pavement markings.
- .3 When paint is used for temporary markings, the paint shall be the same colour as the permanent markings designed for the Work. All paint spots shall be 100mm wide and 300mm long, shall be applied lengthwise to the road surface, shall be spaced 10m apart on centre and tangent sections, and 5m apart on curves, and shall be completely covered with glass beads at the time of painting. When self-adhesive, reflectorized pavement marking tape is used, the spacing shall be the same as used for paint spots. Tape on lower lifts does not need to be removed prior to the placement of the next lift of asphalt concrete pavement.

#### 2.16 HOT THERMOPLASTIC AND COLD PLASTIC MARKINGS WARRANTY

- .1 The Contractor shall provide written confirmation that hot thermoplastic and cold plastic pavement markings installed shall be guaranteed to remain intact and maintain their physical requirements for five (5) years, while being subjected to traffic during both normal summer and winter, and roadway maintenance procedures. The five (5) year requirement shall not hinder the issuance of a Final Acceptance Certificate for the remainder of the Work as it is understood that the written confirmation provided by the Contractor binds the Contractor to the Owner for any reasonable failures within the five (5) year period.
- .2 In the event failure of the hot thermoplastic and cold plastic pavement markings occurs within the five (5) years as specified above, the Contractor at its sole expense shall repair the failed area to the satisfaction of the Engineer.

**END OF SECTION**

<b>REVISION LOG</b>		
<b>DATE</b>	<b>REVISION</b>	<b>COMMENTS</b>
01/29/2021	Addition of Cold Plastic Markings.	N/A