State of California — Business, Transportation, and Housing Agency

Memorandum

To: SEE ATTACHED LIST

Date: December 3, 1993

File No:

From: **DEPARTMENT OF TRANSPORTATION**
Division of Traffic Operations

Subject: Maintenance Factor for Intersection Lighting

Section 9-10, "Highway Safety Lighting Design Standards" of the Traffic Manual sets standards for safety lighting at State highway intersections. To calculate the initial horizontal illuminance (IHI), a light maintenance factor must be included in the design of the lighting.

Maintenance factor (MF) for a luminaire is based on two variables. These variables are based on the environment surrounding the luminaire and the relamping time interval. The MF is the product of the luminaire dirt depreciation (LDD) factor and the lamp lumen depreciation (LLD) factor.

The LDD factors based on the different types of environment for enclosed and gasketed luminaries for four-year relamping interval are listed as follows:

CLEAN	:	From 78% to 85% approx.
MODERATE	:	From 65% to 75% approx.
DIRTY	:	From 47% to 55% approx.

CLEAN	-	No nearby smoke or dust generating activities. Light traffic. The ambient particulate level is no more than 300 micrograms per cubic meter.
MODERATE	-	No nearby smoke or dust generating activities. Moderate to heavy traffic. The ambient particulate level is no more than 600 micrograms per cubic meter.
DIRTY	-	Smoke or dust plumes generated by nearby activities may occasionally envelop the luminaries.

The LLD factor based on a relamping interval of four years is 73% (See General Electric Lighting System Product Application Guide).

As an example, if lighting is to be installed at an urban intersection where traffic is heavy but has no smoke or dust generating activities nearby, the IHI in lux (1 fc = 10.764 lux) is calculated as follows:

At the intersection of centerlines of the entering streets

IHI = (0.6 x 10.764) lux/MF
= 6.5 lux/(LDD x LLD)
= 6.5 lux/(0.65 x 0.73)
= 13.7 lux

At crosswalk areas

IHI = (0.15 x 10.764) lux/MF
= 1.6 lux/(LDD x LLD)
= 1.5 lux/(0.65 x 0.73)
= 3.40 lux

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