

Small City Work Zone Sign Package Program Implementation

**Final Report
July 2017**



IOWA STATE UNIVERSITY
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16. Abstract <p>The ability to acquire and set up work zone related devices that are in compliance with the 2012 revisions to the 2009 <i>Manual on Uniform Traffic Control Devices</i> (MUTCD) can sometimes be difficult for smaller cities. The smaller budgets for these cities can result in a lack of inventory and/or the use of signs that are in poor condition.</p> <p>The objectives of the project described in this report were to assist smaller cities in the acquisition and setup of devices to improve the safety of their work zones for their public works staff and the traveling public. The design, creation, and implementation of the small city work zone sign package program was completed to meet these objectives.</p> <p>First, the content of the work zone sign package was developed. Second, the eligibility rules to apply and compete for the sign package were defined. These rules included having a city population of 10,000 or less and at least one staff person who had completed work zone related training in the last three years. Third, an application was created and distributed to the 27 cities that were deemed eligible. This application consisted of 13 questions that were designed to determine the need each eligible city had for the work zone sign package. Fourth, an evaluation and ranking process that assigned points to the answers for each question was defined and applied. This process was designed to both quantitatively and qualitatively rank each city's need for the work zone sign package. A ranking process was needed to apply in situations where more applications were received than work zone sign packages available. For this pilot project, however, funding for 10 work zone sign packages was available and 10 applications were received.</p> <p>It was concluded that this project helped meet the objective of increasing work zone safety within small cities. The questions contained in the application also appeared to measure the need of the city applicants for the work zone sign package. Based on the application results, it is recommended that the eligibility rules and distribution approach for the competition may need to be changed in order to increase participation. In addition, adjustments to the evaluation and ranking process used for each of the questions could be reconsidered based on the results of this work. Several recommended changes to the questions and the evaluation and ranking process are described in this report. Finally, it is recommended that the program be continued in order to serve the additional needs of small cities in Iowa.</p>			
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EXECUTIVE SUMMARY

The pilot project described in this report focused on the development and implementation of the work zone sign package program in Iowa. The objectives of this project were to assist smaller cities with the acquisition and proper setup of work zone related devices compliant with the 2012 revisions of the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD). Many small cities have budgets that sometimes make it difficult to accomplish these objectives. The project included tasks that focused on the development of a technical advisory committee (TAC), work zone sign package content, an application for acquiring or competing for the work zone package, and a process to select the cities that should receive the work zone devices. The activities completed to finish these tasks are described in this report.

The activities completed as part of this project before the distribution of the work zone sign packages included the development of the package's content, the definition of application eligibility rules, and the creation of the application questions. First, the work zone sign package was created through a discussion with the technical advisory committee. Nine items were identified for inclusion, for example, ROAD WORK AHEAD signs, Class 2 safety vests, and 42-inch channelizer cones. A complete list of the devices is described in Chapter 2. The second task in the process was to define the program eligibility rules. It was determined that the cities eligible to compete for the work zone sign packages should have a population of less than 10,000 and at least one staff person that had received work zone training during the last three years. These eligibility rules limited the number of potential applicant cities in Iowa to 27. Finally, the questions for the application needed to be developed, and the 13 questions included were designed with the technical advisory committee. The objective of the questions was to gather information about the level of need each city applicant had for the work zone sign package. Some of the questions included in the application focused on city population, the number of public works staff, how many times work zone signs were needed each year, and a summary of the applicant's work zone sign inventory and its condition. The application distributed to the 27 eligible cities is in Appendix A.

A total of 10 program applications were received, and an evaluation and ranking process was developed to assess the answers to the questions in each application. More specifically, a point assignment approach was designed to measure the level of need of each city for the work zone sign package based on the city's answers. A ranking approach was defined for 7 of the 13 questions in the application (the other questions involved contact information, etc.), but 2 questions were later used for information purposes only. The questions for which an evaluation and ranking process was developed included those that focused on city population, the number of public works employees, work zone problems encountered and other relevant information that was shared, and the existing sign inventory and its condition. The approaches used to assign points for answers to each of the questions, along with a tie breaker option if needed, are described in detail within Chapter 3. The two questions used for information purposes only included those related to the number of times each year a city might have needed work zone signing and whether the city had suitable storage space for the signs. Overall, each of the 6 reviewers could assign a total of 36 points to each city based on the answers provided by the city in its application. The cumulative number of points assigned to the 10 cities that applied ranged

from 62 to 143. All of the city applicants indicated that they had some level of need for the work zone sign package due to missing inventory and/or devices that were in poor condition.

Several conclusions and recommendations were reached based on the completion of the tasks in this project. This project was developed to help smaller cities acquire and apply proper work zone sign setups. The accomplishment of these objectives should also help improve the safety of work zones in Iowa. It is believed that the distribution of the 10 work zone sign packages as part of this project has helped advance this objective. However, only 10 of the 27 cities eligible to be involved with the program completed an application. It was concluded that the low application rate could be due to several factors (e.g., the communication process used, the staffing levels within small cities, and the length of the application). Overall, however, the questions in the application appeared to measure the need for the work zone sign package relatively well. The answers provided showed, among other things, that the respondents typically had very few public works staff and used work zones relatively regularly but typically did not have a full complement of work zone related devices and/or signs that were in “good” condition. Finally, it was concluded that at least one of the questions appeared to be interpreted differently by individual respondents.

Recommendations (see Chapter 4) were created to address this problem and other potential weaknesses identified in the program through this pilot project. These recommendations focused on the eligibility rules developed, the advertising process, and the wording and ranking point assignment for the application questions. It is recommended, for example, that the eligibility rules and advertising approach be changed to encourage more cities with a population less than 2,000 to apply. It is also suggested that questions about the size of the city transportation system or traffic flow be asked and the question about public works employees be reworded to focus only on those staff involved with work zones. In general, it is also recommended that the results of this pilot project, the content of this report, and the input from the TAC be used in the future to reconsider each question and the evaluation and ranking process applied to it. Finally, it is recommended that this program be continued in order to serve the existing need for these types of work zone sign devices in smaller cities.

CHAPTER 1. INTRODUCTION

Public works departmental staff members who have attended the Iowa Department of Transportation (DOT) Work Zone Safety workshops (or similar training events) are often from cities that have populations of less than 10,000. However, persistent shortages in city budgets can sometimes make it difficult for public works departments in these smaller cities to purchase acceptable work zone temporary traffic control devices (TTC) and/or replace those that are no longer in compliance with the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD) with Revisions 1 and 2, dated May 2012 (FHWA 2012). Sections 1A.05, 1A.07, and 6F.04 of the MUTCD state the following about sign responsibility and maintenance:

Section 1A.05 – “Maintenance of Traffic Control Devices. Clean, legible, properly mounted devices in good working condition command the respect of road users” (FHWA 2012).

Section 1A.07 – “Responsibility for Traffic Control Devices. The responsibility for the design, placement, operation, maintenance, and uniformity of traffic control devices shall rest with the public agency” (FHWA 2012).

Section 6F.04 – “Sign Maintenance. Signs should be properly maintained for cleanliness, visibility, and correct positioning. Signs that have lost significant legibility should be promptly replaced” (FHWA 2012).

This project, funded by the Iowa DOT, was designed to acquire and then provide TTC devices and personal protection vests to small cities that will assist them in meeting the needs described above.

Project Goal and Objective

The goal of this project was to provide an avenue for small cities to obtain a basic package of work zone signs and personal protection vests that can help them improve the safety of their work zone setups and increase the safety for their work zone workers and the traveling public. These devices also should help public works departments remain in compliance with the MUTCD. The objective of this project was to encourage more small cities to participate in work zone safety training events. To accomplish the goal and objective of this project, several tasks were completed. The completion and results of these tasks are described in this report. They included the development of a technical advisory committee (TAC), the sign package to provide, an application for small cities to acquire the package, and a process to select the cities to which to provide the package (including an evaluation and ranking approach for the applications received).

Report Content

This report contains four chapters. The first chapter introduces the project, describes its goals and objectives, and summarizes the report content. Chapter two includes information about the

content of the work zone sign package developed, program eligibility, and the questions included in the program application. Chapter three describes the interaction of the project team with the applications received. It includes a summary of the application question responses and a description of how the answers to the questions were ranked. Chapter four contains the conclusions and recommendations related to the completion of the tasks in this project.

CHAPTER 2. SIGN PACKAGE AND APPLICATION DEVELOPMENT

The TAC for this project consisted of Iowa DOT engineering staff, a public works director, the Iowa Statewide Urban Design and Specifications (SUDAS) director, and a safety trainer from the Iowa Association of Electric Cooperatives. The TAC was used to guide the project team in the tasks completed. More specifically, the TAC helped define the content of the sign package that would be provided to the cities, develop the sign package competition eligibility and application content, and create the application evaluation process to select the cities that should receive the sign package. The completion of these tasks are described in this chapter.

Sign Package Development

At the first meeting of the TAC, the project team suggested a list of work zone related materials that should be included in the work zone sign package for this program. The overall objective was to include those devices that were most needed by smaller cities in Iowa. It was also recognized that some smaller cities might have multi-lane roadways within their jurisdictions. However, it was also understood that the work zone sign package could not cover all of the scenarios a public works crew might encounter. Based on these constraints, the initial work zone sign package suggested by the project team to the TAC included the following:

- 4 – ROAD WORK AHEAD signs
- 2 – ONE LANE ROAD AHEAD signs
- 2 – BE PREPARED TO STOP signs
- 2 – FLAGGER AHEAD signs
- 6 – Type II barricades
- 16 – 28-inch traffic cones
- 4 – Class 2 safety vests
- 6 – Sign stands
- 4 – Traffic drums with bases
- 2 – 24-inch STOP/SLOW paddles

After further deliberation with the TAC, however, it was concluded that some of the items in the list above were not likely needed by the cities within the population range being considered and should be replaced. In addition, it was believed that larger numbers of two other items in the list were needed. Based on this discussion, the Type II barricades, traffic drums with bases, FLAGGER AHEAD signs, and 24-inch STOP/SLOW paddles were removed from the package. Their replacements, along with the items added to the package, are listed below:

- 2 – Type III barricades
- 10 – 42-inch channelizer cones
- 2 – Additional sign stands
- 2 – Additional safety vests

All of the materials included in the final work zone sign package purchased as part of this project were compliant with MUTCD requirements for retroreflectivity, properly sized for lower speed small city roadways, and suitable during nighttime work zone activities. A photograph of the final work zone sign package delivered to the cities selected as part of this project is shown in Figure 1.



Figure 1. Work zone sign package

Program Application Eligibility

The next step that was completed as part of this project was the determination of which cities should be allowed to apply and compete for the work zone sign packages developed. It was originally proposed that this project should focus only on those cities in need of work zone related devices that had a population of 10,000 or less. In Iowa, there are approximately 900 cities that meet this requirement. It was also suggested, however, that it was important that the devices be used appropriately. Therefore, it was proposed to the TAC that only cities that had had one staff member attend work zone signing training through the Iowa Local Technical Assistance Program (LTAP) or the Iowa DOT Work Zone Safety workshops (during the last three years) should be allowed to apply. The Iowa LTAP has access to these attendance lists. Attendance at these workshops would demonstrate the city's commitment to work zone safety and the safety of its public works personnel. When this rule was applied, the number of Iowa cities eligible for this pilot project was reduced to 27. The TAC agreed that these were appropriate eligibility rules for this pilot project.

Application Content Development

After the eligibility rules were determined, the project team developed a series of application questions to include in an online form that cities would use to compete for the work zone sign packages. An online version of this application form was used to improve the competition response rates. The initial list of questions suggested to the TAC included the following:

1. What is the name of your city?

2. What is the name and title of your contact person?
3. What is your address?
4. What is your email address?
5. What is your phone number?
6. What is the population of your city?
7. How many public works employees do you have?
8. How many dollars do you spend “in-house” on roadway repair projects?
9. Do you have suitable storage for the devices in the package?
10. Please provide a brief history of the typical work zone problems you have encountered.
11. Please provide an inventory and average condition assessment (i.e., good, fair, and poor) of your current work zone traffic control devices.
12. Please provide any other relevant information for our consideration.
13. Please sign the following certification statement: “It is understood that if selected to receive one of the packages, our public works employees will participate in LTAP-offered work zone safety workshops and the Roads Scholar Program. It is also understood that by submitting this application I certify the information contained is true and accurate.”

The TAC had two suggested changes to the questions above. The first suggestion was that the question about the total number of dollars spent on “in-house” roadway repair projects be removed. It was argued that the answer to this question could be difficult to determine, could be interpreted differently by individual applicants, and/or could take a significant amount of time to calculate. In addition, there was concern that the answer to this question might skew the evaluation and ranking of the results toward cities with larger budgets. The TAC was then asked what question might be used to better define the need for a work zone sign package by an applicant. The TAC suggested that another question be added to the application that focused on the number of times per year a city performed street repairs that needed a work zone sign setup.

The changes described above were completed, and the final version of the application is included in Appendix A. This version of the application was also accompanied by some introductory text within an email that described the purpose of the project and the work zone sign package content. This email and application was electronically sent to the 27 eligible cities in Iowa, and the cities were provided 10 days to respond. Reminders were also sent to the same set of cities a few days before the deadline.

CHAPTER 3. APPLICATION RESULTS, EVALUATION, AND RANKING

As noted above, a total of 27 cities in Iowa were eligible to apply and compete for the work zone sign package previously described. All 27 cities were emailed the program application and asked to respond. However, it was also estimated that there was only enough project funding to distribute approximately 10 work zone sign packages. This restriction, although it was not needed during this pilot project (i.e., we received only 10 applications), required the development of a process to evaluate and rank the applications' answers (Appendix B contains an example of a completed application). The process developed will be a valuable asset to this program if it is funded again and/or gains popularity in the future. A summary of the answers received from the 10 applicants in this pilot program is provided in the following paragraphs. The criteria, or weighting, and the rationale used to rank the answers from each city is also described.

The primary objective considered during the development of the evaluation and ranking process was to determine and compare the overall need of the cities for the new work zone signing package and, ultimately, to help them improve their work zone setups. The ranking form used for the evaluation is shown in Appendix C. The first five questions of the application included general information about each city (e.g., city name, name and title of contact person, physical address, email address, and phone number) and were not to be used in the evaluation and ranking process. In addition, Question 13 was a signed certification that the information that the applicant provided was true and accurate. The evaluation and ranking of Questions 6 to 12 are described below.

City Population

Question 6 of the application asked the respondents to provide the population of their city. The project team and the TAC were in agreement that cities with higher populations were less likely than those with lower populations to need temporary traffic devices. For this reason, the results were bundled into population categories of less than 2,000 residents, 2,001 to 5,999 residents, and 6,000 to 9,999 residents. In addition, it was concluded that the cities with populations between 2,001 and 5,999 were the most likely to be in need of the work sign package. Cities within this population range were also more likely to have a larger transportation system, more traffic flow, and more frequent work zone activity than smaller cities. The work zone signing and public works department funding in cities with populations between 2,001 and 5,999, however, may not be comparable to funding in cities with larger populations.

The ranking points assigned to the answers for this question were based on the conclusions described above. Cities with a population of less than 2,000 were given two points, those with a population from 2,001 to 5,999 were given three points, and those with a population in the range of 6,000 to 9,999 were given one point. This approach rewarded the cities with the target population for this pilot project but did not dismiss those outside the preferred range. Table 1 provides a summary of the applicant city populations. Six of the cities that applied have a population between 2,001 and 5,999, and the overall average of the applicant city populations was 5,977.

Table 1. City applicant populations

Population Range	Number of Applicants	Average Population
Less than 2,000	0	0
2,001 to 5,999	6	3,922
6,000 to 9,999	4	9,051
Total	10	5,977

Number of Public Works Employees

Question 7 of the application requested the number of public works staff employed by the city. The answers ranged from 4 to 26, with averages of about 7 and 13 for cities with populations between 2,001 and 5,999 and between 6,000 and 9,999, respectively (there were no applicants with a population of 2,000 or less). Originally, a higher number of points was going to be assigned to those cities with a larger number of public works employees. However, larger public works departments often have many employees that do not do street work. This determination made it difficult to assign different point values to the range of answers provided. Therefore, for this pilot project the cities were assigned two points in the ranking process if they had two or more public works employees. Cities with less than two public works employees would have received no points, but none of the pilot project applicants fit within this category. This ranking approach was primarily based on the fact that a proper work zone could or should not typically be staffed with only one person. The development of a new format for this question that would allow a more robust range of points to be assigned to the answers received is recommended in Chapter 4.

Annual Need for Work Zone Temporary Traffic Control

Question 8 of the application was created to determine the number of times a city might need the devices in the work zone sign package. The applicants were asked to estimate the number of times per year they needed the devices. The responses received for this question ranged from “six to eight times per year” to “all year long.” Therefore, it was concluded that some of the respondents misinterpreted the question as it was currently worded. Subsequently, the project team and the TAC used the answers to this question for information purposes only, and the answers were not included in the quantitative evaluation and ranking process. It is recommended in Chapter 4 that this question, or something similar, be used in future competitions (if they occur) but that a process be defined to contact applicants for clarification about their answer if it appears that they were confused. Other options include assigning zero points to responses that do not answer the question or completely disqualifying the city applicant.

Suitable Storage for Signs

The applicants were also asked, in Question 9, if they had suitable storage for the traffic control devices that might be provided. This question was also used for information purposes. If the applicant had answered “no,” they would have been disqualified from the competition. During this pilot project, all 10 of the applicants indicated that they had suitable space to store the sign package materials. In the future, the answer to this question might be assumed of all the city applicants and only confirmed if a city was selected to receive a work zone sign package.

Work Zone Problems Encountered and Other Relevant Information to Consider

The cities were also asked, in Questions 10 and 12, to provide the project team and the TAC with some insight into their work zone issues and situation. Question 10 asked cities to give a brief history of some of the problems they had encountered in work zones (see Appendix D for examples), and Question 12 was an open-ended question that asked cities to provide any other information that they might think was relevant to the application and should be considered in the evaluation and ranking (see Appendix E for examples). These two questions were also the only part of the application where respondents were given space to show the importance they placed on receiving one of the work zone sign packages.

The process of placing a point value on these answers required subjective evaluation by each member of the project team and the TAC. Some guidance was provided to the project team and TAC, however, to achieve a measure of consistency. Members of the project team and TAC were advised to search for key terms in the answers to these questions. The selection of these terms was based on the original intent of the project to help make work zones safer and to provide an avenue for smaller cities to acquire, upgrade, and/or bring into compliance their work zone temporary traffic control devices.

A maximum of 10 points could be assigned to each respondent for their answers to these two questions. First, if the respondents mentioned or implied the importance of their workers’ safety, they were given two points. Seven out of the ten respondents received these points. Second, respondents were given another two points if they mentioned or implied the importance of the traveling public with respect to their work zone setups. Seven out of the ten respondents also received these two points (but not the same seven cities previously noted). Third, respondents were given two points if they mentioned or implied that the proper training of their staff for work zone setups was important. Two of the respondents mentioned this fact. Fourth, if respondents noted that they had a shortage of devices to set up work zones (and the answer matched with the inventory question discussed next), they were also given two points. Seven out of ten respondents indicated that they had a shortage of devices. Finally, another two points were provided to respondents if they mentioned that their work zone temporary traffic control devices were out of compliance (e.g., old, peeling, fading, etc.). Six out of ten respondents received these two points. In all cases, if the above terms were not mentioned or implied, the respondent received no points.

The objective of these questions was to provide a method to evaluate what the city applicant thought about work zone safety. This evaluation and ranking approach described above for point assignments was considered to be one method of accomplishing this task. The applicant's interest in safety and safety training, and a lack of temporary traffic control devices or use of non-compliant signs, was also measured for each applicant. An additional method of measuring the need for a work zone package was also accomplished by evaluating the answers to the inventory question, as described below.

Existing Inventory and Condition

An additional question used in the ranking of the applicants was Question 11. This question asked applicants about the number of signs (i.e., 1 to 10 and 10 or more) in their current inventory and the average condition of those signs (i.e., good, fair, and poor). More specifically, applicants were asked to provide the quantities and condition of their cones, Class 2 vests, ROAD WORK AHEAD signs, ONE LANE ROAD AHEAD signs, BE REPAIRED TO STOP signs, and Type III barricades. These signs all match those included in the work zone sign package. Overall, a point was assigned to a city for each of the six items it did not own, and zero points were assigned if it had even one. Therefore, each city was able to receive up to six points for its inventory response. The number of points assigned to the 10 cities for this question ranged from zero (i.e., the city had at least one of each item) to three (i.e., the city only had one of three items in the list of six). The average number of points assigned to the 10 cities was 1.4. Six of the cities were assigned one point (i.e., the city had five items in the list of six), one city was assigned zero points, another city was assigned two points, and two cities were assigned three points. A recommendation for the potential adjustment of points assigned to the answers of this question is provided in Chapter 4.

Points were also assigned to each city applicant for the condition of its devices. The applicant was assigned no points if it indicated that its cones, vests, or signs were in "good" condition. However, they received one point for every "fair" condition indicated and two points for every "poor" condition noted. A city, therefore, could receive as few as zero points for the condition of its inventory and as many as 12 points. The average number of points assigned to a city was 4.8, and the range of assignments was zero to 10. In other words, there was at least one city that indicated that it only had devices in "good" condition and one or more cities that had an inventory that was almost completely in "poor" condition. Overall, however, the average point assignment shows that many of the applicants had mostly "fair" and "poor" condition signs.

Final Ranking Results

The total number of points assigned to each of the cities was based on the evaluation and ranking process described above. These assignments ranged from 62 to 143 points, and the maximum number of points that could be assigned by each of the six reviewers to any one city was 36. The average number of cumulative points assigned to the 10 city applicants was 93.6. A list of cities to which sign packages were awarded is shown in Appendix F. Two cities that applied were assigned exactly 100 points, and another two cities were assigned 70 points. Fortunately for this pilot project, a tie-breaker process was not necessary because there were 10 applicants and the

project had enough funding to distribute 10 work zone sign packages. For future competitions, however, two tie-breaker alternatives were provided on the ranking form. The first option was called the “judge’s option.” This tie-breaker approach allowed each judge to add one to three points to a city score that indicated the judge’s subjective belief regarding which city needed the work zone sign package more. The second option was a suggestion that a point be added to a city’s score every time the word “safety” was used in the application. If needed, the application of either option would break any tie scores if they were to occur. Neither of the options was needed in this pilot project. In addition, there are some recommended changes to the potential future application within Chapter 4.

CHAPTER 4. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on the tasks completed as part of this project and their results.

Conclusions

- This project was developed to help smaller cities make their work zones safer for both their public works department workers and the traveling public. The provision of the 10 work zone sign packages funded through this project are believed to have advanced that objective.
- The work zone sign package developed as part of this project appears to contain many or most of the devices that are needed by smaller cities within Iowa.
- The application eligibility rules developed as part of this pilot project restricted the competition to 27 cities in Iowa. Ten (37 percent) of these cities applied for the work zone sign package. The relatively low application rate could be the result of several factors. Some of these factors might include the communication process used, the length of the application, the small staffing levels within these small cities, and/or a lack of need by the eligible cities. A recommendation to improve participation is below.
- The questions within the application created as part of this project focused on defining the need for the work zone sign package by the respondent. The answers to those questions appeared to measure this need relatively well. It was shown that most respondents had very few public works staff but that they were using work zones relatively regularly. The answers also showed that most of the applicants did not have a full complement of work zone signs in their inventory and/or the signs that they had were not fully compliant or in good condition. The responses of the 10 city applicants to the questions led to the recommendations noted below.
- At least one of the questions was interpreted differently by individual respondents. This conclusion is based on the answers received in the application as part of this pilot project. The question of concern focused on the number of times work zone signs were needed during a year. The answers were wide ranging, and some did not answer the question directly. A recommendation to assist with apparent confusion regarding any of the questions is below.
- The answers to the open-ended questions asked as part of the application showed that the majority of the cities that responded had a lack of work zone related inventory or had inventory that was out of compliance. However, the cities also acknowledged the importance of proper work zone setups to the safety of their staff and the traveling public.

Recommendations

- The work zone sign package program application email was sent to 27 cities, but none of the respondents had a population of less than 2,000. It is recommended that the program advertisement to these smaller cities be sent directly to their public works directors, maintenance supervisors, and/or mayors. The application could also be distributed to targeted cities at the Iowa DOT Work Zone Safety workshops. It is also recommended that the county engineers or maintenance supervisors be asked to share this opportunity with the cities within their jurisdictions. In addition, the Local Roads Safety Liaison and Safety Circuit Rider at the Iowa LTAP should be used to assist with the distribution of these advertisements.
- It is recommended that the eligibility rules to apply for the work zone sign package be adjusted to encourage more participation. More specifically, if this program is continued, it might be appropriate to allow cities that are willing to participate in work zone and flagger training if selected (rather than just those that have already taken this training) to receive a work zone sign package. Those cities that have already attended the workshops might, however, receive additional points during the ranking process than those indicating a willingness to attend in the future. The provision of this training could be done through the Iowa LTAP staff.
- It is recommended that the evaluation and ranking process connected to each of the questions asked as part of the program application be reconsidered based on the results of this pilot project, the content of this report, and any additional input from the TAC. Some recommendations for specific questions are below. It is recommended, for example, that a measure of the overall need for a work zone sign package by a city might be the city's transportation system mileage and/or typical range of average daily traffic. A question could be added about this information. In addition, it is recommended that the question about public works employees, if included in the application, be more specifically about the public works employees that work on the roadway within work zones and possibly include seasonal or temporary employees. Finally, the city's ability to properly store the sign package might be assumed.
- It is recommended in future competitions that the project team contact any applicant that appears to be confused about any of the questions. This contact should be accomplished for clarification purposes. Alternatively, the respondent could be assigned zero points for anything that does not respond to the question or be disqualified entirely. The approach used will likely be specific to the question and should be a decision made by the project team with guidance from the TAC.
- It is recommended that the minimum amount of inventory for particular devices and the points connected to their availability be reconsidered. During this pilot project, the points assigned were related to whether a city had access to one of six items in the work zone sign package. It may be more appropriate, however, to base that point assignment on inventory numbers for the particular items. For example, the need for cones might be measured based on whether the city has 10 or more.

- It is recommended that this program be continued. There is additional need to assist smaller cities with their acquisition and application of work zone related devices. The content of applications received as part of this project, and a review of the existing devices owned by the cities when the work zone sign packages were delivered, showed the need for this assistance.

REFERENCE

FHWA. *Manual on Uniform Traffic Control Devices for Streets and Highways*. 2012. 2009 Edition with Revisions 1 and 2 dated May 2012. Federal Highway Administration, Washington, DC.

APPENDIX A: APPLICATION FORM

Application
<p>The Iowa Local Technical Assistance Program (LTAP) is pleased to announce this project for 2017. Please complete the following application to the best of your ability and submit by October 28, 2016. Applications received after this date will not be accepted.</p>
1. Name of City <input type="text"/>
2. Name and Title of Contact Person <input type="text"/>
3. Address, City and Zip Code <input type="text"/>
4. Email Address <input type="text"/>
5. Phone <input type="text"/>
6. City Population? <input type="text"/>
7. How many public works employees do you have? <input type="text"/>
8. Approximately how many times per year do you need temporary traffic control for work zones? <input type="text"/>
9. Do you have suitable storage for traffic control devices? <input type="radio"/> Yes <input type="radio"/> No

10. Please give a brief history of typical work zone problems you've encountered.

11. Inventory and average condition of your current work zone traffic control devices.

	Quantity	Condition
Cones	<input type="text"/>	<input type="text"/>
Class 2 Vests	<input type="text"/>	<input type="text"/>
Road Work Ahead Signs	<input type="text"/>	<input type="text"/>
One Lane Road Ahead Signs	<input type="text"/>	<input type="text"/>
Be Prepared to Stop Signs	<input type="text"/>	<input type="text"/>
Type III Barricades	<input type="text"/>	<input type="text"/>

12. Please add any other relevant information you would like for us to consider.

13. It is understood that if selected to receive one of the packages, our public works employees will participate in LTAP offered work zone safety workshops and the Roads Scholar Program. It is also understood that by submitting this application I certify the information contained is true and accurate.

Yes, I agree

APPENDIX B: EXAMPLE OF A COMPLETED APPLICATION

#10



COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, October 27, 2016 7:42:13 AM
Last Modified: Thursday, October 27, 2016 8:06:00 AM
Time Spent: 00:23:47
IP Address: 173.215.59.164

PAGE 1: Application

Q1: Name of City

Q2: Name and Title of Contact Person

Q3: Address, City and Zip Code

Q4: Email Address

Q5: Phone

Q6: City Population?

Q7: How many public works employees do you have? 12

Q8: Approximately how many times per year do you need temporary traffic control for workzones? 10 - 15

Q9: Do you have suitable storage for traffic control devices? Yes

Q10: Please give a brief history of typical work zone problems you've encountered.

Having the public ignore our signs is a big concern. Our 4x4 size signs are old and faded to the point that they might not be conveying the message that there is work being done ahead. Having the proper signage is also a problem. Being seen while working doing the night is always a little stressful. Esp. if the reflective devices are not up to code.

Q11: Inventory and average condition of your current work zone traffic control devices.

	Quantity	Condition
Cones	More than 10	Fair
Class 2 Vests	More than 10	Good
Road Work Ahead Signs	4	Poor
One Lane Road Ahead Signs	2	Poor
Be Prepared to Stop Signs	0	
Type III Barricades	4	Good

Q12: Please add any other relevant information you would like for us to consider.

We try and do a good job in protecting our employees and the public at the same time. In the last few years we have come a long way but could always do better that is for sure. The Work Zone Safety classes have helped a lot. They seem to get the guys thinking more about their own safety & not waiting for me to tell them what to do each time out. Keep up the good work on those classes.

Q13: It is understood that if selected to receive one of the packages, our public works employees will participate in LTAP offered work zone safety workshops and the Roads Scholar Program. It is also understood that by submitting this application I certify the information contained is true and accurate.

Yes, I agree.

APPENDIX C: RANKING FORM

Applicant Number: _____

Work Zone Sign Project Ranking Process	Possible Points	Applicant Points
Population less than 2000 (Q6)	2	<input type="text"/>
Population 2001-5999 (Q6)	3	<input type="text"/>
Population 6000-9999 (Q6)	1	<input type="text"/>
Number of workers (Less than 2 = 0 points) (Q7)	2	<input type="text"/>
Quantity = 1 point for each "0" (Q11)		<input type="text"/>
Condition = 1 point each fair, 2 points each poor (Q11)		<input type="text"/>
Mentions or implies worker safety	2	<input type="text"/>
Mentions or implies public safety	2	<input type="text"/>
Mentions work zone safety workshops	2	<input type="text"/>
Mentions lack of proper devices	2	<input type="text"/>
Mentions out of compliance (old, faded, outdated)	2	<input type="text"/>
Applicant Subtotal		<input type="text"/>
Judge's option points (0 to 3 points)	+	<input type="text"/>
Applicant Point Total	=	<input type="text"/>
<i>Tie Breaker:</i> Number of times "safety" is mentioned		<input type="text"/>

APPENDIX D: SAMPLE RESPONSES TO QUESTION 10

Q10: Please give a brief history of typical work zone problems you've encountered.

- Having advanced warning signs for traffic and cross street traffic will greatly enhance safety for the traveling public and our workers.
- We need signage when filling cracks with tar throughout the whole summer with one crew and for a patch crew that patches the streets in the summer that requires signage and vests to control traffic and provide safety to the staff when tarring or repairing streets. Safety is the utmost concern for the City and its employees when they are completing these projects and being able to give the vehicular traffic users a visual with proper signage of the upcoming traffic concerns due to the repairs that we are doing helps them on passing safely to eliminate any accidents for their safety and the City personnel performing the work. Our worn and outdated signs and barricades being replaced with newer and updated signs would continue to help with the safety for everyone either driving or working on the streets
- Having the public ignore our signs is a big concern. Our 4x4 size signs are old and faded to the point that they might not be conveying the message that there is work being done ahead. Having the proper signage is also a problem. Being seen while working doing the night is always a little stressful. Esp. if the reflective devices are not up to code.
- Having multiple lanes and multiple projects going at one time never seem to have enough signs and end up using old signs that may not meet standards or have to try to get a in touch with a work zone sign company to see if they can deliver the extra signs which can cause delays and much more money than using signs the City has.
- Not enough signage for water main breaks, sewer repair projects and road repairs. Without proper signage, people tend to get too close to workers on the roadways.

APPENDIX E: SAMPLE RESPONSES TO QUESTION 12

Q12: Please add any other relevant information you would like for us to consider.

- We have Highway _ through our community. Highway _ is one of the busiest highways in the state. We also have a county road, Highway _ that carries a lot of traffic to our community, as well as another county road through that goes through. Type III barricades, traffic delineators, and more signage will always help and greatly enhance the safety of our workers, especially with Highway _.
- Having people attend these workshops they are more inclined to use the signage due to having a better understanding of a work zone. They realize it is safer for them and the traveling public which has increased the use of the signs. With the City growing and changing over the past years there are more events and infrastructure projects that need the work zone signage, which has put the City in a sign shortage. Thanks for considering the City of _____ for this work zone sign package project.
- We are a community that has seen our community grow very steadily for the last several years it is hard to keep up with traffic control devices when school functions and other groups in our town borrow what we have. We can never have too much traffic control safety devices for our workers safety and the safety of the public.
- We try and do a good job in protecting our employees and the public at the same time. In the last few years we have come a long ways but could always do better that is for sure. The Work Zone Safety classes have helped a lot. They seem to get the guys thinking more about their own safety & not waiting for me to tell them what to do each time out. Keep up the good work on those classes.

APPENDIX F. LIST OF AWARDED CITIES IN IOWA

Table 2. Populations and cities awarded sign packages

City	Population
Camanche	4,448
Carlisle	3,876
Fairfield	9,464
Hiawatha	7,024
Huxley	3,317
Norwalk	8,945
Sergeant Bluff	4,227
Sheldon	5,188
Solon	2,037
Waverly	9,874