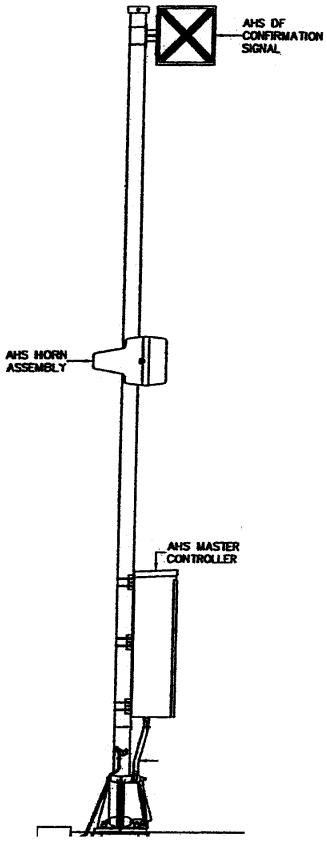
CITY OF ROSEVILLE
TRADITION • PRIDE • PROGRESS

Final Evaluation
An Addendum to the January 2004 Evaluation of the Automated Horn System in the City of Roseville, California



October 2004

Final Evaluation
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Introduction

The City of Roseville is located along Interstate 80 to the northeast of Sacramento. A railroad town since its incorporation in 1909, the City's population of 91,000 residents is now roughly divided by the railroad tracks that were once its glue. Many roadways crossing the railroad right-of-way are grade separated by either a bridge or a subway. However, some of the older roadways still have at-grade crossings. Two of these crossings have been a source of noise irritation for many local residents for years.

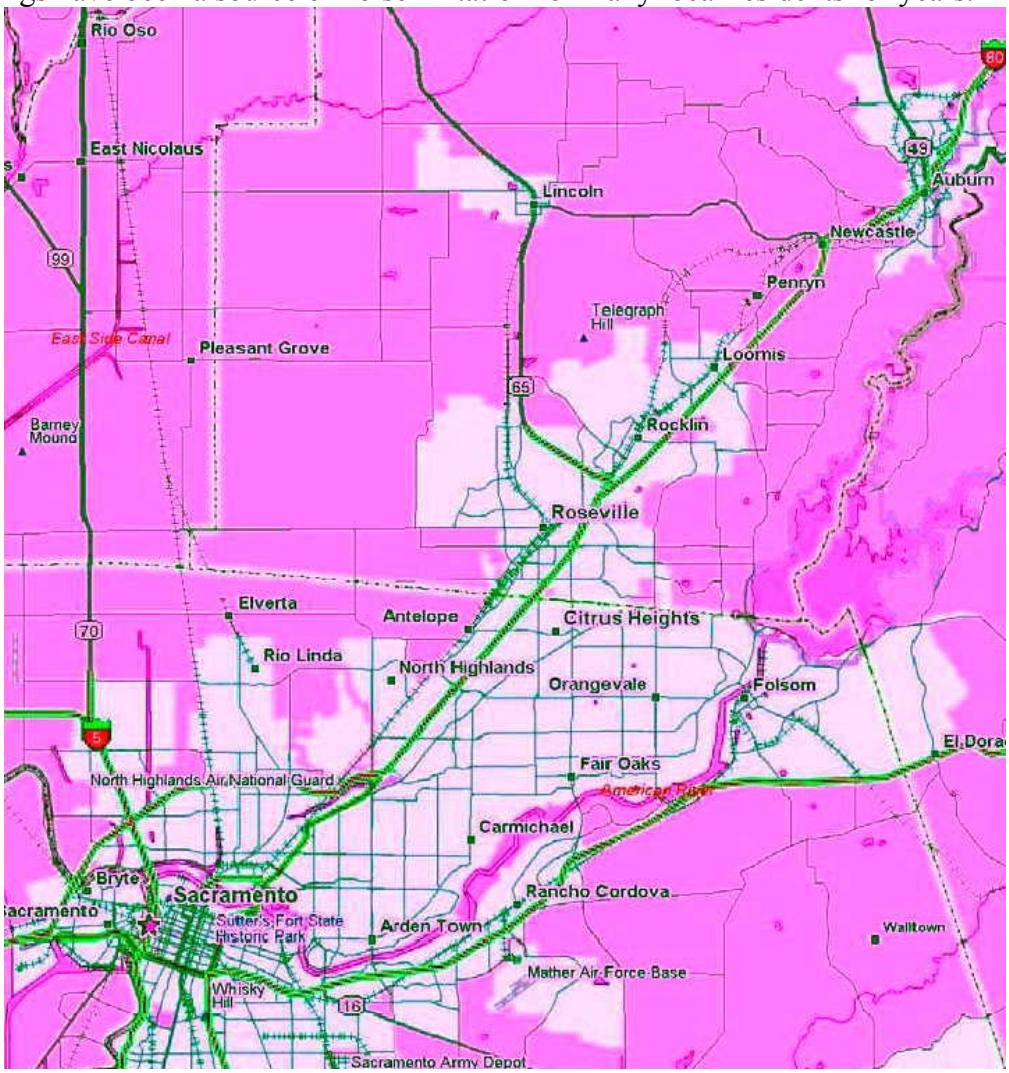


Figure 1 - City Location

The Automated Horn System (AHS) activations in the City of Roseville are the culmination of a three year process that began on September 18, 2000, at the direction of the City Council. City staff worked with the California Public Utility Commission (CPUC), Federal Railroad Administration (FRA), and Union Pacific Railroad (UPRR) staff to plan what would be the first AHS installation in California and one of less than a dozen in the entire United States. On August 19, 2003, at 9 am on a Tuesday morning, the AHS's were activated at the two main railroad at-grade crossings in Roseville – Tiger Way and Yosemite Street.

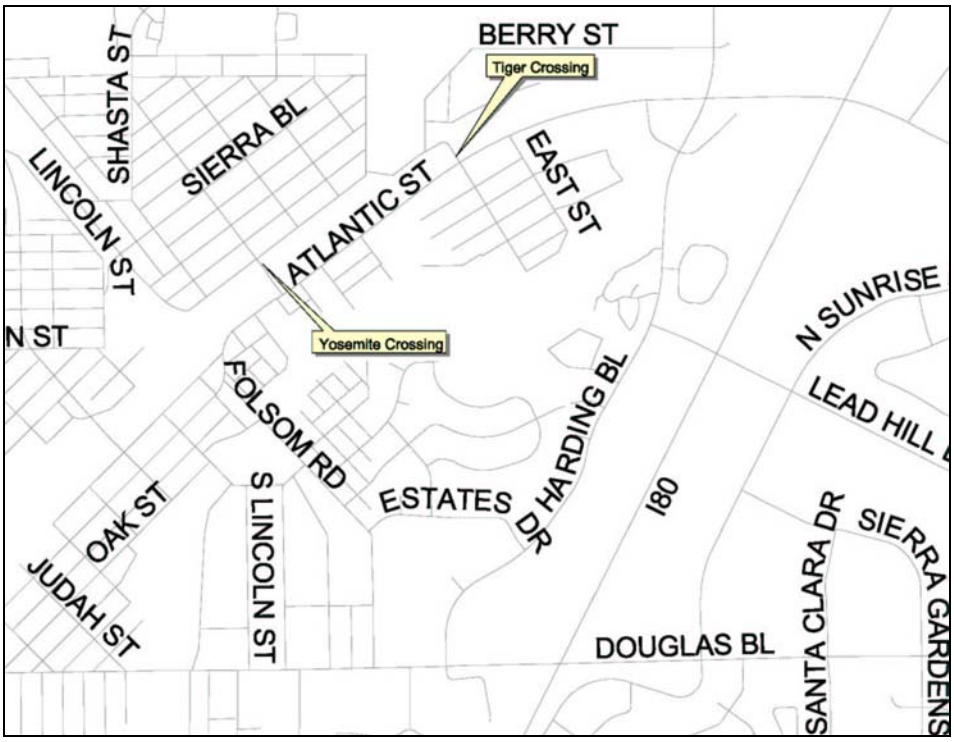


Figure 2 - Crossing Locations

The AHS is a stationary train warning device that replaces the locomotive mounted train horns. Prior to a train being within ¼ mile of a crossing, large flashing orange X's become visible to the train crew. These X's, also known as horn indicators, tell the train crew that the AHS is operating correctly. The X's flash continuously except when a train actively occupies the railroad crossing. They stop flashing when a train is in the crossing so that if a second train approaches and the system correctly recognized the approaching locomotive, they can begin flashing again to show the train crew that the system is working and they do not need to blow their train mounted horn. These X's flash in a rhythmic pattern to offset them from other lights in the vicinity of the crossing. Generally the X's are mounted at the crossing on poles adjacent to the railroad tracks. Since the Roseville rail line has three tracks, the X's were mounted 29 feet above the adjacent ground. This allows them to be visible over other train cars should multiple trains be near the crossings. The Roseville tracks also have a large sweeping curve coming into town. An advance confirmation X, also known as the advance horn

indicator, was placed ¼ mile from the crossing to insure the train crew could be notified that the AHS is operational prior to their requirement to blow the train mounted horn.

Once the train is on the approach to the crossing, the railroad's constant warning time detection equipment (equipment that can tell when a train is approaching, how fast it is going, and when it will arrive at the crossing so that it can consistently provide the same amount of warning time prior to the arrival of a train) notifies the AHS of the impending train. The AHS then begins sounding its stationary horns. These horns are loudspeakers mounted on poles at the crossing. They are pointed in the general vicinity of the approaching traffic and are programmed to sound like a train horn. In Roseville there are 3 horns at each crossing (See Appendix A for the plans and Appendix G for pictures in the report of January of 2004). Each crossing receives approximately 25 seconds of warning time prior to the arrival of the train. This equates to 8 horn activations per train in a 2 long, a short, and a long pattern that is repeated twice. Once the train occupies the crossing, the AHS stops sounding its horn.

The AHS continuously monitors its operational status. It checks to make sure that it is communicating correctly with the railroad warning equipment from which it receives notification of the approaching train. It also monitors the decibel level of the stationary horns every time they sound. Should the system find a problem, it will turn itself and the flashing X's off. The locomotive engineers have been trained to sound their train mounted horns should the flashing X's not be visible for any reason. If the X's are off or just not visible due to sun glare, fog, etc, they are instructed to blow the train mounted horns. They are also permitted to blow the train mounted horns if they perceive a potential danger encroaching on the tracks such as pedestrians or vehicles trying to beat the train through the crossing.

Study Results

The City's AHS installations were granted by the CPUC as a pilot program to test the effectiveness of the horn system. As a part of the test project, the City has been gathering various data to compare the pre-AHS installation crossings to the post-AHS installation crossings. The various types of monitoring and a summary of their results are contained below.

Video Monitoring

After the Automated Horn System (AHS) report was published in January of 2004, there has been no further requirement for video monitoring. To peruse the past video monitoring summary, please go to page five of that report (January 2004).

Accident Data

Using the City's accident database, we queried the intersections of Atlantic/Yosemite, and Atlantic/Tiger for all reported collisions from January 2004 to September 2004. In this nine month period, we discovered a total of four collisions.

At the intersection of Atlantic/Tiger, there were three reported collisions. These collisions did not occur in nor were they connected with the at grade railroad crossing. They occurred in the adjacent signalized street intersection as a result of drivers failing to acknowledge the traffic signal and automobile right of way rules.

At the intersection of Atlantic/Yosemite there was one reported collision. Two vehicles were making a left hand turn from east bound Atlantic St. onto north bound Yosemite St. As these vehicles were proceeding with their movement, an approaching train caused the crossing arms to drop. The first vehicle correctly stopped their vehicle. The second vehicle was following too closely, and could not stop in time to avoid hitting the first vehicle. Use of the AHS had no bearing on this accident.

To peruse these collisions, please go to appendix C in this addendum.

Sound Studies

There have been two sound studies performed: before and after the installation of the AHS. To peruse the sound study results, please go to appendix D of the report published in January of 2004. There have been no modifications made to the AHS; therefore, to perform a third sound study would uncover no new information.

Survey Results

For our third survey, we mailed out 800 questionnaires to residents and businesses; we received back some 238 responses. While all of the questions were the same as the second survey, we were interested in knowing if their opinions had changed. The results of this third survey showed that 71% would like to keep the AHS, 16% were neutral, and 13% wanted the AHS removed. This third survey showed, on a percentage basis, an increase in the desire to keep the AHS.

We also handed out 65 surveys to the actual personnel that work at the UP Railroad Yard; we received back some 18 responses. This survey did not yield as high a return as the previous survey. The results of this third survey showed that 58% would like to keep the AHS, 18% were neutral, and 24% wanted the AHS removed.

To peruse the actual results of the third survey, please see appendix E of this addendum. To compare them to the results of the previous surveys, please see appendix E of the report published in January of 2004.

The mapped results of this third survey can be perused in appendix F of this addendum. Again, we found no evidence of a pattern regardless of what question was asked.

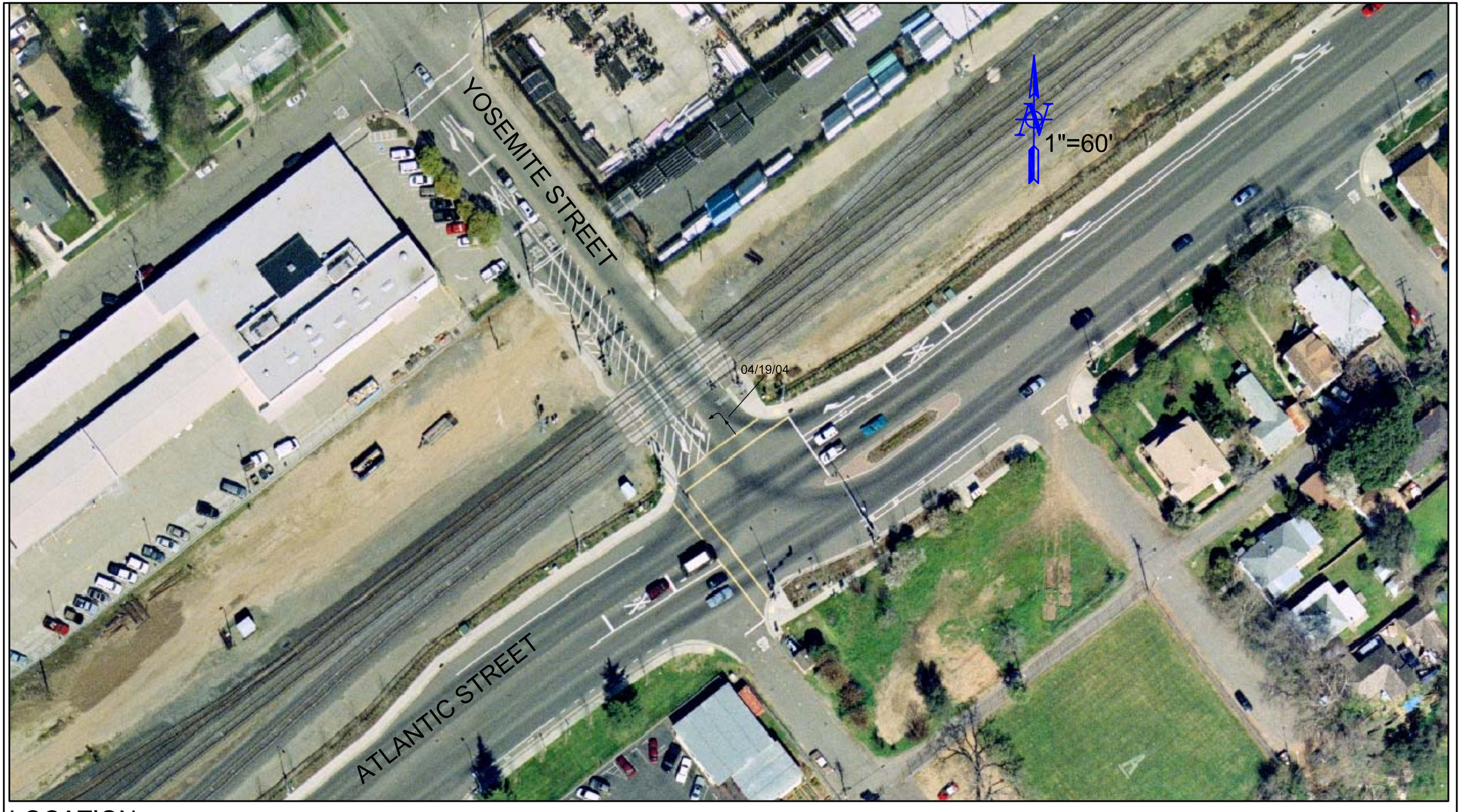
In this third survey, we did receive back more responses, but less comments. However, we did notice an increase in the ratio of positive comments to negative comments; there were three times as many positive comments to negative comments. Comments ranged from "We can keep the windows of our house open at nights during the summer months" to "We prefer the sound of the train whistles over the AHS".

Conclusion

The Automated Horn System has been operational in the City of Roseville for over 13 months. With the feedback from the third survey, and it's performance over the last 6 months, staff supports its use as a viable alternative to the train mounted horns, and will be recommending its continued use to the Roseville City Council.

Appendix C

Accident Diagrams



LOCATION:

ATLANTIC STREET AT YOSEMITE STREET

9 MONTH HISTORY
01/01/2004 to 09/30/2004

City of Roseville
Roseville Police Department

Traffic Collision History Report

Location: Atlantic Street / Yosemite Street
Date Range Reported: 01/01/2004 - 09/30/2004

Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
4/19/04	11:55	19	North	Rear-End	Other Motor Vehicle	North	Making Left Turn	North	Stopped In Road	Following Too Closely	0	0

Total Number of Collisions: 1

Settings Used For Query

Parameter	Setting
Street Name	Atlantic Street
Cross Street	Yosemite Street
Starting Date	01/01/2004
Ending Date	09/30/2004
Distance from Intersection	<= 250' for non rear-end collisions
	<= 250' for rear-end collisions

Collision Diagram

Horizontal Street: ATLANTIC STREET

Vertical Street: YOSEMITE STREET

From: 01/01/2004 To: 09/30/2004

Date Prepared: 10/22/2004

Number of Collisions

1	Property Damage Only
0	Injury Collisions
0	Fatal Collisions
1	Total Collisions

Legend

- Moving Vehicle
- Stopped Vehicle
- Backing Vehicle
- Ran Off Road
- Movement Unknown
- Right Turn
- Left Turn
- Sideswipe
- Day
- Night
- Pedestrian
- Fixed Object
- Bicycle
- DUI
- Injury
- Fatal

Color Legend - Highest Degree of Injury

Maroon = Fatal

Purple = Severe Injury

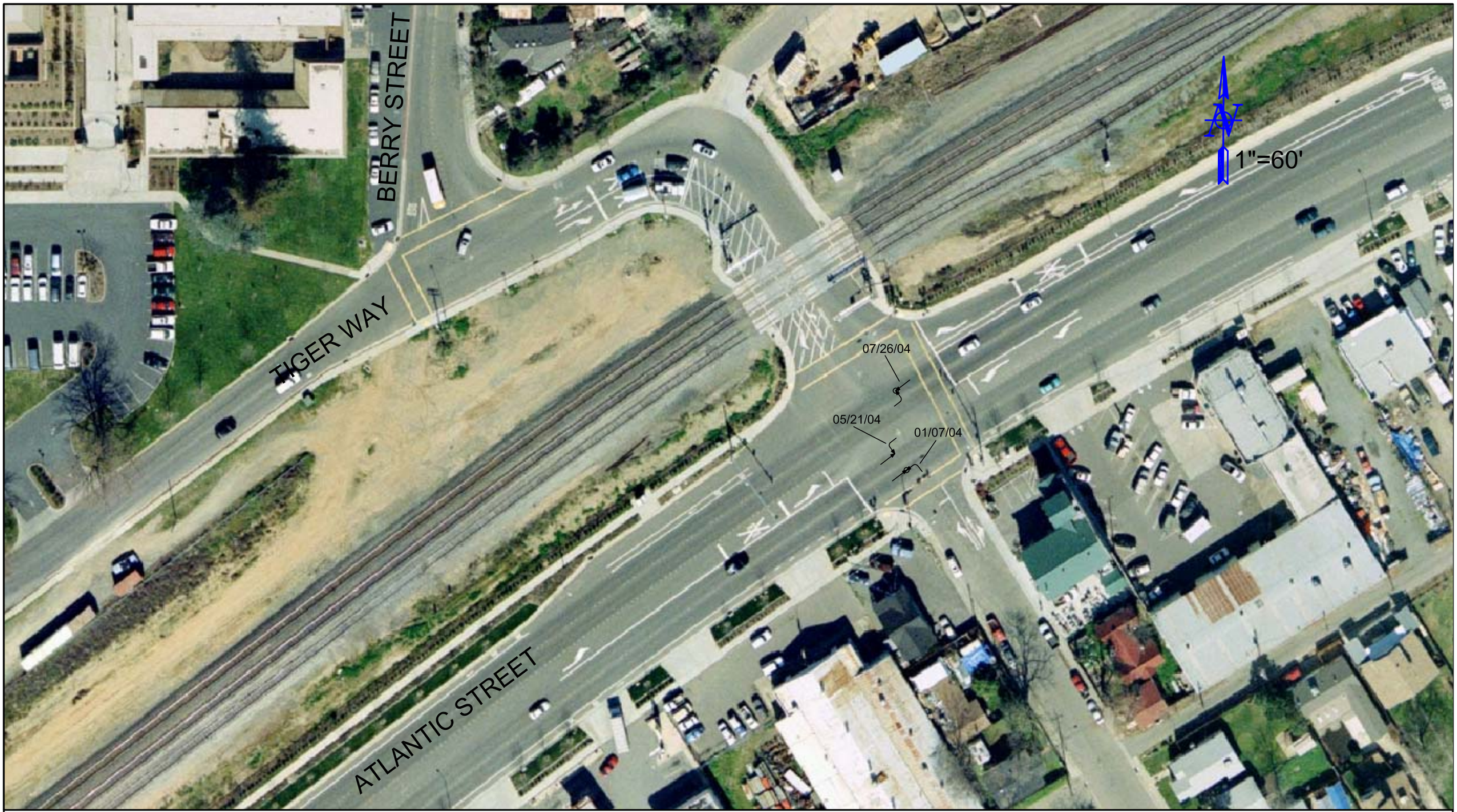
Green = Other Visible Injury

Teal = Complaint of Pain

Dark Blue = Property Damage Only

Settings Used For Query

Parameter	Setting
Street Name	Atlantic Street
Cross Street	Yosemite Street
Starting Date	01/01/2004
Ending Date	09/30/2004
Distance from Intersection	<= 250' for non rear-end collisions
	<= 250' for rear-end collisions



LOCATION:

ATLANTIC STREET AT TIGER WAY

9 MONTH HISTORY

01/01/2004 to 09/30/2004

City of Roseville
Roseville Police Department
Traffic Collision History Report

Location: Atlantic Street / Tiger Way
Date Range Reported: 01/01/2004 - 09/30/2004

Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1/7/04	08:30	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Making Left Turn	Traffic Signals and Signs	1	0
5/21/04	12:00	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	West	Making Left Turn	Auto R/W Violation	0	0
7/26/04	07:20	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Traffic Signals and Signs	2	0

Total Number of Collisions: 3

Settings Used For Query

Parameter	Setting
Street Name	Atlantic Street
Cross Street	Tiger Way
Starting Date	01/01/2004
Ending Date	09/30/2004
Distance from Intersection	<= 0' for non rear-end collisions
	<= 0' for rear-end collisions

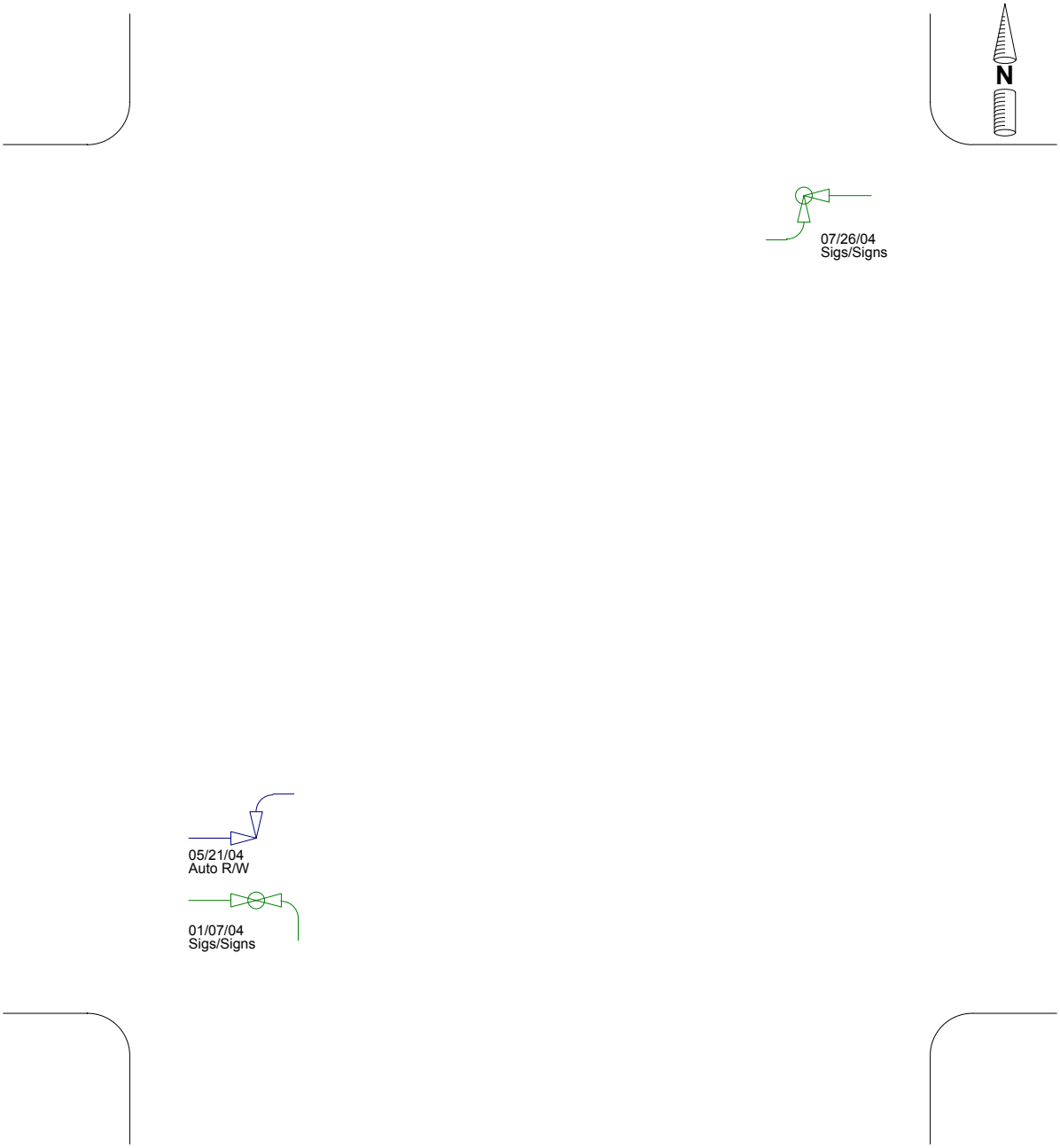
Collision Diagram

Horizontal Street: ATLANTIC STREET

Vertical Street: TIGER WAY

From: 01/01/2004 To: 09/30/2004

Date Prepared: 10/26/2004



Number of Collisions

1	Property Damage Only
2	Injury Collisions
0	Fatal Collisions
3	Total Collisions

Legend

- Moving Vehicle
- Stopped Vehicle
- Backing Vehicle
- Ran Off Road
- Movement Unknown
- Right Turn
- Left Turn
- Sideswipe
- Day
- Night
- Pedestrian
- Fixed Object
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Color Legend - Highest Degree of Injury

Maroon = Fatal

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Teal = Complaint of Pain

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Settings Used For Query

Parameter	Setting
Street Name	Atlantic Street
Cross Street	Tiger Way
Starting Date	01/01/2004
Ending Date	09/30/2004
Distance from Intersection	<= 0' for non rear-end collisions
	<= 0' for rear-end collisions

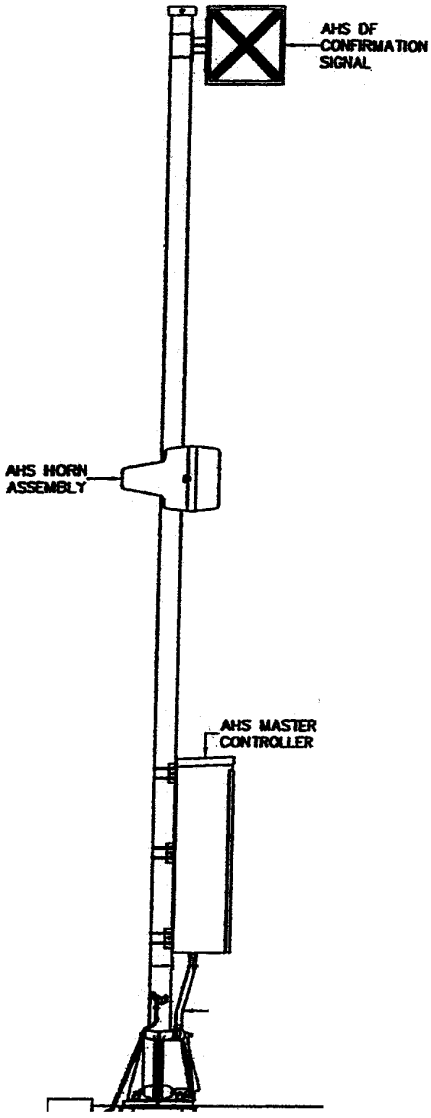
Appendix E

Results of
Resident, Business, and Locomotive Engineers
Survey #3

CITY OF ROSEVILLE
TRADITION • PRIDE • PROGRESS

3rd SURVEY – PLEASE TELL US WHAT YOU THINK!

The Automated Horn System



WHAT'S THE LATEST? The Automated Horn System (AHS) has been operational for the past eight months. During recent months, City staff has collected and compiled the results of the second survey of residents. You should have received the mailer containing this survey around the end of December. City staff mailed out 800 surveys to residents and businesses near the railroad crossings. Of those, 203 surveys were returned. Thank you. The results of the survey showed that 65% of those who responded preferred the AHS to the train mounted horn, 15% did not, and 20% had no opinion. The full results of the survey are available on the web at **www.roseville.ca.us/engineering**.

WE WANT TO KNOW WHAT YOU THINK. The City's installation of the AHS was granted by the CPUC as a test project for California. A requirement of the AHS test project is that we survey residents and businesses near the installations several times after their activation. Attached to this flyer is the third survey. While all of the questions are the same as the second survey, we are interested in knowing if your opinions have changed over the past few months. This information is essential in the continuing study of the AHS. Remember that the results of the City's AHS test project will help shape the future of the system in California. Please take some time to answer the survey questions and return your responses in the enclosed postage paid envelope.

WHEN DO YOU NEED MY RESPONSE? Please respond and return your survey to the City by April 4, 2004.

WHO DO I CONTACT? For additional information or questions, please contact Jason Shykowski of the Public Works/Engineering Department at (916) 746-1300.

Please mark the most appropriate answer considering your experiences since December's survey.

1. How loud is the sound from the Automated Horn System at your house or place of business?

Cannot Hear it	Not at all Loud	Slightly Loud	Moderately Loud	Very Loud	Extremely Loud
☐	☐	☐	☐	☐	☐

2. Is the sound from the Automated Horn System bothersome?

Cannot Hear it	Not Bothersome	Slightly Bothersome	Moderately Bothersome	Very Bothersome	Extremely Bothersome
☐	☐	☐	☐	☐	☐

3. Compared to the loudness of the train horns, the loudness of the Automated Horn System is…?

Not Noticeable	Not as Loud	Just as Loud	Louder
☐	☐	☐	☐

4. Compared to the sound of the train horns, the Automated Horn System is…?

Not Noticeable	Less Bothersome	Just as Bothersome	More Bothersome
☐	☐	☐	☐

5. Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train horn?

Have Not Observed	No Change	For the Better	For the Worse
☐	☐	☐	☐

6. Have you observed the use of the train mounted horns since the activation of the Automated Horn System?

No	Rarely	Occasionally	Frequently	Consistently
☐	☐	☐	☐	☐

7. Should the City keep the Automated Horn System or should it be removed?

No Opinion	Keep	Remove
☐	☐	☐

Suggestions for Improvement:_____

_____

_____

_____

Comments:_____

_____

_____

_____

Thank You

AHS THIRD SURVEY OF RESIDENTS

March-2004

1. How loud is the sound of the Automated Horn System at your house or place of business?

Cannot Hear it	Not at all Loud	Slightly Loud	Moderately Loud	Very Loud	Extremely Loud
34	**107**	**49**	**29**	**10**	**1**

2. Is the sound from the Automated Horn System bothersome?

Cannot Hear it	Not Bothersome	Slightly Bothersome	Moderately Bothersome	Very Bothersome	Extremely Bothersome
28	**148**	**27**	**16**	**7**	**4**

3. Compared to the loudness of the train horns, the loudness of the Automated Horn System is…?

Not Noticeable	Not as Loud	Just as Loud	Louder
74	**121**	**25**	**11**

4. Compared to the sound of the train horns, the Automated Horn System is…?

Not Noticeable	Less Bothersome	Just as Bothersome	More Bothersome
75	**122**	**14**	**19**

5. Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train horn?

No Change	For the Better	For the Worse
90	**23**	**4**

6. Have you observed the use of the train mounted horns since the activation of the Automated Horn System?

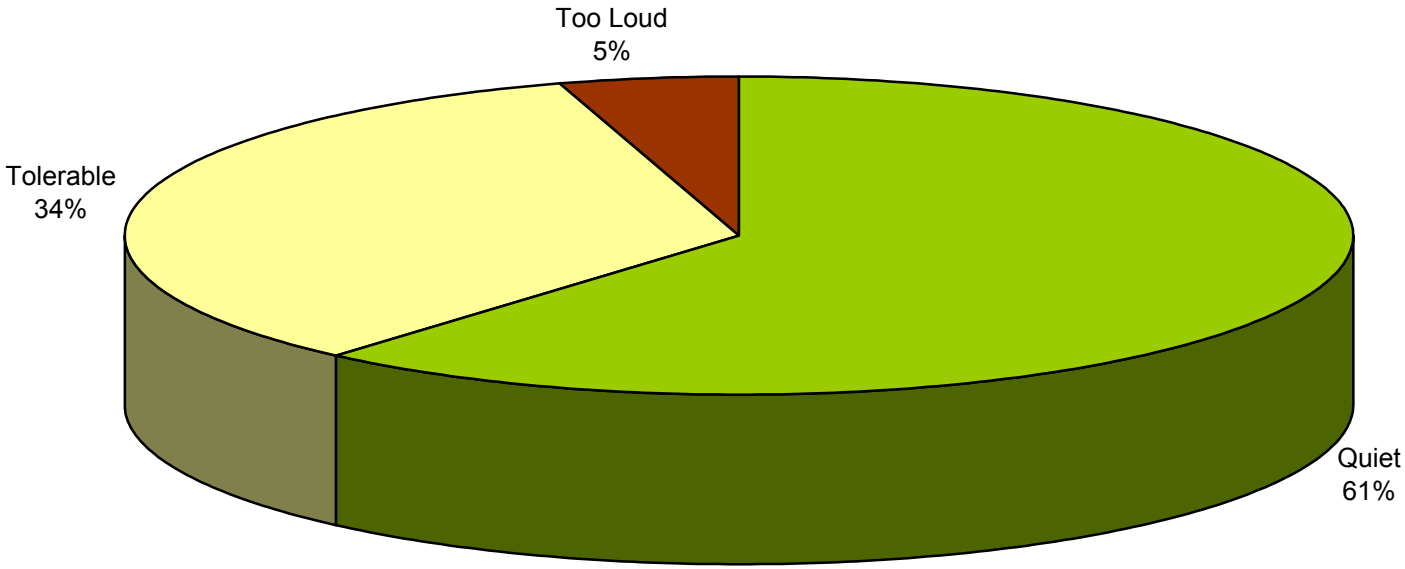
No	Rarely	Occasionally	Frequently	Consistently
44	**68**	**94**	**15**	**8**

7. Should the City keep the Automated Horn System or should it be removed?

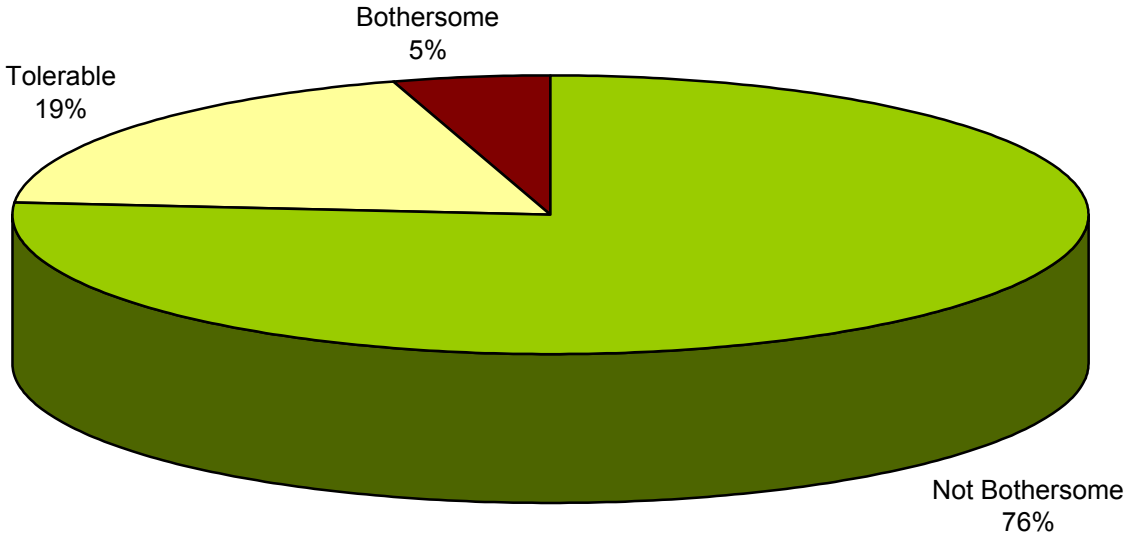
No Opinion	Keep	Remove
36	**164**	**31**

Total Number of Surveys received:	**238**	
Total Number of Suggestions received:	**55**	
Total Number of comments received:	**78**	
Positive:	**37**	**47.4%**
Negative:	**11**	**14.1%**
Neutral:	**32**	**41.0%**

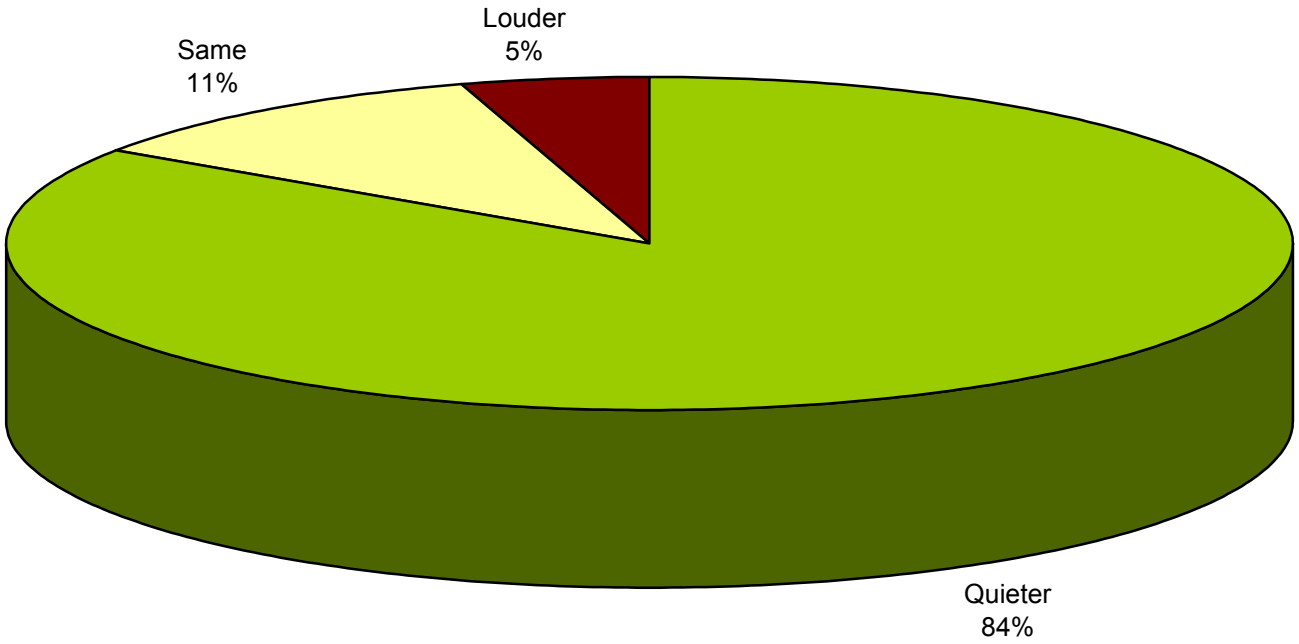
1. How loud is the sound of the Automated Horn System at your house or place of business?



2. Is the sound from the Automated Horn System bothersome?



3. Compared to the loudness of the train horns, the loudness of the Automated Horn System is…?



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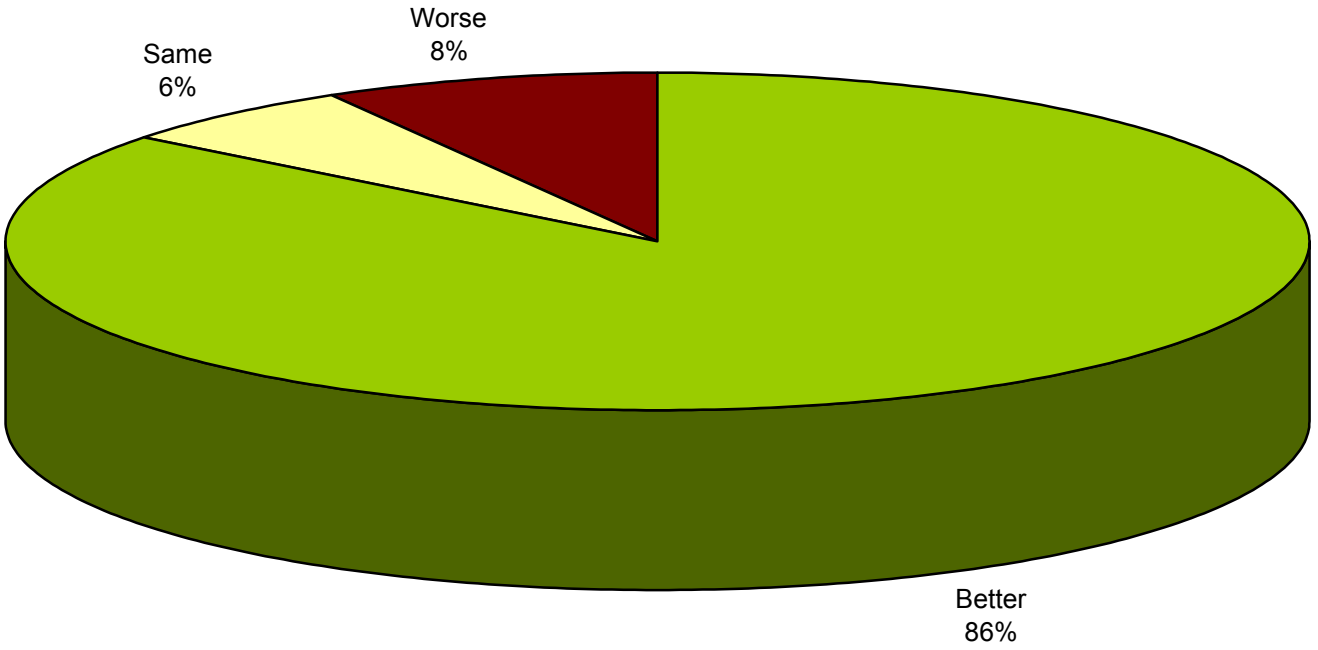

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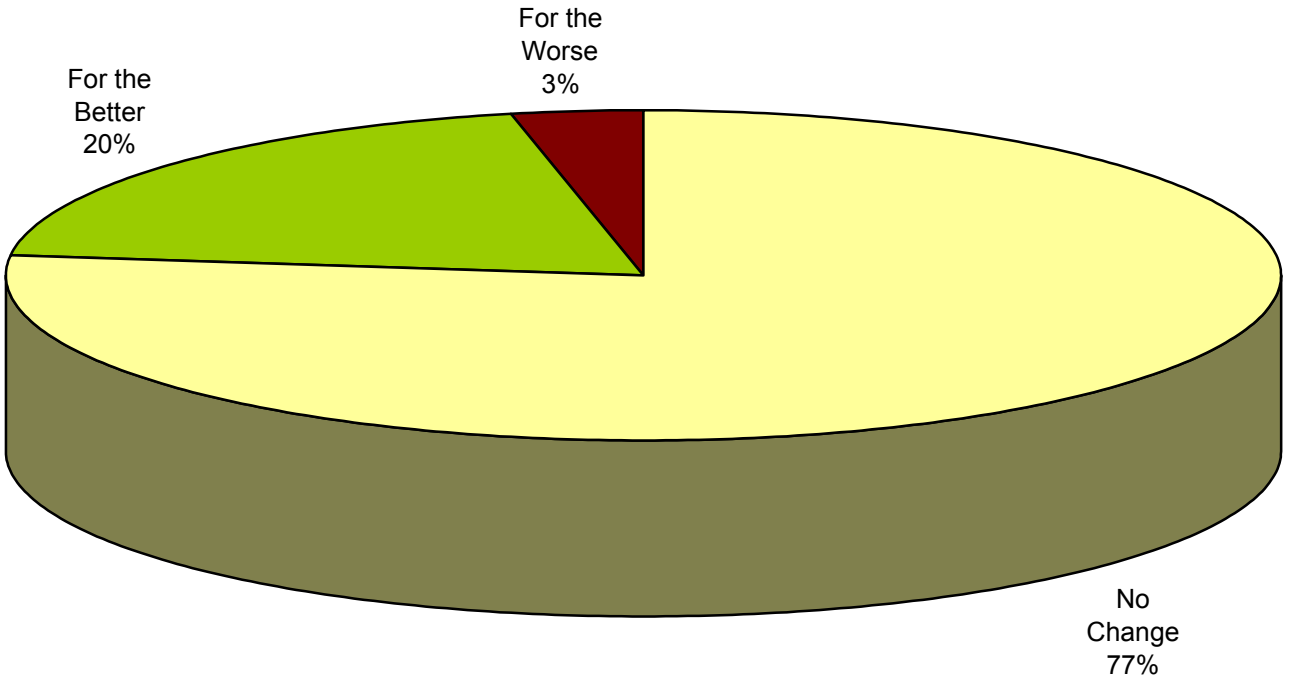
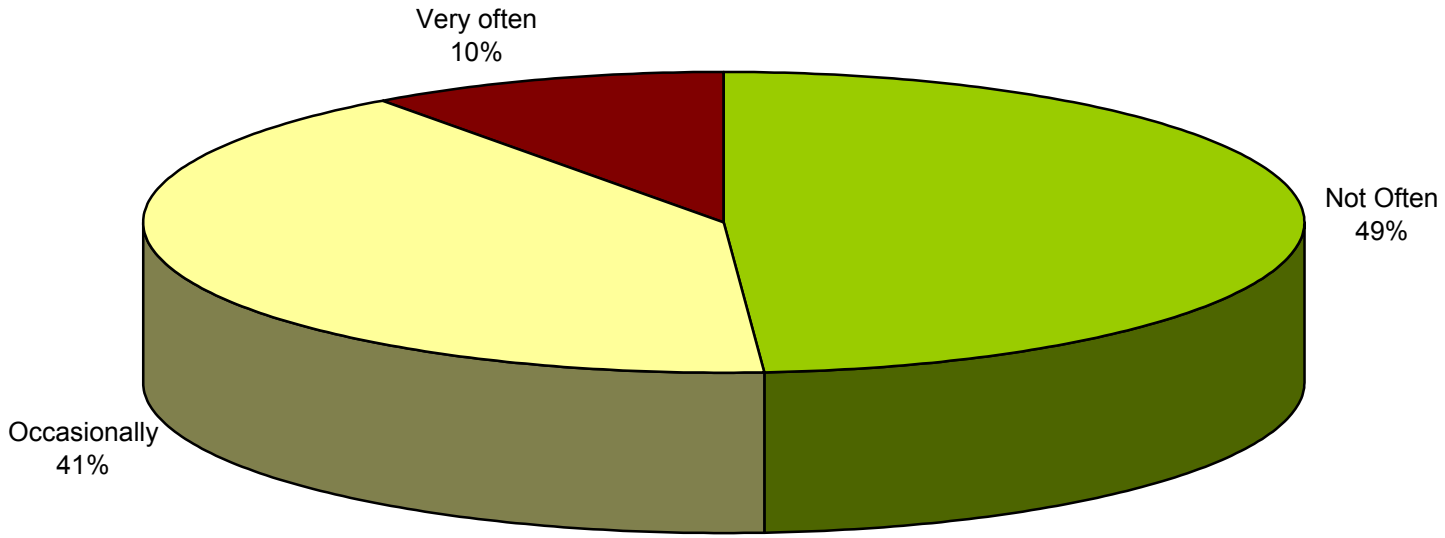
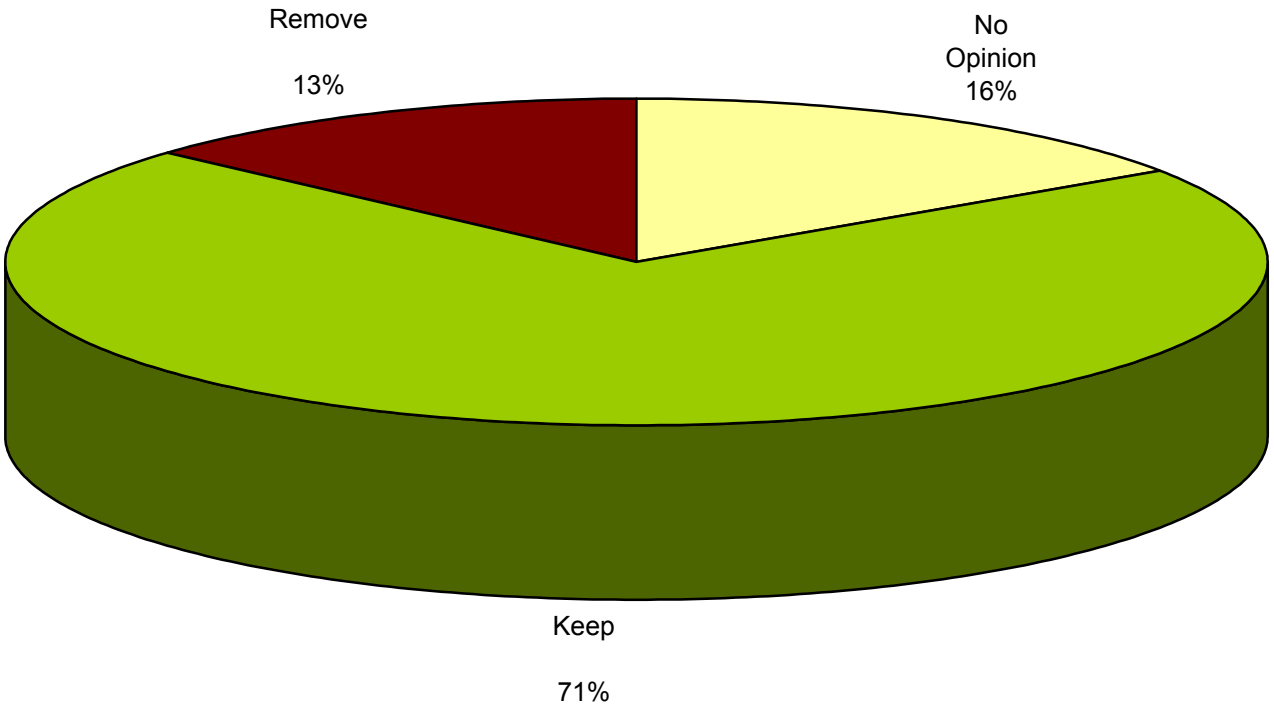


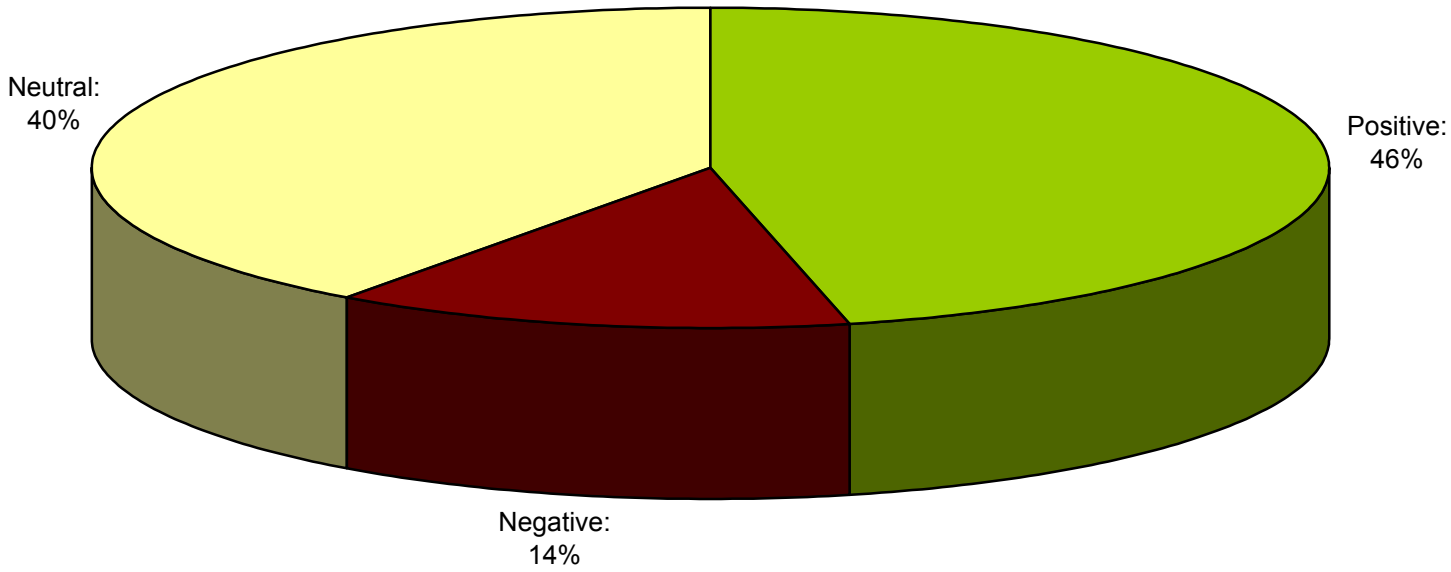
6. Have you observed the use of the train mounted horns since the activation of the Automated Horn System?



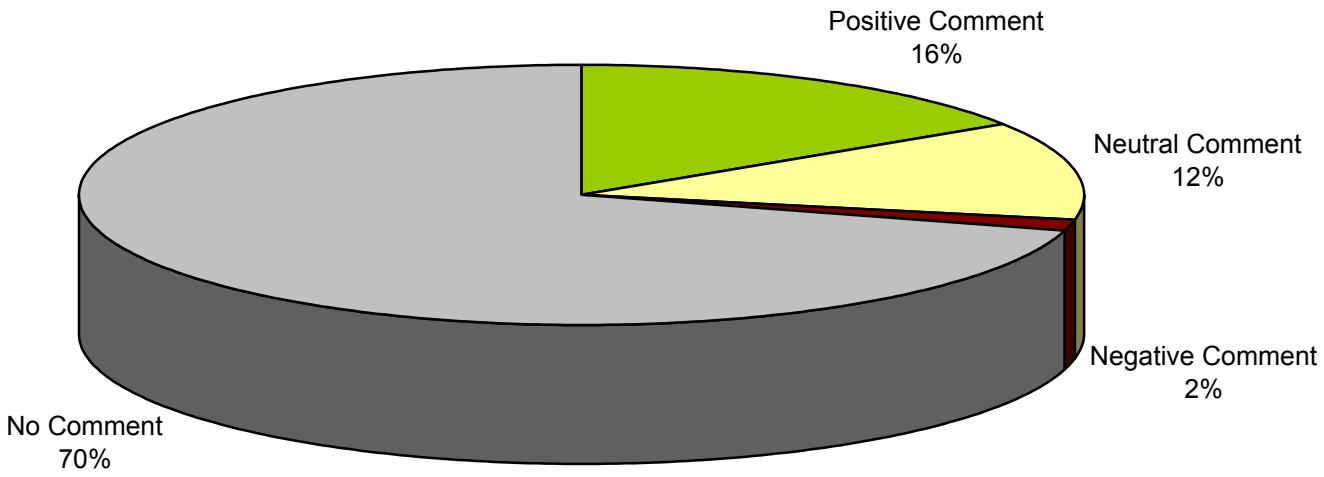
7. Should the City keep the Automated Horn System or should it be removed?



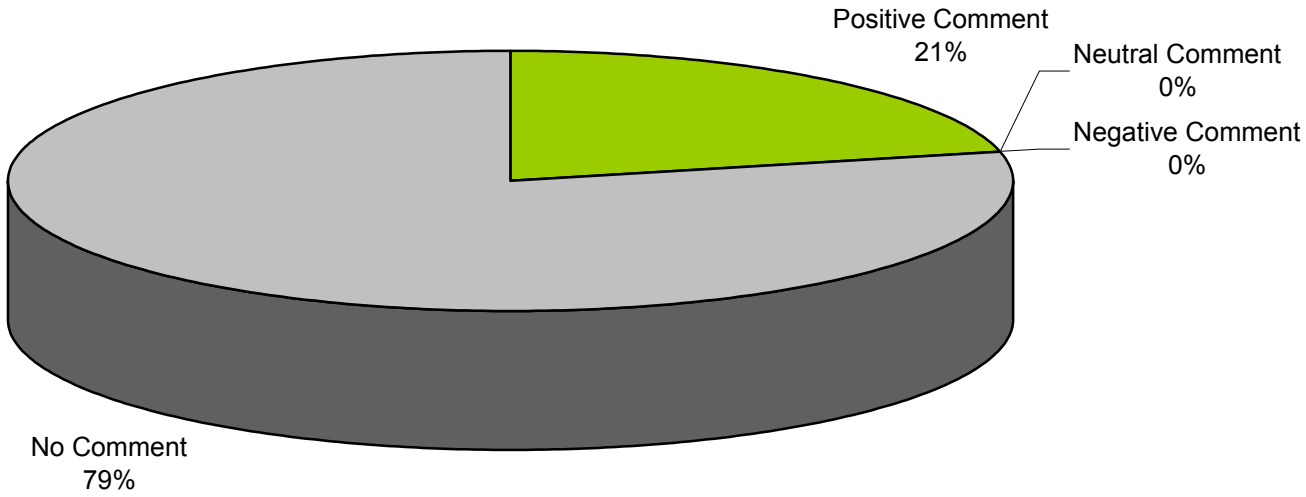
Resident Comments



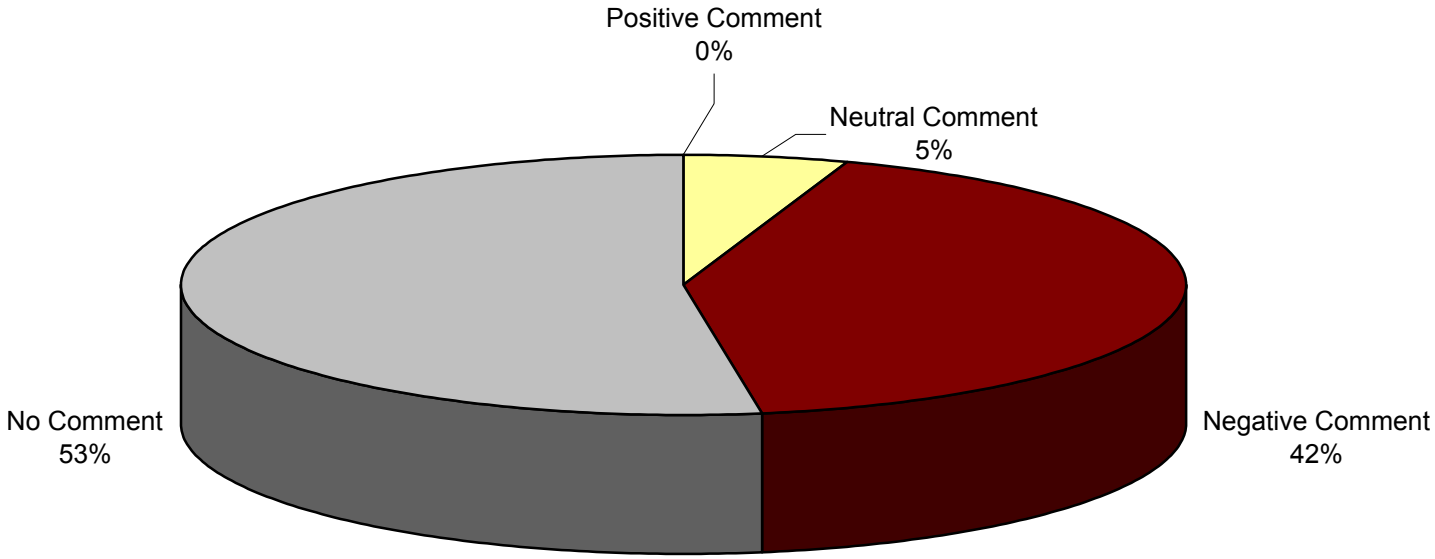
Nature Of Comments From Respondents Who Felt The AHS Was Better Than The Train Horn



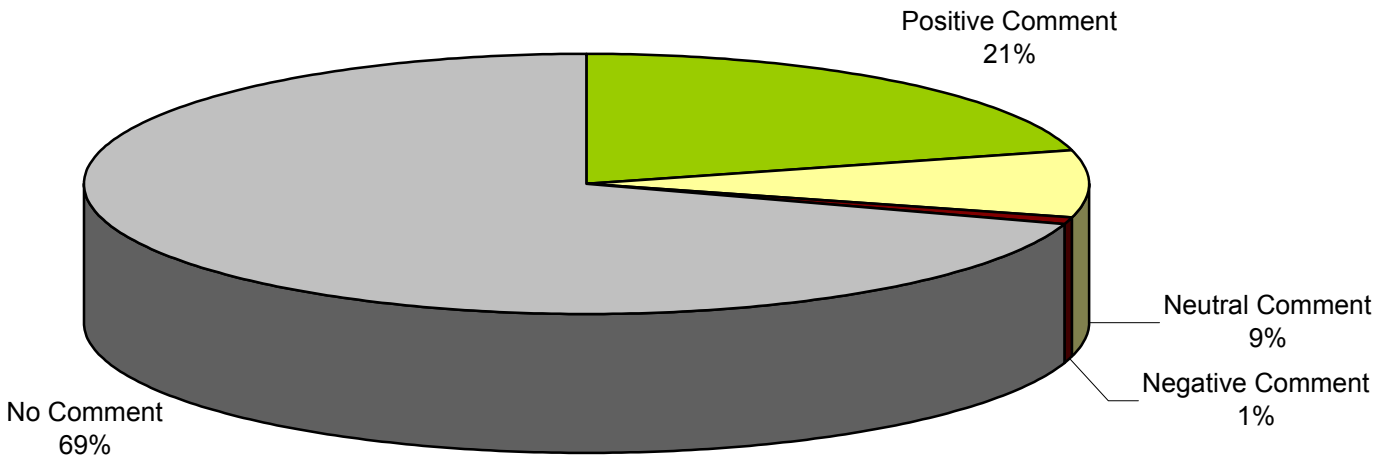
Nature Of Comments From Respondents Who Felt The AHS Was The Same As The Train Horn



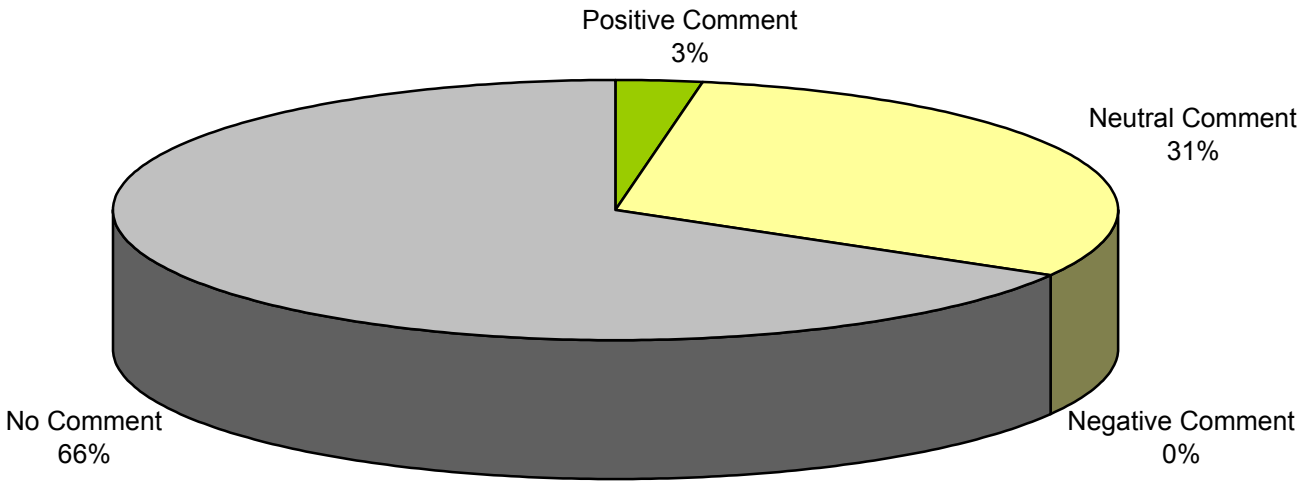
Nature Of Comments From Respondents Who Felt The AHS Was Worse Than The Train Horn



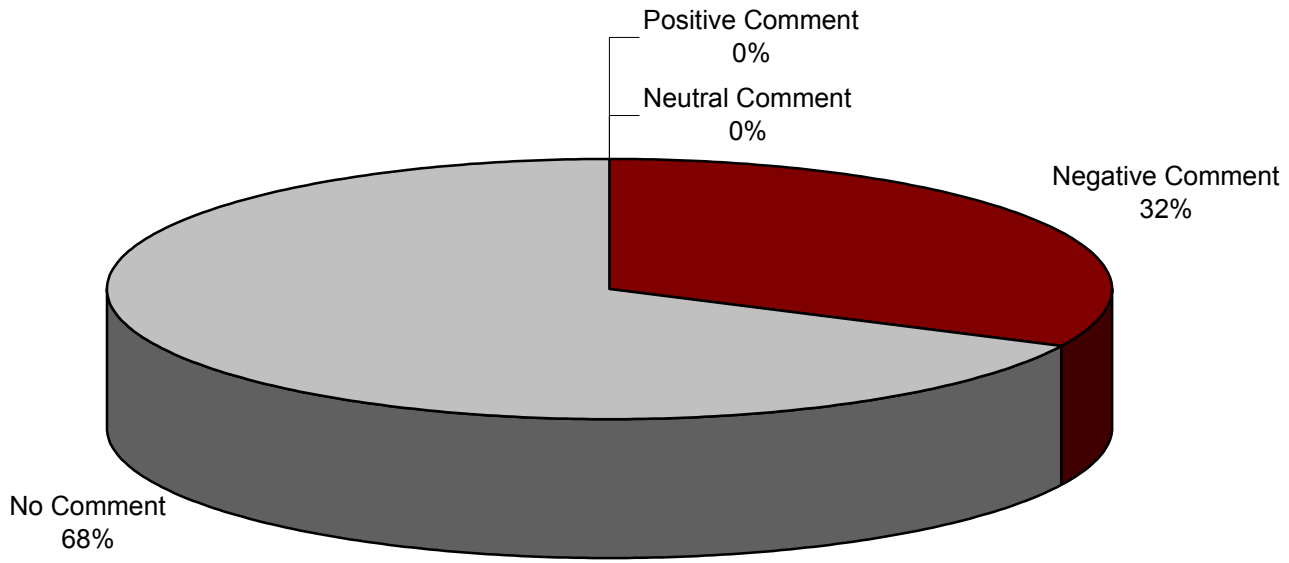
Nature Of Comments From Respondents Who Desire to Keep the Automated Horn System



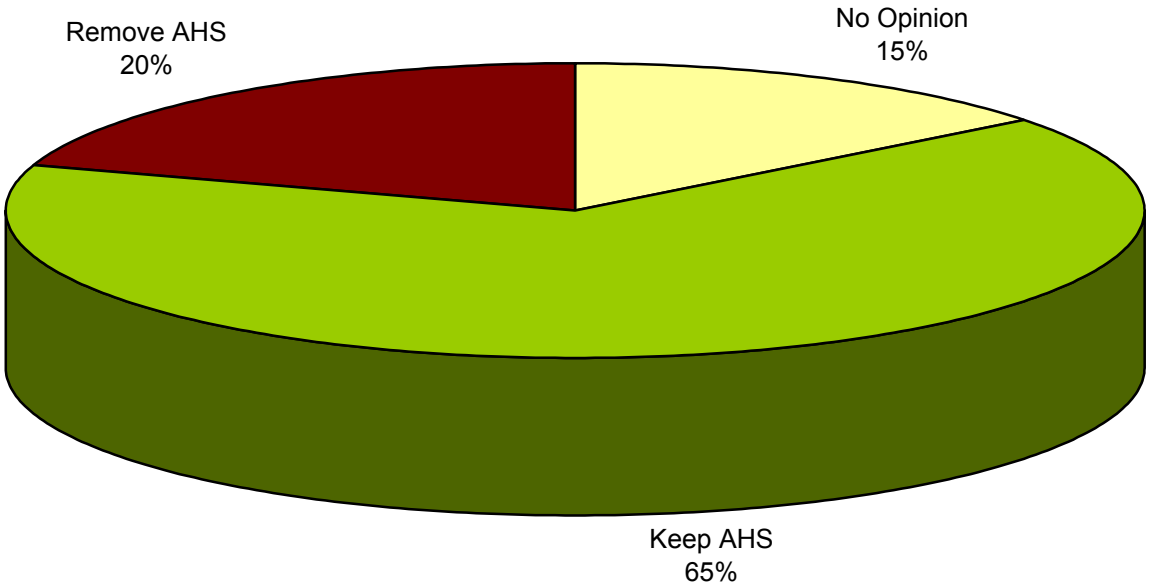
Nature Of Comments From Respondents Who Had no Preference Regarding Keeping the Automated Horn System



Nature Of Comments From Respondents Who Desire to have the Automated Horn System Removed



Preference of Respondents with Suggestions to Improve the Automated Horn System



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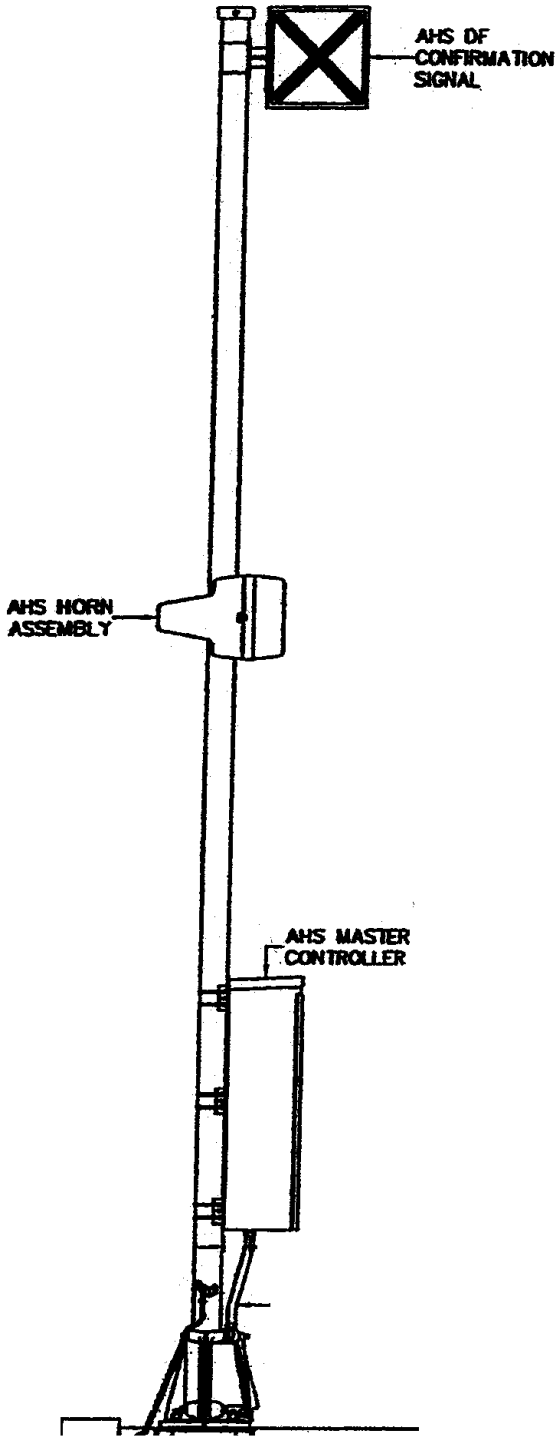
3rd SURVEY - PLEASE TELL US WHAT YOU THINK!

The Automated Horn System



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WE WANT TO KNOW WHAT YOU THINK. The installation of the AHS was granted by the California Public Utilities Commission as a test project for California. A requirement of the AHS test project is that we survey railroad personnel working through the crossings several times after the AHS is activated. Attached to this flyer is the third survey. While all of the questions are the same as the second survey, we are interested in knowing if your opinions have changed over the past few months. This information is essential in the continuing study of the AHS. Remember that the results of the AHS test project will help shape the future of the system in California. Please take some time to answer the survey questions and return your responses in the enclosed postage paid envelope.

WHEN DO YOU NEED MY RESPONSE? Please respond and return your survey to the City by April 4, 2004.

WHO DO I CONTACT? For additional information or questions, please contact Jason Shykowski of the City of Roseville's Public Works/Engineering Department at (916)746-1300.

Please mark the most appropriate answer considering your experiences since December's survey.

1. Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train horn?

No Change	For the Better	For the Worse
☐	☐	☐

2. Is the flashing "X" an effective method of confirming that the AHS is operational?

No	Rarely	Occasionally	Frequently	Consistently
☐	☐	☐	☐	☐

3. Have you had to use the train horns at the Yosemite or Tiger crossings since the activation of the Automated Horn System?

No	Rarely	Occasionally	Frequently	Consistently
☐	☐	☐	☐	☐

3a. Please describe the factors that lead to your decision(s) to sound the train-mounted horn._____

_____

_____

4. If you viewed the employee educational video regarding the AHS, the background information and equipment overview on the video was:

Not Helpful	Somewhat Helpful	Very Helpful	Did Not View
☐	☐	☐	☐

5. If you viewed a problem or malfunction with the AHS, did you report it?

No Problems	Yes	No
☐	☐	☐

5a. Please describe the problem, to whom you reported the problem, and if the person seemed to understand the problem and how to handle it._____

_____

_____

6. Should the Automated Horn System be kept or should it be removed?

No Opinion	Keep	Remove
☐	☐	☐

Suggestions for Improvement:_____

_____

_____

AHS THIRD SURVEY OF RAILROAD PERSONNEL

March-2004

1. Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train Horn?

No Change	For the Better	For the Worse
12	**5**	**0**

2. Is the flashing "X" an effective method of confirming that the AHS is operational?

No	Rarely	Occasionally	Frequently	Consistently
2	**0**	**1**	**5**	**9**

3. Have you had to use the train horns at the Yosemite or Tiger crossings since the activation of the Automated Horn System?

No	Rarely	Occasionally	Frequently	Consistently
8	**4**	**4**	**1**	**0**

4. If you viewed the employee educational video regarding the AHS, the background information and equipment overview on the video was:

Not Helpful	Somewhat Helpful	Very Helpful
1	**2**	**2**

5. If you viewed a problem or malfunction with the AHS, did you report it?

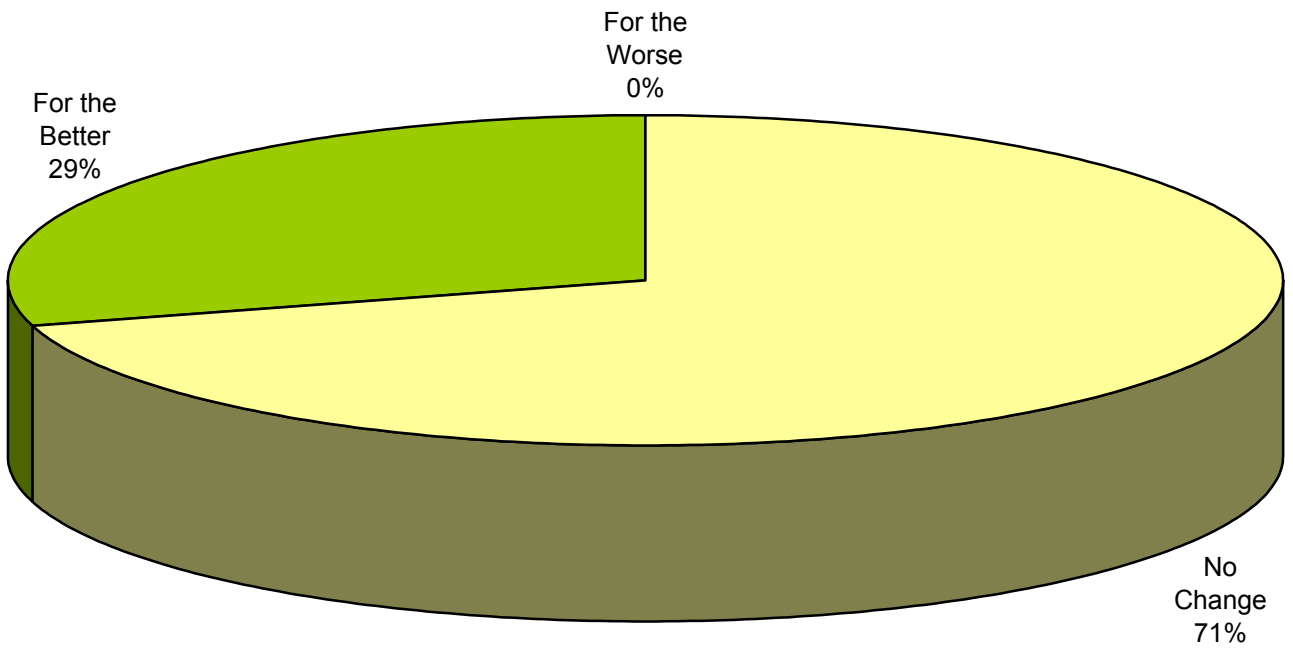
No Problems	Yes	No
8	**5**	**4**

6. Should the Automated Horn System be kept or should it be removed?

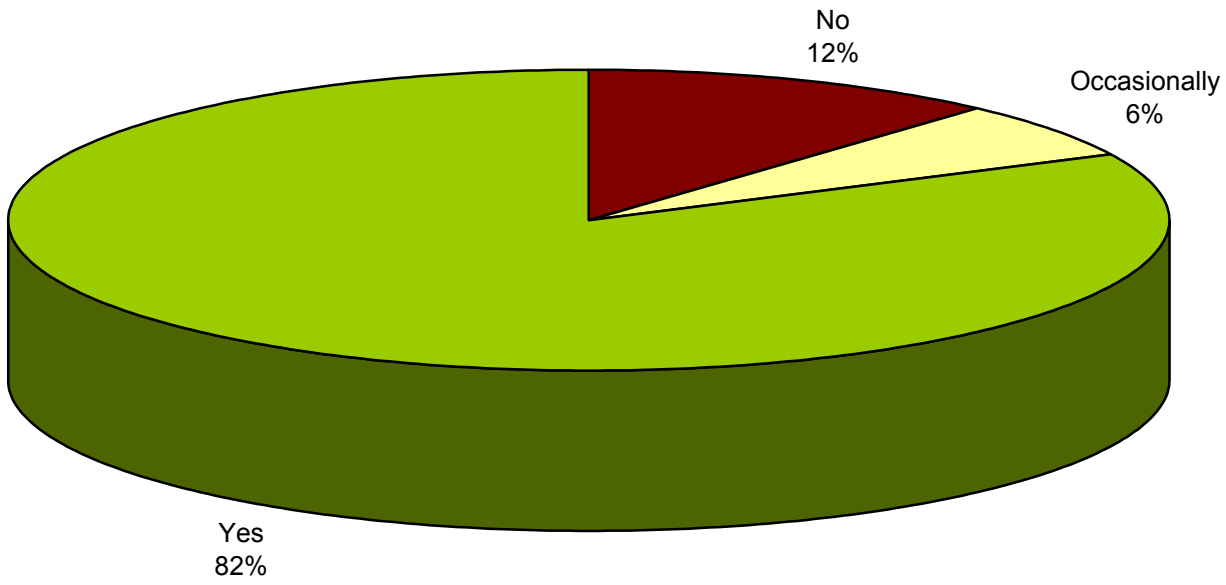
No Opinion	Keep	Remove
3	**10**	**4**

Total Number of Surveys received:	**18**
Number of reasons provided for blowing train-mounted horn:	**10**
Number of descriptions of problems with the AHS:	**5**
Number of suggestions for improvement:	**7**

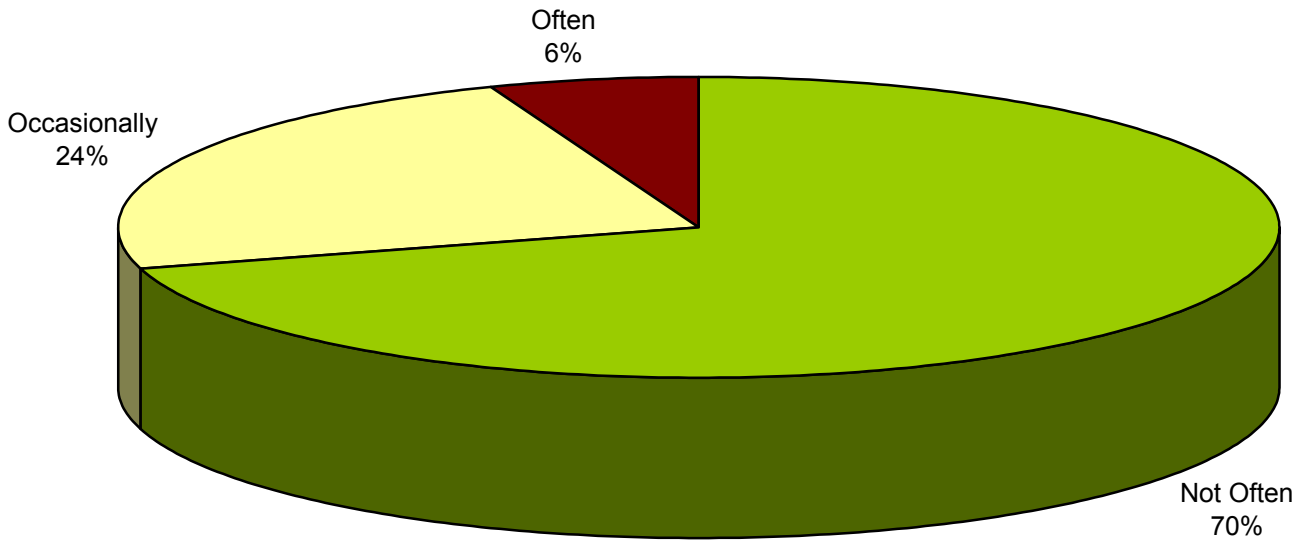
1. Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train Horn?



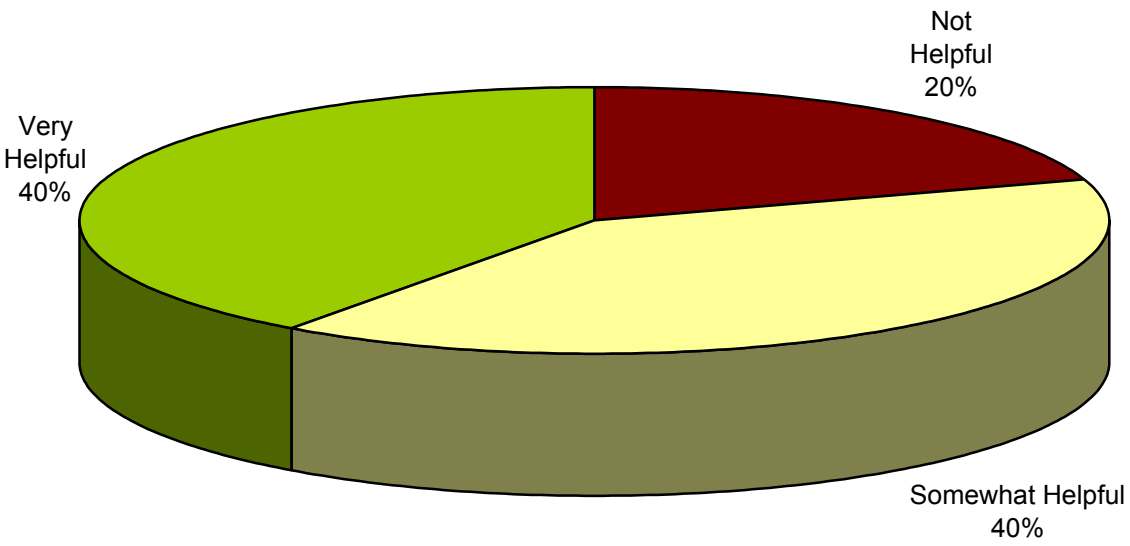
2. Is the flashing "X" an effective method of confirming that the AHS is operational?



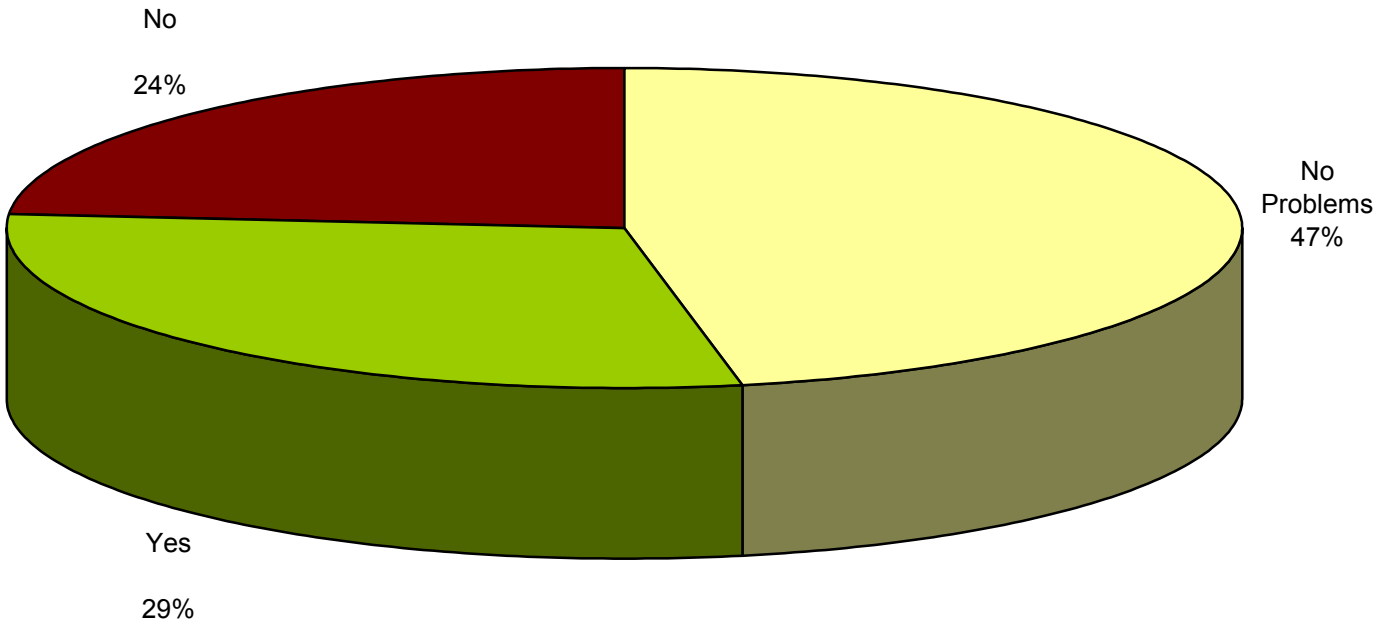
3. Have you had to use the train horns at the Yosemite or Tiger crossings since the activation of the Automated Horn System?



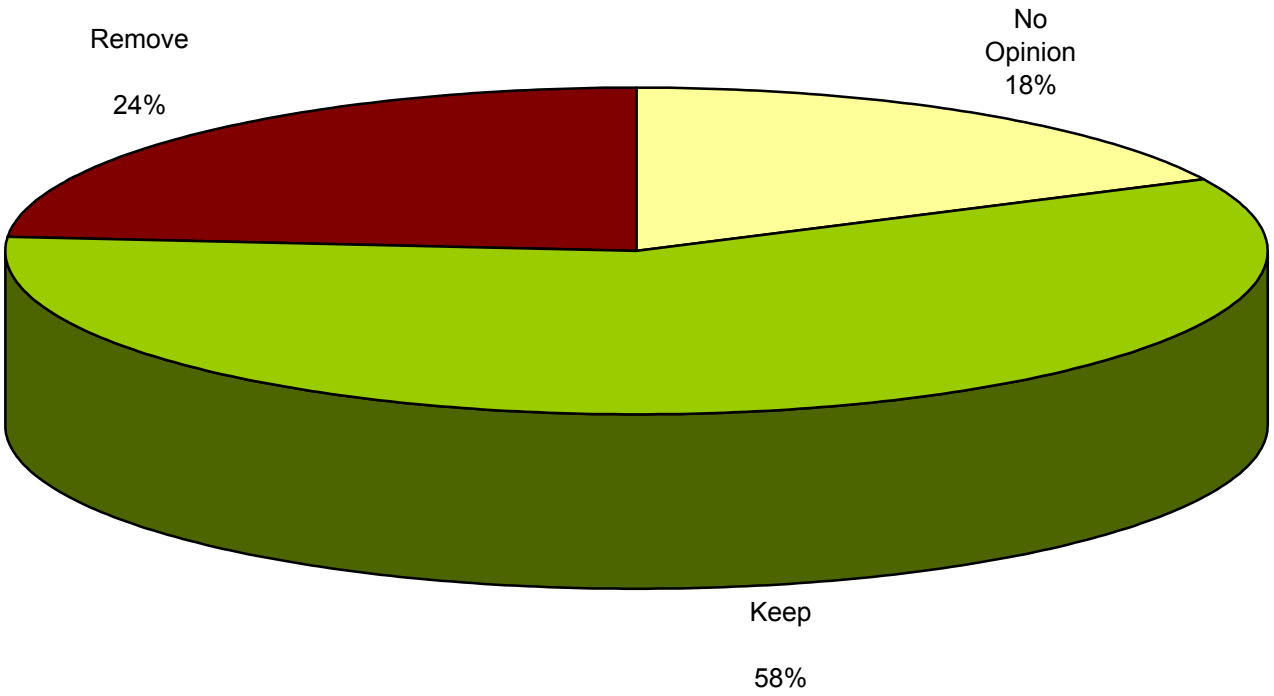
4. If you viewed the employee educational video regarding the AHS, the background information and equipment overview on the video was:



5. If you viewed a problem or malfunction with the AHS, did you report it?



6. Should the Automated Horn System be kept or should it be removed?



Appendix F

Mapped Results of
Resident, Business, and Locomotive Engineers
Survey #3

Question 1 Result
Survey 3

Question: How loud is the sound of the Automated Horn System at your house or place of business?

Quiet

Tolerable

Too Loud

N

W E

S

Question 2 Results
Survey 3

Question: Is the sound from the Automated Horn System bothersome?

Not Bothersome

Tolerable

Bothersome

N

W E

S

Question 3 Results
Survey 3

Question: Compared to the loudness of the train horns, the loudness of the Automated Horn System is..?

Quieter

Same

Louder

N

W E

S

Question 4 Results
Survey 3

Question: Compared to the sound of the train horns, the Automated Horn System is...?

Better

Same

Worse

N

W

E

S

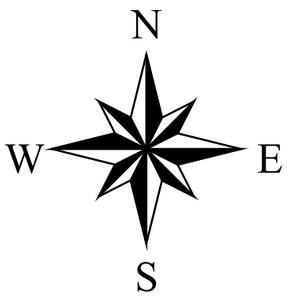
Question 5 Results
Survey 3

Question: Have you observed changes in motorist or pedestrian behavior at the crossings since the Automated Horn System has replaced the train horn?

No Change

For The Better

For The Worse



Question 6 Results
Survey 3

Question: Have you observed the use of the train mounted horns since the activation of the Automated Horn System?

Not Often

Occasionally

Very Often

N
W
E
S

Question 7 Results
Survey 3

Question: Should the city keep the Automated Horn System or should it be removed?

No Opinion

Keep

Remove

N

W E

S

Overall Opinion
Comments Survey 3

Neutral

Positive

Negative

N

W E

S