Environmental Planning Commission

Agenda Number: 16
Project Number: 1003718
Case #'s: 04EPC 1579
January 20, 2005

Staff Report

Agent	City of Albuquerque Planning Department
Applicant	City of Albuquerque City Council
Request(s)	**Amendments to the Zone Code of:** (1) 14 -16-1-5 Definitions (2) 14-16-3-4 Non Conformance Regulations (3) 14-16-3-5 General Sign Regulations (4) 14-16-3-9 Area Lighting Regulations (5) 14-16-3-17 Wireless Telecommunications **Amendment to the Uniform Administrative Code:** Chapter 3 Permits and Inspections; Section 302 Application For Permit (302.2 Submittal Documents).

Staff Recommendation

APRROVAL of 04EPC 1579

Staff Planner

Joshua Skarsgard, Research Analyst

Summary of Analysis

Since 1999 in New Mexico there has been legislation, The Night Sky Protection Act, regulating outdoor lighting. However, municipalities across this state and country have created their own Lighting Ordinances that are more comprehensive than their state laws. That is what Albuquerque is proactively achieving with these Zone Code text amendments. Our night sky is a treasure worthy of our protection.

We can achieve responsible outdoor lighting practice through amendments to the Comprehensive City Zoning Code and Uniform Administrative Code, specifically, by strengthening the sections relation to area lighting and illuminated signage. The notable sections of these proposed text amendments are: **(1) Signs:** A curfew of 11:00 pm or close of business for all signs, and a prohibition on 'uplighting' of signs. **(2) Street Lights (a)** The retrofitting of all mercury vapor streetlights to HPS within 3 years **(b)** Full shielding of all existing streetlights within 7 years (**3) Parking Lot** lights shall be fully shielded within 3 years. **(4) Residential: (a)** The removal of all mercury vapor lights located in residential areas within 1 year. **(b)** Lights that exceed 75 watts shall be fully shielded and so that the bulb is not visible to any adjacent residentially zoned property, within 1 year. **(5) Non-residential: (a)** Outdoor sales area lighting shall be fully shielded and significantly reduced after business hours **(b)** A curfew of 11:00 p.m. or close of business for all uplighting of buildings within 1 year. **(6) Recreational** lighting shall be fully shielded within 7 years. **(8) Floodlights.** The removal or full shielding of all floodlights within one year.

These amendments will significantly reduce sky glow by requiring most lighting to be directed downward and shielded from the sky, place an 11:00p.m. curfew on lit advertising signs and buildings, curtail light trespass in residential neighborhoods, and eliminate energy-wasteful mercury vapor lights and floodlights. It will also be of great savings to the City of Albuquerque in reduced energy costs and better for our environment.

City Departments and other interested agencies reviewed this application from 10/11/2004 to 10/22/04.
Agency comments were used in the preparation of this report, and begin on page 18

Development Services Report

SUMMARY OF REQUEST

Request (s)	**I. Zone Code Text Amendments of:** (1) 14 -16-1-5 Definitions (2) 14-16-3-4 Non Conformance Regulations (3) 14-16-3-5 General Sign Regulations (4) 14-16-3-9 Area Lighting Regulations (5) 14-16-3-17 Wireless Telecommunications Regulations - to implement stricter City wide regulations to the existing City Outdoor Lighting Covenants detailed in the Comprehensive City Zoning Code. **II. Text Amendment to the Uniform Administrative Code**: Chapter 3 Permits and Inspections; Section 302 Application For Permit (302.2 Submittal Documents). To allow the City opportunities to evaluate lighting compliance within the submittal of documents for parties seeking an application for building permit.
Location	*City Wide*

Background, History and Context

For centuries, New Mexicans have looked to the night sky to mark the passage of the seasons, and as both a source of spiritual rejuvenation and a stimulus to scientific inquiry. Even today, visitors come to marvel at its grandeur. The City of Albuquerque is home to several important astronomical observatories and it is clear that our dark skies are part of what makes New Mexico truly a Land of Enchantment. But our night sky is threatened by increasing light pollution so much so that the New Mexico Heritage Preservation Alliance added the night sky to its list of our State's endangered cultural resources.

In response to these problems the Albuquerque Night Sky Protection Task Force drafted a Report to the Mayor and City Council in 2001, and the state enacted the New Mexico State Night Sky Protection Act of 1999. Following their proactive lead, the City of Albuquerque Planning Department has drafted a text amendment to the Zoning Code furthering the objectives set forth by those two documents. The text of these zone code text amendments are a product of months of research into comparable U.S. cities night sky protection ordinances, findings presented by the Night Sky Protection Task Force, and discussions with city officials and private citizens alike.

Today, people who live in or near Albuquerque have lost much of their view of the universe. The spectacular view of the night sky that our ancestors had on clear dark nights no longer exists. The great increase in the number of people living in Albuquerque and the West Side has resulted in a rapid increase in urban sky glow due to outdoor lighting, brightening the night sky to such an extent that the only view most people have of the Milky Way or most stars is when they are well away from the City limits. This excess light in the sky has an adverse impact on the environment and seriously threatens to remove forever one of humanity's natural wonders - our view of the universe.

Poor lighting has many adverse effects, including glare, clutter, light trespass, energy waste, and light pollution. Dark skies are compatible with a safe, secure, and functional nighttime environment. As with astronomers, the public needs and deserves a quality nighttime environment. Glare, clutter, light trespass, energy waste, and light pollution are a major threat to that environment. Another consequence

of poor lighting is wasted energy because much of this light is wasted light. In the United States alone, over one billion dollars a year is wasted to produce unused light, which is the major source of light pollution.

We feel that compliance with the spirit, as well as the letter, of the New Mexico Night Sky Protection Act is in the best interests of the residents of Albuquerque. However, it is clear through our research that the State Act provides only minimal protection. Therefore, it is our recommendation that the City adopt more comprehensive measures to limit light pollution, light trespass, glare, and energy waste from over lighting, in the same manner that other cities have done in America. This can be achieved through amendments to the Comprehensive City Zoning Code and Uniform Administrative Code, specifically, by strengthening the sections relation to area lighting and illuminated signage.

APPLICABLE PLANS AND POLICIES

Albuquerque / Bernalillo County Comprehensive Plan

The subject request is affected by the following Goals and policies in the *Comprehensive Plan:*

OPEN SPACE NETWORK: The Goal is to provide visual relief from urbanization..."
Policy A; "conservation of natural resources and environmental features."

DEVELOPED LANDSCAPE: The Goal is to maintain and improve the natural and the developed landscapes' quality.
Policy A; "the natural and visual environment, particularly features unique to Albuquerque, shall be respected as a significant determinant in development decisions."
Policy C; "Incidental structures such as signs... shall be designed for minimal visual intrusion."

COMMUNITY IDENTITY AND URBAN DESIGNS: The Goal is to preserve and enhance the natural and built characteristics, social, cultural, and historical features that identify Albuquerque and Bernalillo County sub-areas as distinct communities and collections of neighborhoods."

ENERGY MANAGEMENT: The Goal is to maintain an adequate, economical supply of energy through energy management techniques and use of alternative and renewable energy sources."
Policy A: Use of energy management techniques shall be encouraged.
(12) Possible Techniques: "convert street lights to the most efficient lighting method."

DEVELOPING AND ESTABLISHED URBAN AREA: The Goal is to create a quality urban environment which perpetuates the tradition of identifiable individual but integrated communities within the metropolitan area and which offers variety and maximum choice in housing, transportation, work areas, and life styles, while creating a visually pleasing built environment.
Policy M: "Urban and site design which maintains and enhances unique vistas and improves the quality of the visual environment shall be encouraged."

Possible Techniques: (1) Improve Zoning Ordinance and Subdivision Ordinance design standards, and apply design through their site design review processes.
Possible Techniques (2) Design Public Facilities with respect for environmental and visual qualities.

Comprehensive City Zoning Code

The **intent** of the Zoning Code (14-16-1-3) is to help achieve Article IX of the Charter of the City of Albuquerque and the city's Master Plan; in particular the master plan documents which comprise the Albuquerque/Bernalillo County Comprehensive Plan. The Zoning Code

> "is intended to create orderly, harmonious and economically sound development in order to promote the health, safety, convenience and general welfare of the citizens of the city. These regulations are necessary to provide adequate open spaces for light and air including solar access; to avoid undue concentration of population, to secure safety from fire, panic and other dangers; to help control congestion in the streets and public ways; to control and abate unsightly use of buildings or land; to facilitate adequate provisions for community utilities and facilities such as transportation, water, sewer, schools, and parks; to encourage the most appropriate use of land; to properly channel flood water runoff; to conserve and stabilize the value of property; and to enhance the appearance of the landscape."

ANALYSIS

Conformance to Adopted Plans, Policies, and Ordinances

The subject legislation (text amendments) propose to amend the regulations and standards for outdoor lighting within the City of Albuquerque. The proposed language would allow the City to monitor future development and to enforce compliance with the thousands of lights that saturate our communities.

Comprehensive Plan

These proposed text amendments directly affect and are affected by the policies of the Comprehensive Plan. These include the Goals and policies for the following sections: Developing and Established Urban Area, Energy Management, Open Space Networks, Community Identity and Urban Design, and most importantly Developed Landscape. (See page 3 of this staff report for specific language references).

The proposed text amendments will further the Goals and Policy M of the **Developing and Established Urban Area** section by creating a quality urban environment while creating a visually pleasing built environment. This ordinance will play a large role in quality of life in the urban environment**.** In particular, Policy M will be bolstered because this ordinance will maintain and enhance unique vistas and improve the quality of the visual environment.

The proposed text amendments will further the Goal and Policy A of the **Energy Management** section by maintaining an adequate, economical supply of energy through energy management techniques and use of alternative energy sources**.** This text amendment will help convert streetlights to the most efficient

lighting method. We will be requiring all new public street way lighting to be fully shielded as well as prohibiting the sale and installation of the energy inefficient mercury vapor lights.

The proposed text amendments will further the Goal and Policy A of the **Open Space Networks** section by providing visual relief from urbanization and stressing conservation of natural resources and environmental features. These proposed text amendments will help preserve what the New Mexico Heritage Preservation Alliance added to its list of our State's endangered cultural resources – the night sky.

The proposed text amendments will further the Goal of the **Community Identity and Urban Design** section by preserving and enhancing the natural and built characteristics and features that identify Albuquerque. More than any other natural resource, the beautiful scenery of New Mexican skies, is clearly an integral element of our state's reputation for enchanting visitors.

The proposed text amendments will further the Goal of the **Developed Landscape** section by preserving the natural and visual environment, particularly features unique to Albuquerque. Furthermore, by requiring plans to demonstrate where the outdoor lights will be placed we are making it a significant determinant in development approval decisions. In addition, by requiring a mandatory shutoff time for advertising signs we are designing signs for minimal visual intrusion.

City of Albuquerque Zone Code

The proposed text amendments to the zone code will also help bolster the objectives of the Zone Code. This proposed legislation will help create orderly, harmonious and economically sound development in order to promote the health, safety, convenience and general welfare of the citizens of the city. In addition, these regulations are necessary to provide to control and abate unsightly use of buildings or land and will encourage the most appropriate use of land. There is also some evidence that responsible lighting in certain neighborhoods will actually conserve and stabilize the value of property. This amendment will also clearly enhance the appearance of the landscape that surrounds Albuquerque.

Lighting and Security

One of the concerns that the citizens of Albuquerque have demonstrated is a reluctance to change their lighting practices on residential and commercial properties in the name of 'security.' However, our text amendment is not against security lighting – it is against poor security lighting. The residential area threshold for full shielding is 75 watts. That allows for the installation of a more than adequate light bulb that can light a walkway or porch and can be bought in any local lighting store.

Commercial areas typically attempt to blanket their property with light in the most inexpensive manner possible, usually installing floodlights or wall pack lights that are inefficient and dump unused light into the night sky and worse – into the eyes of neighboring adjacent properties and street ways.

Does outdoor nighttime lighting prevent crime? The answer is inconclusive. There have been studies in the United States and in Europe examining this issue, and they have come to no definite conclusions that can be applied to society as a whole. However in 1977, a U.S. Department of Justice study report was published giving the results of a thorough study of the correlation between street lighting and crime. The conclusion was that "there is no statistically significant evidence that street lighting impacts the level of crime, especially if crime displacement is taken into account." In addition, the City of Calgary Police Service conducted a pilot study for fully shielded street and residential lights, and found that there was no significant impact on crime or public safety.

To help maximize the effectiveness of security lighting, security professionals should consider another strategy -- turning off unnecessary lights. Regardless of the light source and its energy efficiency, most nighttime lighting goes unused. It neither lights the way for normal users of the environment in question nor assists witnesses in seeing something worthy of being witnessed.

The ubiquitous effort to eliminate the dark of night makes the public immune to security lighting. As a result, security lighting has lost the ability to turn heads and grab the attention of a potential witness. In response to this phenomenon, some law enforcement officials now advocate parking vehicles in unlit areas under certain circumstances. They conclude that the light, rather than alerting witnesses, only illuminates the criminal's work area.

The strategy for security lighting has often been "more is better". Instead, security professionals should rethink current lighting strategies and their effect on human behavior. It is time to question conventional wisdom and examine the alternatives.

The Proposed Zoning Code Text Amendments

I. 11:00 PM Curfew for Signs (14-16-3-5 General Sign Regulations)

[+(B) (5) Sign illumination curfews. Sign illumination for all signs, both externally and internally illuminated, shall be turned off at eleven pm (11pm) or when the business closes, whichever is later. All Interstate read billboards are exempt from the sign illumination curfew.]

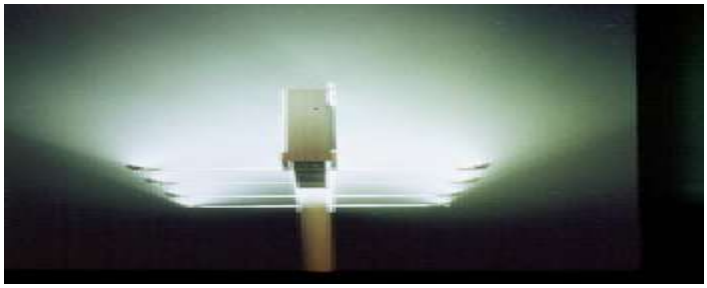
The citizens of the City of Albuquerque have recently been alarmed at the misuse of signs near their neighborhoods. This amendment is seeking to protect these communities by preserving their visual environment and distinctive character, and protecting the natural beauty of their areas. This amendment to the Zone Code is seeking a mandatory illuminated sign curfew for 11:00p.m. (or close of business whichever is later). This curfew bolsters the intent of the *State of New Mexico Night Sky Protection Act Section 5, Segment A* which states, "an outdoor lighting fixture not meeting these provisions shall be allowed if the fixture is extinguished by an automatic shutoff device between the hours of 11:00 p.m. and sunrise."

Concerns from the Sign Industry

A City billboard needs to be lit when the business being advertised is not open. There is a negligible amount of vehicle traffic in the hours ranging from 11:00 p.m. to sunrise. It is also important to point out to the sign owner, or better yet the business doing the advertising, how much coal is being burned (and wasted) to light the night sky. These individuals probably do not realize that in addition to light pollution they are also contributing to air pollution. Most electricity comes from coal-burning power plants.

II. "Up lighting" and "Side lighting" of Signs Regulations (14-16-3-5 General Sign Regulations)

[+(m) Signs that incorporate 'uplighting' or 'sidelighting' are prohibited. Only top-mounted and fully shielded luminaires are allowed for externally illuminated signs.]



See Left: Example of an Uplit Billboard

Lit billboards and off-premise signs are controversial; some persons would like to see them banned near roadways and residential areas. However, others feel that billboards provide a valuable advertising service for small and large businesses and welcome information for the weary traveler. Many signs are illuminated all night and are significantly over lit with bottom-mounted lighting, the major part of which ends up in the sky rather than on the billboard. Billboard and roadway sign lighting can be effective and unobtrusive if it is done in the right manner. Top-lit signs with well-shielded fixtures save energy and contribute little to light pollution. That is why the proposed ordinance requires new signs to be top-lit, whereas, the existing inventory will be required to fully shield up-lit or side-lit signs. The non-conforming existing sign inventory within the City will have one year to shield the bottom-lit or side-lit signs such that no light is emitted off the face of the sign. In addition, these signs (both externally illuminated, and internally illuminated) will terminate their luminance by 11:00 p.m. within one year of the passing of the ordinance.

Tucson's a Great Example: The majority of the billboards in the Tucson, Arizona area are top-lit, and all interstate roadway signs in southern Arizona are lit from the top. This has caused no problems, resulted in better sign lighting, saves money, and helps keep unwanted light out of the sky.

Concerns from the Sign Industry

Shadows from Top Lit Signs: There are no objectionable shadows in the daytime caused by the lighting system being mounted at the top of the billboard. This is an objection often raised by opponents of top-lit billboards.

Top-mounted fixtures are more difficult to service. This may be true in some cases, but in most instances in Tucson the billboards owners were willing to retrofit their signs because they are all quite large and are difficult to change or service no matter where the lights are located.

Unfair for sign owners to retrofit the lighting systems for bottom-lit signs. That is why the City of Albuquerque's approach would be to ask for all new signs to be top-lit. Existing signs are only required to shield that portion of the luminaire that causes light to spill off the face area of the sign within one year of the passage of the ordinance or as they would ordinarily undergo major renovation.

III. Prohibition on Floodlights (14-16-3-9 Area Lighting Regulations)

"floodlight luminaires are prohibited."

BAD Unshielded floodlights trespass light onto roadways and adjacent homes. They are prohibited.

GOOD If floodlights must be used, they should always have top and side shielding, and emit light below horizontal

Albuquerque Night Sky Task Force Targets Floodlights: The Albuquerque City Council created the Night Sky Protection Task Force, which included members of the astronomy community, lighting experts, PNM representatives, and City officials. In March of 2001, the task force recommended that the City "curtail light trespass and reduce glare by eliminating industrial-type security floodlighting…"

Floodlight Information: Floodlights by their very design are not optically designed to be aimed strait down. They are an inexpensive way to "light over there from over here." They are often times mounted onto poles, buildings or structures that allow the light to be spread over large areas and oft times producing glare, and light trespass onto adjacent properties and roadways causing discomfort and dangers for motorists. The proposed ordinance seeks to prohibit their new installation and to make current owners take them down, fully shield them or point them strait down within one year of passage of the ordinance.

III. Prohibition on Mercury Vapor Luminaires (14-16-3-9 Area Lighting Regulations)

"Mercury vapor luminaires are prohibited."

State of New Mexico bans Mercury Vapor: The State of New Mexico passed a night sky law in 1999 that contained a prohibition on mercury vapor lights. The *State of New Mexico Night Sky Protection Act Section 6* states, "USE OF MERCURY VAPOR LIGHTING FIXTURES, -- No new mercury vapor outdoor lighting fixtures shall be sold or installed after January 1, 2000."

Mercury Vapor Information: It is commonly used for a number of outdoor applications, such as "security" lighting and some older streetlights. It has a relatively long life compared to most other lamps. These lamps are a quartz tube filled with mercury gas under pressure. Light is produced when an electric current passes through the mercury vapor. Many of the existing fixtures have a great deal of associated glare due to lack of adequate light control. When the mercury vapor lights are identified, the entire fixture will be replaced by a more efficient light source, such as High Pressure Sodium. Also a high quality fixture will be installed, one that directs the light output to the areas needed and one that is glare free. A cost analysis study will show remarkable energy saving potential. As with all light sources, one should not use more wattage than is necessary for the application. "More light" is not always better. In many applications, such overkill is counterproductive to visibility.

The Light Level Depreciation of Mercury Vapor Lamps. Recent studies indicate that in roughly five years the light output is down by a factor of two. Another five years, down by another factor of two. A mercury lamp never really burns out; it just gets fainter and fainter, using the same amount of energy to produce less light.

IV. Retrofitting of all Mercury Vapor Street Lights (14-16-3-9 Area Lighting Regulations)

"Mercury vapor street luminaires … shall be removed or replaced with fully shielded luminaires that are compliant with this ordinance by January 1, 2008."

The City of Albuquerque is proposing to replace all 6,106 Mercury Vapor streetlights within three years of passage of this ordinance. They will be replaced with more efficient, and less wasteful High Pressure Sodium Lights. This will greatly reduce the watts of electricity consumer per year by the City and dramatically reduce pollution caused by coal burning electricity plants. Best of all, the savings will be substantial to the City in terms of its energy consumption. Below is a preliminary financial summary of the replacement project.

Albuquerque Mercury Vapor Street Light Cost Comparison Example: This cost comparison example compares the annual expenses projected from the Public Service Company of New Mexico Rate Schedule #20 of a *400-watt mercury and 175 watt mercury* and a *250- watt HPS and 100 watt HPS.* These are wattages that would commonly be used for residential street lighting. It is easy to see

the potential savings achieved by utilizing efficient lamps. The results indicate a 15% return on the investment, corresponding with savings of $150,000 dollars a year.

Mercury Vapor Street Light Retrofit Project Financial Summary

	PNM OWNED				CITY OWNED
Type of Light	**Metal Pole**	**Wood Pole**	**Undergrnd**	**Overhead**	**All Lights**
400 Watt Mercury Vapor Light	$ 138.72	$ 39.12	$ 206.40	$ 190.80	$ 144.84
250 Watt High Press. Sodium	$ 81.12	$ 29.88	$ 172.20	$ 156.84	$ 95.16
SAVINGS PER YEAR	**$ 57.60**	**$ 9.24**	**$ 34.20**	**$ 33.96**	**$ 49.68**

	PNM OWNED				CITY OWNED
Type of Light	**Metal Pole**	**Wood Pole**	**Undergrnd**	**Overhead**	**All Lights**
175 Watt Mercury Vapor Light	$ 81.12	$ 29.88	$ 120.24	$ 104.76	$ 61.56
100 Watt High Press. Sodium	$ 69.60	$ 29.88	$ 107.88	$ 92.28	$ 49.08
SAVINGS PER YEAR	**$ 11.52**	**$ -**	**$ 12.36**	**$ 12.48**	**$ 12.48**

Annual Savings per fixture of PNM Owned 175W	
Overhead Wood Pole	$ 12.48
Overhead Metal Pole	$ 24.00
Undergound Metal Pole	$ 23.88
Avg.Savings of PNM owned	**$ 20.12** *avg. of 3

Annual Savings per fixture For PNM owned 400W	
Overhead Wood Pole	$ 43.20
Overhead Metal Pole	$ 91.56
Undergound Metal Pole	$ 91.80
Avg.Savings of PNM owned	**$ 75.52** * avg. of 3

Annual Savings per fixture for City Owned 175W	
Savings of City Owned Lights	**$ 12.48**

Annual Savings per fixture For City Owned 400W	
Savings of City Owned Lights	**$ 49.68**

Return on Investment of Merc. Vap. Retrofit	
Total Cost of Retrofit per Bid	**$ 1,000,349**
Total Savings Per Year	**$ 150,817**
Return on Investment	**15%**

Years to Recover the Cost of MV Retrofit
6 years and 7 months

Bid to Retrofit/fixture	
$ 157.00	175 Watt
$ 194.00	400 Watt

Avg. Savings	
$ 16.30	175 Watt
$ 62.60	400 Watt

Inventory #'s of Lights	
5,005	175 Watt
1,106	400 Watt

Note: Data from the Public Service Co. of N.M. Electrical Services - 8th Revised Rate No. 20

What is the cost/savings to the City of Albuquerque to retrofit the Mercury Vapor Streetlights?
The preliminary private bid received to change out all 6,111 mercury vapor lights was for $1,000,349. The cost savings in one year are close to $150,817. This is a 15% return on investment for the City of Albuquerque and will repay the initial outlaying of funds in six years and seven months. Every year after that will see a savings of $150,817.

Why is The City of Albuquerque retrofitting the streetlights now?
Energy prices reached an all time high when the 21st century arrived. The streetlight system is the City's single largest electricity consumer. The City is proactively trying to find a way to reduce night sky glare and to reduce costs in operating the streetlight system. Some of our research successfully demonstrated that HPS fixtures use less energy and cut down on light pollution, while maintaining safe levels of lighting in Albuquerque neighborhoods. Albuquerque is not the first City to attempt a bold yet money saving project with street lighting. A detailed design was completed and a tender issued to retrofit 11,000 streetlight fixtures in Northwest Calgary between March and mid-November 2002. Tucson has also reaped huge benefits from their streetlight retrofit project in the 90's.

Will this retrofit help the environment?
The City of Albuquerque will remove the mercury vapor luminaires, and non-shielded luminaires with new lower wattage, flat lens streetlight fixtures that use less energy. This will in kind reduce green house gas emissions by using less electricity that reduces the emissions produced by gas and coal-burning generators. When all of Albuquerque's nonconforming streetlight fixtures have been replaced, carbon dioxide emissions will be reduced by as much as 8,000 tons a year.

Do the lower wattage and fully shielded fixtures provide less light?
The nonconforming light fixtures will be replaced in the City of Albuquerque with the new shielded lower wattage fixtures that will illuminate the roadway less because there is less light hitting the road. However, the City of Albuquerque will demand that the new lighting will not be installed unless it meets the minimum Illuminating Engineering Society (IES) recommendations for proper roadway lighting. The flat lens will also generally appear dimmer. This is because there is less glare shooting up and outwards toward your eye. This reduction in glare will help improve visibility and compensate for the reduced wattage.

V. Removal of all Mercury Vapor Residential Lights (14-16-3-9 Area Lighting Regulations)

"Mercury vapor luminaires shall be removed by March 1, 2006. Any replacement luminaire is subject to the provisions of this ordinance upon installation."

In the 70's and early 80's thousands of Albuquerque residents contacted the local lighting utility and ordered lights to be installed in their yards. PNM recently informed the City that they provide services to an estimated 3,500 floodlight private consumers, and 3,500 mercury vapor light ("other") private consumers. This ordinance would be asking the estimated 3,500 mercury vapor lights to be removed within one year of passage of the ordinance. These lights are typically on wood poles and mounted in excess of 20 feet above the ground. These lights are well above the residential pole height limitations but

were grandfathered in. These lights typically operate at or above 150 watts – which produce an enormous amount of light for one backyard and frequently spill copious volumes of unwanted light into neighbor's back yards and windows. The New Mexico State Act prohibits the installation of these lights but PNM continues to maintenance these fixtures because they were grandfathered in. This text amendment seeks to rid our neighborhoods of these nuisances, and to switch all residential lights to a more energy efficient light source within one year of passage of the ordinance. The removal cost of these lights will be born by their suppliers, in most cases PNM.

PNM's Concerns

Accessibility to backyards is difficult and costly for removal of residential Mercury Vapor Lights. PNM's main concern regarding the removal of the residential mercury vapor lights is that they will not be able to access the lights readily. It is clear that in the past they have had to provide maintenance to the lights when there are problems, and as such, it should be expected that their access to the lights for removal should be no different. Furthermore, mercury vapor luminaires have been illegal in this State for over 4 ½ years, and the removal of these harmful lights should not have been avoided in the name of 'grandfather' status from the New Mexico State Act and the Pole Height Limitations in the Zone Code.

VI. Fully Shielding Streetlights (14-16-3-9 Area Lighting Regulation)

"Streets. Lighting of streets shall be only with fully shielded luminaires, installed and aimed in such a way that no light is emitted above a ninety-degree horizontal plane as measured from the lowest point of the luminaire."

Example of a fully cutoff Streetlight fixture

Shielding Process
The City of Albuquerque has an estimated 8,936 arterial High Pressure Sodium streetlights, and 9,255 residential High Pressure Sodium streetlights. Roughly half of these lights are not fully shielded. That means that the City of Albuquerque will have seven years to permanently affix fully cutoff shields onto existing High Pressure Sodium streetlights. A City maintenance crew or PNM crew will have to visit the luminaire location and attach the shield.

Why 7 years to come into compliance as fully shielded?
The average High Pressure Sodium (HPS) streetlight needs to have a bulb changed out, or a regular maintenance visit every four to five years. It is almost impossible for any HPS luminaire to go unvisited during a seven-year period. In order to save the initial outlaying of labor costs in this project the City can achieve fully shielding through the course of normal maintenance visits. Therefore, the cost of permanently affixing these shields will be limited only to the cost of the shield. These shields range in cost from $41.00 to $62.00, when purchased in bulk.

About the Funding
The Albuquerque Night Sky HPS streetlight-shielding project will cost an estimated $454,775. This figure is still being debated but it is comprised of informal estimates from Albuquerque's Public Works Dept. and quotes from local lighting contractors. The figures are detailed below:

Abq Streetlight Shielding Financial Data		
Average Cost per Shield	$	51.00
Number of Lights Required		9,095
Total Cost of Shielding	**$**	**463,845.00**

When Included with Cost of Merc. Vapor Project

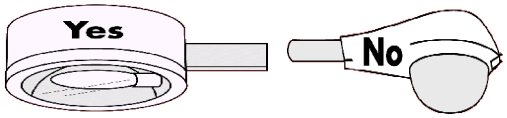
Return on Investment of Streetlight. Retrofit		
Total Cost of Retrofit	$	1,464,194
Total Savings Per Year	$	150,817
Return on Investment		**10%**

Years to Recover the Cost of Streetlight Project
9 years and 8 months

Shielding Streetlight Financial Summary
The City will purchase the shields and then work to arrange a contract with PNM and the City Public Works Department to install the shields themselves though the course of normal maintenance over a seven-year period. The data suggests that if the shielding costs are included with the Mercury Vapor retrofit project that the total return on investment of retrofitting ALL the lights in the City of Albuquerque would be 10%, and it would take 9 years and 8 months to recover the cost of this project, and every year after that would experience financial savings of $150,817.

VII. Shielding of lights greater than 75 watts in Residential Areas (14-16-3-9 Area Lighting Regulation)

"Light bulbs exceeding 75 watts must be enclosed in a fully shielded luminaire and the bulb itself cannot be directly visible from any other residential property."



Example of a 75-watt or higher residential fully shielded fixture

The effectiveness and enforcement of residential lighting restrictions is always problematic. First, the majority of lighting fixtures easily available on the homeowner market are inherently unshielded and rarely pointed straight down. Second, residential lighting is commonly changed or supplemented after construction is completed without any official review or approval process.

The low individual outputs of such lights and the low overall amounts used per home or acre mean that the impacts are lower in terms of night sky pollution - though the impacts are greater in terms of light trespass onto adjacent properties (often times next door neighbors). A balance must be struck here between these impacts and the practical issues of enforcement.

We believe that we have struck that balance by applying suitable standards written into the Albuquerque Zoning Code. That is why we have chosen a loosely restrictive 75-watt threshold for residential lighting – above this wattage a property owner must shield. Below 75-watts and the light bulb can be unshielded and placed anywhere on the property. A 75-watt bulb produces very good lighting for security purposes and can light almost every backyard or front entrance with one bulb. 50 and 60-watt bulbs are recommended and are purchasable at any local lighting store. The City of Albuquerque will also work with local retailers and encourage them to carry shielded products and to make this information available to homeowners in your community. Locally owned businesses are particularly well able to respond to this kind of approach. This information can be distributed with the building permits process. We also believe the most effective way to address most residential lighting is by education and through homeowners' associations.

VIII. Outdoor Sales and Display Areas (14-16-3-9 Area Lighting Regulation)

"Outdoor sales and display areas. Outdoor sales and display area lighting shall be fully shielded. Lighting used after the close of business shall be only for security purposes, not to exceed one third (1/3) of the total luminaires lit during business hours by March 1, 2006."

Display lot lighting usually includes, but is not limited to, automobile sales or rental, recreational vehicle sales, or building material sales lots. These lots have been the target of a great deal of restrictions in the other municipalities that we have researched, in addition, the Albuquerque Night Sky Task force made a recommendation that the City "set reasonable limits on permissible light levels in commercial settings… and car dealerships."

This provision will require them to fully shield their lots within a year of the passage of the ordinance as well as reduce the amount of light being used after the light curfew to 1/3 of their operational lighting needs. In essence, that allows for ample lighting for security… but not for advertising.

IX. Canopy Lighting Regulations (14-16-3-9 Area Lighting Regulation)

"Canopies. All fuel sales, drive-in, and drive-through canopy luminaires shall be fully shielded and mounted on or recessed into the lower surface of the canopy ceiling. Canopy lighting shall be turned off during non-business hours."

The key to quality outdoor retail lighting is to attract the customer to a safe, secure environment. Too often, this is translated into a call for "bright lights." Such high luminance levels may pose adaptation problems for customers leaving the station and re-entering the darker roadway nearby [and even on entering the service areas]. Glare must be minimized. It is the quality of light, not quantity, which is more closely associated with perceptions of a safe and secure area. Too often people associate more light or brighter light with "safer" surrounds. It can be easily demonstrated that too much light, or poorly directed light, causes a loss of visibility. That is why the ordinance demands canopy lighting to be turned off after business hours, and to be fully shielded.

X. Recreational Lighting Regulations (14-16-3-9 Area Lighting Regulation)

"Nonconforming outdoor recreational facility lighting. Outdoor recreational facility lighting installed prior to adoption of this ordinance shall conform to the regulations contained herein by January 1, 2012."

Lighting levels used for night sports are a major issue pertaining to Albuquerque's lighting objectives. Controlling trespass and glare with such lighting levels is an extremely technical challenge, requiring the utmost in quality luminaires and design. Further, the lighting fixtures commonly used for sports lighting can be huge sources of direct glare, not only to areas nearby and at considerable distances from the sports fields, but also to spectators and players actually using the fields. The brightest single sources of light visible in city nighttime landscape views are often these facilities. It is no surprise that such lighting is usually the single greatest source of complaint and neighborhood tension about lighting issues.

Fortunately, several manufacturers have begun producing fully shielded luminaires suitable for sports lighting, particularly for the most commonly encountered levels of lighting. These designs provide major reductions in off-field spill, and can entirely eliminate direct uplight. Further, many feel that these designs deliver substantially improved lighting quality on the field for the players.

Unfortunately, many of the facilities that are in non-conformance are owned by the State and not subject to City regulations, particularly Milne, UNM Football Stadium, and all APS recreational sites. These areas will continue to produce light spill into adjacent areas, and both direct and reflected light into the sky. With quality designs using modern fixtures, these obtrusive effects can be considerably reduced, but the huge amounts of lighting required in some situations will always lead to some obtrusive impacts, even with the best design. The surrounding Albuquerque communities should be aware of the potential impacts. The location and alignment of new fields should be carefully considered. Fully shielded lighting for new recreational facilities is expected and for those lights that are currently operational within City limits we will ask them to become fully shielded within seven years.

Concerns of Reviewing Agencies / Pre-Hearing Discussion

The Albuquerque Police Department was concerned with the safety issues regarding the night sky ordinance. After a number of exchanged emails I believe those concerns were mitigated. It is important to remember that this ordinance is not lowering light levels; it is lowering bad lighting levels. You can place as many 75-watt bulbs on your property as you see fit for security. Above 75 watts and it must be shielded.

Concerns of Reviewing Agencies / Pre-Hearing Discussion

The City of Albuquerque Planning Department has had discussions with PNM, City of Albuquerque Public Works, NAIOP, Winrock Mall, New Mexico Auto Dealership members, Commercial Lighting and Electric Co., The Albuquerque Chamber of Commerce, Neighborhood Organizations, and the New Mexico Petroleum Marketers Association regarding the proposed. There concerns have been adequately met where possible and their involvement in this text amendment process is encouraged.

Neighborhood Concerns

As of the writing of this report, no comments have been received.

Conclusions

The proposed text amendments to the *Zoning Code*, as well as the amendment to the *Uniform Administrative Code* will give the City greater influence on those lighting problems that face our community. It is our position that such a policy is consitent with the City's established commitment to environmental protection and quality-of-life enhancement. A strong lighting code would further help to bolster Albuquerque's reputation as a progressive community dedicated to preserving safe, attractive, pedestrian-friendly urban spaces.

These amendments will significantly reduce skyglow by requiring most lighting to be directed downward and shielded from the sky, curtail light trespass and reduce glare by eliminating floodlighting in residential and commercial areas, place an 11:00p.m. curfew on the lighting of advertising signs, sports facilities, and buildings, set a reasonable limit on permissible light levels in residential neighborhoods, and eliminate energy-wasteful mercury vapor light fixtures.

The proposed standards for outdoor lighting have been exhaustively researched and are reasonable, attainable, and enforceable. There enactment would be a feather in the cap of this City. The benefit will be a safer, more attractive city where citizens can enjoy nighttime activities in well-lighted public venues without sacrificing the beauty of our starry skies or being subject to the intrusion of unwanted light around our homes.

FINDINGS – (Project 1003718/04EPC 01579) - November 17, 2004

1. In 1999, the New Mexico State Legislature enacted the State's first statewide lighting code, the New Mexico Night Sky Protection Act (NMSA 74-12-1). The Act prohibited the new mercury vapor outdoor lighting fixtures to be sold or installed after January 1, 2000. In addition, the Act allowed fixtures that were not in compliance, if the fixture was extinguished by an automatic shutoff device between the hours of 11:00 p.m. and sunrise.

2. In March of 2001 the Albuquerque City Council created the Night Sky Protection Task Force to make recommendations to the Mayor and the Council as to how to bring our municipality into conformance with or go beyond the State Night Sky Protection Act (NMSA 74-12-1). The Task Force drew on the expertise of law enforcement officials, traffic engineers, electrical contractors, PNM representatives, street lighting specialists, astronomers, and environmentalists. They recommended that:

    a. Albuquerque adopts "more comprehensive measures to limit light pollution, light trespass, glare, visual clutter, and energy waste from over lighting."

    b. "A strong lighting code would further help to bolster Albuquerque's reputation as a progressive community dedicated to preserving safe, attractive, pedestrian-friendly urban spaces."

    c. Albuquerque should "curtail light trespass by eliminating industrial-style security floodlighting in residential areas and reduce skyglow by requiring most lighting to be directed downward and shielded from the sky."

    d. Studies have "failed to demonstrate that excessive light levels reduce the incidence of either property crimes or personal assaults, although such lighting may create a false perception of safety."

3. Pursuant to the proposed text amendments, **residentially** zoned areas shall be required to fully shield all light fixtures greater than 75 watts, and remove all mercury vapor luminaires, and floodlight luminaires within one year.

4. Pursuant to the proposed text amendments, **non-residentially** zoned areas shall be required to fully shield all light fixtures, remove or fully shield all security 'floodlights', and remove all mercury vapor luminaires within one year of the passage of this ordinance. Outdoor sales and display area lighting used after the close of business shall be only for security purposes, not to exceed one third (1/3) of the total luminaires lit during business hours. In addition, there will be an 11:00 p.m. (or close of business whichever is later) curfew on the illumination of buildings.

5. Pursuant to the proposed text amendments, existing non-conforming **streetlights** shall be fully shielded within 7 years; however, in the case where a fixture becomes 'unrepairable' the replacement fixture is required to be fully shielded. In addition, the use of mercury vapor luminaires will be prohibited upon the adoption date of the ordinance and the existing non-conforming mercury vapor streetlights will be placed on a 3-year replacement schedule. New street lights shall be fully shielded.

6. Pursuant to the proposed text amendments existing non-conforming **parking lot lights** shall be fully shielded within 3 years. New parking lot lights shall be fully shielded.

7. Pursuant to the proposed text amendments, 'uplighting' of **signs** will be prohibited. Existing non-conforming signs shall fully shield such that all light is directed only onto the face of the sign within one year. In addition, all internally lit and externally lit advertising signs will have a curfew of 11:00 p.m. (or close of business whichever is later). Interstate read billboards are exempt from the lighting curfew.

8. Pursuant to the proposed text amendments, existing non-conforming **outdoor recreational facility lighting** shall be fully shielded within 7 years. New outdoor recreational facility lighting shall be fully shielded.

9. The proposed text amendments will further the **Goals and Policy M of the Developing and Established Urban Area** section by creating a quality urban environment while creating a visually pleasing built environment. This ordinance will play a large role in quality of life in the urban environment. In particular, Policy M will be bolstered because this ordinance will maintain and enhance unique vistas and improve the quality of the visual environment.

10. The proposed text amendments will further the **Goal and Policy A of the Energy Management** section by maintaining an adequate, economical supply of energy through energy management techniques and use of alternative energy sources**.** This text amendment will help convert streetlights to the most efficient lighting method.

11. The proposed text amendments will further the **Goal and Policy A of the Open Space Networks** section by providing visual relief from urbanization and stressing conservation of natural resources and environmental features. It will help preserve what the New Mexico Heritage Preservation Alliance added to its list of our State's endangered cultural resources – the night sky.

12. The proposed text amendments will further the **Goal of the Community Identity and Urban Design** section by preserving and enhancing the natural and built characteristics and features that identify Albuquerque. More than any other natural resource, the beautiful scenery of New Mexican skies, is clearly an integral element of our state's reputation for enchanting visitors.

13. The proposed text amendments will further the **Goal of the Developed Landscape** section by preserving the natural and visual environment by requiring plans to demonstrate where the outdoor lights will be placed. In addition, by requiring a curfew for advertising signs we are designing signs for minimal visual intrusion.

14. The proposed text amendments will also help bolster the objectives of the **Zoning Code**. This proposed legislation will help create orderly, harmonious and economically sound development in order to promote the health, safety, convenience and general welfare of the citizens of the city. In addition, these regulations are necessary to provide to control and abate unsightly use of buildings or land and will encourage the most appropriate use of land. There is also some evidence that responsible lighting in certain neighborhoods will actually conserve and stabilize the value of property. This amendment will also clearly enhance the appearance of the landscape that surrounds Albuquerque.

RECOMMENDATION – (Project 1003718/04EPC 01579) - November 17, 2004

APPROVAL of *04EPC 01579,* text amendments of the Zoning Code for implementation of night sky protection regulations based on the preceding Findings.

Joshua Skarsgard
Research Analyst

cc: City of Albuq., Planning Department, 600 2nd St. NW, Albuq. NM 87102

Attachments

CITY OF ALBUQUERQUE AGENCY COMMENTS

PLANNING DEPARTMENT

Zoning Code Services

Reviewed, no comment.

Office of Neighborhood Coordination

City Wide

PUBLIC WORKS DEPARTMENT

Transportation Development (City Engineer/Planning Department):

- Reviewed, no comments.

Utility Development (City Engineer/Planning Department):

- No objection to Text Amendment.

Hydrology Development (City Engineer/Planning Department):

- The Hydrology Section has no objection to the text amendment request.

Transportation Planning (Department of Municipal Development):

- Reviewed, no comments regarding on-street bikeways, off-street trails or roadway system facilities.

Traffic Engineering Operations (Public Works Department):

- No comments received.

Street Maintenance (Public Works Department):

- No comments received.

Water Resources, Water Utilities and Wastewater Utilities (Water Authority):

- No comments received.

New Mexico Department of Transportation (NMDOT):

- Reviewed, no comments.

RECOMMENDED CONDITIONS FROM CITY ENGINEER, MUNICIPAL DEVELOPMENT, PUBLIC WORKS, WATER AUTHORITY and NMDOT:

Conditions of approval for the proposed Text Amendment shall include:

a. None.

ENVIRONMENTAL HEALTH DEPARTMENT

Air Quality Division

Environmental Services Division

PARKS AND RECREATION

Planning and Design

In order to determine if lighting is in conformance in section (G) a., we would need a contractor to analyze every fixture within the ball fields, tennis courts, swimming pools and parking lots associated with each. To accomplish this the department will need to hire a contractor to conduct a study of what can and cannot be brought into conformance. The departments will need funding for the study, then funding for the equipment to adjust, aim, shield and purchase the lamp or shield to conform. Depending on when the ordinance is passed, 180 days ***(Note: The City of Albuquerque has since extended this timetable to seven years***) may not be enough time to obtain a study and if it's not budget time departments cannot seek funding until budgets are being proposed. I would suggest that sections (G)a. and b. be eliminated completely.

If the sections cannot be eliminated then prolong the date one year from the signing of the ordinance to allow departments go through a budget cycle to plan and ask for funding for a study and obtain the equipment/supplies to conform.

Open Space Division

No adverse comment.

POLICE DEPARTMENT/Planning

No adverse comment.

SOLID WASTE MANAGEMENT DEPARTMENT

Refuse Division

FIRE DEPARTMENT/Planning

TRANSIT DEPARTMENT

Adjacent and nearby routes	N/A
Adjacent bus stops	N/A
Site plan requirements	N/A
Large site TDM suggestions	N/A
Other information	None.

COMMENTS FROM OTHER AGENCIES

BERNALILLO COUNTY

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

Reviewed, no comment.

ALBUQUERQUE PUBLIC SCHOOLS

MID-REGION COUNCIL OF GOVERNMENTS

No comment

MIDDLE RIO GRANDE CONSERVANCY DISTRICT

PUBLIC SERVICE COMPANY OF NEW MEXICO

December 7, 2004

After continuing to work with staff regarding the language PNM continues to have concerns with the following proposed language changes:

Section 14-16-3-4 (F) Nonconforming outdoor public street lighting. Outdoor public street lighting installed prior to adoption of this ordinance, shall conform to the regulations contained herein by January 1, 2012. However, when any outdoor street lighting unit becomes non repairable, any replacement fixture(s) shall be subject to the provisions of this ordinance upon installation.
PNM feels that due to the thousands of lights involved it will be extremely difficult to comply with this section in the timeframe identified.

Section 14-16-3-4 (G) Nonconforming Outdoor Non-Residential Property Lighting.
Non-conforming outdoor non-residential property lighting installed prior to adoption of this ordinance, shall not be exempted from the regulations contained herein.
PNM discontinued the installation of private area lighting in 1991; however, this would impact many existing customers who rely on this type of lighting for a variety of reasons from safety to advertising.

Section 14-16-3-4 (H) (1) Nonconforming Residential Property Lighting. Nonconforming outdoor residential property lighting installed prior to adoption of this ordinance shall not be exempted from the regulations contained herein.
(1) Where conformance may be achieved by adjusting, shielding or re-aiming of a luminaire, or by replacement of an existing lamp with one of lower light output, such installation shall be made to conform by January 1, 2006.

PNM discontinued the installation of private area lighting in 1991; however, the number of lights that would be impacted by this language would make it prohibitive for PNM to comply within one year.

Section 14-16-3-9 (A) (1) - (4) Light Pole Regulations.
The maximum height of a light pole, measured from the finished grade to the top of the pole, within 100 feet of a residential zone shall be 16 feet.
PNM's minimum mounting height is 25 feet per PNM's standards.

Section 14-16-3-9 (E) (3) Residential Lighting Regulations.
The installation of high intensity discharge luminaires (including, but not limited to mercury vapor, metal halide and high pressure sodium lamps) and flood light luminaires are prohibited upon the adoption of this ordinance.

PNM's current equipment is a high-pressure sodium lamp, and this equipment complies with the New Mexico Night Skies Protection Act.

(Note: The City of Albuquerque has since amended the residential lighting requirements by removing the high intensity discharge prohibition and replaced it with a prohibition on only mercury vapor luminaires and flood lights).