

## **Night Work Specification**

### **1.0 Hours of Work**

The contractor is advised that most work for this contract will be carried out during night time hours. For the purposes of this contract "night" is defined as the period beginning one half hour after sunset and ending one half hour before sunrise as posted by Environment Canada.

Full or partial lane closures (including ramps) will **not** be permitted during the following hours :

Monday to Friday	6:00 AM to 7:00 PM
Saturday	10:00 AM to 7:00 PM
Sunday	11:00 AM to 7:00 PM

**Lane closures not in compliance with these limits will be subject to a lane rental fee of \$750.00 for every 15 minute increment or any part thereof.**

### **2.0 Traffic Control Plan**

At least 30 days prior to the start of work the contractor must submit 4 bound copies of a detailed "Night-Time Work Plan" for review and approval by the Department. The plan must be updated by the contractor as operations require.

The plan must include, but may not be limited to :

#### **Traffic Control**

- C Detailed written description of all traffic control procedures (referenced to drawings).
- C Detailed drawings of all traffic control procedures and signing including controls for ramp traffic - all drawings to be on either letter or tabloid size sheets with title blocks.
- C Detailed description of set-up/tear down and lane shift times, sequences & procedures.
- C Detailed description of all channelization and guiding devices to be used.
- C Detailed plan for handling emergency vehicles passing through the site.
- C Frequency of inspection and detailed procedure of patrolling the traffic control set-up.
- C Details for placing temporary traffic markings & erection of shoulder hazard signing.
- C Details of Traffic Control Person personal protective equipment.
- C Detailed sketch of proposed temporary sign stand design.
- C Detailed drawings of all work area internal traffic control procedures - all drawings to be on either letter or tabloid size sheets with title blocks.

### **Lighting Plan**

The lighting plan must be prepared by a Professional Engineer knowledgeable in the science of photometrics and vision.

- C Descriptions and sketches of the layout of light towers including spacing, luminary height, lateral placement and anticipated illuminance provided.
- C Photometric & physical specifications of all lighting equipment.
- C Detailed description of all lighting to be used on construction equipment.
- C Methods to be employed to reduce glare.
- C Contractor's frequency and procedure for checking illumination levels.

### **Special Safety Elements**

- C Details of personal protective equipment which will be required for workers.
- C Detailed lesson plans for training which will be given to workers and an example of the card which will be issued to personnel who have received the training.
- C Details of equipment warning devices which will be employed.
- C Detailed Hazard Assessment for night work.
- C Emergency response plans.

### **Other Elements**

- C Noise and vibration abatement methods which will be employed where necessary

## **3.0 Minimum Requirements**

The provisions of the Nova Scotia Temporary Traffic Control Manual apply to this project. A pilot vehicle shall be used to guide traffic during all lane closures on this project.

Additional minimum requirements for work at night on this project are as follows.

### **3.1 Signing**

**3.1.1 Materials** : All signs shall have retroreflective sheeting which meets the requirements of ASTM Type III sheeting.

**3.1.2 Placement** : Signs shall be erected at a minimum height of 1.5 m to the bottom of the sign. They must be essentially perpendicular to the direction of traffic and vertical. The sign shall be adequately supported to ensure minimal movement from this position.

The supports for these signs shall be constructed so that they break away or collapse on impact.

**3.1.3 Flashing Light Units** : Units shall have lights which can be dimmed. Non-functioning lamps and bulbs shall be replaced immediately. Red and white reflective tape shall be applied to all sides of the unit such that it defines the outline of the unit.

### **3.2 Channelization Devices**

**3.2.1 Materials** : Retroreflective sheeting for all channelization devices (cones and drums) shall meet the requirements of ASTM Type III sheeting.

Drums shall be used for all channelization on "100 Series" highways.

Cones may be used for channelization on "non-100 Series" highways. Cones for night work shall be a minimum of 700mm in height with two reflective bands as described in Figure 1 of this specification.

Ballast for all channelization devices shall be placed at ground level.

**3.2.2 Placement** : The maximum distance permitted between channelization devices shall be based on work zone operating speeds as follows :

<u>Estimated Operating Speed (km/h)</u>	<u>Maximum Spacing (m)</u>
Less than 50	2.5
50 to 70	5
Greater than 70	10

**3.2.3 Ramps and Intersections** : Devices used at ramps and intersections shall be spaced at intervals equal to one-half of the values show in Section 3.2.2. In these areas it is permissible to alternately space with drums and cones.

When exit ramp gores are relocated with channelization devices, a temporary exit sign shall be erected at the relocated gore. The signs shall be a minimum 100 cm x 75 cm with white 15 cm letters on a green reflective background. The sign shall have the exit number and a directional arrow.

**3.2.4 Transverse Drum Barriers** : Two drums shall be placed transversely across the closed lane at a spacing of 250 meters to alert errant drivers.

### **3.3 Traffic Control Persons**

**3.3.1 Training** : All traffic control persons shall receive training in addition to the general worker training which deals specifically with nighttime traffic control procedures. Traffic control persons on-site must carry a card certifying they have received this training.

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**3.3.2 Illumination** : The traffic control person shall be illuminated from above at minimum of Level 3 illuminance as defined in Section 3.6 of this specification.

In the event of failure of any portion of the lighting system at a traffic control person station, all operations must be discontinued until the required illumination is restored.

**3.3.3 Visibility** : In addition to their standard protective equipment, Traffic Control Persons shall wear a CSA Z96-02 Class 2 fluorescent orange-red vest or jacket over white coveralls. They shall also have a minimum of 80 sq. cm of reflective material added to their hard hats which is visible from all sides. They must also be equipped with a flashlight complete with semi-transparent red cone.

**3.3.4 Communications** : All traffic control persons shall be equipped with radios so that they have communication with each other and the pilot vehicle operator.

### **3.4 Workers**

**3.4.1 Training** : All workers shall receive specific training on night work operations. Personnel on-site must carry a card certifying they have received this training.

**3.4.2 Visibility** : In addition to their standard protective equipment, All workers shall wear a high-visibility vest or jacket which meets the requirements for CSA Z96-02 Class 2 apparel. They shall also have a minimum of 80 sq. cm of reflective material added to their hard hats which is visible from all sides.

### **3.5 Work Vehicles**

**3.4.1 Training** : All vehicle operators shall receive specific training on night work operations. Personnel on-site must carry a card certifying they have received this training.

**3.4.2 Visibility** : In addition to their standard protective equipment, all equipment operators who leave their vehicles shall wear a high-visibility vest or jacket which meets the requirements for CSA Z96-02 Class 2 apparel. They shall also have a minimum of 80 sq. cm of reflective material added to their hard hats which is visible from all sides.

**3.4.3 Flashing Lights** : All vehicles in the work area must operate rotating or flashing incandescent amber lights visible in 360 degrees around the vehicle. Strobe lights are not permitted.

**3.4.4 Reflectorized Markings** : All work vehicles including trucks must have red and white reflective tape applied to all sides such that it defines the outline of the vehicle.

**3.4.5 Truck Message Signs** : All trucks which are required to enter and exit the lane closure will display a sign on their rear which reads "WORK VEHICLE - DO NOT FOLLOW". The sign shall be reflectorized and at least 120 cm x 60 cm with 15 cm black letters on an orange background.

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**3.4.5 Truck Turning** : To avoid confusing motorists and to improve site safety, trucks will not be permitted to turn around on the site. After delivery of their load all trucks must proceed to the next interchange to turn.

**3.4.6 Internal Traffic Control Plan** : A detailed traffic control plan for the movement of construction vehicles on the site shall be developed and included in the training of all personnel.

### **3.6 Lighting**

**3.6.1 Illuminance** : The level of illuminance required for various tasks will be defined in three "levels". Luminaries must be of sufficient wattage and quantity to provide a minimum horizontal illuminance as follows.

<u>Level</u>	<u>Minimum Average Illuminance</u>	<u>Minimum Point Illuminance</u>
Level 1	60 Lux	30 Lux
Level 2	110 Lux	80 Lux
Level 3	220 Lux	

**3.6.2 Work Area** : Level 1 illumination shall be provided in all areas which workers and inspection staff regularly carry out their duties. In addition to this basic requirement the following illuminance levels shall be provided :

3.6.2.1 For paving operations :

Level 2 - a minimum of 15 m ahead of the paver and material transfer vehicle. A minimum of 30 m behind the paver.

Level 1 - a minimum of 120m ahead to 250 m behind the paver.

3.6.2.2 For milling operations :

Level 2 - a minimum of 15 m ahead and 15 m behind the milling machine.

Level 1 - a minimum of 120m ahead to 250 m behind the milling machine.

3.6.2. For shouldering operations :

Level 1 - a minimum of 120m ahead to 250 m behind the shouldering machine.

3.6.2.4 For guardrail operations :

Level 1 - a minimum of 100 m ahead to 100 m behind the section under construction.

**3.6.3 Glare** : All luminaries shall be located and directed in such a way to minimize glare to both motorists and work vehicles. If severe glare is noted from any travel path, the contractor must adjust the lighting to reduce the glare to an acceptable level.

**3.6.4 Measurement of Illuminance** :Measurements shall be taken at the road surface, in a uniform pattern spaced at 5m throughout a representative test area. Illumination measurements are to be made by a person familiar with using a photometer and the operator shall not wear reflective materials while taking the measurements.

The contractor shall check the illumination levels on the site each time a change in lighting configuration is made and at least once every 5 working days. A copy of the measurements shall be given to the Engineer within 24 hours.

The contractor shall also provide on-site, for use by the Engineer, a photometer capable of measuring the level of illuminance.

**3.6.5 Lighting Maintenance**: The contractor shall replace non-functioning lamps immediately. The luminary aiming shall be checked daily. The luminaries shall be cleaned regularly.

### **3.7 Accommodation of Traffic**

**3.7.1 Delays** :On this Contract the Work Zone, consisting of the Work Area and Buffer Area, shall not exceed 1.5 km in length, unless authorized by the Engineer.

The Contractor shall carry out their work activities in such a manner to minimize traffic delays. The following maximum time delays to traffic shall be adhered to:

- a) an accumulative 20 minutes through the Contract limits, and
- b) 10 minutes through any one Work Zone.

The Contractor will be required to adjust work activities, minimize the length and/or number of Work Zone(s), to adhere to these limits.

During times of high traffic volumes, should the limits not be met, the Contractor may be required to stop work activities and pull off the road until volumes permit restarting.

### **3.8 Traffic Control Maintenance**

The contractor must employ a full time traffic control supervisor with enough staff to ensure constant patrol and maintenance of all traffic control devices.

#### **3.8.1 Traffic Control Devices :**

All signs, channelization devices and other traffic control devices shall be kept clean and in acceptable condition. The minimum standard for acceptability shall be the latest edition of "Quality Standards for Work Zone Traffic Control Devices" by the American traffic Safety Services Association.

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**3.8.2 Lane Openings** : Prior to opening any lane to traffic all the temporary pavement markings, hazard markers and hazard signing must be in place.

Temporary markings must be spaced at a maximum of 10m. Markings may be made with an approved temporary marking tape or with a combination of painted marks and temporary overlay markers. Where painted marks are used they must be coated with glass beads and temporary overlay markers (TOMs) must be placed at a maximum spacing of 20m over the painted marks.

**4.0 Traffic Control Trial**

Prior to the start of work a traffic control trial shall be carried out for inspection by the Contractor and a Department representative. The trial shall involve setup and operation of the full traffic control system and work area lighting system. No work shall commence until approval is given by the Department to proceed.

## **Night Work Specification** **Figure 1- Cone for Night Work**

