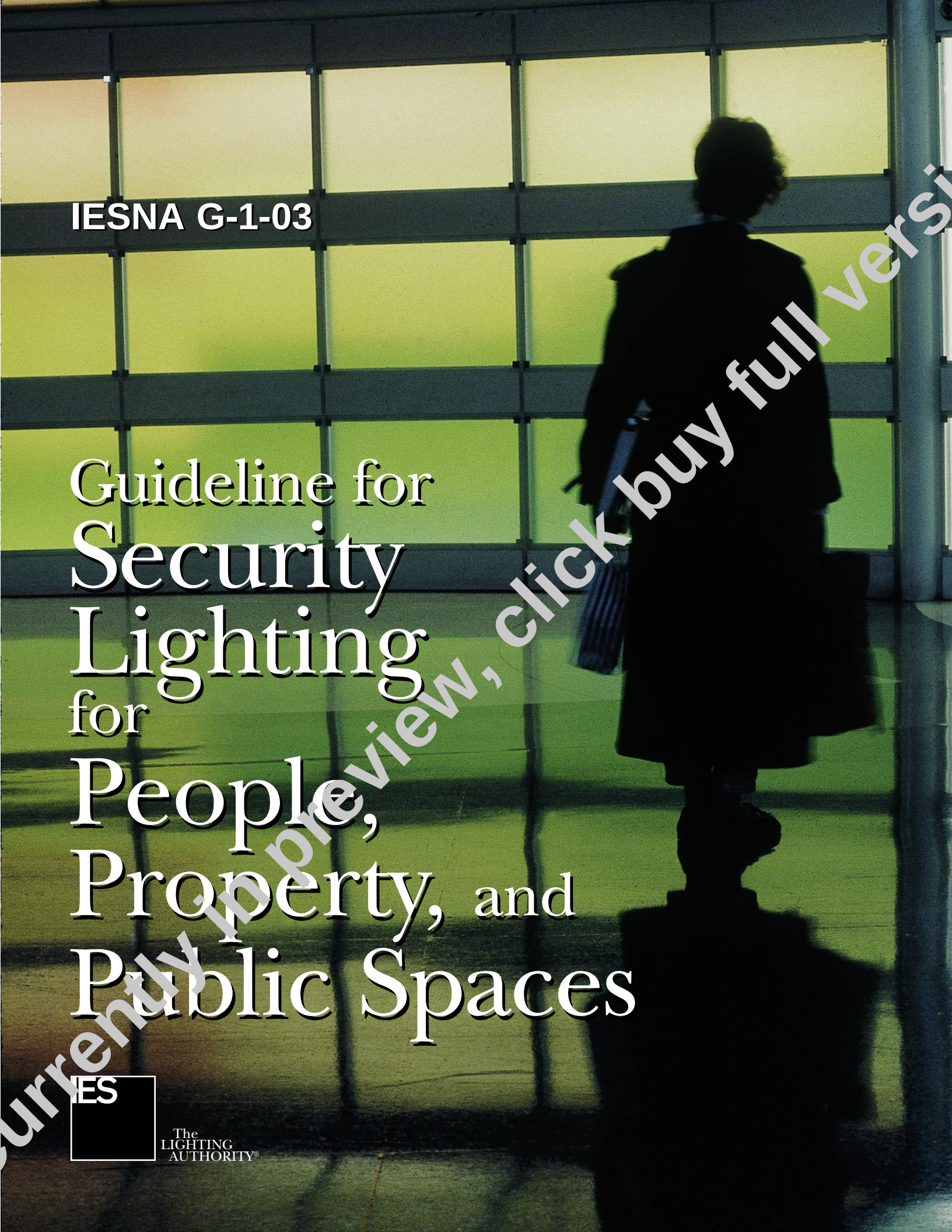

IESNA G-1-03

Guideline for Security Lighting for People, Property, and Public Spaces

IES

The LIGHTING AUTHORITY®

IESNA G-1-03

Guideline
for
Security Lighting
for
People, Property, and Public Spaces

Publication of this Committee Report has been approved by the IESNA. Suggestions for revisions should be directed to the IESNA.

Prepared by:
IESNA Security Lighting Committee

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IESNA G-1 Security Lighting for People, Property, and Public Spaces

Foreword and History

During World War I, the U.S. Government recognized the need for industry to increase exterior lighting at key production facilities, docks, assembly yards, high security facilities, and railway yards. These improvements had two purposes, to aid in production, and to deter sabotage. Although exterior protective lighting was widely increased, no standard was set.

- With the advent of World War II, at the request of the War Department, Military Intelligence, with assistance from the Insurance Committee for the Protection of American Industrial Plants, and the American Standards Association (ASA), initiated a project to develop a *standard* on outdoor protective lighting for industrial properties. The primary purpose of these efforts was to prevent theft and sabotage. Additionally, it was soon realized that "light discipline" was important to the war effort. Coastal facilities were darkened, and *stray light* was strictly controlled. North America was learning the importance of good security lighting and lighting discipline.

- During 1942, the ASA War Standards Procedure was applied, and a War Standards Committee prepared and published American Standard, A85-1942, Protective Lighting for Industrial Properties. This eventually became an ANSI Standard.

- In 1948, the ASA Safety Code Coordinating Committee terminated *War Standards* and substituted a *revised standard* for peacetime use. The Illuminating Engineering Society was designated Administrative Sponsor for this effort.

- The IES Protective Lighting Committee developed the first draft of this revision, which the Sectional Committee used as a basis for an American National Standard Practice.

- In 1977, The Protective Lighting Committee, IES, sponsored, wrote, and published American National Standard Practice for Protective Lighting-RP-1. This standard was intended as a guide for outdoor protective lighting to those responsible for plant protection.[1]

  In 1994, a Security Lighting Committee was formed by the IESNA. Its first project was to write a modern guideline for security lighting for North America.

- During 1997-1998, the Security Lighting Committee developed material that was the basis for Chapter 29 of the IESNA Lighting Handbook, Ninth Edition.[2]

- During 1999, members of the Security Lighting Committee outlined the contents and approach for a guideline for peer review and comment before several professional groups. These groups included the American Society of Safety Engineers, and the American Society for Industrial Security.

- During 2000, additional presentations were made before professional security groups concerned with the safety and security of the public, including the International Conference on Shopping Centers and the American Society of Industrial Security.

1.0 INTRODUCTION

The Security Lighting Committee, previously known as The Protective Lighting Committee of the Illuminating Engineering Society of North America (IESNA), was established to generate and develop criteria for lighting to enhance the security of people and property, to recommend the integration and interaction of lighting as part of a total security system, and to write a publication.

1.1 Lighting and its Relationship to Crime

The possibility that lighting might have an impact on the incidence of crime was a topic of interest in the United States in the sixties. Municipalities across America improved their street lighting to combat crime and some encouraging results were reported, but on review there was no significant statistical evidence that improved street lighting influenced the *level* of street crime. There was, however, an indication that the improved street lighting decreased the *fear* of crime.

Twenty years later, in 1988, a before and after relighting study of a street in the outer city area of London, England, by K. Painter demonstrated a marked reduction in the incidence of crime and the fear of crime on the relighted street. (See **Annex A**.)

This lead to an outburst of similar studies in the UK by Painter (1989, 1991, 1994), Barr and Lawes (1991), Burden and Murphey (1991), Davidson and Goodey (1991), Herbert and More (1991), Glasgow Crime Team (1992, Nair (1993), Ditton and Nair (1994) and Cridland (1995). The results were mixed.

The most sophisticated study undertaken on the effect of lighting on the incidence of crime was in 1999 in Stoke-on-Trent in England by Painter and Farrington.

Three areas of housing were selected; one was the experimental area where the lighting was improved; one was designated the adjacent area; the third was the control area, which served as the baseline against which any changes in crime could be monitored. The lighting in the adjacent and control areas remained unchanged. One aspect of the study was to see if improved lighting in one area might lead to similar benefits of crime reduction in the adjacent area. There was a marked reduction in the prevalence of crimes such as theft and vandalism, vehicle crime, and personal crime in the experimental area after relighting. There was no significant change in the adjacent or control areas. A similar study in the town of Dudley, England, showed that the level of delinquency decreased more in the relighted area than in the control area.

The results of all these studies indicate that lighting has a place to play in crime prevention. A list of sources for further reading may be found in **Annex A**. While there are no guarantees that improved lighting will cause a decrease in crime, there are circumstances in which lighting can be an effective crime countermeasure, either alone or in combination with other measures.

Lighting can affect crime by two indirect mechanisms. The first is the obvious one of facilitating surveillance by the authorities and the community after dark. If such increased surveillance is perceived by criminals as increasing the effort and risk and decreasing the reward for a criminal activity, then the level of crime is likely to be reduced. Where increased surveillance is perceived by the criminally inclined not to matter, then better lighting will not be effective. The second mechanism by which an investment in better lighting might affect the level of crime is by enhancing community confidence and hence increasing the degree of informal social control. This mechanism can be effective both day and night but is subject to many influences other than lighting.

2.0 SCOPE AND PURPOSE

The primary purpose of this publication is to establish guidelines for the design and implementation of security lighting.* It addresses security illumination but does not give advice on construction practices. The objective is to provide guidance for designing security lighting systems for new facilities and for evaluating existing facilities and systems. This publication is intended for the use of property owners and managers, crime prevention specialists, law enforcement and security professionals, risk managers, lighting specifiers, contractors, the legal profession, and homeowners who are concerned about security and the prevention of crime. Crime, its prevention, and the application of lighting to help minimize criminal activity, are considered in a less technical and user-friendly manner for the benefit of property owners, but illuminating engineers, architects and other professionals should find the concepts useful to review with their clients.

The primary measurement references throughout this document are metric, with the English equivalent in parenthesis. For example, 1.5 meters will be displayed as 1.5 m (5 ft), and 100 lux will be displayed as 100 lux (10 fc). These conversions are approximate, but considered sufficiently accurate in this context.

In this publication will be found a discussion of basic security principles, illuminance requirements for various types of properties, a protocol for evaluating current lighting levels for different security applications, and security survey and crime search methodology. The guidelines are based on consensus among members of the IESNA Security Lighting committee and other security experts.

Suggestions are given for exterior and interior security lighting practices for the *reasonable protection of persons and property*. This document also promotes a concept of *best practice*, which takes into account the following lighting design issues:

- Economics (including cost, maintenance and operational costs)
- Environmental issues (including light pollution, light trespass and the adverse effects of light on animals and plants)
- Municipal lighting ordinances, by-laws or codes
- Energy conservation, and maintenance requirements

Minimum guidelines for the safe movement of persons and equipment and for performing specific tasks can be found in other IESNA publications. This document is intended to provide specific guidelines where it has been determined that *security is an issue*, and where security is an important determining factor in the design or retrofit of a given property.

Note that throughout this guideline the phrase when *security is an issue* is used to differentiate the lighting design suggestions presented herein from those contained in other IESNA publications. While these other publications may make reference to security, in G-1 it is the only issue. Note too that when *security is an issue*, not only lighting,

* Note the distinction made in this document between security lighting and lighting for safety. Security lighting is intended to protect people and property from criminal activities. Lighting for safety is intended to provide safe working conditions, safe passage and identification of hazards or obstructions.

but all measures and system components are increased and/or strengthened; for example, personnel, surveillance, gates, locks, and fences.

Security lighting, as part of a well-balanced security plan, should have the following objectives:

1. Provide a clear view of an area from a distance and enable anyone moving in or immediately around it to be easily seen
2. Deny potential hiding spaces adjacent to frequently traveled foot routes
3. Permit facial identification at distance of at least 9 m (30 ft), and create the perception of being identifiable
4. Facilitate the proper use of other security devices available on the property
5. Deter crime against persons or property
6. Enhance the public's feeling of comfort in accessing spaces and increase night-time pedestrian traffic

3.0 BASIC PRINCIPLES OF SECURITY AND SECURITY LIGHTING

3.1 Principles

Security lighting is installed to help protect people and property from criminal activities, and to create a perception of security. To better understand the principles of security lighting, it is first appropriate to look at several key security tenets.

Responsibility - In North America, the burden of security and safety is generally placed on the individuals who have primary control over a given property. With the rights of control comes the responsibility of control. For example, a property owner can enforce rules of trespass, install security systems, restrict access, and make other decisions that may have far reaching consequences for those who access the property. To a lesser degree, a tenant of the property may share in this control and responsibility for the sublet space. Owners and operators have or should have, a superior knowledge of the site's history, including crime. Casual visitors, invitees, or customers generally have no responsibility for security at a given site since they are not able to exercise reasonable control over the events at the location, or influence the environment. It is generally the responsibility of a resident, business operator, or property owner to provide for the safety and protection of human life and the property.

Anticipating the threat - A helpful approach in determining the security needs of a property or operation is to study the *opportunity, means,* and *motivation* of potential perpetrators. Security works to deny *opportunity*, and increase the level of *means* or resources necessary for the criminal to successfully attack the target, and escape. When opportunity is limited, and a large amount of time and resources are required to successfully complete a criminal act and escape, criminal *motivation* declines.

Time - Time is the criminal's enemy. The longer a criminal act takes in *planning, execution,* and *escape,* the more likely the crime will be deterred. Most common criminals will choose a property that requires the least amount of stealth, equipment, and planning.

Target hardening - A target is harder to attack when coordinated security elements are provided. In the process of target hardening, deterrent objectives are set, options reviewed, and steps taken to improve security. The *target* is the people or property to be protected, and the various security features are the *hardening elements.* Each separate security element adds to the others, making the target harder to attack. Security elements available to the professional will vary by situation, but often include management controls, perimeter protection, a means of surveillance, response capabilities, and security lighting. A good security plan will contain layers of security features, and will not rely on one single security feature for success.

Fight or flight - The basic decision made by persons when threatened is fight or flight. In other words…*is defense or evasion the appropriate measure?* Sometimes, the act of fleeing danger is simply not an option due to circumstances. *Fight* may be the physical act of defense or a call for help. For police or security officers, it usually means some form of physical defense for serious threats. *Flight,* on the other hand, may mean moving to a safe place, or getting out of the way of a presumed threat. Lighting, if properly installed and maintained, can play an important role in helping people make this basic decision.

Security elements - Security elements can be *active* or *passive* deterrents. Active elements have the capacity to interact with persons or generate a response to a criminal's actions. Passive elements include those security features and applications that are static in nature and do not interact with a would-be intruder or criminal.

Passive elements for a home or business may include deterrent features such as perimeter fencing or walls, open or barrier landscaping, exterior and interior illumination systems, safes, open areas, and warning signs.

The most active deterrent is a patrol officer. The effectiveness and response of uniformed individuals making patrol rounds is often hard to predict, causing a