DUFRESNE GROUP CONSULTING ENGINEERS

1996 Depot Street, Manchester Center, VT 05255 (t) 802.768.8291 | (f) 802.768.8315 | (e)dg_manchester@dufresnegroup.com www.dufresnegroup.com

STATE OF VERMONT
CHRISTINA M. LEGG
NO. 73343
CIVIL
LICENSED
PROFESSIONAL ENGINEER
8-14-14

NIGHTTIME WORK LIGHTING SYSTEM PLAN
WARDSBORO BF 013-1(22)
WARDSBORO, VERMONT
August 14, 2014

General

During construction of the Wardsboro BF 013-1(22) box culvert project, Route 100 will be temporarily closed for a maximum of 60 hours, from 6PM on Friday to 6AM the following Monday. During the road closure period, traffic will be detoured from the work area on Route 100 and nighttime construction is planned.

Lighting System Design

The lighting system is designed in accordance with *National Cooperative Highway Research Program (NCHRP) Report 498 – Illumination Guidelines for Nighttime Highway Work.*

The work zone is approximately 150' x 120' or 18,000 square feet (sf). This area covers the recommended illumination area for fast moving equipment, such as backhoes, which is 20 meters or approximately 65 feet as recommended in Table 3 of NCHRP Report 498.

Four light towers, each (equal to Wanco Light Tower WLTC-4) with four 1,000 watt metal halide lamps, will provide illumination of the work area.

Under Table 3 of NCHRP Report 498, the recommended average maintained illumination is a target level of 54 lux for excavation and fill operations. Using Figure 5 of NCHRP Report 498, for an illumination level of 54 lux and metal halide lamps, the recommended illumination is 3.5 watts per square meter or 0.325 watts/sf.

The required total illumination is calculated as 0.325 watts/sf x 18,000 sf = 5,850 watts. This requirement is met by the proposed light towers, which provide a total of 16,000 watts.

Field Installation

The light towers will be installed with two towers on each side of the culvert excavation area. The installation will be in accordance with the attached Figure 6 from NCHRP Report 498, with lights at no more than 60 degrees from vertical.

The light locations and angles will be field adjusted as necessary to provide adequate lighting.

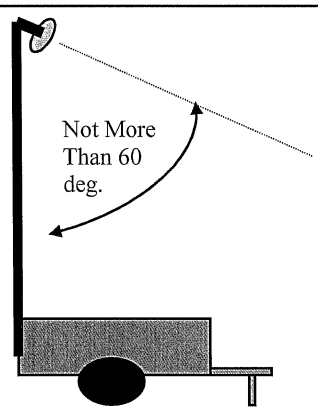
Fixed Work Areas	
Drainage Excavation, Pipe Installation, Structures, Signalization, Maintenance Activities, Staging and Startup of Paving Operations	
Illumination Requirements	Minimum Area Illumination Level = 54 lx Category II Work – Minimum Illumination Level = 108 lx Category III Work - Minimum Illumination Level = 216 lx
Recommended Lighting Equipment	Portable Light Plants with extending towers, four luminaires (typically 1000w metal halide)
Configuration Guidelines	1) Extend Tower to Maximum Practical Height 2) Use Glare Control Shades on the Luminaires 3) Maintain Glare Control Aiming When possible aim lights away from oncoming traffic Angle between the vertical and the aiming direction of the lamps should not exceed 60 degrees 4) Space Light Plants to Provide Required Illumination Levels
Typical Configuration Sketch	

Figure 6. Field guidelines for fixed area lighting.