Final Report

Phoenix Area Visibility Survey

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Prepared for

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SECTION I.
Introduction

The Arizona Department of Environmental Quality (ADEQ), acting on behalf of the Visibility Index Oversight Committee (VIOC), retained BBC Research & Consulting (BBC) to conduct the Phoenix Area Visibility Survey. The Committee will use research results to assist in the development of a visibility index or other method designed to track progress in improving visibility in the Phoenix area.

Background

In March 2000, Governor Jane Hull convened the Brown Cloud Summit to examine methods to improve visibility in the Phoenix Metropolitan Area. As part of this Summit, a Visibility Standards Subcommittee was established to recommend methods for measuring visible air quality and tracking improvements in visible air quality over time. In addition to other activities, the Subcommittee reviewed the visibility standards implemented in Colorado, California and by the EPA. Based on its research, the Visibility Standards Subcommittee recommended that a visibility index be established through a public survey process representative of a cross-section of residents.

Acting on the recommendation, ADEQ established the Visibility Index Oversight Committee. The Committee's goal was to coordinate the involvement of Phoenix-area residents in the development of a visibility index.

Study Objectives

The Visibility Survey for the Phoenix Metropolitan Area was designed to accomplish three primary objectives. A representative cross-section of residents of Area A[1] would be asked for their feedback in order to:

- Determine what visible air qualities are desirable.
- Determine what visible range is acceptable.
- Determine how often the visual air quality and acceptable visual ranges should be expected to occur.

[1] The geographic area that the study encompassed was "Area A" per ARS S49-541. Area A generally consists of the Phoenix Metropolitan Area.

Overview of Methodology

To accomplish these objectives, a number of key tasks were completed, beginning in April 2002.

First, the BBC study team met with members of the VIOC and staff from the ADEQ to discuss the study objectives and approach. Based upon that meeting, the study team designed a visibility survey instrument and approach.

The survey was administered with a representative sample of Area A residents. Participants attended group sessions (of no more than 20 participants), viewed 21 different images that showed varying visibility levels, and completed a written questionnaire commenting on the slides. There were three primary parts to the survey instrument. The first was designed to capture individuals' ratings of the level of visual air quality in each slide on a 7-point scale of very poor to excellent. The second asked respondents to indicate if the visible air quality in each slide was acceptable or not. The third asked respondents to indicate the number of days in which a given level of visible air quality would be acceptable.

The BBC study team administered 27 sessions in carefully controlled environments. The sessions included a total of 385 participants at six separate locations in the Phoenix Metropolitan Area. Participants were recruited to be demographically representative of four regions of Area A, and three sessions were conducted in Spanish.

Upon conclusion of the surveys, data were entered and statistically analyzed. Implications of survey findings to the development of a visibility index were then identified and discussed.

Acknowledgements

The BBC study team acknowledges the valuable assistance provided by Dan Ely, a Researcher with the Colorado Department of Public Health and Environment. Dan provided helpful insights throughout the survey effort based on his experience designing, conducting and analyzing a visibility survey for the Denver Metropolitan Area.

The study team also received strong guidance from ADEQ staff including project manager Michael Sundblom and Mike George, as well as the Phoenix Area Visibility Index Oversight Committee, chaired by Leandra Lewis and including Diane McCarthy, Richard Bark, Dave Berry, Robert Cialdini, Molly Greene, Yvonne Hunter, Gaye Knight, Jay Kaprosy, Tom Moore, Karen Rasmussen, and Nancy Wrona.

This Report

The remainder of this report describes the survey approach and findings. Section II provides details about the survey approach, including participants, locations and the survey instrument. Section III provides a statistical analysis of the results of the survey. Finally, Section IV provides a summary of findings. Appendix A includes the survey element comparison. The English and Spanish survey instruments and instructions are included as Appendix B.

SECTION II.
Survey Approach

The methodology for the Phoenix Area Visibility Survey was carefully designed to fully meet the project objectives described in Section I of this report. At every stage of survey planning, the BBC team received guidance and feedback from ADEQ and VIOC, and also utilized the expertise of a staff member from the Colorado Department of Public Health and Environment who had conducted a similar study for the Denver Metropolitan Area.

The survey was administered with a representative sample of residents of Area A. Participants attended group sessions of no more than 20 participants, viewed a series of slides that showed varying visibility levels, and completed a written survey addressing the visible air quality depicted on the slides. The sessions included a total of 385 participants at six separate locations around Area A. Participants were recruited to be demographically representative of four regions of Area A, and three sessions were conducted in Spanish.

Below we describe each aspect of the survey approach. We begin by discussing the selected sample size and demographics of participants, and then describe the images that were shown to participants. We explain the survey instrument development, pretest and administration process. Finally, we present information about the locations and environment in which the surveys took place.

Sample Size

A target sample size of 384 participants was identified for the Phoenix Visibility Survey. This sample size was chosen so that the responses would validly reflect Area A's residents within +/- 5 percent at the 95 percent confidence level. The total sample was then divided among four regions of Area A based upon each region's share of Area A's population. Therefore, 10 percent of participants were from the Northeast region, 31 percent from the Southeast, 47 percent from the Central region and 12 percent from the West region. (Each of the four regions is discussed in more detail later in this section.)

Participant Recruitment

Participants in the Phoenix Visibility Survey were recruited using random digit dialing allocated proportionally by population across the four Area A regions. BBC's subcontractor, Davis Research, conducted the recruiting. Potential participants responded to a series of screening questions to ensure that the final sample was a statistically valid reflection of Area A's population in terms of demographic and socioeconomic characteristics (e.g., race and ethnicity, income, etc). Respondents were invited to participate in the survey if they were residents of Area A and were willing and able to participate in the survey. To maximize show rates and to provide maximum opportunity for participation in the survey, sessions were held at several times during the day and evening. The participant demographics and participant show rates are detailed below.

Participant Demographics

Survey participants were carefully recruited so that the total sample was representative of Area A, and that participants within each of the four regions were representative of the population within that region. Characteristics including age, gender and ethnicity were considered in the recruiting effort. In addition, survey participants were asked to report additional socioeconomic characteristics, including race, annual household income, education, and length of time they have lived in the Phoenix area.

Age. To develop a recruiting plan that ensured an appropriate distribution of age groups, residents were classified into four age categories: 18 to 29 year olds, 30 to 49 year olds, 50 to 64 year olds and individuals 65 and over. Exhibit II-1 shows the actual age distribution of Area A residents and the ages of actual survey participants. The table shows that survey participants closely matched Census percentages for age across Area A.

Exhibit II-1.
Comparison of Age Distributions

Source:
2000 US Bureau of the Census and BBC Research & Consulting.

Age Group	Census	Participants
18-29	23.7%	19.6%
30-49	39.1%	39.5%
50-64	19.0%	23.8%
65+	18.2%	17.1%

Because the age distribution differs for each region, recruitment was planned based on 2000 Census figures. For example, if one region had a higher percentage of individuals over 65 years old, BBC recruited a correspondingly larger number of those individuals.

Northeast. The Northeast region (shown on a map on page 8) is the smallest region by population in Area A, accounting for approximately 9 percent of the population. The proportion of confirmed recruits who came to the survey location and completed the survey (the "show rate") in this region was excellent, at 95 percent (38 out of 40). The participants were representative of the Northeast region's age distribution, which has a slightly lower percentage of individuals 18 to 29 (15 percent) and a slightly higher percentage of individuals 50 to 64 (24 percent) compared to Area A.

Southeast. The Southeast region represents 31 percent of the population of Area A. The age distribution in this region is very similar to the overall age distribution for Area A. The show rate was 84 percent, which met BBC's projections for recruitment.

The age distribution in the Southeast region for participants showed a slightly lower percentage of participants from the 18 to 29 age group that live in this region (22 versus 27 percent). In the 30 to 49 and 50 to 64 year old age groups, participants were slightly over-representative of residents in these age groups, 43 versus 40 percent and 20 versus 17 percent, respectively.

West. The West region represents approximately 11 percent of Area A's population, only slightly more than the Northeast region. The show rate for participants in this area far exceeded expectations with 46 out of 48 recruits participating in the survey (96 percent).

The age distribution in the West region is substantially different than the total distribution for Area A. The 18 to 29 year old group is much smaller (15 percent versus 24 percent), as is the 30 to 49 year old group (32 versus 39 percent). The 65+ group in the West region is much larger than Area A as a whole (34 percent versus 18 percent).

Survey participants mirrored this distribution fairly well. There was a poorer turnout for 65+ individuals than expected. However, as with other regions, turnout for the 30 to 49 and 50 to 64 groups exceeded our expectations.

Central. The Central group represents approximately 49 percent of Area A's population. Sessions in this region were conducted in both Spanish and English. The show rates for the region as a whole were largely affected by poor turnout for the Spanish-speaking groups. The show rate was 44 percent for the Spanish-speaking groups and 86 percent for the English-speaking groups. Therefore, the show rate for the region as a whole was 75 percent, lower than any other region.

The age distribution of participants, as compared to the 2000 Census, was slightly lower in the 18 to 29 group (20 versus 25 percent) and slightly higher in the 50 to 64 group (25 versus 19 percent). Again, this was typical for the region as a whole.

Gender. The 2000 Census reported that the City of Phoenix is composed of 51 percent males and 49 percent females. Therefore the study team recruited males and females equally in all age groups. Of the actual survey participants, 47 percent were male and 53 percent were female. This proportion of male to female participants was consistent across all age groups.

In the Spanish-speaking groups, male turnout was especially poor. Males made up only 26 percent of the participants.

Race and ethnicity. Hispanics were actively recruited to participate in the survey; however, the rates at which Hispanics actually came and participated in the survey were lower than for non-Hispanics. A total of 18 percent of participants reported they were of Hispanic origin and nearly all Hispanic participants came from either the Central or Southeast regions. The Census shows that approximately 25 percent of Area A residents are Hispanic. Factors that may be associated with the relatively low Hispanic show rate include a national trend toward low rates of public participation by ethnic minorities, and the particular location for the surveys conducted in Spanish. Despite the low show rate, the 18 percent Hispanic participation rate is more than adequate to represent the views of the Hispanic population.

Among the 82 percent of non-Hispanic survey respondents, approximately 77 percent reported they were white, 3 percent reported they were African American, 2 percent reported they were American Indian and 1 percent reported they were Asian. Approximately 1 percent reported "other" as an ethnicity.

Income. During the recruiting process, participants reported the following annual household incomes: 15 percent earn less than $25,000, 32 percent earn $25,000 to $50,000, 28 percent earn from $50,000 to $75,000, 13 percent earn from $75,000 to $100,000, and 10 percent of participants' households earn $100,000 or more.

When compared to 2000 Census figures, participants were slightly over-representative of middle-income ranges ($50,000 to $74,999) and slightly under-representative of very low-income ranges (under $24,999). However, the sample of participants is adequate to represent the views of lower-income residents.

Education. Approximately 4 percent of participants reported having less than a high school diploma, 12 percent were high school graduates, 38 percent had attended trade or vocational school or some college, 27 percent were college graduates and 18 percent had attended or completed graduate school. The percentage of participants who were college graduates is similar to the actual population based on the 2000 Census.

Length of residency. Survey participants reported the length of time they have lived in the Phoenix area. Approximately 72 percent of participants have lived in the Phoenix area for 10 or more years. Approximately 16 percent have lived in the area five to ten years, 7 percent have lived in the area three to five years and 4 percent have lived in the area one to three years. Only 1 percent of participants have lived in the area less than one year and all of these have lived in the area at least six months.

The length of residency for participants can be compared to Census 2000 figures by looking at how many current residents were living in the same county in 1995 as in 2000. Census 2000 shows that 77 percent of current 2000 residents were living in the same county (in the Phoenix area) in 1995. This indicates that the participants were representative of the Area A population.

Image Projection

Preserving the photographic quality of the images is essential to establishing a valid visible air quality index. After considering several alternatives, the study team determined that showing the images on slide projectors rather than via a digital medium would result in the highest level of consistency. The image quality using digital displays could result in too much variation based upon the type of computer used, the type of software program used and the quality and settings of the projector used to display the images. The most consistent images result from slide projections on a white projector screen.

Additionally, multiple sets of slides were created so that each slide would be projected for a total of 4 minutes or less throughout the implementation of the survey. This was determined to be the maximum life of the slides before the image began to deteriorate.

Image Selection

Participants in the Phoenix Visibility Survey were asked to evaluate the visibility conditions depicted in 21 unique images. Each image provided the same vista, a southwesterly perspective on downtown Phoenix, with South Mountain in the background at a distance of about 25 miles. The images varied, however, in terms of the visibility conditions they depicted. Visibility conditions in the images

ranged from very little visibility impairment at 15 deciviews, to substantial visibility impairment at 35 deciviews.[1] The range of visibility conditions depicted across the 21 slides essentially reflected the range of actual visibility conditions that are experienced in Phoenix throughout the year.

Air Resource Specialists, Inc. (ARS) created the images used in this visibility survey using their WinHaze software. ARS, the leader in this field, developed the images by digitizing a slide photograph of the image under pristine visibility conditions, and then used their computer model to "degrade" the view in one deciview increments to represent the varied visibility conditions shown in the 21 slides.[2] Exhibits II-2 through II-4 are examples of the images shown.

Exhibit II-2.
Deciview 15

Source: Arizona Department of Environmental Quality.

[1] The deciview scale, developed in the early 1990s, is analogous to the decibel scale for rating sound. The deciview scale is near zero for a perfectly pristine atmosphere and increases as visibility degrades. Each incremental deciview unit represents approximate 10 percent change in light extinction, which is a small but usually perceptible scenic change. (See Interagency Monitoring of Protected Visual Environments newsletter, Winter 1993.)

[2] See Molenar, et. al., 1994, "Visual Air Quality Simulation Techniques," *Atmospheric Environment*, v. 28, n. 5, pp 1055-1063, for a detailed discussion of the techniques used to develop the images. ARS's proprietary software program, WinHaze, implements the technique that is the subject of the *Atmospheric Environment* paper.

Exhibit II-3.
Deciview 25

Source: Arizona Department of Environmental Quality.

Exhibit II-4.
Deciview 35

Source: Arizona Department of Environmental Quality.

Prior research has demonstrated that individuals' perceptions of visual air quality from viewing slides are a good substitute for their perceptions from viewing an actual "live" vista.[3] Many of the early visibility surveys, including studies conducted by the National Park Service in the late 1970s and

[3] See Introduction to Malm, William C., *Introduction to Visibility*, Section 8. Cooperative Institute for Research in the Atmosphere, Colorado State University, May 1999.

1980s and the Denver Brown Cloud Visibility Survey, relied on evaluations of actual photographs taken at different times, under different visibility conditions. However, more recent efforts such as work performed for the U.S. Environmental Protection Agency in 1993, have often relied on "modeled" images similar to those used in the Phoenix Visibility Survey. The principal advantage of modeled images relative to actual slides taken at different times is that the modeled images do not vary in terms of extraneous elements — such as cloud cover, sun angle, precipitation, vista color, birds, jet trails, etc. Prior research has shown that variations in some of these elements can have an impact on how viewers evaluate visual air quality.[4]

The modeled images used in the Phoenix Visibility Survey essentially portray visibility conditions under relatively uniform, regional haze conditions. At certain times of the year, particularly during the winter months, Phoenix sometimes experiences haze with a distinct layering, sometimes referred to as an urban plume. Basing the survey on images portraying regional haze-type conditions may provide better information for establishing a visibility index for the region as a whole. It is not known

from this study, however, whether Phoenix residents would provide a different evaluation of visibility conditions if presented with images portraying a distinctly layered haze. Prior visibility research on perceptions of uniform regional haze versus urban plumes is also inconclusive.[5]

Survey Instrument

BBC drafted a survey instrument that consisted of three exercises. First, survey participants viewed a series of 25 slides and marked the visual air quality of each slide using a 7-point scale, ranging from very poor to excellent. In the second part of the survey, participants viewed the same 25 slides again and indicated whether the visibility in each slide was acceptable, by marking “yes” or “no.” In the third part of the survey, participants were shown seven slides and were asked to list how many days in a year the visibility in the slide would be acceptable to them.

Survey administration protocol called for each set of 25 slides to include four duplicate slides which were analyzed to ensure consistency in ratings. The order in which slides were shown was randomized in every session. Also, the seven slides shown in the final exercise were selected at random for each group to ensure that all 21 unique slides were viewed and rated a sufficient number of times.

The survey instrument was written in clear, understandable and conversational English, and was translated into Spanish as well. Complex terminology and jargon was avoided. In all 27 survey sessions, the moderator read the survey script verbatim to ensure that instructions were administered in an identical manner to all participants.

The final survey instrument was submitted to ADEQ and VIOC for review and approval prior to administration of the full survey effort.

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[4] See, for example, Brookshire, D.S. and Schulze, W.D., "The Economic Benefits of Preserving Visibility in the National Parklands of the Southwest," *Natural Resources Journal*, January 1983.

[5] As noted in Introduction to Visibility, Section 8, page 63: "The results indicate that plumes, if positioned in the sky in such a way as to not obscure the vista, have a minimal impact on VAQ. However, dark plumes were rated lower or perceived to have a greater impact on visual air quality than light-colored plumes ..."

Survey Pre-test and Administration

The survey instrument was tested in two internal BBC pre-test sessions. The study team then conducted an additional three pre-test sessions in Phoenix, including one session with VIOC members and their guests. The pre-tests checked for areas of confusion, misunderstandings of words or instructions, and timing of the instrument.

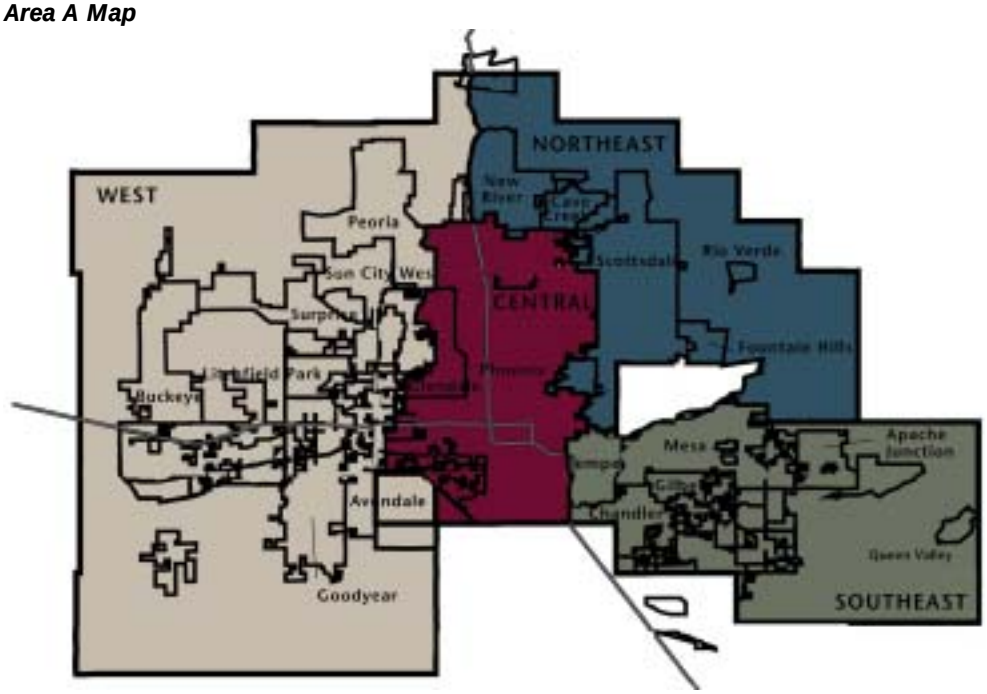
The 27 survey sessions were then scheduled and conducted between July 22 and July 30, 2002. Recruited individuals were mailed a letter in advance of the session which stipulated the date, time and location of the session. Each session lasted approximately 45 minutes, including about ten minutes at the conclusion of the survey in which participants were invited to ask questions or provide additional feedback to the moderator. At the end of each session, each participant was given a $50 cash incentive payment.

Overall, 82 percent of recruited individuals actually came to the sessions and completed the survey, which is significantly higher than a typical show rate. Women were somewhat more likely to show than men, and middle age individuals were more likely to show than younger individuals. Spanish-speaking recruits had a relatively low show rate.

Locations

It was important for the study team to ensure that the survey participants were representative of the geographic and demographic diversity of Area A. As mentioned previously, to ensure representativeness throughout the entire region, the study team divided Area A into four regions based on population and demographic characteristics. The four regions were: Northeast, Southeast, West and Central. Exhibit II-5 illustrates the boundaries of each of the four regions of Area A.

Exhibit II-5.
Area A Map



Source: BBC Research & Consulting, 2002.

Based on the population and demographic characteristics of Area A and each region, three sessions were held in the Northeast region, 12 were held in the Central (including three sessions conducted in Spanish), three were held in the West, and nine sessions were held in the Southeast region. Locations within each of these regions were selected on the basis of ease of access, availability of an appropriate site (such as a library or community center) and proximity to population centers within each region. Within each location selected, the survey was administered at a public facility, as Exhibit II-6 shows.

Exhibit II-6.
Phoenix Visibility Survey Sites

Region	Site	City	Number of Sessions
Central	Yucca Branch Library	Phoenix	9
	South Mountain Community College	Phoenix	3
Northeast	Scottsdale Civic Center Library	Scottsdale	3
Southeast	Pyle Adult Recreation Center	Tempe	6
	Mesa Main Library	Mesa	3
West	Peoria Main Library	Peoria	3

Source: BBC Research & Consulting, 2002.

Survey Environment

To ensure that the data collected from residents at the different locations across Area A were valid and representative, it was important to carefully control the environment where the survey took place. In selecting sites for the survey administration, the project team took into account room size, lighting, room set-up and viewing distance from the slides.

Sites and rooms were selected to ensure that the meeting rooms were of similar size and that the room setups could be similar at every location. Each survey administrator was trained to set up the projector, tables and chairs such that survey respondents were seated at an optimal, defined distance from the images. Slides were shown in darkness and participants were provided individual lighting to see their survey forms. Slide projectors were set up approximately 12 feet from the screens in every case to create a viewable image that horizontally filled the screen.

Statistical Analysis of Results

At the conclusion of the sessions, all survey instruments were individually numbered and reviewed for completion. Data were then entered by BBC staff and randomly checked by the project manager to ensure accuracy. Once the data file was complete, additional checks for data entry error (e.g., codes exceeding the possible minimum or maximum values) were performed.

BBC analyzed survey responses to identify overall perceptions of visible air quality among Phoenix-area residents. Additional analyses were run to identify any substantive differences in how various population cohorts perceived visible air quality. For these analyses, survey responses were examined by participants' demographic and socioeconomic characteristics and place of residency within the Phoenix-metropolitan area. Finally, the survey data were tested for reliability via several means.

In the next section of this report we provide a statistical analysis of survey findings.

SECTION III.
Survey Data Analysis

This section presents the results of the survey analysis, including reliability tests and logistic regression models and statistical hypothesis tests that were employed to identify the demographic, socioeconomic and geographic factors that may be related to differing perceptions of visible air quality.

Overview

BBC designed and implemented a visibility survey with 385 Phoenix-area residents (Area A residents). BBC conducted statistical analyses, including logistic regression models and hypothesis testing (e.g. Chi-square, differences of means), to answer the following questions:

- How do Area A residents rate visual air quality? What factors influence ratings of visual air quality?
- What visible air quality levels are acceptable to residents? What factors influence acceptability ratings of visible air quality?
- How many days are visible air quality levels acceptable to Area A residents?
- How reliable are the data collected?

In addition to visible air quality perceptions, participants provided demographic and socioeconomic data, including their gender, age, household income, education, length of residency in the Phoenix-metropolitan area, race and Hispanic/Latino descent. Regional data on where participants live in the Phoenix-metropolitan area were also collected. The analyses incorporate these data to identify any statistically significant differences in visible air quality ratings among different demographic and regional groups.

How Do Area A Residents Rate Visual Air Quality?

On a scale of one to seven, with one being "very poor" and seven being "excellent," participants rated a series of 25 random-order slides that included varying visual air quality views of the Phoenix city landscape (4 slides were duplicates). The slides ranged from 15 to 35 deciviews, with "15" representing the clearest visual air quality and "35" representing the least clear visual air quality. Exhibit III-1 on the following page shows the percentage of ratings that each deciview level received.

Overall ratings. For each deciview level in Exhibit III-1 and Exhibit III-2 on the following page, the shaded percentage highlights the modal rating by deciview (i.e., the visual air quality rating that received the most responses from participants). The mode suggests that:

- Participants consider visual air quality to be near "excellent" for deciviews 15 through 17.
- As deciview level increases, participants become steadily less satisfied with visual air quality.
- The mode shifts from the positive side of the rating scale (5, 6 or 7) to average (4) at deciview 21, and falls below average (ratings 1, 2 and 3) at deciview 23.

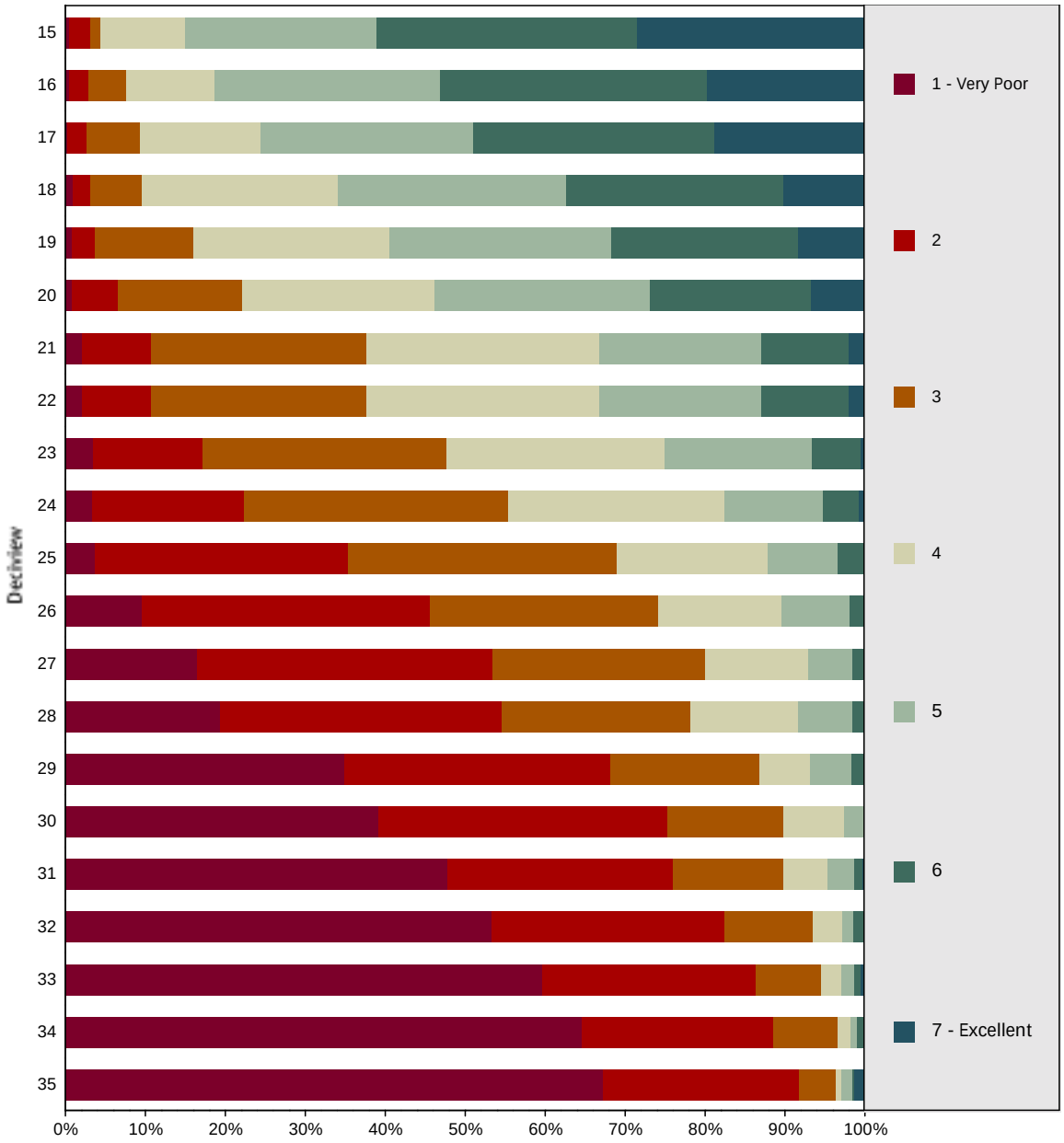
Exhibit III-1.
Quality Ratings by Deciview from All Respondents

	Visible Air Quality Rating							
Deciview	Very Poor VAQ 1	2	3	4	5	6	Excellent VAQ 7	Total
15	0.5 %	2.6 %	1.3 %	10.6 %	24.0 %	32.5 %	28.5 %	100 %
16	0.5	2.4	4.7	11.1	28.2	33.4	19.7	100
17	0.3	2.4	6.6	15.2	26.5	30.2	18.9	100
18	1.0	2.1	6.5	24.5	28.6	27.1	10.2	100
19	0.8	2.9	12.3	24.6	27.7	23.3	8.4	100
20	0.8	5.8	15.5	24.1	26.9	20.2	6.6	100
21	0.8	6.1	25.6	28.2	23.2	13.2	2.9	100
22	2.1	8.6	27.0	29.1	20.2	11.0	2.1	100
23	3.4	13.7	30.5	27.4	18.4	6.1	0.5	100
24	3.4	18.9	33.1	27.0	12.3	4.5	0.8	100
25	3.7	31.6	33.7	18.9	8.7	3.4	0.0	100
26	9.6	36.0	28.6	15.4	8.5	1.9	0.0	100
27	16.5	37.0	26.5	12.9	5.5	1.6	0.0	100
28	19.4	35.2	23.6	13.4	6.8	1.6	0.0	100
29	34.9	33.3	18.6	6.3	5.2	1.6	0.0	100
30	39.2	36.1	14.5	7.6	2.4	0.3	0.0	100
31	47.8	28.2	13.8	5.5	3.4	1.0	0.3	100
32	53.3	29.2	11.0	3.7	1.3	1.6	0.0	100
33	59.6	26.8	8.1	2.6	1.6	0.8	0.5	100
34	64.6	23.9	8.1	1.6	0.8	1.0	0.0	100
35	67.2 %	24.6 %	4.5 %	0.8 %	1.3 %	0.3 %	1.3 %	100 %

Note: Shaded area indicates modal rating by deciview.
Source: BBC Research & Consulting, Visibility Survey, July 2002.

Exhibit III-2 depicts the Exhibit III-1 data graphically.

Exhibit III-2.
Quality Ratings by Deciview from All Respondents



Note: The results shown are the same as Exhibit III-1.
Source: BBC Research & Consulting, Visibility survey, July 2002.

What Factors Influence Ratings of Visual Air Quality?

To identify the factors that may influence visual air quality ratings, BBC employed standard statistical hypothesis tests (e.g., Chi-square, tests of means). Factors that may have played a role in how participants rated visible air quality include demographics and place of residency.

Demographics. Some demographic characteristics were associated with statistically significant differences in how individual slides were rated.

Age. When rating relatively clear air quality, younger participants were more likely to give high ratings than were older participants. Exhibit III-3 compares visual air quality ratings by two population cohorts — those under age 35 and participants 55 and older. The shaded area in Exhibit III-3 denotes a statistically significant difference between each cohort's visual air quality ratings. As shown, there are no statistically meaningful differences in average ratings for deciviews 24 or greater (with the exception of deciview 35).

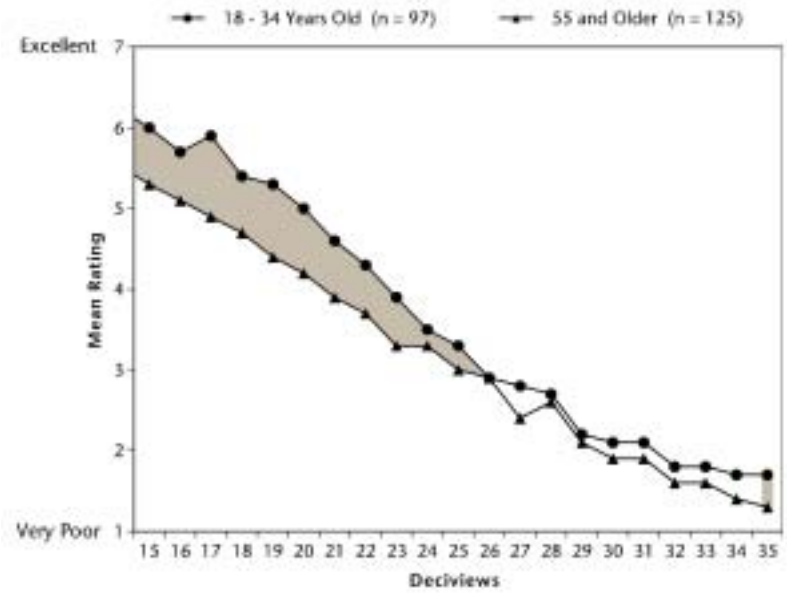
Exhibit III-3.
Air Quality Ratings by Deciview and Age Cohort

Note:

Shaded area indicates statistically significant differences between age cohorts' average ratings, at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



There were also some meaningful (statistically significant) differences in how 35 to 54-year-old participants rated visual air quality compared to other age cohorts.

- For deciviews 15 through 20 and deciview 23, mean visual air quality ratings were higher among 35 to 54-year-olds than they were for participants 55 years old and older.
- Thirty-five to 54-year-olds rated deciviews 17, 19 and 21 lower than participants under age 35.

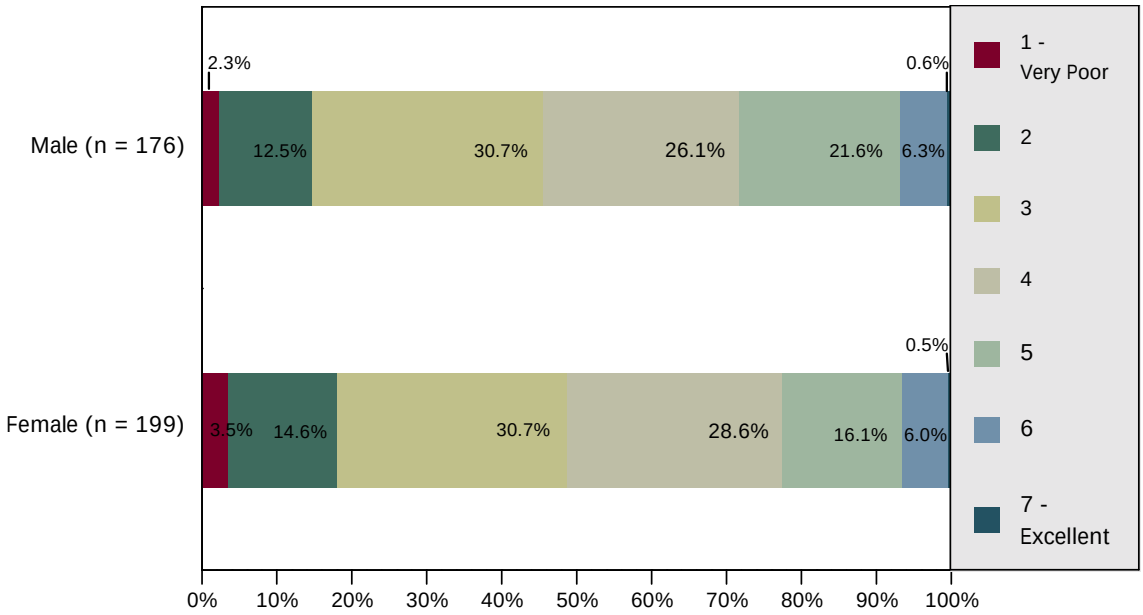
Education. Overall, ratings of visual air quality did not vary much with the level of a participant's educational attainment. At higher deciview levels, education level begins to have a greater impact on participants' visual air quality ratings. However, statistically significant differences only occur between college graduates and non-college graduates for some of the higher deciviews. Non-college graduates rated deciviews 31 and 35 higher than college graduates.

Hispanic origin. Participants' Hispanic descent also had little influence on visual air quality ratings, but some statistically significant differences do exist between Hispanics and non-Hispanics. For deciview levels (15 and 18) non-Hispanics gave higher ratings than Hispanics. However, non-Hispanics gave lower ratings than their Hispanic counterparts when rating deciview 33.

Other factors. Some demographic and socioeconomic characteristics, including participants' gender, income and length of residency in the Phoenix-metro area, did not have statistically significant impacts on how participants rated visual air quality. To illustrate the consistency of ratings between groups, Exhibits III-4 through III-6 compare participants' ratings of deciview 23.

Gender. At deciview 23, the modal rating among male and female participants is below average ("3" rating).

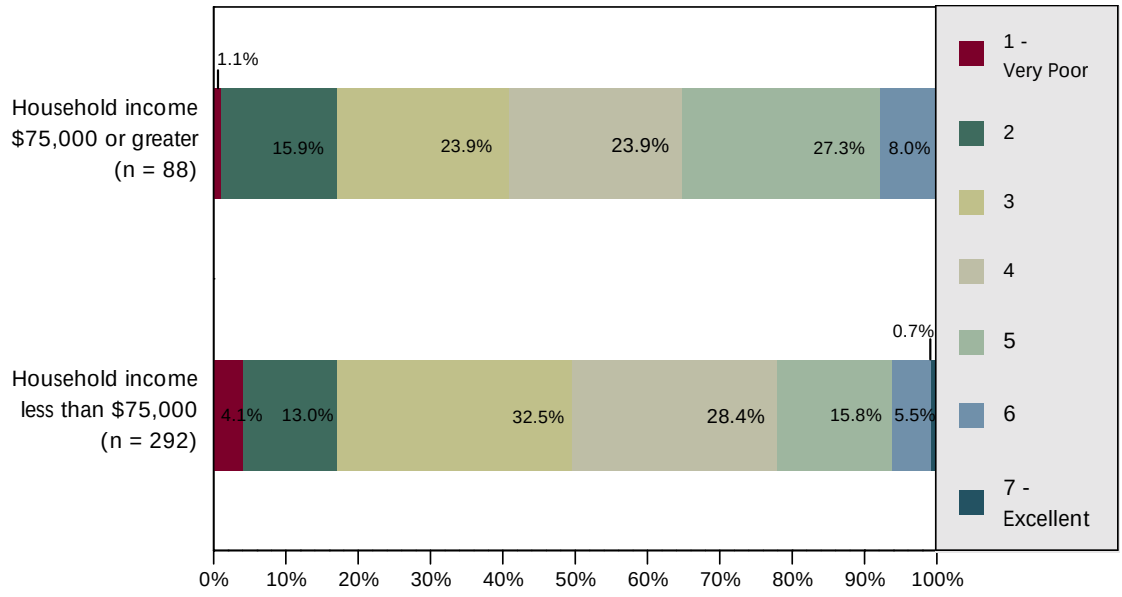
Exhibit III-4.
Deciview 23 Ratings Among Male and Female Participants



Source: BBC Research & Consulting, Visibility Survey, July 2002.

Income. In Exhibit III-5, differences in visual air quality ratings are not statistically significant for participants with household incomes greater than and less than $75,000.

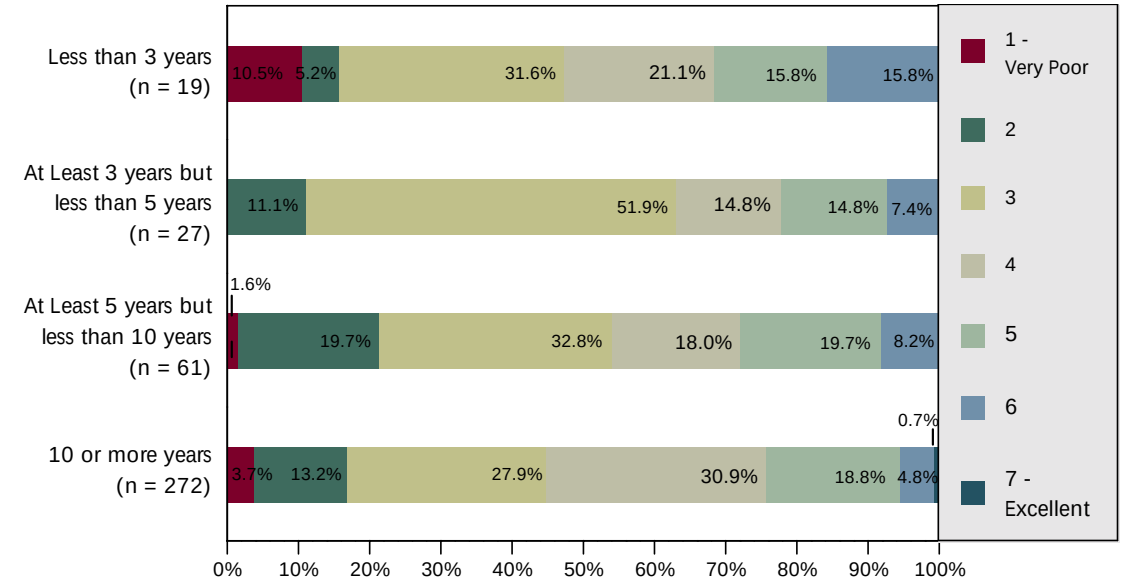
Exhibit III-5.
Deciview 23 Ratings Among Participants with Household Incomes $75,000 or Greater



Source: BBC Research & Consulting, Visibility Survey, July 2002.

Length of residence. More than two-thirds of participants, regardless of length of residence in the Phoenix area, gave average or below average ratings for deciview 23 as shown in Exhibit III-6.

Exhibit III-6.
Deciview 23 Ratings by Length of Phoenix-Area Residence



Source: BBC Research & Consulting, Visibility Survey, July 2002.

Place of residence. As discussed in Section II, participants were categorized into one of four regions based on their place of residence in the Phoenix-metropolitan area.

For nearly all deciview levels, participants living in the northeast region rated visual air quality lower than did participants from other areas, on average. Exhibit III-7 compares the visual air quality ratings of northeast region participants and all other participants.

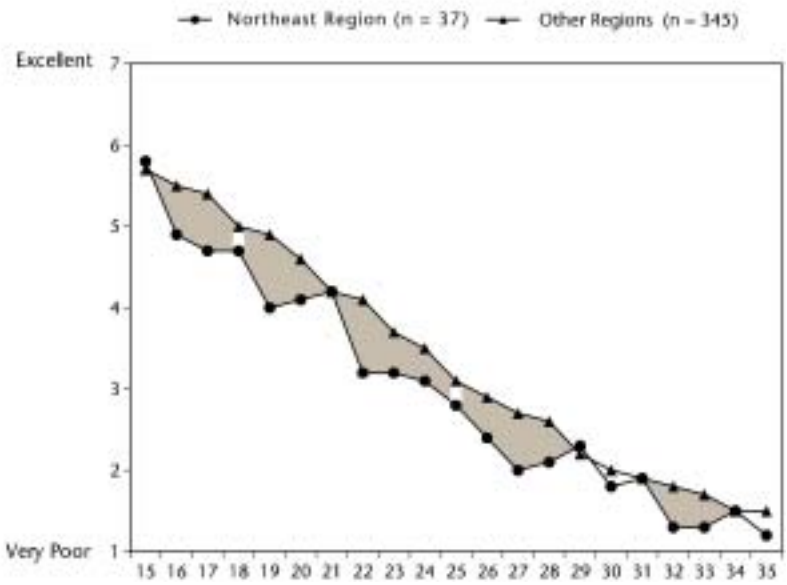
Exhibit III-7.
Air Quality Ratings by Deciview and Region of Residence

Note:

The shaded region highlights statistically significant differences.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



What Visual Air Quality Levels are Acceptable to Residents?

In the second survey exercise, participants provided feedback on whether they thought the visible air quality shown in 25 random-order slides was acceptable or unacceptable. As shown in Exhibit III-8 on the following page, participants' acceptance of visible air quality drops precipitously as deciview level increases.

- At least 90 percent of all participants found visible air quality acceptable between 15 and 20 deciviews;
- At 24 deciviews, nearly half of all participants thought the visible air quality was unacceptable; and
- By 26 deciviews, almost three-quarters of participants said it was unacceptable.

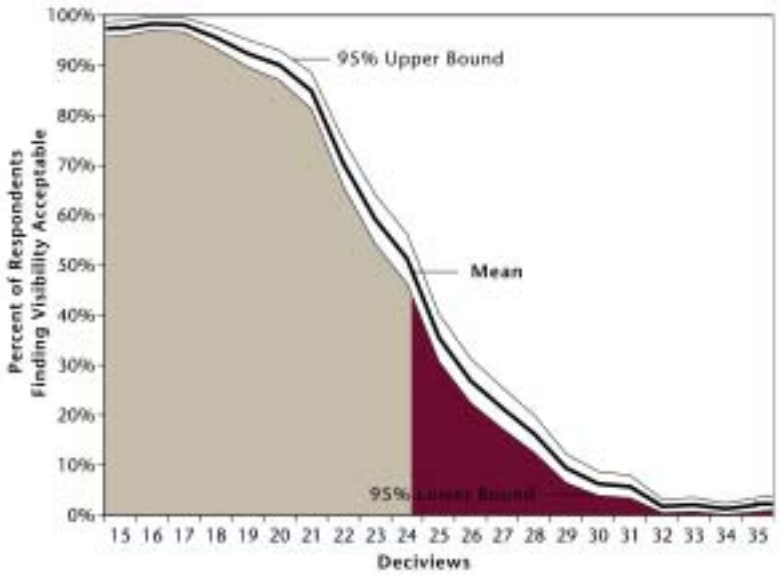
Exhibit III-8.
Actual Acceptable Visibility, with Confidence Intervals, All Participants

Note:

The thin black lines around the actual mean are confidence intervals at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.

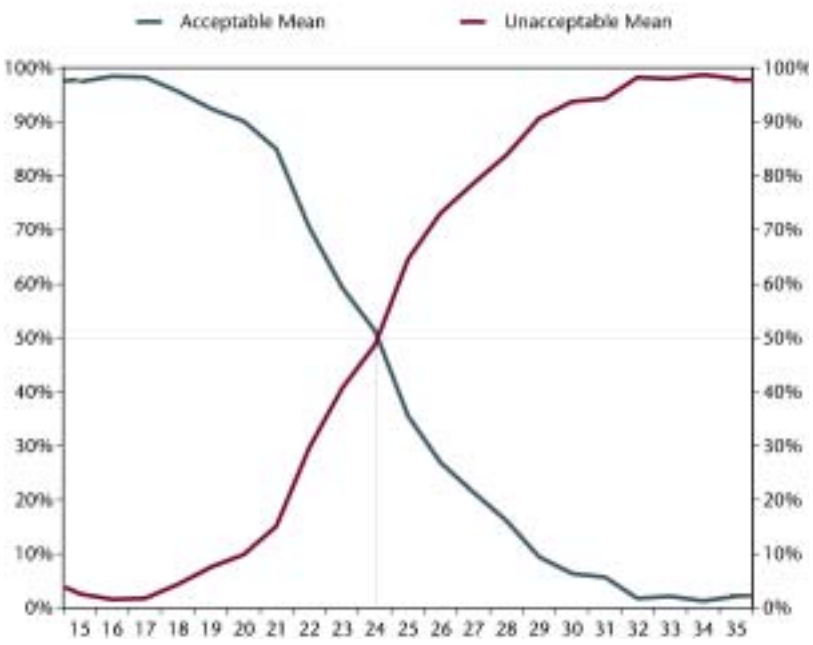


As shown in Exhibit III-9, at 24 deciviews, half of the participants considered the visibility to be acceptable and half considered unacceptable. Nearly all participants considered deciviews 31 and higher to be unacceptable.

Exhibit III-9.
Actual Acceptable and Unacceptable Visibility, with Confidence Intervals, All Participants

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



What Factors Influence Acceptability Ratings of Visible Air Quality?

To understand the influence of underlying participant characteristics on acceptability ratings, BBC developed a logistic regression model and performed other statistical tests.

Logistic regression models (logits) examine relationships between many factors and one variable of interest (dependent variable), all at the same time. A logit models these relationships by isolating the influence of individual factors (independent variables such as age, income, place of residency, etc.) on the probability of each slide being given an "acceptable" versus an "unacceptable" rating. The model can determine which variables have a statistically significant influence on the results. The model estimates the following function:

Probability[Acceptable Rating] = f(deciview, age, income, gender, education, ethnicity length of Phoenix residence, region of residence)

Survey data were examined in further detail to explore findings from the logistic regression models.

Factors that played a role in whether participants found visible air quality acceptable include participants' demographic characteristics and place of residence.

Demographics. The analysis indicated that several demographic factors appear to have influenced participants' acceptability ratings of visible air quality.

Gender. Among participants, women were more likely than men to consider a given level of visible air quality "acceptable."

Age. Findings from the logit analyses show that, as participants age, they become less likely to give "acceptable" visual air quality ratings.

Acceptability ratings by age group for each deciview level were compared (using Chi-square and difference of proportions tests) to explore the statistical relationship between age and acceptable visible air quality more fully.

Exhibit III-10 on the following page shows acceptability ratings by age group for deciviews 19 through 22 where statistically significant differences occur. At deciview 19, all 18 to 34-year-old participants said the visible air quality was acceptable compared to 90 percent of participants 35 to 54 and 55 and older. Beyond 23 deciviews there are no statistically significant differences in acceptability.

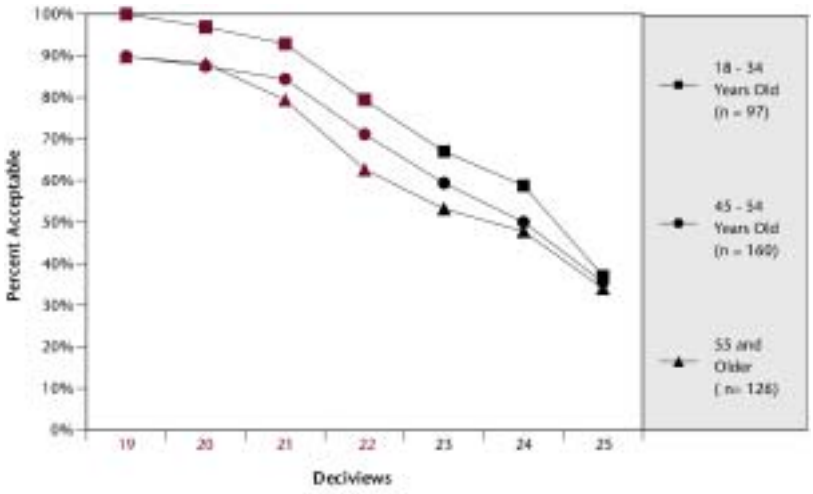
Exhibit III-10.
Percent Acceptable by Age Group

Note:

Red deciviews are statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



Income. Participants with household incomes of $100,000 or greater gave fewer "acceptable" ratings than did participants with household incomes between $75,000 and $100,000.

Education. As education level increased, participants were less likely to consider the visible air quality at a given deciview to be "acceptable." This regression analysis finding was examined further by comparing acceptability ratings of college graduates with non-college graduates (Exhibit III-11 on the following page).

- At deciview 17, nearly all participants from both education cohorts thought visible air quality was acceptable.
- By 22 deciviews, three-quarters of non-college graduates listed visible air quality as acceptable while only 64 percent of college graduates did.
- The disparity in acceptability ratings between non-college graduates and college graduates persists as deciview level worsens.

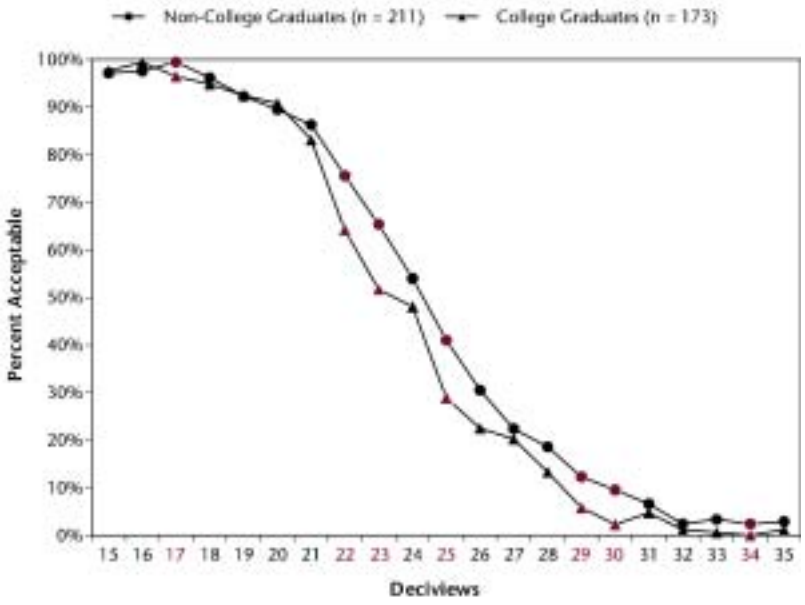
Exhibit III-11.
Percent Acceptable Ratings Among Non-College Graduates and College Graduates

Note:

Red deciviews are statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



Race and Hispanic origin. Race and Hispanic origin did not have statistically significant impacts on participants' acceptability ratings.

Place of residence. Meaningful differences exist between ratings from northeast region residents and other participants for deciviews that range from fairly good, to average and poor. Exhibit III-12 compares the northeast region's "acceptable" rating percentages with other regions. At each statistically significant deciview level (19, 22 and 27), northeast residents were less likely to find visible air quality acceptable.

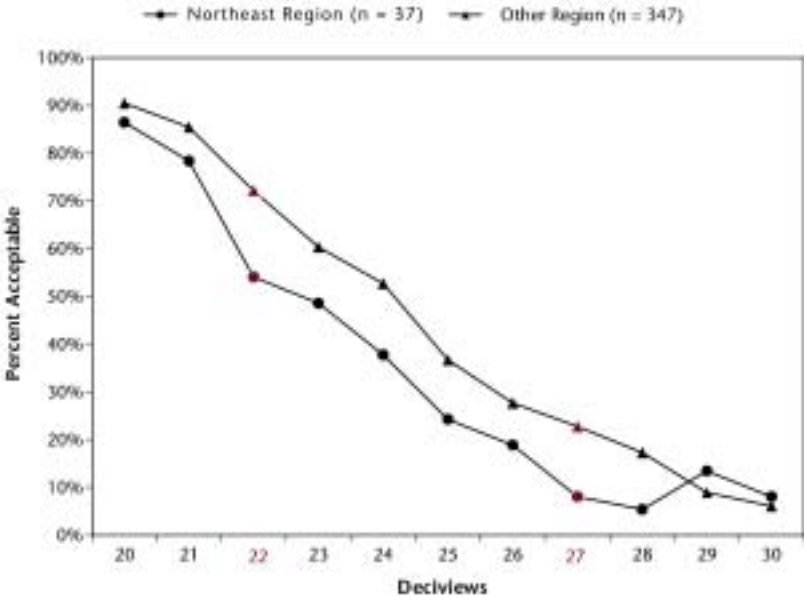
Exhibit III-12.
Illustration of Regional Difference in Acceptability Rating, Deciviews 20-30.

Note:

Red deciviews are statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



How Many Days are Visible Air Quality Levels Acceptable to Area A Residents?

The final exercise participants completed was to consider the number of days of the year that a given visible air quality level is acceptable. Participants were shown seven random-order slides and could list any number of days between 0 and 365. The deciview levels shown in the slides varied across groups. Exhibit III-13 shows the mean number of days that participants thought given deciview levels would be acceptable.

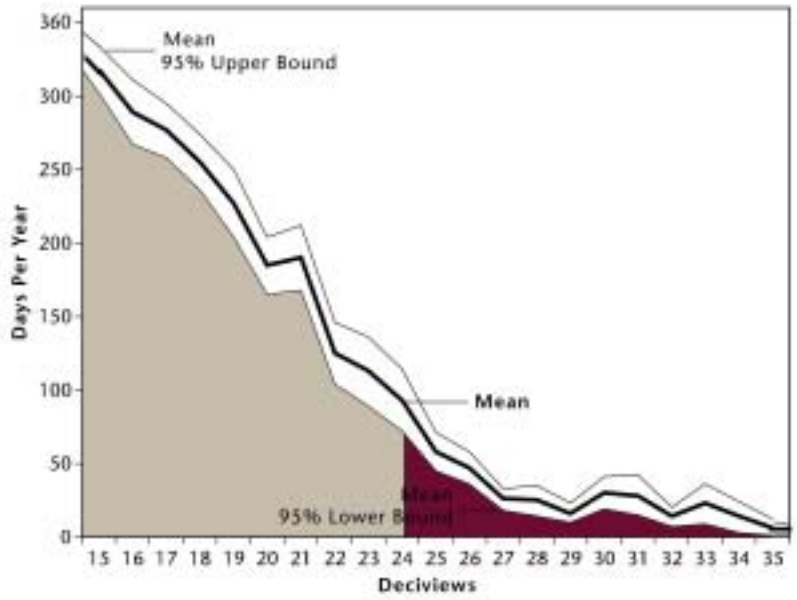
Exhibit III-13.
Acceptable Number of Days per Year by Deciview

Note:

The thin black lines around the actual mean are confidence intervals at the 95% confidence level.

Source:

BBC Research & Consulting, Visibility Survey, July 2002.



As deciview level increases, the number of acceptable visible air quality days falls dramatically. At deciview 15, participants thought visible air quality would be acceptable for nearly 90 percent of the year. By deciview 19, visible air quality is only acceptable for 60 percent of the year and only 30 percent of the year at 23 deciviews.

What Factors Influence Number of Acceptable Air Quality Days?

Unlike the previous analyses, few meaningful differences in the average number of acceptable days could be related to demographic factors. Part of this is due to the smaller sample sizes that resulted from showing participants in each session only seven slides.

How Reliable Are the Data Collected?

Three specific tests were conducted to evaluate the reliability of the data collected. First, BBC gauged whether individual respondents were consistent in their ratings of acceptable visible air quality. For the second test, BBC examined the correlation between groups (sessions) in their ratings. Finally, BBC examined the correlation between each individual's visual air quality ratings on the seven-category scale (in Part I of the survey) and the number of deciviews portrayed in the slides. The

purpose of the last test was to examine whether any respondents may have inadvertently "flipped" the scale in providing their ratings. We also discuss the reliability of the survey resulting from its sample size.

Ratings consistency — individual participants. In the course of the survey, participants were shown four duplicate slides. These repeated slides permit examination of the consistency of responses by individual respondents.

Acceptability. Acceptability responses for these duplicated, "reliability" slides were compared with participants' initial acceptability responses. As shown in Exhibit III-14, 90 percent of participants' responses were the same for both the reliability and study slides (either Yes/Yes or No/No). This suggests that individual participants were consistent in their evaluation of visible air quality.

Exhibit III-14.
Rating Reliability Analysis:
Acceptability

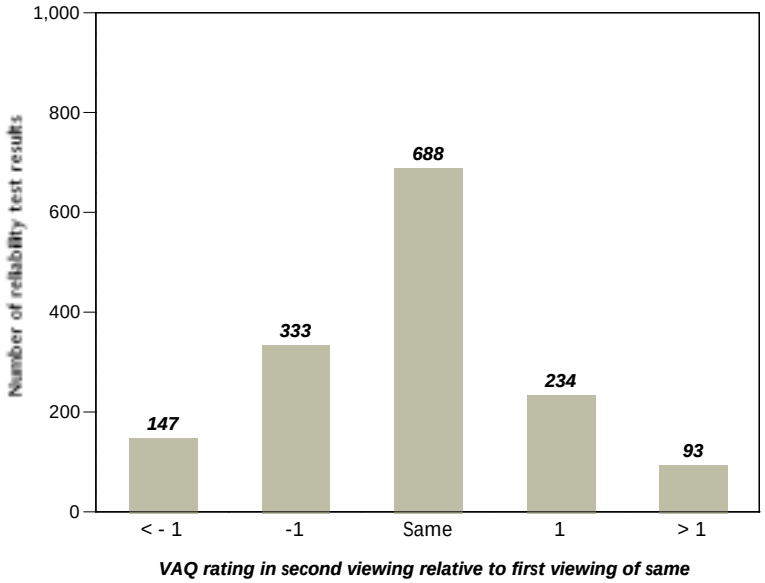
Source:
BBC Research & Consulting, Visibility Survey, July 2002.

(Sum 15 - 35 Deciview Reliability Acceptable Response) Reliability Slides	*Study Slides (Sum 15-35 Deciview Acceptable Responses)* Yes	No
Yes	619	59
No	98	756

Visual air quality ratings. When rating the visual air quality on a scale of 1 to 7, participants were remarkably consistent in scoring the reliability slides. As shown in Exhibit III-15 on the following page, in 84 percent of the cases, the rating given to the reliability slide was the same as or within +/- 1 of the rating initially given to the slide. These results are also presented by individual deciview in Appendix A.

Exhibit III-15.
Results of Reliability Tests on Visual Air Quality Ratings

Source:
BBC Research & Consulting.



Ratings consistency — between groups. To evaluate whether variation in slide order, session location, moderator or other external session factors impacted participants' ratings, BBC conducted correlation analyses between sessions. Of the 351 possible pairs, 56 percent had correlations greater than 0.95, and 91 percent had correlations greater than 0.90. This clearly indicates that session-related factors did not substantially impact how participants responded to the visibility survey.

Ratings consistency — "flipped" scales. When individuals are asked to assign a quantitative rating scale, such as the 1 to 7 rating exercise performed in Part I of the survey, there is always the risk that one or more respondents may inadvertently "flip" the scale. To test for this possibility, BBC examined the correlation between each individual's rating of the 21 distinct images on the 1 to 7 scale and the number of deciviews portrayed in the image. Since an increasing number of deciviews implies reduced visibility and respondents were asked to provide higher numbers (e.g., a 7) for images that they felt showed the best visual air quality and lower numbers (e.g., a 1) for images they felt portrayed the worst visual air quality, these correlations were expected to be negative (between 0 and -1.0) if the exercise was performed correctly.

Over 90 percent (354/385) of individual respondents' visual air quality ratings in Part I were inversely correlated with their ratings on the 1 to 7 scale (as expected) and had correlation coefficients ranging from -0.6 to -1.0. The responses of an additional 20 survey participants were also negatively correlated with their ratings, though their responses showed a weaker relationship to the number of deciviews portrayed (correlation coefficients between -0.3 and -0.6).

The responses of nine of the remaining 11 survey participants were essentially uncorrelated to the number of deciviews portrayed in the slides (correlation coefficients between -0.3 and +0.2). The final two respondents appear to have "flipped" the scale. These respondents' ratings for Part I are strongly positively correlated with the number of deciviews portrayed (correlation coefficients between +0.6 and +1.0), indicating they rated the slides with the most haze as portraying the best visibility conditions. Since BBC cannot read the minds of the survey respondents and be absolutely certain that they inadvertently reversed the scale, the unadjusted responses of all participants were

included in the analyses described earlier in this section. No responses were eliminated as "outliers" or adjusted in any fashion. Even if two respondents did inadvertently "flip" the scale in providing their responses, as only two out of 385 survey participants, their responses represent less than one percent of the total dataset and do not have a meaningful impact on the results.

Sample size. The sample size for the Phoenix Area Visibility Survey was carefully constructed to minimize the size of the confidence interval around estimated proportions and to yield results at the 95 percent confidence level. The confidence interval is a specified range of numbers within which a population proportion will lie. The confidence level is a percentage that states the long-run percentage of confidence intervals that will include the true population proportion. The confidence interval and the confidence level are critical determinants of the appropriate sample size for a population.[1] In the equation below, *d* represents the size of the confidence interval, *z* the confidence level, *p* the population proportion, and *n* the sample size.

$$d = \sqrt{\frac{z^2 p(1-p)}{n}}$$

For the purposes of determining the initial sample size, the 95 percent confidence level and a confidence interval of +/- 5 percentage points was selected. To ensure that the sample is adequate regardless of the population proportion, *p* was set to 0.5 (50%). Solving for n, a sample size of 384 was required to validly reflect Area A's residents within +/- 5 percent at the 95 percent confidence level. Thus, the survey met the requirement for statistical reliability at the 95 percent confidence level.

[1] See Exploring Market Research (Zikmund, 1997) for a more thorough explanation of determining sample size.

SECTION IV.
Visibility Survey Implications

The Visibility Survey has produced a reliable data set for use by the VIOC in terms of how residents of Area A rate varied levels of visual air quality, what visible levels are considered to be acceptable or unacceptable and how often (in terms of number of days per year) varied levels are acceptable.

Reliable Data from the Visibility Survey

The statistical analyses of the survey results, provided in Section III, demonstrate that survey participants were internally consistent in how they evaluated the slides. Further, the high correlations found in comparing the average results across the survey sessions indicate that slide order, location, moderator and other session-specific factors had little or no influence on the results.

Survey participant demographics generally closely mirrored the population makeup of Area A as a whole, with the exception of relatively low Hispanic/Latino participation in the survey. While Section III identified some differences in perception or evaluation of visibility related to different demographic and socioeconomic characteristics, Phoenix area respondents were quite consistent on the whole in their evaluations. When the logit model was re-run without any demographic variables, the number of deciviews alone provided nearly as accurate a prediction of whether a slide would be rated as "acceptable" as the full model provided with all demographic variables included.

The sample size meets the statistical requirements to yield results that are reliable at the 95 percent confidence level.

In sum, the study team believes the results of the visibility survey are highly reliable and representative of the population of Area A as a whole.

Survey Element Comparison

VIOC may wish to use information from each of the three parts of the Visibility Survey. It is instructive to compare participants' responses to each of the three parts of the survey side-by-side, to understand the results more fully. Exhibit IV-1 on the following page shows the overall survey responses for selected deciviews. (Appendix A presents the data for every deciview.)

Exhibit IV-1 demonstrates that Area A residents were willing to consider air quality that they rated below average to be acceptable, at least some of the time. For example, fewer than 40 percent of respondents rated the visual air quality at 21 deciviews at a 5, 6 or 7 (on a scale of 1 – very poor, to 7 – excellent); however, almost 85 percent indicated that the visible air quality at this level was acceptable. Survey participants indicated that the view at 21 deciviews would be acceptable 190 days per year.

Only 7 percent of participants rated 27 deciviews a 5, 6 or 7, yet over one fifth considered this level of visibility acceptable. However, those respondents (on average) indicated that 27 deciviews would be acceptable for only 26 days per year.

Exhibit IV-1.
Overall Survey Responses for Selected Deciviews

Deciview	Percent Rating 5 - 7	Percent Acceptable	Mean Number of Days Acceptable
19	59.0%	92.4%	227
21	38.7%	84.9%	190
23	24.7%	59.3%	113
25	11.9%	35.5%	58
27	7.0%	21.4%	26

Source: BBC Research & Consulting, Visibility Survey, July 2002.

Should VIOC decide to establish a rating system or visibility index for the Phoenix Metropolitan Area, the data set developed through this survey will allow VIOC to relate quantified visibility levels to the perceptions of the residents of Area A. At any given level of visibility (between 15 and 35 deciviews), the dataset can indicate how area residents would rate that visibility level between 1 and 7, what percent of residents would deem that visibility level to be acceptable and how often that level of visibility would be acceptable during the year for the average resident.

APPENDIX A.
Survey Element Comparison

Exhibit A-1.
Survey Element Comparison

Visible Air Quality Rating												
Deciview	*Very Poor VAQ 1*	*2*	*3*	*4*	*5*	*6*	*Excellent VAQ 7*	*Average Rating*	*Mode*	*Percent Acceptable*	*Percent Unacceptable*	*Average Number Days Acceptable*
15	0.5 %	2.6 %	1.3 %	10.6 %	24.0 %	32.5 %	28.5 %	5.7	6	97.4 %	2.6 %	318
16	0.5	2.4	4.7	11.1	28.2	33.4	19.7	5.4	6	98.4	1.6	289
17	0.3	2.4	6.6	15.2	26.5	30.2	18.9	5.3	6	98.2	1.8	277
18	1.0	2.1	6.5	24.5	28.6	27.1	10.2	5.0	5	95.6	4.4	255
19	0.8	2.9	12.3	24.6	27.7	23.3	8.4	4.8	5	92.4	7.6	227
20	0.8	5.8	15.5	24.1	26.9	20.2	6.6	4.6	5	90.1	9.9	185
21	0.8	6.1	25.6	28.2	23.2	13.2	2.9	4.2	4	84.9	15.1	190
22	2.1	8.6	27.0	29.1	20.2	11.0	2.1	4.0	4	70.4	29.6	125
23	3.4	13.7	30.5	27.4	18.4	6.1	0.5	3.6	3	59.3	40.7	113
24	3.4	18.9	33.1	27.0	12.3	4.5	0.8	3.4	3	51.3	48.7	93
25	3.7	31.6	33.7	18.9	8.7	3.4	0.0	3.1	3	35.5	64.5	58
26	9.6	36.0	28.6	15.4	8.5	1.9	0.0	2.8	2	26.9	73.1	47
27	16.5	37.0	26.5	12.9	5.5	1.6	0.0	2.6	2	21.4	78.6	26
28	19.4	35.2	23.6	13.4	6.8	1.6	0.0	2.2	2	16.2	83.8	25
29	34.9	33.3	18.6	6.3	5.2	1.6	0.0	2.0	1	9.4	90.6	16
30	39.2	36.1	14.5	7.6	2.4	0.3	0.0	1.9	1	6.3	93.7	30
31	47.8	28.2	13.8	5.5	3.4	1.0	0.3	1.8	1	5.7	94.3	28
32	53.3	29.2	11.0	3.7	1.3	1.6	0.0	1.6	1	1.8	98.2	14
33	59.6	26.8	8.1	2.6	1.6	0.8	0.5	1.5	1	2.1	97.9	23
34	64.6	23.9	8.1	1.6	0.8	1.0	0.0	1.5	1	1.3	98.7	14
35	67.2 %	24.6 %	4.5 %	0.8 %	1.3 %	0.3 %	1.3 %	2.6	1	2.1 %	97.9 %	6

Source: BBC Research & Consulting, Visibility Survey, July 2002.

Exhibit A-2.
Reliability Slide vs. Actual Deciview Ratings

Reliability of Deciview VAQ Ratings											
	Deciview 15	***Deciview 16***	***Deciview 17***	***Deciview 18***	***Deciview 19***	***Deciview 20***	***Deciview 21***	***Deciview 22***	***Deciview 23***	***Deciview 24***	***Deciview 25***
Same rating	38.9 %	44.8 %	36.6 %	25.7 %	36.5 %	35.2 %	45.3 %	33.6 %	44.3 %	23.5 %	41.5 %
Rating + 1	25.0	13.5	26.7	28.6	15.4	16.7	3.8	17.8	14.8	17.3	16.9
Rating - 1	27.8	26.0	21.8	20.0	23.1	26.9	26.4	25.2	16.4	36.7	26.2
Rating > + 1	5.6	9.4	1.0	20.0	15.4	9.3	7.5	9.3	9.8	2.0	6.2
Rating < - 1	2.8	6.3	13.9	5.7	9.6	12.0	17.0	14.0	14.8	20.4	9.2
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
n=	36	96	101	35	52	108	53	107	61	98	65

	Deciview 26	***Deciview 27***	***Deciview 28***	***Deciview 29***	***Deciview 30***	***Deciview 31***	***Deciview 32***	***Deciview 33***	***Deciview 34***	***Deciview 35***
Same rating	36.8 %	41.9 %	60.8 %	50.0 %	53.5 %	62.8 %	61.5 %	82.4 %	64.2 %	87.3 %
Rating + 1	23.5	8.1	13.7	19.8	14.8	11.5	7.7	5.9	11.9	3.2
Rating - 1	27.9	35.5	15.7	14.6	19.7	12.8	12.8	11.8	16.4	7.9
Rating > + 1	2.9	4.8	2.0	8.3	5.6	2.6	10.3	0.0	3.0	0.0
Rating < - 1	8.8	9.7	7.8	7.3	6.3	10.3	7.7	0.0	4.5	1.6
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
n=	68	62	51	96	142	78	39	17	67	63

Source: BBC Research & Consulting, Visibility Survey, July 2002.

APPENDIX B.
Survey Instrument

Verbal Instructions for Phoenix Visibility Survey

(Hand out questionnaires and pen lights. Ask if anyone has a questionnaire that does not have a slide set number, group number, and observer number written on it. Tell them to also fill in their observer initials where indicated. Remind participants to please turn off any cell phones or pagers.)

(As people check it, it's ok if they want to fill out the demographics section of the survey. Also, if folks ask at this stage how they were recruited, it's ok to tell them "at random." If people want to know more details, such as who the client is or what the study will be used for, tell the participants that you will answer all of those questions at the end of the session.)

Part I

(This section works well standing at the front of the room.)

Hello, thank you all very much for your time. The purpose of this meeting is to find out what you all think about what the haze, or air pollution, looks like in the Phoenix area. We're going to show you some pictures and ask you to judge the quality of the view.

There are three parts to this meeting. *First*, we'll show you some slides and ask you to rate the visual air quality of each picture. *Second*, we'll show you the same slides again and ask you if the quality of the view is acceptable. *Finally*, we'll look at a few slides and ask you how many days during the year the air quality shown in the slides would be acceptable.

All of the slides reflect the same view of the Phoenix metropolitan area. A computer model was used to show different levels of visibility, which correspond to the actual range of air quality in Phoenix.

Now before we start, I want to mention a couple of guidelines.

- First, please keep your comments to yourself. We would prefer that no one talk during the exercise. We're going to save some time at the end of the hour to have a discussion and gather any comments you might have.

- Second, the view that we're going to show you is of an urban, city area. Don't rate the slides as if they were in a national park or wilderness area. Realize that we're judging the air quality in a city.

- And finally, we don't want you to think about the health effects of smog or the costs of preventing or cleaning up air pollution. All we're doing today is asking your opinion of how the air LOOKS.

In the first exercise you'll be using a 7-point scale to rate the slides. On your *questionnaire* you'll see that the "1" is labeled "very poor" visual air quality and the "7" is labeled "excellent" visual air quality. So the lower numbers indicate poorer visibility and the higher numbers indicate better visibility. As you look at each slide, rate it on this scale.

Please provide a response for each slide—don't leave any blank. If you need more time to make up your mind, let me know. But for the most part, just go ahead and put down your first impression. There are no right or wrong answers in any of this. This is not a test.

Each slide I'm going to show you was taken from the exact same place, the Squaw Peak Water Treatment Plant. Each slide shows the water treatment plant facilities in the foreground, the city of Phoenix in the center, and the Sierra Estrella Mountains in the background.

OK, we'll first start with five warm-up slides. On your sheet, mark how the visual air quality of Slide A rates on a scale of 1 — very poor — to 7 — excellent. These warm-up slides are just for practice, they won't count on this exercise. If you have any questions, please wait and ask them when we are done with the warm-up slides.

Please make sure to turn on your pen light, as I'm going to turn the room lights off now. *(Close room door. Make sure the "do not enter" sign is on the door. Turn out lights.)*

(Go through warm-up slides A through E.)

Are there any questions?

Now turn to page 2 of the survey and we'll go through a set of 25 slides, 15 on this page and 10 more slides on the next.

Before we start, I want to remind you about the scale. Sometimes people switch it around. The higher numbers indicate the better visibility; and the lower numbers indicate the poorer visible air quality.

(Go through 25 study slides. After the 10th slide, remind people about the scale. After the 15th slide, tell people to turn the page and remind them about the scale. Count silently to 10 for each slide. Say the slide number outloud as you advance to a new slide.)

Part II

Okay, now we are ready to do Part II. Turn to page 4 of your questionnaire. The instructions for this part are at the top of the page. I'm going to read them out loud now.

(Read instructions outloud.)

Instructions for Part II.

In this exercise we are seeking public input on acceptable visibility levels for the greater Phoenix area. Part II involves looking at the slides again and deciding whether a particular view has an acceptable level of visibility for an urban area.

Please base your decision on the following:

- Consider that this is a view in a city. In other words, please take into account that you are judging the visibility in an urban area, and not a pristine desert area, where standards might be stricter.

- Consider "unacceptable" as visual air quality that is unreasonable or objectionable visibility. Please do not mark a slide "unacceptable" just because you can see some haze, unless you believe that any amount of haze is more than you would tolerate.

- The acceptable visibility levels should be based solely on visibility. Do not try to guess what might be the health effects of haze or how much it might cost to have better visibility. Your decision should be based on how the air looks—this is about visibility only.

Please indicate in the spaces provided whether the visibility in a given slide is acceptable to you.

Are there any questions? Once again, we will do the warm-up slides and then go into the 25 study slides. This time you are asking yourself, is the visibility acceptable to you? Yes or no.

(If participants ask - - tell them to consider the visual air quality at any moment. - - as opposed to lasting for several hours or a day. Basically, if at any moment the visual air quality looks like a given slide, would it be acceptable or not.)

(Go through warm-ups.)

Are there any questions? Please turn to page 5 on the survey. As you can see, the first 13 slides should be rated going down the shaded left-hand-side column. When we get to the 14th slide, I'll remind you to start the new column.

For each slide, ask yourself, is this much haze acceptable?

(Go through 25 study slides. Allow a count of "5" for each slide. When you get to slide 14, remind participants to start the new column at the top of the page on the right-hand side.)

Part III

For Part III I'm going to show you a few more slides, which I've picked at random. As I show you each slide, write down the *number of days in a year* that the visibility shown would be acceptable to you. The number of days can range from zero — if you feel that the visibility in the slide would not ever be acceptable — to 365 — if the visibility shown in the slide was acceptable every day. The total for all the slides will not total 365; for example, you could have a few slides where you put down 365 days, if the views would both be acceptable to you year-round.

Please turn to page 6. We will *not* do warm-up slides on this last exercise.

(Go through 7 study slides. Count to "15" for each slide.)

Demographic Information

Finally, please fill out the information on page 7.

Discussion

I promised you that we'd save some time at the end of our meeting for discussion. Does anyone have any comments they'd like to pass along?

As soon as you've filled out the final page of the questionnaire, please hand me your questionnaire and your pen light. In exchange, I'll hand you your "thank you gift."

Thank you very much for coming today.

(Hand out incentive payment envelopes.)

Alert participants to the option of having ADEQ send them follow-up info in the future.

Phoenix Visibility Survey

Slide Set #: _____ ***Group #:*** _____

Observer #: _____ ***Your Initials:*** _____

Part I. Warm-up Slides

Instructions

Please mark the visual air quality of each slide in the space provided below using the 1–7 scale.

				Visual Air Quality			
	Very Poor						***Excellent***
	1	*2*	*3*	*4*	*5*	*6*	*7*
A.	❑	❑	❑	❑	❑	❑	❑
B.	❑	❑	❑	❑	❑	❑	❑
C.	❑	❑	❑	❑	❑	❑	❑
D.	❑	❑	❑	❑	❑	❑	❑
E.	❑	❑	❑	❑	❑	❑	❑

Part I: Study Slides

Instructions

Please mark the visual air quality of each slide in the space provided below using the 1–7 scale.

				Visual Air Quality			
	Very Poor						***Excellent***
	1	*2*	*3*	*4*	*5*	*6*	*7*
1.	❑	❑	❑	❑	❑	❑	❑
2.	❑	❑	❑	❑	❑	❑	❑
3.	❑	❑	❑	❑	❑	❑	❑
4.	❑	❑	❑	❑	❑	❑	❑
5.	❑	❑	❑	❑	❑	❑	❑
6.	❑	❑	❑	❑	❑	❑	❑
7.	❑	❑	❑	❑	❑	❑	❑
8.	❑	❑	❑	❑	❑	❑	❑
9.	❑	❑	❑	❑	❑	❑	❑
10.	❑	❑	❑	❑	❑	❑	❑
11.	❑	❑	❑	❑	❑	❑	❑
12.	❑	❑	❑	❑	❑	❑	❑
13.	❑	❑	❑	❑	❑	❑	❑
14.	❑	❑	❑	❑	❑	❑	❑
15.	❑	❑	❑	❑	❑	❑	❑

Part I: Study Slides, Continued

Instructions

Please mark the visual air quality of each slide in the space provided below using the 1–7 scale.

	Visual Air Quality						
	Very Poor						***Excellent***
	1	*2*	*3*	*4*	*5*	*6*	*7*
16.	❑	❑	❑	❑	❑	❑	❑
17.	❑	❑	❑	❑	❑	❑	❑
18.	❑	❑	❑	❑	❑	❑	❑
19.	❑	❑	❑	❑	❑	❑	❑
20.	❑	❑	❑	❑	❑	❑	❑
21.	❑	❑	❑	❑	❑	❑	❑
22.	❑	❑	❑	❑	❑	❑	❑
23.	❑	❑	❑	❑	❑	❑	❑
24.	❑	❑	❑	❑	❑	❑	❑
25.	❑	❑	❑	❑	❑	❑	❑

Part II: Study Slides

Instructions

In this exercise we are seeking public input on acceptable visibility levels for the greater Phoenix area. Part II involves looking at the slides again and deciding whether a particular view has an acceptable level of visibility for an urban area.

Please base your decision on the following:

- Consider that this is a view in a city. In other words, please take into account that you are judging the visibility in an urban area, and not a pristine desert area, where standards might be stricter.
- Consider "unacceptable" as visual air quality that is unreasonable or objectionable visibility. Please do not mark a slide "unacceptable" just because you can see some haze, unless you believe that any amount of haze is more than you would tolerate.
- The acceptable visibility levels should be based solely on visibility. Do not try to guess what might be the health effects of haze or how much it might cost to have better visibility. Your decision should be based on how the air looks—this is about <u>visibility</u> only.

Please indicate in the spaces provided whether the visibility in a given slide is acceptable to you.

Part II. Warm-up Slides

Instructions

Please indicate in the spaces provided whether the visibility in a given slide is acceptable to you.

A. Acceptable? ❑ Yes ❑ No

B. Acceptable? ❑ Yes ❑ No

C. Acceptable? ❑ Yes ❑ No

D. Acceptable? ❑ Yes ❑ No

E. Acceptable? ❑ Yes ❑ No

Part II. Study Slides

Please indicate in the spaces provided whether the visibility in a given slide is acceptable to you.

1.	Acceptable?	❑ Yes	❑ No	14.	Acceptable?	❑ Yes	❑ No
2.	Acceptable?	❑ Yes	❑ No	15.	Acceptable?	❑ Yes	❑ No
3.	Acceptable?	❑ Yes	❑ No	16.	Acceptable?	❑ Yes	❑ No
4.	Acceptable?	❑ Yes	❑ No	17.	Acceptable?	❑ Yes	❑ No
5.	Acceptable?	❑ Yes	❑ No	18.	Acceptable?	❑ Yes	❑ No
6.	Acceptable?	❑ Yes	❑ No	19.	Acceptable?	❑ Yes	❑ No
7.	Acceptable?	❑ Yes	❑ No	20.	Acceptable?	❑ Yes	❑ No
8.	Acceptable?	❑ Yes	❑ No	21.	Acceptable?	❑ Yes	❑ No
9.	Acceptable?	❑ Yes	❑ No	22.	Acceptable?	❑ Yes	❑ No
10.	Acceptable?	❑ Yes	❑ No	23.	Acceptable?	❑ Yes	❑ No
11.	Acceptable?	❑ Yes	❑ No	24.	Acceptable?	❑ Yes	❑ No
12.	Acceptable?	❑ Yes	❑ No	25.	Acceptable?	❑ Yes	❑ No
13.	Acceptable?	❑ Yes	❑ No				

Part III: Study Slides

Please list how many days in a year the visibility in this slide is acceptable to you. (The numbers do not have to add up to 365.)

Slide	***Number of Days during the Year (0 to 365)***
A.	_____
B.	_____
C.	_____
D.	_____
E.	_____
F.	_____
G.	_____

Demographic Information

1. Sex (check one)

   ❑ Male ❑ Female

2. Age (check one)

   ❑ 18–24 ❑ 45–54

   ❑ 25–34 ❑ 55–64

   ❑ 35–44 ❑ 65+

3. Annual household income (check one)

   ❑ Under $24,999

   ❑ $25,000 to $49,999

   ❑ $50,000 to $74,999

   ❑ $75,000 to $99,999

   ❑ $100,000 or more

4. What is the highest level of schooling you have completed? (check one)

   ❑ Some high school or less

   ❑ High school graduate

   ❑ Trade/vocational school or some college

   ❑ College graduate

   ❑ Post-graduate work or degree

5. How long have you lived in the Phoenix metropolitan area? (check one)

   ❑ Less than one year

   ❑ At least one year but less than 3 years

   ❑ At least 3 years but less than 5 years

   ❑ At least 5 years but less than 10 years

   ❑ 10 or more years

6. Which describes your race or ethnic group? (check one)

   ❑ Anglo/white

   ❑ Hispanic/Chicano/Latino

   ❑ African American/Black

   ❑ American Indian/Native American

   ❑ Asian/Oriental/Pacific Islander

   ❑ Other

7. Are you of Hispanic or Latino descent? (check one)

   ❑ Yes ❑ No

Instrucciones Verbal para el Estudio de Visibilidad en la Ciudad de Phoenix

(Distribuye cuestionarios y las plumas iluminadas. Pregunta si alguien tiene un cuestionario que no tiene un numero de coleccion de diapositivas, numero de grupo, y numero de observador escrito en el cuestionario. Digales tambien que escriban sus iniciales de observador donde indicado. Recordar a los participantes que apagen sus telefonos celulares o pagers.)

Parte I

(Es major presentar esta seccion al frente del cuarto.)

Hola y muchas gracias a todos por su tiempo. El proposito de esta junta es para enterarnos de lo que ustedes piensan sobre el tema de smog, o polucion de aire, que se ve en el area de Phoenix. Les vamos a presentar una serie de photos y pedirles que ustedes juzguen la calidad de la vista.

Esta junta consiste de tres partes. *Primero*, les vamos a presentar unas diapositivas y pedirles que ustedes classifiquen la calidad visual de cada photo. *Segundo*, les vamos a presentar las mismas diapositivas otra vez y les vamos a preguntar si la calidad de la vista es acceptable. *Finalmente*, vamos a ver a unas pocas diapositivas y les vamos a preguntar cuantos dias durante el año la calidad del aire mostrada en las diapositivas seria acceptable.

Todas las diapositivas muestran la misma vista del area metropolitana de Phoenix. Se uso un modelo de computadora para demostrar los niveles differentes de visibilidad que corresponden al alcance real de la calidad del aire en Phoenix.

Ahora antes de comenzar, quiero mencionar unas pocas lineas de guia:

- Primero, por favor de mantener sus comentarios a sis mismos. Preferemos que nadie hable durante el ejercicio. Vamos a ahorrar tiempo al fin de la hora para comentarios que ustedes quizas tendran.

- Segundo, la vista que les vamos a presentar es de un area urbana de ciudad. No clasifiquen las diapositivas como si eran de un parque nacional o un area de yermo. Reconocer que nosotros estamos juzgando la calidad del aire en una ciudad.

- Y finalmente, no queremos que piensen en los effectos en su salud causada por smog o los costos de prevenir o mejorar la polucion de aire. Lo unico que les pedimos en este dia es su opinion sobre como el aire SE VE.

En el primer ejercicio, ustedes van a usar la escala de 7 puntos para clasificar las diapositivas. En su *cuestionario*, ustedes veran que el numero “1” esta marcado “Muy Inferior” calidad del aire visual y el numero “7” esta marcardo “Excelente” calidad del aire visual. Los numeros mas bajos indican visibilidad inferior y los numeros altos indican mejor visibilidad. Cuando vean a cada diapositiva, favor de clasificar usando esta escala.

Por favor de proveer una respuesta para cada diapositiva — no dejen ninguna vacia. Diganme si necesitan mas tiempo para decidir. Pero por la parte mayor, sigan adelante y escriban su primer impresion. No hay respuestas correctas ni equivocadas en todo esto. Esto no es un examen.

Todas las diapositivas que les voy a mostrar fueron sacadas en la misma locacion — la facilidad de purificacion del agua de Squaw Peak. Cada diapositiva muestra las facilidades de purificacion del agua al primer plano, la ciudad de Phoenix al centro y las montanas Sierra Estrellas al fondo.

Bueno, comensaremos con cinco diapositivas preparativas. En su cuestionario, marque como la calidad visual del aire de Diapositiva A clasifica en la escala de 1 — Muy Inferior — hasta 7 — Excelente. Estas diapositivas preparativas son solamente para practica — no seran consideradas en este ejercicio. Esperaremos hasta el concluso de las diapositivas preparativas para preguntas y comentarios.

Por favor enciendan las plumas iluminadas. Voy a apagar las luces. (Cierra la puerta del cuarto. Asegurar que el signo de “no entrar” esta en la puerta. Apage las luces.)

(Sigan con las diapositivas preparativas A hasta E.)

Hay preguntas?

Ahora, cambien a la Pagina 2 del cuestionario y comensaremos con las 25 diapositivas, 15 en esta pagina y las diez siguiente en las paginas proximas.

Antes de empezar, les quiero recordar de la escala. A veces personas lo cambian. Los numeros altos indican mejor visibilidad; los numeros bajos indican visibilidad inferior del aire.

(Presenten las 25 diapositivas del estudio; despues de la diapositiva decima, recordarles de la escala. Despues de la diapositiva numero 15, diles a cambiar la pagina y recordarles de la escala. Cuenta silenciosamente a diez durante cada diapositiva. Anuncia el numero del diapositiva cuando adelantas hacia la nueva diapositiva.)

Parte II

Bueno, ahora estamos listos para la Parte II. Cambien a la Pagina 4 de su cuestionario. Las instrucciones para esta parte estan al principio de la pagina. Ahora voy a leer las instrucciones en voz alta.

(Lee las instrucciones en voz alta.)

Instrucciones para Parte II.

En este ejercicio, estamos solicitando opiniones del publico sobre los niveles aceptables para el area mayor de Phoenix. Parte II envuelve mirando las diapositivas una vez mas y decidiendo si una vista particular tiene un nivel aceptable para un area urbano.

Por favor de basar sus decisiones en lo siguiente:

- Considere que esta es una vista de la ciudad. En otras palabras, por favor de tomar en cuenta que usted esta juzgando la visibilidad en un area urbano, y no un area de desierto pristino donde las reglas podrian ser mas estrictas.

- Considere “inaceptable” la calidad visual de aire que no es razonable o es reprobable. Por favor de no marcar una diapositiva “inaceptable” solamente porque usted puede ver smog, a menos que usted cree que cualquier cantidad de smog es mas de lo que usted podria tolerar.

- Los niveles aceptables de visibilidad deben ser basados solamente sobre visibilidad. No trate de adivinar los efectos de smog en su salud o cuanto seria el costo de obtener mejor visibilidad. Su decision debe ser basado sobre como el aire se ve – esto se trate solamente de visibilidad.

Por favor indicar en los espacios proveidos si la visibilidad en un dado diapositiva es acceptable a usted.

Hay algunas preguntas? Una vez mas, vamos a presentar las diapositivas preparativas y luego comensaremos con las 25 diapositivas del estudio. Esta vez preguntense a sis mismos, es la visibilidad aceptable a usted? Si o no?

(Si los participantes preguntan — digales que consideren la calidad visual del aire en cualquier momento — no si la vista duraria varias horas o un dia. Basicamente, si en cualquier momento usted ve la calidad del aire visual en una diapositiva, seria aceptable o no.)

(Terminen las diapositivas preparativas.)

Hay algunas preguntas? Por favor de cambiar la Pagina 5 del cuestionario. Por favor de marcar las primeras 13 diapositivas en la columna obscurada a la izquierda. Cuando lleguen a la diapositiva numero 14, les voy a recordar que comienzen la columna nueva a la derecha.

Por cada diapositiva, preguntese a sis mismos, es acceptable esta cantidad de smog?

(Presenta las 25 diapositivas del estudio. Permitir al contado de “5” para cada diapositiva. Al llegar a la dispositiva numero 14, recordarles a los participantes a comenzar la columna nueva a la tapa de la pagina a la derecha.)

Parte III

En Parte III, les voy a presentar unas pocas mas diapositivas que escogi al alazar. Durante cada diapositiva, escriban el numero de *dias en un año* en que la visibilidad presentada seria acceptable a usted. Los numeros de dias pueden ser de alcance de zero — si usted piensa que la visibilidad de la diapositiva nunca seria acceptable — hasta 365 — si la visibilidad presentada en la diapositiva seria diariamente acceptable. El total de todas las diapositivas no va a sumar a 365; por ejemplo, usted puede tener unas pocas diaspositivas en que usted escribio 365 dias, si las vistas serian acceptable a usted por todo el año.

Cambie a la Pagina 6. No vamos a presentar diapositivas preparativas en este ejercicio.

(Presente las 7 diapositivas del estudio. Cuente hasta “15” durante cada diapositiva.)

Informacion Demografica

Finalmente, por favor de completar la informacion en la Pagina 6.

Discusion

Les di mi promesa que al fin de la junta tendriamos tiempo para comentarios. Alguien tiene comentarios que les gustarian pasar al grupo?

Cuando se acaba de rellenar la ultima pagina del cuestionario, por favor de entregarme su cuestionario y la pluma iluminada. En cambio del cuestionario y la pluma, les dare su regalito.

Muchisimas gracias.

(Distribuye los sobres con el pago de incentivo.)

Dar aviso a los participantes sobre la opcion de solicitar que ADEQ les envie los resultados en el futuro.

Ciudad de Phoenix Estudio de Visibilidad

Coleccíon de Diapositivas #: _____ ***Grupo #:*** _____

Observador #: _____ ***Sus Iniciales:*** _____

Parte I. Diapositivas Preparativas

Instrucciones

Por favor de marcar la calidad visual del aire en cada diapositiva en los espacios proveeidos abajo usando la escala de 1 a 7.

	Calidad Visual del Aire						
	Muy Inferior						***Excelente***
	1	***2***	***3***	***4***	***5***	***6***	***7***
A.	❑	❑	❑	❑	❑	❑	❑
B.	❑	❑	❑	❑	❑	❑	❑
C.	❑	❑	❑	❑	❑	❑	❑
D.	❑	❑	❑	❑	❑	❑	❑
E.	❑	❑	❑	❑	❑	❑	❑

Parte I: Diapositivas del Estudio

Instrucciones

Por favor de marcar la calidad visual del aire en cada diapositiva en los espacios proveeidos abajo usando la escala de 1 a 7.

Calidad Visual del Aire

	Muy Inferior						***Excelente***
	1	*2*	*3*	*4*	*5*	*6*	*7*
1.	❑	❑	❑	❑	❑	❑	❑
2.	❑	❑	❑	❑	❑	❑	❑
3.	❑	❑	❑	❑	❑	❑	❑
4.	❑	❑	❑	❑	❑	❑	❑
5.	❑	❑	❑	❑	❑	❑	❑
6.	❑	❑	❑	❑	❑	❑	❑
7.	❑	❑	❑	❑	❑	❑	❑
8.	❑	❑	❑	❑	❑	❑	❑
9.	❑	❑	❑	❑	❑	❑	❑
10.	❑	❑	❑	❑	❑	❑	❑
11.	❑	❑	❑	❑	❑	❑	❑
12.	❑	❑	❑	❑	❑	❑	❑
13.	❑	❑	❑	❑	❑	❑	❑
14.	❑	❑	❑	❑	❑	❑	❑
15.	❑	❑	❑	❑	❑	❑	❑

Parte I: Diapositivas del Estudio

Instrucciones

Por favor de marcar la calidad visual del aire en cada diapositiva en los espacios proveeidos abajo usando la escala de 1 a 7.

				Calidad Visual del Aire			
	Muy Inferior						***Excelente***
	1	*2*	*3*	*4*	*5*	*6*	*7*
16.	❑	❑	❑	❑	❑	❑	❑
17.	❑	❑	❑	❑	❑	❑	❑
18.	❑	❑	❑	❑	❑	❑	❑
19.	❑	❑	❑	❑	❑	❑	❑
20.	❑	❑	❑	❑	❑	❑	❑
21.	❑	❑	❑	❑	❑	❑	❑
22.	❑	❑	❑	❑	❑	❑	❑
23.	❑	❑	❑	❑	❑	❑	❑
24.	❑	❑	❑	❑	❑	❑	❑
25.	❑	❑	❑	❑	❑	❑	❑

Parte II: Diapositivas del Estudio

Instrucciones

En este ejercicio, estamos solicitando opiniones del público sobre niveles de visibilidad acceptables para el area mayor de la ciudad de Phoenix. En Parte II, veremos las diapositivas otra vez y decideremos si una vista particular tiene un nivel acceptable de visibilidad para un area urbana.

Por favor de basar su decisión en lo siguiente:

- Considere que ésta es una vista de una ciudad. En otras palabras, por favor de tomar en cuenta que usted está juzgando la visibilidad en un area urbana y no un area de desierto pristino donde quizás las reglas podrían ser mas estrictas.

- El aire que no es razonable o que muestra visibilidad reprobable debe ser considerado "inacceptable." Por favor de no marcar una diapositiva "inacceptable" sólo porque usted puede ver un poco de smog, a menos que usted cree que cualquier cantidad de smog que usted podría tolerar.

- Los niveles acceptables de visibilidad deben ser basados exclusivamente sobre visibilidad. No trate de adivinar cuales serían los effectos de salud causados por el smog ni cuanto sería el costo de mejorar la visibilidad. Base su decisión en como el aire parece — el tema de este estudio es solamente sobre la visibilidad.

Por favor indique en los espacios proveeidos si la visibilidad de una diapositiva particular es acceptable a usted.

Parte II. Diapositivas Preparativas

Instrucciones

Por favor de indicar en los espacios proveeidos si la visibilidad de una diapositiva particular es acceptable a usted.

A. Acceptable? ❑ Sí ❑ No

B. Acceptable? ❑ Sí ❑ No

C. Acceptable? ❑ Sí ❑ No

D. Acceptable? ❑ Sí ❑ No

E. Acceptable? ❑ Sí ❑ No

Parte II. Diapositivas del Estudio

Por favor de indicar en los espacios proveeidos si la visibilidad de una diapositiva particular es acceptable a usted.

1.	Acceptable?	❑ Sí	❑ No	14.	Acceptable?	❑ Sí	❑ No
2.	Acceptable?	❑ Sí	❑ No	15.	Acceptable?	❑ Sí	❑ No
3.	Acceptable?	❑ Sí	❑ No	16.	Acceptable?	❑ Sí	❑ No
4.	Acceptable?	❑ Sí	❑ No	17.	Acceptable?	❑ Sí	❑ No
5.	Acceptable?	❑ Sí	❑ No	18.	Acceptable?	❑ Sí	❑ No
6.	Acceptable?	❑ Sí	❑ No	19.	Acceptable?	❑ Sí	❑ No
7.	Acceptable?	❑ Sí	❑ No	20.	Acceptable?	❑ Sí	❑ No
8.	Acceptable?	❑ Sí	❑ No	21.	Acceptable?	❑ Sí	❑ No
9.	Acceptable?	❑ Sí	❑ No	22.	Acceptable?	❑ Sí	❑ No
10.	Acceptable?	❑ Sí	❑ No	23.	Acceptable?	❑ Sí	❑ No
11.	Acceptable?	❑ Sí	❑ No	24.	Acceptable?	❑ Sí	❑ No
12.	Acceptable?	❑ Sí	❑ No	25.	Acceptable?	❑ Sí	❑ No
13.	Acceptable?	❑ Sí	❑ No				

Parte III: Diapositivas del Estudio

Por favor liste cuántos días en un año la visibilidad de una diapositiva particular es acceptable a usted. (Los números no tienen que sumar hasta 365.)

Diapositiva	***Número de Días Acceptables Durante el Año (0 a 365)***
A.	_____
B.	_____
C.	_____
D.	_____
E.	_____
F.	_____
G.	_____

Informacíon Demográfico

1. Genero (marque uno)
   - ❑ Hombre ❑ Mujer

2. Edad (marque uno)
   - ❑ 18–24 ❑ 45–54
   - ❑ 25–34 ❑ 55–64
   - ❑ 35–44 ❑ 65+

3. Ingreso annual del hogar (marque uno)
   - ❑ Menos de $24,999
   - ❑ $25,000 a $49,999
   - ❑ $50,000 a $74,999
   - ❑ $75,000 a $99,999
   - ❑ $100,000 o más

4. ¿Cuál es el nivel más alto de escuela que usted completó? (marque uno)
   - ❑ Un poco de escuela de segunda enseñanza o menos
   - ❑ Graduado de escuela de segunda enseñanza
   - ❑ Escuela de oficio/vocacional o un poco de la universidad
   - ❑ Graduado de la universidad
   - ❑ Estudio o licensia avanzado despúes de la universidad

5. ¿Cuánto tiempo ha vivido en el area metropolitana de Phoenix? (marque uno)
   - ❑ Menos de un año
   - ❑ Por lo menos un año pero menos de 3 años
   - ❑ Por lo menos 3 años pero menos de 5 años
   - ❑ Por lo menos 5 años pero menos de 10 años
   - ❑ 10 o más años

6. ¿Cuál representa su raza o grupo étnico? (marque uno)
   - ❑ Anglo/Blanco
   - ❑ Hispano/Chicano/Latino
   - ❑ Africano Americano/Negro
   - ❑ Indio(a) Americano/Americano Nativo
   - ❑ Asiático/Oriental/Isleño Pacífico
   - ❑ Otro

7. ¿Es usted de descendencia Hispana o Latina? (marque uno)
   - ❑ Sí ❑ No