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Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA)

Beltway Perception Study

Summary Final Report

September 13, 2007

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Agency (MAPA)**

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1: INTRODUCTION

The Omaha-Council Bluffs Metropolitan Area Planning Agency (MAPA) is conducting a Beltway Feasibility Study to study the need for and feasibility of a beltway to serve the Omaha-Council Bluffs metropolitan area (metro area). A beltway is a major road that follows a circular route around a city, thereby providing an alternate route for traffic traveling around or through a city and relieving the congestion on streets and highways inside of the beltway. As the metro area grows, traffic along major highways and interstates in the area is becoming more congested and the need for transportation improvements is increasing. Currently, the beltway concept is in its initial phase of MAPA's long term plan for transportation development in the area.

A key component of the beltway study is to determine if there is public support for a beltway or other major transportation improvements. Therefore, MAPA conducted a public opinion survey to gauge public perception on the construction of a beltway in the Omaha-Council Bluffs metropolitan area. For the purpose of this study, the areas included in the study consist of the following counties: Douglas, Washington, Sarpy and Pottawattamie.

2: DESCRIPTION OF METHODOLOGY

2.1 Sample Design and Selection

2.1.1 Target Population

All persons aged 18 years and older who reside in Douglas, Washington, Sarpy or Pottawattamie County constitute the target population for which estimates are required.

2.1.2 Sampling Unit

The sampling unit for the purpose of this study is a household with a zip code in Douglas, Washington, Sarpy or Pottawattamie County.

2.1.3 Sample Design

A stratified random sample is selected by dividing the target population into non-overlapping subpopulations called strata. The stratum consists of Douglas, Washington, Sarpy and Pottawattamie Counties. Within each stratum, a random sample is selected such that every sampling unit in the subpopulation has an equal probability of being selected for the sample.

From the population of 283,275¹ housing units in Douglas, Washington, Sarpy and Pottawattamie Counties, a sample size of 752 was chosen. The data collected from the combined total of 752 sampled units would ensure a margin of error for the key estimate of percent favorable not more than ± 5 percentage points at the 95 percent confidence level. In other words, if the same survey was conducted 100 times, 95 of those times the

¹ U.S. Census Bureau, Douglas County Fact Sheet, Occupied Housing Units <http://factfinder.census.gov>

results would be no more than 5 percentage points higher or lower than the results if we had interviewed the entire population.

2.1.4 Sampling Technique

A list of all households with zip codes in either Douglas, Washington, Sarpy or Pottawattamie County was obtained. From this list, 752 households were randomly selected, without replacement, for inclusion in the sample. Each household on the sample list was contacted to participate in the survey. All surveys were conducted via telephone by professional research interviewers. To help eliminate non-response bias, each number from the sample list was contacted a minimum of five times before declaring that the number was unreachable.

3: SURVEY RESULTS

The survey questionnaire was designed to obtain, through responses to a series of 9 questions, a respondent's opinion on the current and future state of traffic congestion in the Omaha-Council Bluffs metropolitan area as well as their views on the construction of a beltway in the metro area. All sampling errors associated with the estimates described in the report are at the 95 percent confidence level.

Traffic congestion in the whole target population of the Omaha-Council Bluffs metropolitan area was rated as *“medium”* by **63.2% ± 3.4%** of all residents in the target population, while **21.46% ± 2.9%** believed that traffic congestion was in fact *“high”*. Consensus seems to exist that traffic congestion is currently at moderate levels. However, when residents were asked to predict future traffic levels, a large plurality – **42.7% ± 3.5%** – suggested that traffic congestion would *“worsen significantly”*. In addition, some **39.4% ± 3.5%** believed that traffic congestion would *“worsen some”*.

Across the whole target population, **31.6% ± 3.3%** of sampled residents were aware of the MAPA Beltway Feasibility Study. While **27.8% ± 3.2%** of the target population believe *“a beltway”* would *“best improve traffic conditions in the metropolitan area”*, **27.8% ± 3.2%** of Omaha-Council Bluffs residents suggest that *“improved transit”* is the more appropriate solution. Despite the observance that the opinions regarding solutions to traffic congestion are statistically equal, **63.7% ± 3.4%** believe that “a beltway” would have a *“positive”* impact on the metropolitan area and **66.7% ± 3.4%** are *“in favor of the construction of a beltway or some portion of a beltway”* around the Omaha-Council Bluffs metropolitan area.

APPENDIX A MAPA BELTWAY FEASIBILITY STUDY: PUBLIC OPINION PHONE SURVEY RESULTS BY QUESTION

Table 1: Gender

Response	Number of Responses	Estimate (%)
Male	366	48.67
Female	386	51.33

Table 2: Question 1. Are you aware that MAPA is currently conducting a study of a beltway for the Omaha/Council Bluffs metropolitan area?

Response	Number of Responses	Estimate (%)
Yes	238	31.61
No	514	68.39

Table 3: Question 2. How would you rate traffic congestion in the Omaha/Council Bluffs metropolitan area?

Response	Number of Responses	Estimate (%)
High	162	21.46
Medium	475	63.16
Low	86	11.47
None at all	11	1.46
Don't know	18	2.39

Table 4: Question 3. Looking 50 years out into the future, do you think traffic congestion in the Omaha/Council Bluffs metropolitan area will:

Response	Number of Responses	Estimate (%)
Worsen Significantly	321	42.69
Worsen Some	296	39.36
Remain the Same	56	7.44
Improve	52	6.92
Don't know	27	3.60

Table 5: Question 4. Which one of the following do you think would best improve traffic conditions in the metropolitan area?

Response	Number of Responses	Estimate (%)
Don't know	20	7.97
A Beltway	209	27.78
More lanes on arterial streets	143	19.09
More lanes on freeways	126	16.66
Improved transit	209	27.82
Don't know	65	8.65

Table 6: Question 5. What kind of impact do you think a beltway would have on the metropolitan area?

Response	Number of Responses	Estimate (%)
Positive	479	63.69
Negative	160	21.27
Don't know	113	15.04

Table 7: Question 6. In general, do you favor the construction of a beltway or some portion of a beltway around the Omaha/Council Bluffs metropolitan area?

Response	Number of Responses	Estimate (%)
Yes	502	66.74
No	182	24.21
Don't know	68	9.06

Table 8: Question 7. How long have you lived in the Omaha metro area?

Response	Number of Responses	Estimate (%)
Less than 1 year	7	0.94
1 to 5 years	43	5.69
6 to 15 years	132	17.58
16 years and over	570	75.79

Table 9: Question 9. How much do you drive your primary vehicle in a year?

Response	Number of Responses	Estimate (%)
Less than 5,000 miles a year	78	10.38
Between 5,000 and 10,000 miles a year	228	30.33
Between 10,000 and 15,000 miles a year	260	34.58
Over 15,000 miles a year	161	21.39
Do not drive	25	3.32

APPENDIX B GLOSSARY OF STATISTICAL TERMS

Confidence Interval: A confidence interval is used to express precision of estimates in a meaningful way. Generally, survey results with a narrow interval are more reliable than results with larger intervals. A 95% confidence interval for an estimate such as the population average indicates that if sampling were repeated indefinitely, each sample leading to a new confidence interval, then for every 19 out of 20 samples, the interval will cover the true population average value.

Estimate: in general, an estimate is an indication of the value of an unknown quantity based on observed data. In survey work, once a sample has been selected and the responses are obtained from the sampling units, the sample must be related back to the population of interest. Since the responses have only been observed on sampling units and not on every unit in the population, population quantities of interest must be estimated using the responses from the sample. This is carried out with the use of sampling weights.

Sampling Unit: a sampling unit is the unit that is actually sampled. The population is divided into non-overlapping units called sampling units such that each member of the population belongs to only one sampling unit. Sampling units may or may not correspond to the units of analysis. For example, in a household survey, the units selected may be dwellings, while the units of analysis would be people or families.

Standard Error: the standard error of an estimate is defined as the square root of the variance of the estimate and is often the preferred choice of error statistics since it is reported in the same units of measurement as the estimate itself.

Stratified Survey Design: a stratified sampling design utilizes relevant information available on members of the population to increase the precision of survey estimates. If the variable of interest is thought to take on different mean values in different

subpopulations, more precise estimates of population quantities may be obtained by taking a stratified random sample. The population is divided into non-overlapping subpopulations, called strata. The strata constitute the whole population such that each sampling unit belongs to only one stratum. An independent sample is drawn from each stratum and information is pooled to obtain overall population estimates.

Target Population: the target population is the population about which information is desired. It is the collection of units to which the survey results apply.

Variance (of an estimate): every estimate obtained from a sample has an error associated with it. This error is, in part, due to the fact that if a different sample of the same size and design was selected from the same population, it would produce different survey estimates than the sample originally selected. This sampling error contributes to what is called the variance of the estimate, which is a measure of the variability in the estimate obtained from repeated samples.

APPENDIX C ESTIMATION AND VARIANCE SPECIFICATIONS

The following formula was used to generate the survey estimates found above for the proportion of the target population in level k of question x :

Let y_{hi} represent the response of unit i from stratum h for a level k of given question,

$$\text{where } y_i = \begin{cases} 1 & \text{if respondent } i \text{ selected level } k \text{ of question } x \\ 0 & \text{otherwise} \end{cases}$$

Then the estimated proportion of y in the overall population is

$\bar{y}_{str} = \sum_{h=1}^H \frac{N_h}{N} \bar{y}_h$, where $\bar{y}_h = \left(\sum_{i=1}^{n_h} y_{hi} \right) / n_h$ is the population stratum proportion estimated by the weighted average of the observations in stratum h .

The variance of \bar{y}_{str} is estimated by

$\hat{V}(\bar{y}_{str}) = \sum_{h=1}^H \left(1 - \frac{n_h}{N} \right) \left(\frac{N_h}{N} \right)^2 \frac{s_h^2}{n_h}$, where $s_h^2 = \sum_{i=1}^{n_h} \frac{(y_{hi} - \bar{y}_h)^2}{n_h - 1}$ is the sample variance within stratum h .

$$SE(\bar{y}_{str}) = \sqrt{\hat{V}(\bar{y}_{str})}$$

Note that the finite population correction (fpc), $\left(1 - \frac{n}{N} \right)$, was not included in the variance estimation. Since the population size is large compared to the sample size, the sampling fraction $\frac{n}{N}$ is approximately 0, and thus, the fpc is approximately 1.