# Suicides on Commuter Rail in California: Possible Patterns-A Case Study







MTI Report 10-05







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# SUICIDES ON COMMUTER RAIL IN CALIFORNIA: POSSIBLE PATTERNS-A CASE STUDY

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Suicides on rail systems constitute a significant social concern. Reports in local media, whether in newspapers, television, or radio, have brought awareness to this very sensitive and personal subject. This is also true for the San Francisco Bay Area. These events also cause severe trauma for the train operators and staff of the system as well as disruption and cost to society. The overall objective of this project was to conduct a pilot study to identify possible patterns in suicides associated with urban commuter rail systems in California. The Caltrain commuter rail system in the San Francisco Bay Area was used as the subject system for the pilot study.

The primary intent of the data analysis was to determine whether suicides along the Caltrain tracks exhibited patterns. Pattern detection in this study was conducted primarily on the basis of time and location. Because the data were readily available, the gender factor was also included in the analysis, although this is not a factor that is connected to the rail system.

It was concluded that the data did show some patterns for suicides with respect to time and location. Some of the patterns can be explained while the reasons for some are not immediately obvious. However, the patterns in the latter category did not indicate a particularly attractive location or possible source for suicides.

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# **TABLE OF CONTENTS**

EXECUTIVE SUMMARY	1
BACKGROUND AND INTRODUCTION	5
THE CALTRAIN SYSTEM	7
LITERATURE REVIEW	9
DATA COLLECTION AND ANALYSIS METHODOLOGY	13
PATTERN ANALYSIS AND RESULTS	15
Year of Occurrence Month of the Year Day of the Week Day of the Month Time of Day Milepost Proximity to Stations Proximity to Road Crossings Proximity to Stations and Road Crossings Gender  SUMMARY OF CONCLUSIONS	16 18 20 22 24 25 31 36 39 40
RECOMMENDATIONS	43
APPENDIX A: FATALITY LOG	45
APPENDIX B: LISTING OF STATIONS	55
APPENDIX C: LISTING OF CROSSINGS	57
APPENDIX D: CALTRAIN SCHEDULE	61
ENDNOTES	67
ABBREVIATIONS AND ACRONYMS	71
BIBLIOGRAPHY	73
ABOUT THE AUTHORS	75
PEER REVIEW	77

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	IJ		C)I	COL	пспо	

# **LIST OF FIGURES**

1.	Map of Caltrain System	8
2.	Correlation Between Subway Suicide Attempts and News Articles on Suicide	11
3.	Number of Suicides Per Year	17
4.	Number of Unintended Deaths Per Year	17
5.	Suicides by Month of the Year	19
6.	Unintended Deaths by Month of the Year	19
7.	Number of Suicides by Day of the Week	21
8.	Number of Unintended Deaths by Day of the Week	21
9.	Number of Suicides by Day of the Month	23
10.	Number of Unintended Deaths by Day of the Month	23
11.	Unintended Deaths and Suicides Compared to Total Running Time, by Time of the Day	25
12.	Number of Suicides by Milepost (1992–2009)	27
13.	Number of Unintended Deaths by Milepost (1992–2009)	28
14.	Number of Suicides by Milepost (2004–2009)	29
15.	Number of Unintended Deaths by Milepost (2004–2009)	30
16.	Percent of Suicides at Stations and Incremental Distances from Stations	34
17.	Percent of Unintended Deaths at Stations and Incremental Distances from Stations	34
18.	Number of Suicides at Station Platforms	35
19.	Number of Unintended Deaths at Station Platforms	35
20.	Cumulative Percent of Unintended Deaths and Suicides at Stations and at Incremental Distances from Stations	36
	Cumulative Percent of Unintended Deaths and Suicides at Road Crossings and at	38

	•		
101	$\sim$ t	Figures	•
151	()I		`

# **LIST OF TABLES**

	1.	Suicides and Unintended Deaths Per Year	16
	2.	Suicides and Unintended Deaths By Month	18
	3.	Suicides and Unintended Deaths by Day of the Week	20
	4.	Suicides and Unintended Deaths by Day of the Month	22
	5.	Suicides and Unintended Deaths by Time of Day	24
	6.	Unintended Deaths and Suicides at Stations and Locations at Incremental Distances from Stations	32
	7.	Cumulative Number of Unintended Deaths and Suicides at Stations and Locations at Incremental Distances from Stations	33
	8.	Road Crossings: Unintended Deaths, Suicides at Road Crossings and Locations at Incremental Distances from Road Crossings	37
	9.	Road Crossings: Unintended Deaths and Suicides at Road Crossings and Locations at Incremental Distances from Road Crossings (Cumulative Values)	38
1	10.	Unintended Deaths and Suicides at Stations and Road Crossings and at Incremental Distances from Stations and Road Crossings	39
1	11.	Suicides and Unintended Deaths by Gender	40

# **EXECUTIVE SUMMARY**

Suicides on rail systems constitute a significant social concern. Reports in local media, whether in newspapers, television, or radio, have brought awareness to this very sensitive and personal subject. This is also true for the San Francisco Bay Area. In recent months, a great deal of attention has been given to a series of suicides committed by teenagers from Henry M. Gunn High School at the West Meadow Drive crossing of the Caltrain commuter rail system. Much effort has been made to try to prevent further suicides from occurring. Parents and community volunteers at the tracks around the area of the West Meadow Drive crossing were holding a night watch at the time that this report was written. In addition, counseling and support services were provided for the students and families who were affected. These events also cause severe trauma for the train operators and staff of the system as well as disruption and cost to society.

The overall objective of this project was to conduct a pilot study to identify possible patterns in suicides associated with urban commuter rail systems in California. The Caltrain commuter rail system in the San Francisco Bay Area was used as the subject system for the pilot study.

Pattern detection in this study was conducted primarily on the basis of time and location. Because the data were readily available, the gender factor was also included in the analysis, although this is not a factor that is connected to the rail system. Data related to suicides as well as unintended deaths were used in the analyses. Analyzing both suicides and unintended deaths enabled a comparison and contrasting of patterns that aided in developing some insights.

It should be noted that a study to explore patterns of individual conduct regarding suicide on railroads would require postmortem autopsies. Such research was outside the scope of this study.

A summary of the major conclusions regarding possible patterns follows:

- 1. Year of Occurrence: There did not appear to be a trend over time. There may be a slight upward trend for suicides if the data from the last few years were compared to the data for the first few years, but this may be due to a concurrent increase in population or increased service by Caltrain. A similar comparison for unintended deaths showed the opposite result, in other words, there were fewer deaths during the last few years. This may be the result of having mitigated the circumstances that caused the unintended deaths.
- 2. Month of the Year: No distinct pattern was identified for suicides or for unintended deaths related to the month of the year except for a low frequency of suicides in September.

- 3. Day of the Week: Most suicides occurred during the workweek, especially on Mondays and Fridays. Fewer trains are running during the weekend, therefore there are fewer opportunities for deaths involving trains. The literature indicated that suicides are more likely to occur on Mondays because the stress of "new beginnings" may be too much for people to handle. The results of this study do not directly support this finding.
- **4. Day of the Month**: The data showed some indication of a cluster of suicides at the beginning of the month. This would support the finding in the literature that most suicides occur during the first week of the month. A pattern could not be detected for unintended deaths.
- **5. Time of Day**: The data appeared to indicate that the peak periods of suicides correlate fairly well with the peak periods of train operations.
- **6. Milepost**: The data showed three sets of patterns.

The largest concentration of suicides was between the Burlingame and Sunnyvale stations, approximately a 25-mile stretch of track, with a fairly uniform distribution of suicides. In contrast there was only one suicide south of Diridon Station. There were lower concentrations of suicides north of the Burlingame Station and the pattern was also less uniform than the Sunnyvale to Burlingame section. The Burlingame to Sunnyvale section is characterized by older neighborhoods and an opinion was offered that the cause of the higher incidence of suicides in this area could be that the railroad is a more integral part of the community. The area to the north of the Burlingame station has relatively more industrial development and the tracks are in tunnel in the area close to San Francisco. The almost total absence of suicides south of Diridon Station could be attributed to lower development density and much lower train frequency to the south of Diridon Station.

In contrast to the suicides north of Diridon Station, the unintended deaths showed more clustering, which may indicate that there may be circumstances that caused these deaths, but they could also have been spurious accidents. It should be noted that it was not the objective of this study to determine causes or circumstances of unintended deaths. Moreover, eliminating causes of accidents can sometimes not be feasible from economic and other viewpoints.

The contrast between the relatively uniform distribution of the suicides in the Sunny-vale to Burlingame section and the unintended deaths in the same section indicated that there were not specific areas that were much more attractive for suicides than others. It is also noteworthy that the data alanyzed showed that the maximum number of suicides that occurred on a 0.5-mile section of track during the last six-year period was three, which leads to the conclusion that, based on the data analyzed in this study, suicides on the tracks were relatively rare events and that it is unlikely that the suicides were caused by factors specifically associated with the railroad or that there was a significant source for suicides, such as a hospital, nearby.

- 7. Proximity to Stations: Only 20 percent of all the suicides occurred at the stations. This corresponds with the 26.2 percent of suicides that was found in the literature. The station may be a convenient point of access but not the preferred place to commit suicide. The data also showed that approximately two thirds of the suicides occurred within 0.5 of a mile from the stations. This holds true for unintended deaths as well. This result may be significant when considering prevention and mitigation of deaths because the efforts can be concentrated in close proximity to the stations.
- **8. Proximity to Road Crossings**: Forty-three percent of suicides occurred within 0.1 of a mile from a road crossing and almost two-thirds within 0.3 of a mile. This may be an indication that a person committing suicide uses the road as access to the tracks and then walks a relatively small distance away from the road, possibly to avoid interference.
- **9. Proximity to Stations and Road Crossings:** An analysis, wherein the proximities of suicides and unintended deaths to either stations or road crossings were combined, showed that most suicides and unintended deaths occurred within 0.3 of a mile from either a station or a road crossing.
- **10. Gender**: The data revealed that males chose rail suicides 3.5 times more often than females. This result confirms the findings in the literature that males use rail suicides more often than females.

It may be concluded that the data did show some patterns for suicides with respect to time and location. Some of the patterns can be explained while the reasons for some are not immediately obvious. However, the patterns in the latter category did not indicate a particularly attractive location or possible source for suicides. In the immediate past, there were the tragic suicides associated with the students from Gunn High School within a very short period of time, but, given the relatively long periods of time for which the data were analyzed in this study, these events did not stand out at the level of aggregation used in the analyses.

It is recommended that Caltrain continue to monitor suicides to detect patterns and attempt to mitigate the circumstances where the suicides could be prevented, if such prevention methods would be feasible from economic and other viewpoints. Other commuter rail system operators may find the analyses conducted in this study helpful as a basis for detecting patterns in suicides.

Executive S	Summary
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# BACKGROUND AND INTRODUCTION

Suicides on rail systems constitute a significant social concern. Reports in local media, whether in newspapers, television, or radio, have brought awareness to this very sensitive and personal subject. This is also true for the San Francisco Bay Area. In recent months, a great deal of attention has been given to a series of suicides committed by teenagers from Henry M. Gunn High School at the West Meadow Drive crossing of the Caltrain commuter rail system. Much effort has been made to try to prevent further suicides from occurring. Parents and community volunteers at the tracks around the area of the West Meadow Drive crossing were holding a night watch at the time that this report was written. In addition, counseling and support services were provided for the students and families that were affected.<sup>1</sup> These events also cause severe trauma for the train operators and staff of the system as well as disruption and cost to society.<sup>2</sup>

The overall objective of this project was to conduct a pilot study to identify possible patterns in suicides associated with urban commuter rail systems in California. The Caltrain commuter rail system in the San Francisco Bay Area was used as the subject system for the pilot study.

The remainder of the report is organized as follows: the next chapter is an overview of the Caltrain system, followed by a literature review related to rail suicides. Next is a chapter expaining the data collection and analysis methodology, followed by an analysis and results chapter. A summary of major conclusions and recommendations follows the analysis chapter, and the study is concluded by recommendations for further study.

Background and Introduction	

6

# THE CALTRAIN SYSTEM

Caltrain is a commuter rail system located in the San Francisco Bay Area of Northern California. The southern terminus is in Gilroy and the northern terminus is at the intersection of 4<sup>th</sup> Street and King Street in San Francisco. The total length of the Caltrain track is 77.4 miles.<sup>3</sup> Caltrain owns the tracks from milepost 0 to milepost 51.7 and the Union Pacific Railroad owns the tracks from the latter milepost to milepost 77.4 in Gilroy.<sup>4</sup>

The Caltrain system has a total of 32 stops with 29 being regular stops, two weekend-only stops at Broadway and Atherton, and a stop at Stanford Stadium that is only in operation during special events.<sup>5</sup> A map of the system is shown in Figure 1.<sup>6</sup>

On average, trains operate on a half-hourly schedule for stations from San José to San Francisco with more frequent service provided during special events and commuter times. On a normal weekday, Caltrain operates 90 trains. Caltrain provides service from Gilroy to San José only three times a day, each direction, during commuter times. During the weekend, no service is provided between Gilroy and San José. According to a survey done in February of 2009, Caltrain provides service for an average of 39,000 weekday passengers.

Other rail operators also use the same tracks as the Caltrain system. The Union Pacific runs freight service along the track at night and parks their rail cars at a siding during the day. Two Amtrak passenger services utilize the tracks as well. The Amtrak Coast Starlight is currently scheduled to operate once per day in each direction on the section south of Santa Clara. The Amtrak Capital Corridor service runs seven times every weekday in each direction on the section of track between Santa Clara and San José. The Altamont Commuter Express (ACE) Rail also utilizes the latter section of the Caltrain tracks and makes three trips per weekday in each direction. With the exception of Caltrain, all the passenger rail services extend beyond the tracks utilized by Caltrain.

Caltrain began operation in 1987, but the rail tracks it operates on have been around for much longer. The original rail track from San Francisco to San José was built in 1863 by the San Francisco and San José Railroad, and in 1870 was purchased by Southern Pacific. In 1904, the rail line was double tracked and usage continued to increase. However, as the use of personal automobiles increased, the ridership on the rail line decreased. Southern Pacific filed a petition in 1977 to have commuter service on the rail line closed down due to increasing operating losses. The California Department of Transportation (Caltrans) wanted to preserve the commuter service, so it began to subsidize the operation in 1980. Caltrans made many improvements to the system by replacing the Southern Pacific equipment with new locomotives and rolling stock, upgrading stations, and renaming the system Caltrain. In 1980, In 1

In 1987, the Peninsula Corridor Joint Powers Board (PCJPB) was formed to manage the rail lines. In 1991, the right-of-way for tracks between San Francisco and San José was purchased from Southern Pacific for \$220 million. The next year, PCJPB was assigned full responsibility for Caltrain, and Amtrak was assigned to be the contract operator. <sup>15</sup> PCJPB

extended service into Gilroy and a new station in San José was opened to create a connection to the Santa Clara Valley Transportation Authority (VTA) Light Rail system. In 2003, a connection between Caltrain and the Bay Area Rapid Transit (BART) system was created at the Millbrae Station. <sup>16</sup>

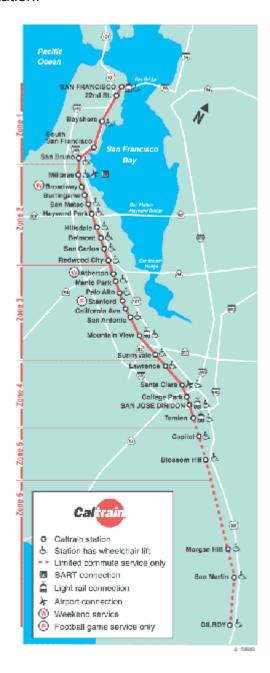


Figure 1. Map of Caltrain System

# LITERATURE REVIEW

The primary objective of the literature review was to obtain information on possible patterns of suicides associated with passenger rail systems with respect to location and time of the death. Other characteristics of the persons committing suicide were also included in the literature review, mainly to provide some additional background and perspective. Some solutions to suicides on rail systems were included for the same reasons. It should be noted that the information on personal characteristics and the solutions were obtained primarily from the major studies that were reviewed for patterns and other literature that focuses on these topics were not reviewed.

Rachel Abbott et al. conducted the "Suicides and Open Verdicts on the Railway Network" (SOVRN) project. This three-year project began in 1999 after concerns, from the London and North Eastern Zone of Railtrack PLC, were aired about an alarmingly high rate of rail suicides. The goals of the project were to identify trends in the characteristics of those who commit suicide on railways, assess the effects of railway suicides upon people associated with the incident, evaluate the methods of dealing with the suicides, and make recommendations on how to reduce the number of railway suicides and effectively respond to them. Abbott et al. set out to reach these objectives by auditing the open verdict cases and railway suicides on the East Coast Main Line (ECML) from London to Scotland, interviewing those who had been affected by rail suicides, and analyzing previous methods of responding to rail suicides.<sup>17</sup>

Abbott et al. observed the proximity of psychiatric hospitals to where suicides had taken place on the railroad tracks. The data showed that people who had committed suicide had chosen sites that were closer to their homes than psychiatric hospitals. It was also revealed that the majority of suicides had not taken place at station platforms. Only 26.2 percent of suicides had occurred at station platforms, while the remaining 73.8 percent of suicides had occurred elsewhere, the most common place being open track. Abbott et al. concluded that the majority of rail suicides happened away from station platforms because they were much more likely to be fatal. Open track suicides were more often fatal because the trains travel at higher speeds than when they approach station platforms.<sup>18</sup>

The results of a study, with the aim of determining how to prevent rail suicides and other accidents, were presented by O'Grady and Griesi at the 6th World Conference of Injury Prevention and Control in Montreal, Canada. The authors had surveyed mass transit companies from around the world. Fifty responses had been received from 22 different countries. The authors estimated that these responses represented approximately half of the world's major mass transit systems. All surveys had been conducted throughout the year 2000. One survey from an underground transit system in Toronto, Canada, revealed that the majority of suicides had occurred in tunnel segments of the track.<sup>19</sup>

An article published by Mishara in the *Canadian Journal of Psychiatry* (1999) examined suicides that had taken place on the Montreal Subway System. The author's goals were to determine the characteristics of those who commit suicides by rail, their personal and psychiatric histories, and find trends that could be used to help prevent future suicides. Mishara analyzed an investigation by the coroner's office of 129 suicides that occurred on

the Montreal Metro from 1986 to 1996. Mishara found that 70 percent of the suicide victims had chosen the Metro station closest to their homes as the place to kill themselves.<sup>20</sup>

The time of the day at which suicides take place showed trends in the literature reviewed. The studies done by Abbott et al. and Mishara both revealed that the majority of suicides had taken place during the early morning to late afternoon.<sup>21</sup> Abbott et al. explained that this pattern was due to the fact that there had been more trains in operation during these times and therefore more opportunity to commit suicide. Their data indicated that suicides were more likely to occur on Mondays and the first week of the month. Abbott et al. hypothesized that this pattern may be due to the stress of "new beginnings."<sup>22</sup>

Baumert et al. wrote an article published in the *European Journal of Public Health* (2005), which explored railway suicides that occurred in Germany from 1991 to 2000. The authors studied trends among suicides and assessed how the number of railway suicides compared to other methods of suicide. They reviewed suicides that were recorded by the German Central Registry over a 10-year period and found that rail suicides accounted for seven percent of the total number of suicides in Germany.<sup>23</sup> No specific statistics for the percentage of total suicides caused by rail could be found for the United States. Statistics published by the Centers for Disease Control (CDC) indicated that, for the period 2002–2006, the majority of suicides occurred by firearms, suffocation and falling. Less than 10 percent were caused by other means, including rail suicides. During this period, the largest percentage of suicides committed by men occurred by firearms (57.7 percent), while the largest percentage of suicides among females occurred by poisoning (38.8 percent).<sup>24</sup>

The gender of those committing suicide had a pattern according to the study done by Abbott et al. They found that the ratio of males to females who had committed suicide on the UK railway systems was almost 4 to 1. This was higher than the corresponding ratio of total suicides in England and Wales, which was found to be 3 to 1.25 O'Grady and Griesi found slightly higher numbers of male suicides compared to female suicides on railway systems, but the difference was not significant enough to draw conclusions.26 Mishara found that out of the 129 rail suicide victims included in his study, 61 percent were men and 39 percent were women (1.5 to 1 ratio).27 The CDC statistics indicated that, in 2006, men in the United States were four times as likely to die from suicide as females. However, females attempted suicide two to three times as often as men.28

Baumert et al. found that rail suicides appeared to be more common for people under the age of 65.<sup>29</sup> Abbott et al. found that people, who are unemployed, retired, or economically inactive made up the majority of those who commit suicide. Not having a job may give people a feeling of no purpose in their life thus increasing their chance of suicide. They also found that people who lived alone due to separation, divorce, or being widowed, accounted for one-quarter of rail suicides.<sup>30</sup> Mishara found similar results in his study done in Montreal, Canada. He concluded that almost two-thirds of the rail suicides had been committed by people under the age of 40. Mishara also examined the psychiatric history of the victims who had killed themselves on the Montreal Subway System. He found that 73 percent of the victims had inpatient psychiatric treatment and 27 percent had been residing in a mental health treatment facility at the time of their suicide.<sup>31</sup> Abbott

et al. noted similar trends between the psychiatric histories of the people who had killed themselves on the UK railway system. They found that 83 percent of victims had had significant signs of mental disorders present before they committed suicide and 17 percent had been hospital inpatients at their time of death.<sup>32</sup>

O'Grady and Griesi reported on a study done in Toronto, Canada which showed a direct correlation between the number of news articles about rail suicides and the number of suicides that occurred on the tracks. The authors stated that this correlation was due to "copy cats" that decided to kill themselves on the rail tracks after hearing about it in the news.<sup>33</sup> The graph for this correlation is shown below. Mishara's article on suicides in the Montreal Subway System found similar results stating that when media was required to stop publicizing suicides, the suicide rate dropped by 75 percent.<sup>34</sup>

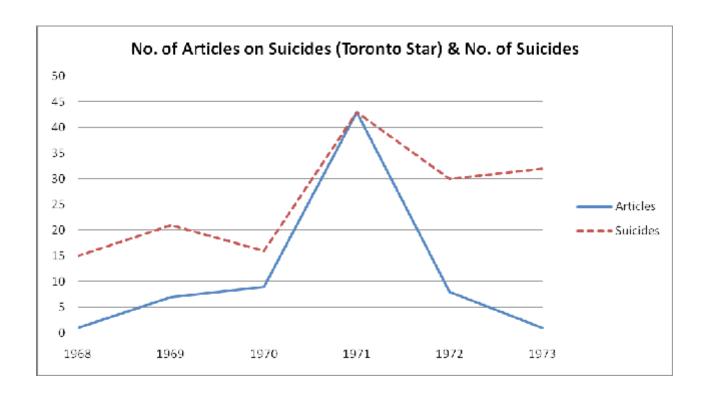


Figure 2. Correlation Between Subway Suicide Attempts and News Articles on Suicide

Although finding solutions for the prevention of suicides is not an objective of this study, it is interesting to note some of the solutions that have been proposed. Mishara, along with O'Grady and Griesi agreed that requiring the media to not report suicides was one viable solution. Abbott et al. stated that another way to solve the problem of suicides at train stations was to train staff on how to recognize and intervene with potential victims. O'Grady and Griesi said improved track and station design could help prevent future suicides. Train stations should be designed to prevent access to the track and surveillance and alarm systems should be installed to notify authorities if a person is found walking on the track. Mishara agreed by stating that subway systems should physically limit passengers' ability to have access to the tracks. He gave the example of a subway system

in Singapore that had had a door system installed at the stations in attempt to improve air quality. The door system had created an airtight barrier between the subway station and the tracks to prevent fumes from the train from entering the station. The doors for the barrier only opened when a train had come to a stop and passengers were leaving or entering the train. In addition to improving air quality at the subway station, the door system completely eliminated suicides.<sup>39</sup> Baumert et al. stated that while rail suicides represented only seven percent of the total number of suicides in Germany, they often caused a "public death" that affected many more people than other forms of suicide that occur in less public places. Rail suicides affect the entire community by traumatizing train drivers as well as witnesses. In addition, there are economic impacts due to delays in the train schedule and the costs associated with clean-up. Baumert et al. thought the best method for reducing the number of railway suicides was to promote suicide prevention campaigns.40 O'Grady and Griesi's data collected from mass transit systems around the world stated that only approximately half of train suicide attempts had been fatal. The survivors had usually suffered severe physical trauma and many times had required amputation. O'Grady and Griesi believed that this information should be communicated throughout the mental health community to deter those who were thinking of using rail as a method of suicide.41

# DATA COLLECTION AND ANALYSIS METHODOLOGY

The primary intent of the data analysis was to determine whether suicides along the Caltrain tracks exhibited patterns. Pattern detection in this study was conducted primarily on the basis of time and location. Because the data was readily available, the gender factor was also included in the analysis, although this is not a factor that is connected to the rail system.

As will be seen later in the report, data related to suicides as well as unintended deaths were used in the analyses. Analyzing both suicides and unintended deaths enabled a comparison and contrasting of patterns that aided in developing some insights.

It should be noted that a study to explore patterns of individual conduct regarding suicide on railroads would require postmortem autopsies. Such research was outside the scope of this study.

The objective of detecting patterns is ultimately to identify the underlying causes of these patterns. Once the underlying causes are understood, attempts can be made to design solutions for the prevention of these deaths. As background to the data analysis and formulations of the conclusions, it is useful to broadly understand the factors that can cause unintended deaths versus suicides and what may be done to mitigate the two types of fatalities.

In the case of unintended deaths, there are factors associated with the rail system that can be the cause of the fatalities. These include physical attributes of the system (e.g. at-grade crossings with streets versus grade-separated crossings), operational factors (e.g. speed of operation), and environmental factors (e.g. sight distance at crossings). In some instances, these factors could be principal contributors to unintended deaths and could lead to a repetition of deaths at a specific location or at a specific period in time. An example of this could be a road crossing where there is inadequate stopping sight distance for the vehicles on the road. Inadequate stopping sight distance may lead to collisions with trains at a specific location and possibly during specific periods in time. Analysis of the history of the location and time of unintended deaths could show clusters of deaths, which could indicate the existence of an underlying contributing factor, such as inadequate stopping sight distance. The rail operator and other responsible agencies could attempt to find solutions to prevent or reduce the associated deaths, if economically and otherwise feasible.

There are factors, not directly under the control of the rail operator that can cause unintended deaths, such as vehicles stalling on the tracks, drivers going around a gate, or pedestrians making unlawful crossings. Even though this behavior is outside the control of the rail operator, making crossings grade-separated or providing pedestrian bridges, if feasible, could reduce or prevent these deaths.

The factors that cause suicides are external to the system. A concentration of suicides at a specific location may indicate an ease of committing suicide at that location or that there is a source of suicide candidates nearby. If such a concentration of suicides could be

located, then the suicides could be prevented or reduced by changing either the physical or operational characteristics of the rail system to prevent access, or through intervention at locations where clusters of suicides are present. The community may accomplish this intervention at specific sources of suicides, such as psychiatric hospitals or schools, or though general suicide-prevention actions.

The following data sets were obtained from Caltrain:

- A list of all deaths, from August 1992 to December 2009. The milepost, nature of fatality, and date were provided for each fatality. The nature of a fatality was classified as "suicide," "unintended," "homicide," or "pending." The data for the deaths that were classified as "homicide" or "pending" were eliminated from the data set. Other information about each individual death was also provided, but these data were not complete for the entire set. This information includes: time of the day, day/night, day of the week, gender, age, race, day/night, moon phase, and rail service associated with the death. Comments were also made in a few cases about the nature of the fatality, or personal characteristics of the person involved. Of these data, only the time of the day, and gender were utilized, because the remainder of the items contained too few data points or were considered irrelevant for this study. The data obtained from Caltrain were rearranged to facilitate analysis and are presented in Appendix A.
- Detailed maps of the tracks.<sup>42</sup>
- A list of stations, provided by Caltrain, which is contained in Appendix B.
- A list of at-grade road crossings of the track, owned by Caltrain, from milepost 0.00 to milepost 44.22. The mileposts of the remainder of the at-grade road crossings were provided separately by Caltrain staff.<sup>43</sup> The data are shown in Appendix C.
- A Caltrain schedule, presented in Appendix D.<sup>44</sup>

# PATTERN ANALYSIS AND RESULTS

The data for unintended deaths and suicides were analyzed to determine whether there were patterns with respect to:

- Year of occurrence
- Month of the year
- Day of the week
- Day of the month
- Time of day
- Milepost
- Proximity to stations
- Proximity to road crossings
- Proximity to stations and road crossings
- Gender

A total of 200 deaths, from August 1992 to December 2009, were reported to have occurred on the Caltrain tracks from Gilroy to San Francisco. Only 193 deaths were analyzed in this report, due to the elimination of the data for deaths that were classified as "homicide" or "pending." There were two homicides and five pending cases. It should be noted that the elimination of the pending cases could affect the analyses and the conclusions, but because they are few in number, the effect will be relatively small. Once they are classified and found to be clustered in time or location, the conclusions of this report should be reconsidered. Of the 193 deaths that were analyzed, 123 were suicides and 70 were unintended. On the average, this amounted to 10 total deaths, six being suicides and four unintended, on an annual basis. From a data-analysis perspective, it may be concluded that these events are relatively rare.

Although rail deaths are rare, they are significant and need to be addressed. Because suicides constitute 64 percent of all fatalities along the tracks, the public's concern over the suicides is understandable. The rarity of the events complicates the task of pattern detection, especially when only a few years' worth of data is considered. When attempting to make conclusions about safety improvements to a site, it is customary to take into account only the data for a period when significant changes to the infrastructure, operations, and the environment have not occurred. Typically this period does not extend more than three to six years into the past. However, since the main goal of this study was to identify broad trends, it was decided to use the entire database for analysis in all cases and only the last six years' worth of data in some cases. Although physical and operational changes have taken place during this period, the Caltrain service, which is the main user of the tracks between Gilroy and San Francisco, operated along the entire length of the track during the entire period of analysis, 1992 to 2009.

# YEAR OF OCCURRENCE

The unintended deaths and suicides were classified according to the year in which they occurred. It should be noted that the data for 1992 do not reflect a full year. Data for 1992 include deaths starting in August and six of the deaths in 2009 were still pending and are not included. The results of the analysis are presented in Table 1 as well as in Figures 3 and 4.

It is difficult to conclude whether there is a clear increasing or decreasing trend for unintended deaths or suicides. There may be a slight upward trend for suicides, if the data for the last few years are compared to the data for the first few years, but this may be due to a concurrent increase in population. A similar comparison for unintended deaths per year shows the opposite result, i.e. there are fewer deaths during the last few years. This may be the result of eliminating causes of deaths at some locations.

Table 1. Suicides and Unintended Deaths Per Year

Year	Suicides	Unintended
1992	4	1
1993	6	4
1994	4	5
1995	10	9
1996	4	5
1997	5	2
1998	6	3
1999	4	3
2000	7	10
2001	9	5
2002	4	1
2003	7	3
2004	8	1
2005	8	2
2006	9	8
2007	6	2
2008	13	3
2009	9	3

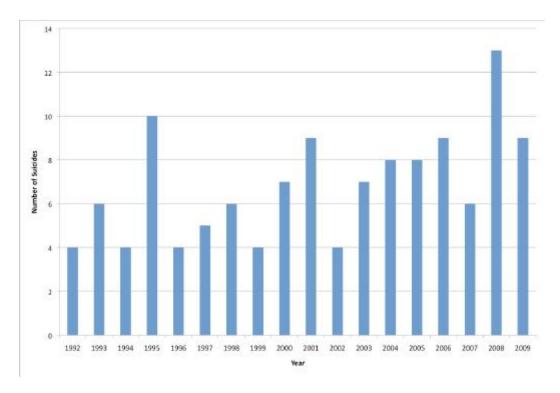


Figure 3. Number of Suicides Per Year

(note: 1992 and 2009 do not contain data for the full year)

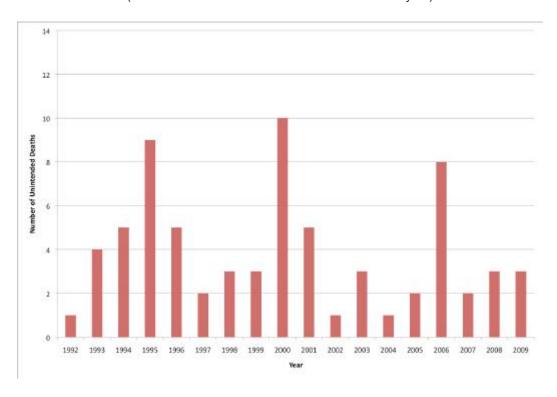


Figure 4. Number of Unintended Deaths Per Year (note:1992 and 2009 do not contain data for the full year)

## MONTH OF THE YEAR

All suicides and unintended deaths were classified according to the month of the year. Suicides and unintended deaths occurring in each month are presented in Table 2 and also in Figures 5 and 6. Suicides were most prevalent in March, May and October and the smallest number was recorded in September. The largest number of unintended deaths occurred in January.

A distinct pattern could not be identified for suicides or unintended deaths, except for the low number of suicides in September and the high number of unintended deaths in January. It may be speculated that the low number of suicides in September may be related to the beginning of the school year and that younger people, who have suicidal tendencies, may be less apt to commit suicide at that time. However, such a conclusion could only be proven by further investigation that is outside the scope of this project. The spike in the number of unintended deaths in January could possibly be the result of intoxicating-substance abuse during the festive period at the beginning of January. However, there are other festive periods that do not exhibit this same pattern. It could also possibly be the result of "new beginnings," an issue that was discussed in the literature review. More detailed investigation of the circumstances and causes of these deaths would be required to determine the reason for the larger number of deaths in January.

Table 2. Suicides and Unintended Deaths By Month

Month	Suicides	Unintended
January	10	11
February	8	8
March	14	4
April	9	5
May	14	4
June	9	6
July	12	6
August	9	6
September	2	6
October	16	6
November	13	4
December	7	4

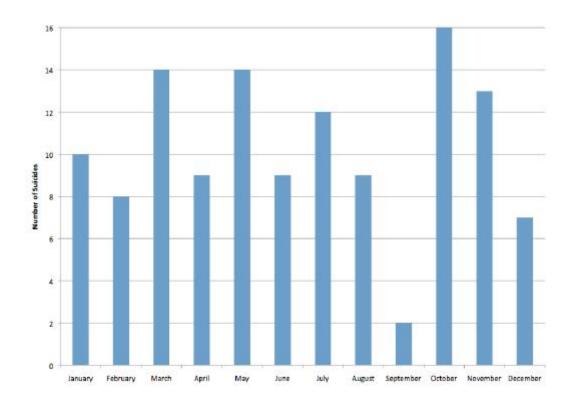


Figure 5. Suicides by Month of the Year

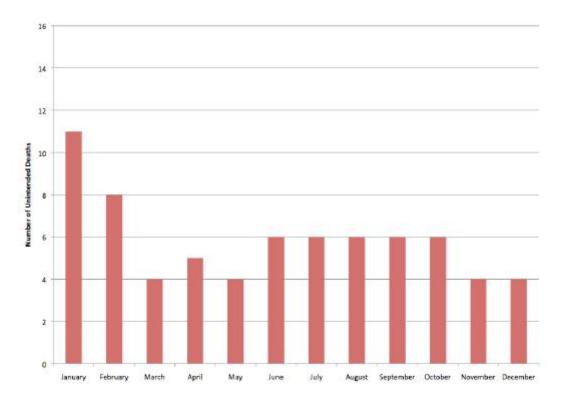


Figure 6. Unintended Deaths by Month of the Year

# DAY OF THE WEEK

All suicides and unintended deaths were classified according to day of the week. Table 3 as well as Figures 7 and 8 contain the results of the analysis.

Day-of-week data were provided for some suicides and unintended deaths. The missing days were identified using old calendars. These data were added into the data set contained in Appendix A. It can be seen that most suicides occur during the workweek, especially on Mondays, Tuesdays, and Fridays. Fewer trains are running during the weekend, therefore there is less opportunity for a death involving a train. Abbott et al. found that suicides are more likely to occur on Mondays, and, as stated before, they hypothesized that this may be due to the stress of "new beginnings." Although it was found that more suicides occurred on Mondays than on other days, the number of suicides on Mondays was comparable to the number on Fridays. The results of this study therefore do not support their finding.

Table 3. Suicides and Unintended Deaths by Day of the Week

Day of the Week	Suicides	Unintended
Sunday	9	4
Monday	24	16
Tuesday	19	8
Wednesday	16	13
Thursday	15	10
Friday	22	12
Saturday	18	7

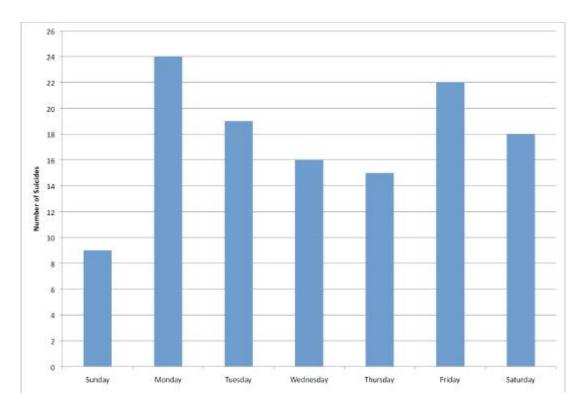


Figure 7. Number of Suicides by Day of the Week

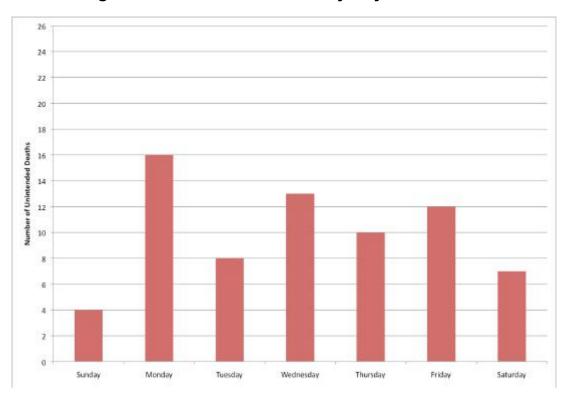


Figure 8. Number of Unintended Deaths by Day of the Week

# DAY OF THE MONTH

Day of month data were provided for all 193 deaths and the results of the analysis are presented in Table 4 as well as in Figures 9 and 10.

There appears to be some indication of a cluster of suicides at the beginning of the month. This would support the finding of Abbott et al. that most suicides occur during the first week of the month, possibly due to the stress of "new beginnings."<sup>46</sup> No clearly discernable pattern for unintended deaths was found.

Table 4. Suicides and Unintended Deaths by Day of the Month

Day of Month	Suicides	Unintended
1	2	1
2	1	5
3	5	3
4	6	3
5	5	2
6	9	5
7	8	0
8	4	2
9	4	1
10	1	1
11	2	4
12	4	2
13	5	2
14	3	3
15	3	3
16	4	4
17	4	1
18	3	1
19	2	4
20	4	2
21	3	0
22	5	4
23	3	3
24	3	3
25	8	2
26	4	2
27	2	0
28	5	2
29	4	4
30	6	0
31	1	1

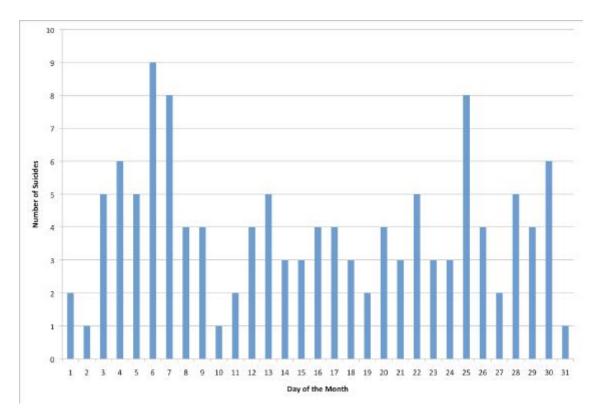


Figure 9. Number of Suicides by Day of the Month

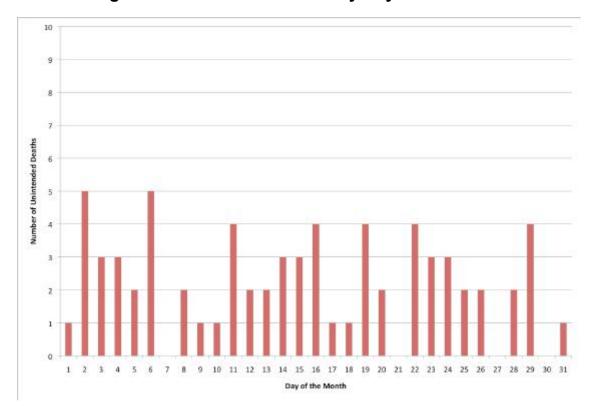


Figure 10. Number of Unintended Deaths by Day of the Month

# TIME OF DAY

Time of day data were provided for only 37 suicides and 16 unintended deaths. The data are contained in Table 5 and Figure 11, together with the number of hours that Caltrain was running during the hour in question. The numbers of hours were calculated based on the train schedule in force on February 4, 2010.<sup>47</sup> The schedule is shown in Appendix D. For example, for the hour starting at 10:00 a.m., the 5.27 hours of operation was the sum of the time during that hour that any Caltrain train operated during the week, regardless of the direction. This measure was considered a pseudo-measure for exposure to trains.

The data appear to indicate that the peak periods of suicides correlate fairly well to the peak periods of operation. This conclusion is similar to the conclusion of Abbott et al., i.e. that suicides are most likely to occur in late morning or early afternoon.<sup>48</sup> The pattern is not that clear for unintended deaths, but that may be because of the relatively small data sample.

Table 5. Suicides and Unintended Deaths by Time of Day

Hour	Suicides	Unintended
00:00	1	0
01:00	1	0
02:00	0	0
03:00	0	0
04:00	0	0
05:00	2	0
06:00	1	2
07:00	3	1
08:00	3	0
09:00	2	0
10:00	0	0
11:00	2	1
12:00	0	0
13:00	2	0
14:00	0	1
15:00	2	0
16:00	4	3
17:00	3	3
18:00	4	4
19:00	2	0
20:00	2	0
21:00	2	0
22:00	1	0
23:00	0	1

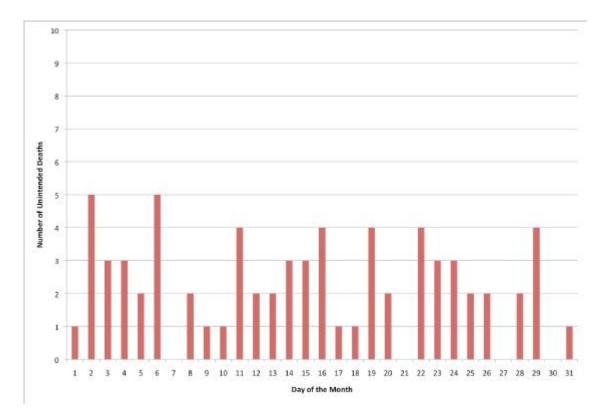


Figure 11. Unintended Deaths and Suicides Compared to Total Running Time, by Time of the Day

(Note: total running time for Caltrain trains only)

#### **MILEPOST**

The suicides for the period 1992 through 2009 were allocated to 0.5-mile increments along the entire length of the tracks. The results of the analysis are presented in Figure 12. The approximate locations of the stations are also indicated in the figure.

The data shown in Figure 12 indicate that the largest concentrations of suicides occur between the Burlingame and Sunnyvale stations, approximately a 25-mile section of the track. It is striking that there was only one suicide south of the Diridon Station. This outcome may be attributed to the relatively lower population density, lower number of trains per day, smaller number of stations per mile of track, and the smaller number of road crossings per mile. There are 27 stations north of Diridon Station (0.57 per mile) and six stations to the south (0.20 per mile). There are 47 road crossings (0.99 per mile) north of and 35 (1.17 per mile) to the south of Diridon station. However, such a disparity in suicide concentrations cannot be explained by these factors alone. In a March 29, 2010 discussion with Mark Simon, Caltrain's executive officer for public affairs, he expressed the opinion that this phenomenon could partially be explained by the fact that the communities north of the Diridon Station were older and that the rail system is more central to these communities, which grew up around a railroad first built in 1863.

There are also relatively fewer suicides north of Burlingame, which may be partly explained by the fact that part of the track is in tunnel, which limits access, and the fact that there are relatively fewer residential areas and relatively more commercial areas than south of the

### Burlingame Station.

The results of a similar analysis for unintended deaths are presented in Figure 13. There are also more deaths in the northern part, but in contrast to the suicides, they are relatively more concentrated in clusters. There are relatively more unintended deaths than suicides north of the Burlingame Station and south of the Diridon Station.

The results of a similar analysis performed for the period 2004 through 2009 (approximately six years' worth of data) show similar patterns. These data are shown in Figures 14 and 15. The unintended death data show fewer clusters, possibly because of mitigation of the factors that could cause unintended deaths.

The contrast between the relatively uniform distribution of the suicides in the Sunnyvale to Burlingame section and the unintended deaths in the same section indicate that there were not specific areas that were significantly more attractive for suicides than others, based on the data analyses. It is also noteworthy that the data set analyzed that the maximum number of suicides that occurred on a 0.5-mile section of track during the last six-year period was three, which leads to the conclusion that, based on the data analyzed in this study, suicides on the tracks were relatively rare events and that it is highly unlikely that the suicides were caused by factors associated with the railroad or that there was a significant source for suicides.

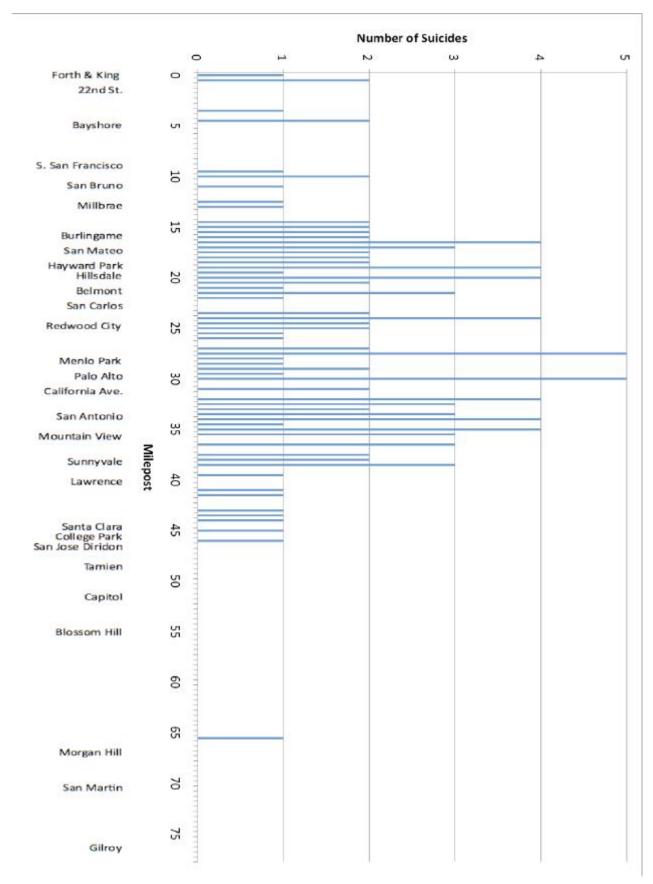


Figure 12. Number of Suicides by Milepost (1992–2009)

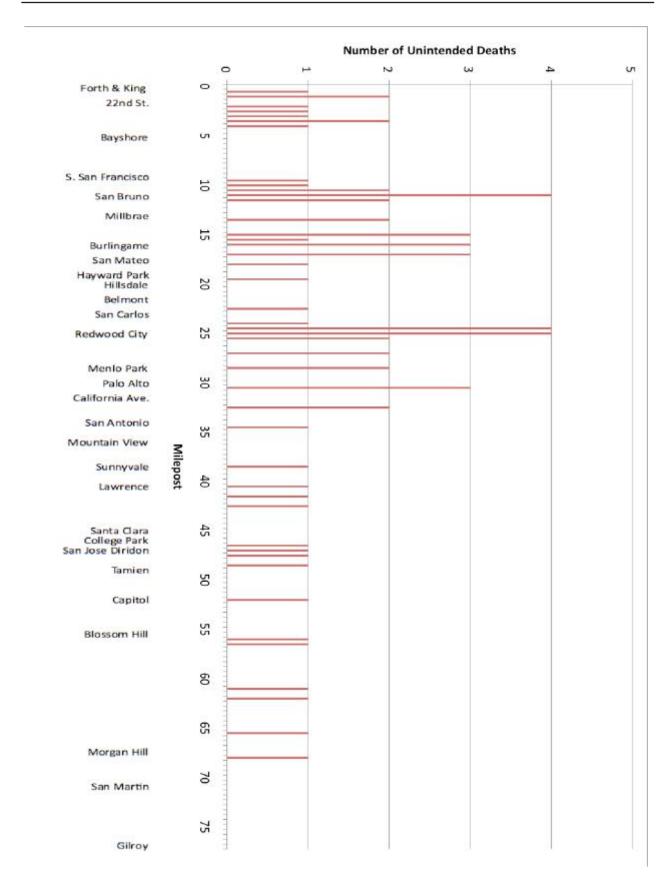


Figure 13. Number of Unintended Deaths by Milepost (1992–2009)

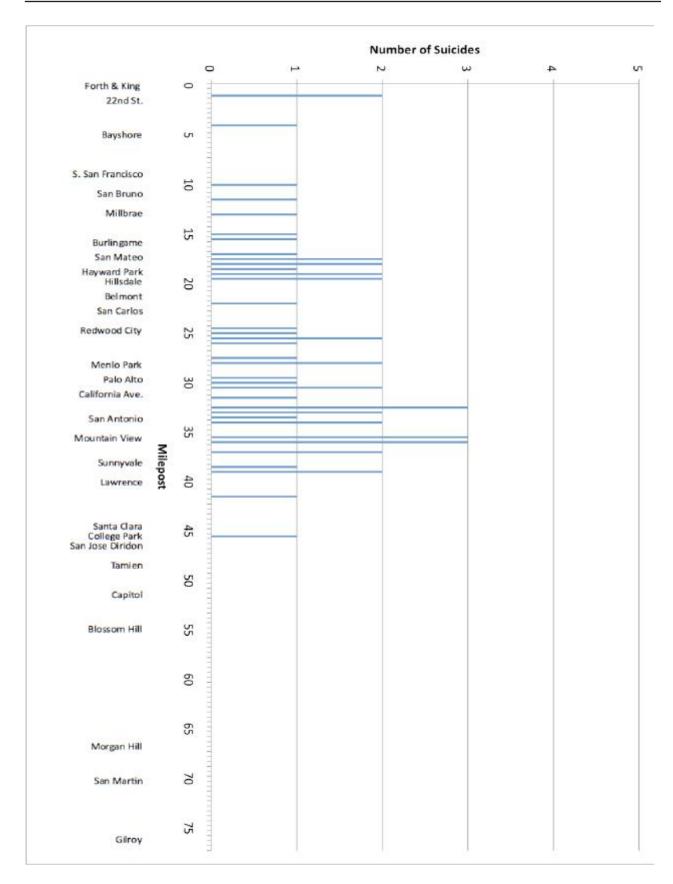


Figure 14. Number of Suicides by Milepost (2004–2009)

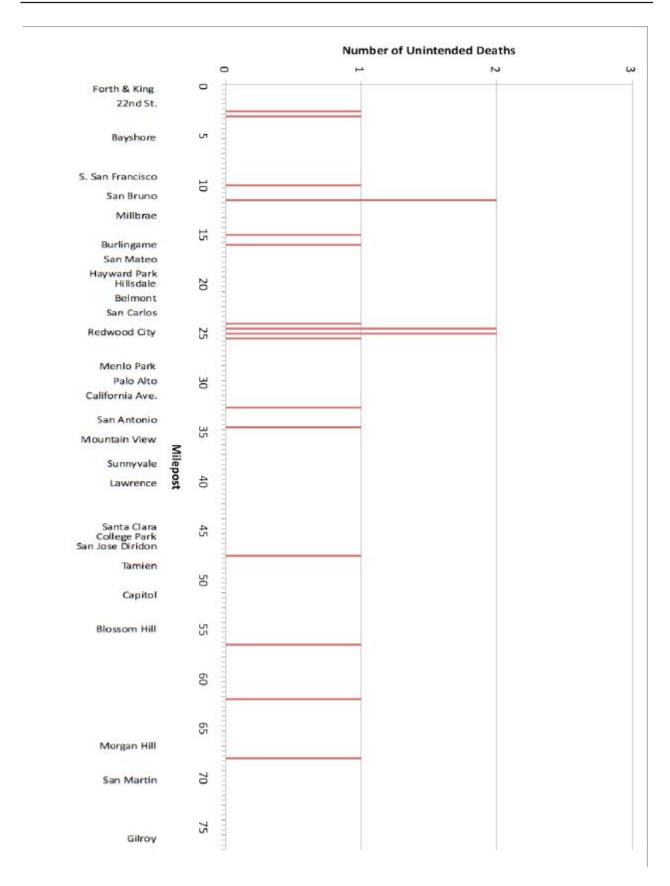


Figure 15. Number of Unintended Deaths by Milepost (2004–2009)

### **PROXIMITY TO STATIONS**

An analysis was performed to determine the proximity to stations where suicides and unintended deaths occurred. The location of suicides and unintended deaths occurring at stations were identified using the maps provided by Caltrain.<sup>49</sup> Only deaths occurring within the station platform, according to the milepost associated with the event, were allocated to the station. The suicides and unintended deaths occurring away from the stations were classified according to 0.1-mile increments from the ends of the station platform up to a distance of 0.5 miles from the stations. A distance of 0.0 miles from the station indicates that the death occurred at the station platform.

The choice of the distance of 0.5 miles is somewhat arbitrary. Choosing only a short distance from the station might have excluded a visible pattern. People who commit suicides may look for an access point to the tracks and commit suicide away from that point to avoid interference. According to the literature, they may also move away from the station to encounter trains traveling at higher speeds. The most convenient access points are the stations and road crossings. The analysis for road crossings is contained in the next section. Choosing a longer distance than 0.5 miles would increase the number of times that a suicide would be included in both the stations and road-crossings analyses.

Two basic types of analyses were performed. The first analysis consisted of comparing the concentrations of suicides and unintended deaths found within each 0.1-mile increment from the station. The second analysis comprised the calculation of the cumulative number of suicides at 0.1-mile increments.

The results of the first analysis of the suicides and unintended deaths are presented in Tables 6 as well as in Figures 16 and 17. Twenty percent (25 suicides) of all the suicides (123 total suicides) occurred at the stations. This corresponds roughly with the 26.2 percent of suicides that Abbott et al. found to have occurred at station platforms. For it should be noted that the sections of the tracks that have the largest concentration of suicides are the station platforms. Each station platform is approximately 0.1 mile in length. When comparing 0.1-mile increments away from the station, the suicide rate at the stations exceeds any other 0.1-mile increment of section that was analyzed.

It is significant that 80 percent of the suicides occurred away from the stations, which confirms that the station could be a convenient access point but not the primary choice for committing suicide. This finding supports Abbott et al.'s reasoning that the majority of rail suicides happen away from station platforms because they are much more likely to be fatal.<sup>51</sup>

Table 6 also includes the ratio of suicides to unintended deaths at incremental distances from the station. The overall ratio of suicides (123 total suicides) versus unintended deaths (70 total unintended deaths) is approximately 1.8. The ratio of suicides to unintended deaths at the stations is 1.6, which is about the same as the overall ratio. The ratios of suicides to unintended deaths at increments from the station are, with the exception of the 0.3 to 0.4-mile increment, substantially greater than the average ratio. This result underscores the finding discussed in the foregoing paragraph. It should be noted that the number of unintended deaths in the 0.3 to 0.4-mile increment is about twice as high as in other increments. The reason for this may be that deaths that occurred at crossings were included in the station-based analysis. Finding the cause of this aberrant number was not considered germane to this study.

The number of suicides and unintended deaths that occurred at specific stations are shown in Figures 18 and 19 respectively. In general, the same patterns exist as were identified for the deaths according to milepost. There are relatively more deaths in the northern section and a relatively more uniform pattern for suicides versus unintended deaths.

Table 6. Unintended Deaths and Suicides at Stations and Locations at Incremental Distances from Stations

Incremental Distance from Station (miles)	Total Deaths (Suicide + Unintended)	Suici	des		Unintended	
	Number of total deaths	Number of suicides	% of suicides	Number of unintended	% of unintended deaths	Ratio of suicides to unintended
0.0	41	25	20%	16	23%	1.6
0.0 - 0.1	13	10	8%	3	4%	3.3
0.1 - 0.2	19	13	11%	6	9%	2.2
0.2 - 0.3	20	16	13%	4	6%	4.0
0.3 - 0.4	23	12	10%	11	16%	1.1
0.4 - 0.5	12	9	7%	3	4%	3.0

The cumulative number of total deaths, suicides, unintended deaths, as well as the percent of the total deaths (193 total deaths), suicides (123 suicides), and unintended deaths (70 unintended) are shown in Table 7. It can be seen that approximately two thirds of total deaths, suicides, and unintended deaths occur within 0.5 miles from station platforms. This result may be significant when considering prevention and mitigation of deaths, because the efforts can be concentrated around the stations. The cumulative percentages (as a percent of the total deaths) are shown in Figure 20. The shape of the curves indicates a relatively uniform increase in both suicides and unintended deaths away from the station.

Table 7. Cumulative Number of Unintended Deaths and Suicides at Stations and Locations at Incremental Distances from Stations

Distance from Station (miles)	Total Dea (Suicide Unintend	e +	Sı	uicides		Uni	intended	
	Cumulative number of deaths	% of total	Cumulative number of deaths	% of suicides	% of total	Cumulative number of deaths	% of unintended	% of total
0.0	41	21%	25	20%	13%	16	23%	8%
0.1	54	28%	35	28%	18%	19	27%	10%
0.2	73	38%	48	39%	25%	25	36%	13%
0.3	93	48%	64	52%	33%	29	41%	15%
0.4	116	60%	76	62%	39%	40	57%	21%
0.5	128	66%	85	69%	44%	43	61%	22%

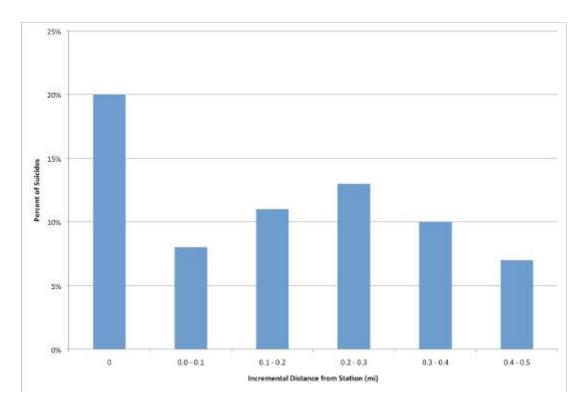


Figure 16. Percent of Suicides at Stations and Incremental Distances from Stations

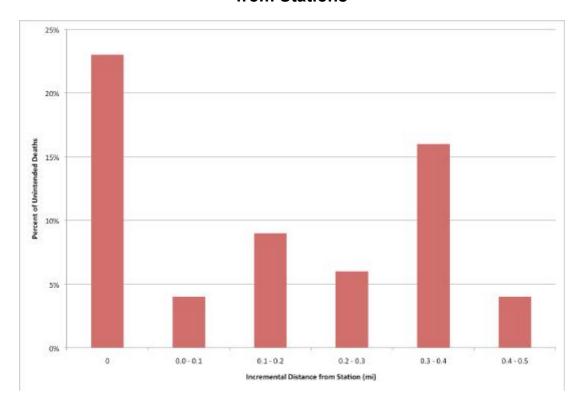


Figure 17. Percent of Unintended Deaths at Stations and Incremental Distances from Stations

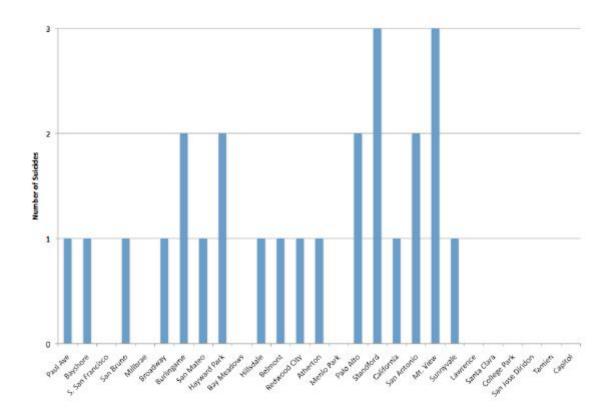


Figure 18. Number of Suicides at Station Platforms

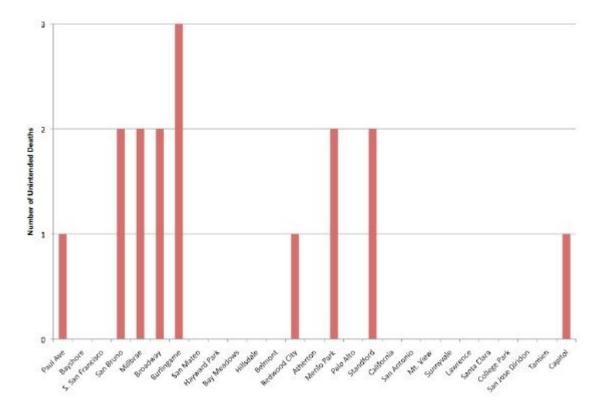


Figure 19. Number of Unintended Deaths at Station Platforms

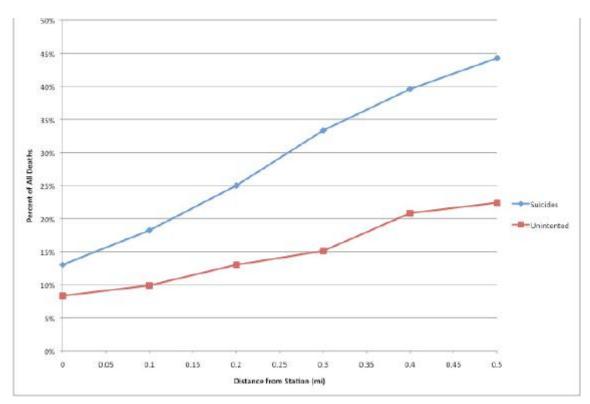


Figure 20. Cumulative Percent of Unintended Deaths and Suicides at Stations and at Incremental Distances from Stations (percent based on total of 193 deaths)

### PROXIMITY TO ROAD CROSSINGS

An analysis, similar to the analysis carried out for the deaths relative to station platforms, was carried out for the proximity of the deaths to road crossings. All suicides and unintended deaths occurring at road crossings were identified. Deaths were classified according to the distances away from the road crossings. A distance of zero meant that the death occurred within the paved area of the road. The results are shown in Table 8. Smaller increments were used closer to the road crossings (as compared to the increments used for the stations) because a suicidal person would not have to leave the crossing or go very far to encounter a train traveling at high speed.

The percentage of suicides at road crossings is less than the percentage of suicides at even a small distance away from the road crossing. This may indicate that the crossing may be a convenient access point and that the persons who wish to commit suicide may walk only a small distance away from the crossing. Since there are probably fewer bystanders present at road crossings, as compared to stations, the suicidal person may be less likely to deem it necessary to venture far away from the road. It is also possible that a suicidal person could be inside a vehicle stopped at or near the road crossing. Further investigation to confirm these conclusions was outside the scope of this study.

As stated in the previous section, the ratio of suicides to unintended deaths for the entire data sample (193 deaths) is 1.8. From Table 8 it can be seen that the ratios of suicides to unintended deaths show an uneven pattern. No distinct conclusion was made regarding this result.

Table 8. Road Crossings: Unintended Deaths, Suicides at Road Crossings and Locations at Incremental Distances from Road Crossings

Incremental Distance from Road Crossing (miles)	Total Deaths (Suicide + Unintended)	Suici	des		Unintended	I
	Number of deaths	Number of deaths	% of all suicides	Number of deaths	% of all unintended deaths	Ratio of suicides to unintended
0.0	15	10	8%	5	7%	2.0
0.0 - 0.025	21	7	6%	14	20%	0.5
0.025 - 0.05	25	15	12%	10	14%	1.5
0.05 - 0.1	34	21	17%	13	19%	1.6
0.0 - 0.1	80	43	35%	37	53%	1.2
0.1 - 0.2	18	15	12%	3	4%	5.0
0.2 - 0.3	6	4	3%	2	3%	2.0

The cumulative numbers of total deaths, suicides and unintended deaths are presented in Table 9. In the case of suicides, 59 percent occurred within 0.3 miles of a road crossing, compared with 52 percent for stations (see Table 7). It may be concluded that these patterns are similar. By comparison, 67 percent of unintended deaths occur within 0.3 miles of a road crossing versus 41 percent for stations. This result is not surprising, given that a significant proportion of these deaths may be the result of drivers making poor judgments when crossing the railroad track, or people walking on the right of way, or other factors associated with the road crossings.

The cumulative percentages (as a percent of the total 193 deaths) are also shown in Figure 21. It can be seen that there is a significant leveling-off of suicides and unintended deaths after a distance of 0.1 miles away from the stations. This supports the conclusion that the persons wanting to commit suicide may not feel the need to go far to encounter a train traveling at high speed to ensure a fatal outcome.

Table 9. Road Crossings: Unintended Deaths and Suicides at Road Crossings and Locations at Incremental Distances from Road Crossings (Cumulative Values)

Distance from Road Crossing (miles)	Total Dea (Suicide Unintend	<b>+</b>	Sı	uicides		Un	intended	
	Cumulative number of deaths	% of total	Cumulative number of deaths	% of suicides	% of total	Cumulative number of deaths	% of unintended	% of total
0.0	15	8%	10	8%	5%	5	7%	3%
0.025	36	19%	17	14%	9%	19	27%	10%
0.05	61	32%	32	26%	17%	29	41%	15%
0.1	95	49%	53	43%	27%	42	60%	22%
0.2	113	59%	68	55%	35%	45	64%	23%
0.3	119	62%	72	59%	37%	47	67%	24%

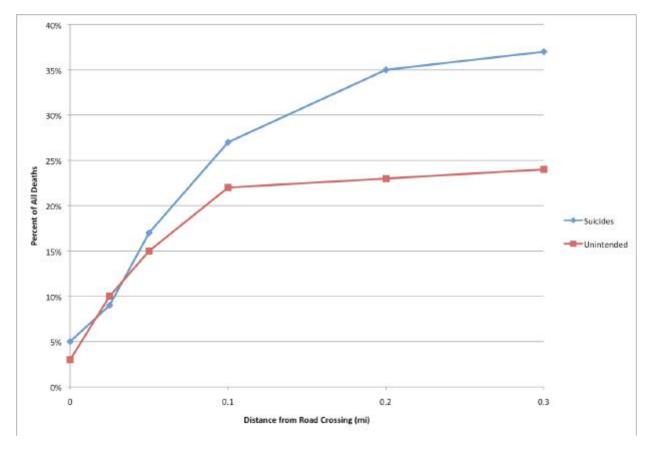


Figure 21. Cumulative Percent of Unintended Deaths and Suicides at Road Crossings and at Incremental Distances from Road Crossings

#### PROXIMITY TO STATIONS AND ROAD CROSSINGS

The fact that the data for suicides and unintended deaths relative to stations and road crossings could overlap was noted in a previous section. The data from the previous two sections were combined to determine the extent to which the suicides and unintended deaths were concentrated around stations and road crossings and also to form some idea of the magnitude of the overlap of the data.

The cumulative percentages of suicides and unintended deaths as a function of the distance from the nearest station or road crossing are shown in Table 10. The data indicate that 100 percent of deaths occur within 0.3 miles from a road crossing or station. The fact that the percentages as shown are greater than 100 percent is the result of having some stations and road crossings within 0.3 of a mile of each other. A death would then be allocated to both the station and the road crossing, leading to some double counting. Since the percentages are not much greater than 100 percent, it could be concluded that the overlap is not great and that the conclusions made in the foregoing sections should not be greatly affected by this overlap.

Table 10. Unintended Deaths and Suicides at Stations and Road Crossings and at Incremental Distances from Stations and Road Crossings

Incremental Distance from Station or Road Crossing (miles)	Total Deaths (Suicide + Unintended)	Sı	uicides		U	nintended	
	Number	Cumulative number of suicides	% of Suicides	% of Total deaths	Cumulative number of unintended deaths	% of Unintended deaths	% of Total deaths
0.0	56	35	28%	18%	21	30%	11%
0.1	149	88	72%	46%	61	88%	32%
0.2	186	116	94%	60%	70	100%	36%
0.3	212	136	111%	71%	76	109%	39%

## **GENDER**

All suicides and unintended deaths were classified according to gender for the deaths for which data were available. Males chose rail suicides 3.5 times more than females, as can be seen in Table 11. The results confirm Abbot et al.'s finding that males choose rail as the method of suicide more often than females.<sup>52</sup>

Table 11. Suicides and Unintended Deaths by Gender

	Male	Female	Male to Female Ratio
Suicides	60	17	3.5
Unintended	23	13	1.8

# **SUMMARY OF CONCLUSIONS**

A summary of the major conclusions regarding possible patterns follows:

- 1. Year of Occurrence: There did not appear to be a trend over time. There may be a slight upward trend for suicides if the data from the last few years were compared to the data for the first few years, but this may be due to a concurrent increase in population or service by Caltrain. A similar comparison for unintended deaths showed the opposite result, i.e. there were fewer deaths during the last few years. This may be the result of having mitigated the circumstances that caused the unintended deaths.
- 2. Month of the Year: No distinct pattern was identified for suicides or for unintended deaths related to the month of the year except for a low frequency of suicides in September.
- 3. Day of the Week: Most suicides occurred during the workweek, especially on Mondays and Fridays. Fewer trains are running during the weekend, therefore there are fewer opportunities for deaths involving trains. The literature indicated that suicides are more likely to occur on Mondays because the stress of "new beginnings" may be too much for people to handle. The results of this study do not directly support this finding.
- 4. Day of the Month: The data showed some indication of a cluster of suicides at the beginning of the month. This would support the finding in the literature that most suicides occur during the first week of the month. A pattern could not be detected for unintended deaths.
- **5. Time of Day**: The data appear to indicate that the peak periods of suicides correlate fairly well with the peak periods of train operations.
- **6. Milepost**: The data showed three sets of patterns.
  - The largest concentration of suicides was between the Burlingame and Sunnyvale stations, approximately a 25-mile stretch of track, with a fairly uniform distribution of suicides. In contrast there was only one suicide south of the Diridon Station. There were lower concentrations of suicides north of the Burlingame Station and the pattern was also less uniform than the Sunnyvale to Burlingame section. The Burlingame to Sunnyvale section is characterized by older neighborhoods and an opinion was offered that the cause of the higher incidence of suicides in this area could be that the railroad is a more integral part of the community. The area to the north of the Burlingame station has relatively more industrial development and the tracks are in tunnel in the area close to San Francisco. The almost total absence of suicides south of the Diridon Station could be attributed to lower development density and much lower train frequency to the south of the Diridon Station.
  - In contrast to the suicides north of the Diridon Station, the unintended deaths showed more clustering, which may indicate that there may be circumstances that caused

these deaths, but they could also have been spurious accidents. It should be noted that it was not the objective of this study to determine causes or circumstances of unintended deaths. Moreover, eliminating causes of accidents can sometimes not be feasible from economic and other viewpoints.

- The contrast between the relatively uniform distribution of the suicides in the Sunnyvale to Burlingame section and the unintended deaths in the same section indicated that there were not specific areas that were much more attractive for suicides than others, based on the data analyses. It is also noteworthy that the maximum number of suicides that occurred on a 0.5-mile section of track during the last six-year period was three, which leads to the conclusion that suicides on the tracks were relatively rare events and that it is unlikely that the suicides were caused by factors specifically associated with the railroad or that there was a significant source of suicides, such as a hospital nearby.
- 7. **Proximity to Stations**: Only 20 percent of all the suicides occurred at the stations. This corresponds with the 26.2 percent of suicides that was found in the literature. The station may be a convenient point of access but not the preferred place to commit suicide. The data also showed that approximately two thirds of the suicides occurred within 0.5 of a mile from a station. This holds true for unintended deaths as well. This result may be significant when considering prevention and mitigation of deaths because the efforts can be concentrated in close proximity to the stations.
- 8. Proximity to Road Crossings: Forty-three percent of suicides occurred within 0.1 mile from a road crossing and almost two-thirds within 0.3 of a mile. This may be an indication that a person committing suicide uses the road as access to the tracks and then walks a relatively small distance away from the road, possibly to avoid interference.
- **9. Proximity to Stations and Road Crossings:** An analysis, wherein the proximities of suicides and unintended deaths to either stations or road crossings were combined, showed that most suicides and unintended deaths occurred within 0.3 of a mile from either a station or a road crossing.
- 10. Gender: The data revealed that males chose rail suicides 3.5 times more often than females. This result confirms the findings in the literature that males choose rail as a method of suicides more often than females.

It may be concluded that the data did show some patterns for suicides with respect to time and location. Some of the patterns can be explained while the reasons for some are not immediately obvious. However, the patterns in the latter category did not indicate a particularly attractive location or possible source for suicides. In the immediate past, there were the tragic suicides associated with the students from Henry M. Gunn High School within a very short period of time. However, given the relatively long periods of time for which the data were analyzed in this study, these events did not stand out at the level of aggregation used in the analyses.

# **RECOMMENDATIONS**

It is recommended that Caltrain continue to monitor suicides to detect patterns and attempt to mitigate the circumstances where the suicides could be prevented, if such prevention methods would be feasible from economic and other viewpoints. Other commuter rail system operators may find the analyses conducted in this study helpful as a basis for detecting patterns in suicides.

# **APPENDIX A: FATALITY LOG**

A list of all deaths, from August 1992 to December 2009, were provided by Caltrain. The data were rearranged to facilitate analysis.

Data and abbreviations used in chart:

**Mile Post:** Miles from a mile post, starting at San Francisco's 4th and King Street Station, heading south on Caltrain tracks, in tenths of a mile. Letters S and N refer to southbound or northbound tracks.

**Nature:** Nature of death—unintended (U), suicide (S), homocide (H) or pending (P)

**Caltrain/Union Pacific:** Name of train service CT=Caltrain; UP=Union Pacific; SP=Southern Pacific; ACE=Altamont Commuter Express; AMTRAK=United States national rail service

Moon Phase: Percent of illumination of moon

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age Ra	Race D	Day/ Night F	Moon Phase
5/22/98		Friday	San Francisco	0.7 S	$\supset$			Σ			Day	
12/21/92		Monday	San Francisco	1.00 S	S							
90/21/9	3:15 p.m	Thursday	San Francisco	1.20 S	S	СТ		Σ			Day	
8/2/94		Tuesday	San Francisco	1.20 S	D							
6/15/01		Friday	San Francisco	1.40 S	)			ш			Day	
3/23/08	4:29 p.m.	Sunday	San Francisco	1.50 N	Ø	CT	Tresspasser struck in tunnel				Day	
1/8/03		Wednesday	San Francisco	2.40 N	⊃			Σ		Z	Night	
1/24/07	6:20 p.m.	Wednesday	San Francisco	2.60 S	D	CT				Z	Night	37%
7/26/04		Monday	San Francisco	3.20 S	D			Σ		_	Day	
1/3/03		Friday	San Francisco	3.70 N	D			Щ		Z	Night	
1/24/94		Monday	San Francisco	3.70 N	⊃							
5/27/06	1:30 p.m.	Saturday	San Francisco	4.10 N	S	CT		Σ			Day	
12/20/93		Monday	San Francisco	4.10 N	⊃							
3/19/99		Friday	San Francisco	5.20 S	S			Σ			Day	
2/17/96		Saturday	Brisbane	5.40 N	S			ш		_	Day	
8/11/94		Thursday	South San Francisco	9.70 S	D							
10/28/04		Thursday	South San Francisco	10.20 N	Ø			Σ		_	Day	
5/29/05		Sunday	San Bruno	10.30 S	D			Σ		Z	Night	
1/17/03		Friday	San Bruno	10.70 S	S			Σ		Z	Night	
11/3/97		Monday	San Bruno	11.0 S	S						Day	
2/25/96		Sunday	San Bruno	11.0 N	D						Day	
9/12/95		Tuesday	San Bruno	11.0 S	D					Z	Night	
12/31/01		Monday	San Bruno	11.10 N	D			ш		Z	Night	
10/16/00		Monday	San Bruno	11.10 S	D						Day	
3/4/00		Saturday	San Bruno	11.10 S	n			F&M		Z	Night	

Date	Time	Day	Location	Mile Post	Nature (Suicide or unintended)	Caltrain/ Union Pacific	Comments	Sex	Age	Race	Day/ Night	Moon Phase
80/08/9	1:15 p.m.	Monday	San Bruno	11.60 N	S	CT		Щ			Day	
4/19/08	5:34 p.m.	Saturday	San Bruno	11.60 S	Þ	CT	On skateboard with headphones	Σ	15		Day	
7/24/05		Sunday	San Bruno	11.60 S	D			Σ			Day	
11/4/05		Friday	Millbrae	13.30 S	S			Σ			Night	
11/15/00		Wednesday	Millbrae	13.70 S	コ			Σ			Night	
2/17/95		Friday	Millbrae	13.70 S	D						Day	
10/1/96		Tuesday	Millbrae	13.90 N	S						Day	
8/12/95		Saturday	Burlingame	15.10 N	D	SP					Night	
3/30/05		Saturday	Burlingame	15.20 S	S			Σ			Night	
8/23/95		Wednesday	Burlingame	15.20 N	D						Day	
4/18/06	2:40 p.m.	Tuesday	Burlingame	15.30 S	D	СТ		Σ			Day	
3/12/04		Friday	Burlingame	15.40 S	S			Σ			Day	
10/5/95		Thursday	Burlingame	15.60 N	エ						Night	
11/18/06	12:30 a.m.	Saturday	Burlingame	15.60 S	S	CT		Σ			Night	
4/10/95		Monday	Burlingame	15.60 N	$\supset$						Night	
10/24/00		Tuesday	Burlingame	15.70 N	S			Σ			Night	
9/19/08	6:00 p.m.	Friday	Burlingame	16.20 N	⊃	СТ		ட			Day	
5/8/01		Tuesday	Burlingame	16.30 N	S			Σ			Night	
8/15/92		Saturday	Burlingame	16.30 S	S							
5/11/98		Monday	Burlingame	16.30 S	D						Night	
10/22/99		Friday	Burlingame	16.40 S	)			ш			Day	
4/16/01		Monday	Burlingame	16.60 N	S			Σ			Day	
2/25/00		Thursday	San Mateo	16.90 N	S			Σ			Day	
9/21/09	4:40 p.m.	Monday	San Mateo	17.10 N	S	СТ	At grade crossing	Σ	49	>	Day	
9/2/93		Thursday	San Mateo	17.20 N	Π							

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age F	Race	Day/ Night	Moon Phase
12/29/97		Monday	San Mateo	17.20 S	D						Night	
5/16/98		Saturday	San Mateo	17.40 N	S						Night	
8/14/93		Saturday	San Mateo	17.40 S	⊃							
3/4/98		Wednesday	San Mateo	17.45 N	S						Day	
10/22/01		Monday	San Mateo	17.50 S	တ			Σ			Day	
12/16/09	6:53 p.m.	Wednesday	San Mateo	17.60 N	۵	CT	Transient was laying on tracks at station	Σ	61		Night	
11/30/07	4:50 p.m.	Friday	San Mateo	17.60 N	တ	CT					Night	%29
8/3/05		Wednesday	San Mateo	17.70 S	S			Σ			Night	
8/28/01		Tuesday	San Mateo	18.00 S	တ			Σ			Day	
1/28/00		Friday	San Mateo	18.10 S	⊃			Σ			Day	
10/30/08	5:23 a.m.	Thursday	San Mateo	18.30 N	တ	CT					Night	
20/9/6	11:40 a.m.	Thursday	San Mateo	18.30 N	S	CT					Day	22%
1/28/08	3:10 p.m.	Monday	San Mateo	19.00 S	တ	CT		ш	43		Day	
10/9/95		Monday	San Mateo	19.00 S	S						Night	
8/6/07	5:35 a.m.	Monday	San Mateo	19.30 S	တ	CT					Day	40%
12/5/08	7:12 a.m.	Friday	San Mateo	19.40 S	S	СТ		Σ			Day	
7/26/95		Wednesday	San Mateo	19.60 S	S						Night	
8/21/09	10:45 p.m.	Friday	Palo Alto	19.70 N	S	СТ		Щ	13	>	Night	
5/14/09	6:38 a.m.	Thursday	San Mateo	19.70 S	S	СТ			Σ		Day	
7/12/00		Wednesday	San Mateo	19.90 N	S				≥		Day	
3/2/00		Thursday	San Mateo	19.90 S	⊃				Σ		Day	
5/25/93		Tuesday	San Mateo	20.30 S	S							
10/20/97		Monday	San Mateo	20.70 N	S						Night	
00/2/2		Friday	San Mateo	20.70 S	S				Σ		Day	
5/20/95		Saturday	San Mateo	20.90 S	S						Day	

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age	Race	Day/ Night	Moon Phase
1/30/02		Wednesday	Belmont	21.00 S	တ			Σ			Day	
3/6/93		Saturday	Belmont	21.40 S	S							
11/15/97		Saturday	Belmont	21.50 S	S						Day	
7/25/98		Saturday	Belmont	21.90 S	S			Σ			Day	
3/25/93		Thursday	Belmont	22.10 S	တ							
10/4/92		Sunday	Belmont	22.40 N	S							
1/6/07	6:50 p.m.	Saturday	Belmont	22.50 N	တ	CT					Night	%68
2/8/95		Wednesday	San Carlos	22.60 S	)						Day	
4/2/94		Tuesday	San Carlos	22.80 S	S							
1/8/03		Wednesday	Redwood City	24.40 S	S			Σ			Day	
4/6/95		Thursday	Redwood City	24.50 S	တ	SP					Night	
4/6/06	11:58 p.m.	Thursday	Redwood City	24.50 N	⊃	CT		Σ			Day	
2/26/03		Wednesday	Redwood City	24.60 S	တ			Σ			Night	
1/7/08	7:25 p.m.	Monday	Redwood City	24.70 S	S	CT		Σ	17		Night	
10/22/02		Tuesday	Redwood City	24.80 S	S			≥			Day	
8/16/95		Wednesday	Redwood City	24.80 N	n	SP					Night	
6/4/93		Friday	Redwood City	24.80 N	D							
9/15/09	4:50 p.m.	Tuesday	Redwood City	24.80 S	⊃	CT	At grade crossing	Σ	22	≶	Day	
11/3/06	11:00 p.m.	Friday	Redwood City	24.80 S	)	CT					Night	
5/11/99		Tuesday	Redwood City	24.90 S	တ			ш			Night	
1/29/01		Monday	Redwood City	25.20 N	)			Σ				
1/26/98		Monday	Redwood City	25.20 N	⊃							
2/1/06	7:43 a.m.	Wednesday	Redwood City	25.20 S	)	CT		ш				
6/13/04		Sunday	Redwood City	25.30 S	S			Σ				
10/9/98		Friday	Redwood City	25.40 N	S			≥				

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age Race	Day/ Night	Moon Phase
10/11/06	5:57 p.m.	Wednesday	Redwood City	25.40 S	D	CT		≥		Day	
60/8/2	5:52 p.m.	Wednesday	Redwood City	25.70 N	S	CT		Σ		Day	
10/16/05		Sunday	Redwood City	25.70 N	တ			≥		Day	
7/16/96		Tuesday	Redwood City	25.80 S	D					Day	
11/6/09	5:45 p.m.	Friday	Redwood City	25.90 N	۵	CT	3/10 mile south of Redwood City station	Σ	09	Night	
90/9/6	5:30 p.m.	Wednesday	Redwood City	26.00 N	⊃	CT		Σ		Day	
10/28/04		Thursday	Redwood City	26.20 N	S			Σ		Night	
1/12/97		Sunday	Redwood City	27.00 N	S					Day	
8/4/95		Friday	Redwood City	27.20 N	I					Night	
2/14/96		Wednesday	Redwood City	27.40 S	⊃	SP				Night	
1/16/95		Monday	Atherton	27.50 N	D					Night	
4/27/08	7:05 p.m.	Sunday	Atherton	27.60 S	S	CT		ட		Day	
66/2/2		Wednesday	Atherton	27.80 S	S			ட		Day	
1/13/03		Monday	Menlo Park	28.40 N	Z			ட		Day	
10/16/96		Wednesday	Menlo Park	28.40 N	တ			ட		Night	
1/18/05		Tuesday	Menlo Park	28.40 S	S			Σ		Day	
11/29/01		Thursday	Menlo Park	28.40 S	S			ட		Night	
4/7/08	8:38 p.m.	Monday	Menlo Park	28.50 N	S	СТ		Σ	99	Day	
1/3/02		Thursday	Menlo Park	28.80 S	⊃			Σ		Day	
6/13/01		Wednesday	Menlo Park	28.80 S	⊃			ட		Day	
2/23/99		Tuesday	Menlo Park	29.00 N	⊃					Night	
10/28/01		Sunday	Menlo Park	29.20 S	S			Σ		Night	
7/2/07	6:15 p.m.	Thursday	Palo Alto	29.80 S	S	СТ				Day	71%
6/29/00		Thursday	Menlo Park	30.00	S			Σ		Night	

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age	Race	Day/ Night	Moon Phase
12/12/04		Sunday	Palo Alto	30.20 S	တ			Σ			Night	
2/19/99		Friday	Palo Alto	30.60 S	J			Σ			Night	
11/6/04		Saturday	Palo Alto	30.80 N	S			Σ			Night	
10/7/02		Monday	Palo Alto	30.80 N	S			Σ				
11/14/03		Friday	Palo Alto	30.80 S	S			Σ			Night	
2/6/96		Tuesday	Palo Alto	30.80 N	)						Night	
6/17/08	8:05 p.m.	Tuesday	Palo Alto	30.90 N	တ	CT					Day	
12/2/94		Friday	Palo Alto	30.90 N	)							
3/3/95		Friday	Palo Alto	31.00 S	S						Day	
11/23/92		Monday	Palo Alto	31.80 S	S							
20/6/2		Saturday	Palo Alto	32.00 N	တ			Σ			Day	
10/13/03		Monday	Palo Alto	32.70 S	)			Щ			Night	
4/5/96		Friday	Palo Alto	32.90 S	S						Night	
6/2/09	9:57 p.m.	Tuesday	Palo Alto	33.00 N	S	CT		ட	17	>	Night	
60/9/9	8:20 p.m.	Tuesday	Palo Alto	33.00 N	S	CT		Σ	17	>	Day	
3/3/06	8:28 a.m.	Friday	Palo Alto	33.00 S	S	CT		Σ			Day	
6/28/07	4:50 p.m.	Thursday	Palo Alto	33.00 N	D	СТ	Car struck while stuck on tracks				Day	%26
7/22/06	9:10 a.m.	Saturday	Palo Alto	33.20 S	S	CT		Σ			Day	
10/19/09	10:50 p.m.	Monday	Palo Alto	33.30 S	۵	CT		Σ	16		Night	
12/9/05		Friday	Palo Alto	33.50 S	S			Σ			Night	
1/4/94		Tuesday	Palo Alto	33.50 S	S							
5/1/01		Tuesday	Palo Alto	33.60 S	S			Σ			Night	
5/4/09	11:30 a.m.	Monday	Palo Alto	33.80 S	S	СТ		ш		*	Day	

Date	Time	Day	Location	Mile	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Age Race	Race	Day/ Night	Moon Phase
12/23/09	5:11 p.m.	Wednesday	San Antonio	34.10 S	۵	CT	Adult male stepped off platform in front of train	Σ			Night	
80/9/9	4:20 p.m.	Friday	Mountain View	34.10 N	S	CT					Day	
8/10/09	6:33 p.m.	Monday	Mountain View	34.10 S	S	CT	At station	Щ	42		Day	
11/25/95		Saturday	Mountain View	34.20 S	S						Night	
5/20/03		Tuesday	Mountain View	34.60 S	တ			Σ			Night	
3/13/97		Thursday	Mountain View	34.70 N	S						Day	
10/5/06	6:44 p.m.	Thursday	Mountain View	34.70 N	⊃	CT		Щ			Day	
96/9/9		Tuesday	Mountain View	34.80 N	S						Day	
2/24/95		Friday	Mountain View	34.80 N	တ						Night	
8/1/8		Friday	Mountain View	35.10 N	S						Day	
12/31/08	6:12 p.m.	Wednesday	Mountain View	35.60 S	တ	CT					Night	
4/19/95		Wednesday	Mountain View	35.80 S	S						Day	
10/13/08	5:55 p.m.	Monday	Mountain View	36.00 S	S	CT		ш			Day	
2/18/04		Wednesday	Mountain View	36.00 S	S			ш			Day	
4/6/06	7:15 p.m.	Thursday	Mountain View	36.10 N	S	CT		Σ			Day	
11/7/08	5:09 p.m.	Friday	Mountain View	36.50 N	S	CT		Σ			Night	
2/13/07	7:50 p.m.	Tuesday	Mountain View	36.50 S	S	CT					Day	18%
11/25/01		Sunday	Sunnyvale	37.10 S	S			Σ			Night	
12/24/05		Saturday	Mountain View	37.30 S	S			Σ			Night	
11/11/06	8:18 p.m.	Saturday	Mountain View	37.50 N	S	СТ		Σ			Night	
4/4/01		Wednesday	Sunnyvale	38.50 N	တ			Σ			Day	
7/25/94		Monday	Sunnyvale	38.50 N	S							
2/30/02		Monday	Sunnyvale	38.60 S	တ			Σ			Night	
2/26/93		Friday	Sunnyvale	38.80 S	S							

Date	Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex Age		Race	Day/ Night	Moon Phase
10/11/00		Wednesday	Sunnyvale	39.00 N	⊃						Night	
3/17/93		Wednesday	Sunnyvale	39.30 S	S	SP						
3/8/06	9:22 p.m.	Wednesday	Sunnyvale	39.40 N	ഗ	CT		Σ			Night	
5/25/09	9:16 a.m.	Monday	Sunnyvale	39.50 N	S	CT		Σ			Day	
3/20/95		Monday	Sunnyvale	40.50 S	ဟ						Day	
9/22/92		Tuesday	Sunnyvale	40.60 S	)							
12/22/06	1:20 a.m.	Friday	Santa Clara	41.70 S	တ	CT		Σ			Night	
7/29/95		Saturday	Santa Clara	42.00 N	)						Day	
3/22/93		Monday	Santa Clara	42.50 N	ഗ	SP						
3/6/00		Monday	Santa Clara	42.80 N	D			Σ			Day	
00/97/9		Monday	Santa Clara	44.00 S	ဟ			ш			Day	
8/14/98		Friday	Santa Clara	44.20 N	S						Day	
2/29/00		Tuesday	Santa Clara	44.70	S			Σ			Night	
7/3/04		Saturday	San José	45.60 S	S			Σ				
11/6/09	3:39 p.m.	Friday	San José	46.40 N	۵	ACE	Identified by law enforcement as transient	ш	52		Day	
2/22/99		Monday	San José	46.70 N	)			ш			Day	
7/29/94		Friday	San José	46.90 ?	S	AMTRAK						
4/2/94		Saturday	San José	47.20 ?	D	SP						
60/2/9	4:04 p.m.	Friday	San José	48.00 S	D	СТ		Σ	38	>	Day	
1/9/00		Sunday	San José	48.60 N	D			Σ			Night	
7/25/00		Tuesday	San José	52.50 S	⊃						Day	
11/20/97		Thursday	San José	56.20 N	D						Day	
7/23/09	6:40 p.m.	Thursday	San José	57.00 S	⊃	CT		≥			Day	
5/14/01		Monday	San José	61.50 S	D			Σ			Day	
11/6/08	6:35 a.m.	Thursday	San José	62.20 S	⊃	CT		ш			Night	

Date	Date Time	Day	Location	Mile Post	Nature (Suicide or Unintended)	Caltrain/ Union Pacific	Comments	Sex	Sex Age Race	Race	Day/ Night	Day/ Moon Night Phase
6/19/96		Wednesday San José	San José	09 <sup>2</sup> 9	$\supset$						Day	
8/7/03		Thursday	Thursday Morgan Hill	S 05.99	S			Σ			Night	
/23/06	1/23/06 6:50 p.m. Monday		Morgan Hill	68.10 S	ם	СТ		ш			Night	

# **APPENDIX B: LISTING OF STATIONS**

A list	of all	Caltrain	stations	was p	provided	by	Caltrain.	The	data	include	the	mileposts	and
speci	fic inf	ormation	about th	e cro	ssings a	and o	condition	s of	the s	tation.			

Data as of: March 23, 2005 Revised: June 1, 2005

# 7.2 STATION PEDESTRIAN AND EMERGENCY CROSSINGS

LEGEND		
CITY/JURISDICTION = Refers to the city in which the station is located	AC = Hot mix asphaltic concrete crossing surface	CB = Center Boarding
NO. of TRKS = The number of crossing tracks	C = Concrete panel crossing surface	NCB = Narrow center bo
PANEL SURFACE = Crossig panel surface material	R = Rubber panel crossing surface	OB = Outside Boardi
BOARD = Boarding type		* = UP Track
S GATE = Oneway Swing Gate	AWS = Advance Warning Signs	
	VEAR = Year Last Reconstructed	Condition based on 1-5

Condition based on 1-5, 1 = Very Good, 5 = Very Poor

SAN FRANCISCO SFK   2 22nd STREET   TWE   2 22nd STREET   TWE   2 22nd STREET   TWE   2 22nd STREET   STREET	MP CTY  0.2 SF  1.8 SF  4.1 SF  5.2 BSBN  9.3 SSF  11.6 SBRN  11.6 SBRN  15.2 BURL	F	XING	SURFACE 1	2 20	3	4	3	YEAR COND.	D. STRIPING	AWS	ш	s	S GATE CENTER	rer WIDTH	H NOTES
SAN FRANCISCO 22nd STREET 22nd STREET BAYSHORE SOUTH SF SOUTH SF SAN BRUNO MILLBRAE BROADWAY	0.2 SF 1.8 SF 4.1 SF 5.2 BSBN 11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL		2						0							_
22nd STREET PAUL AVENUE BAYSHORE SOUTH SF SAN BRUNO MILLBRAE BROADWAY BURLINGAME	1.8 SF 4.1 SF 5.2 BSBN 9.3 SSF 11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL								2003			NO	ON		_	Terminal crossings
PAUL AVENUE BAYSHORE SOUTH SF SAN BRUNO MILLBRAE BROADWAY BURLINGAME	4.1 SF 5.2 BSBN 9.3 SSF 11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL		-								,	YES	NO			
BAYSHORE SOUTH SF SAN BRUNO MILLBRAE BROADWAY BURLINGAME	5.2 BSBN 9.3 SSF 11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL										-	NO	ON			
SOUTH SF SAN BRUNO MILLBRAE BROADWAY BURLINGAME	9.3 SSF 11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL	OB 4	2	C 5.16	6 1 5.30	-			2004	ON	NO	YES	NO	15'-18'-15'	10, 10,	2 Emergency crossings (concrete) both end of platforms
SAN BRUNO MILLBRAE BROADWAY BURLINGAME	11.6 SBRN 13.6 MLBR 15.2 BURL 16.3 BURL	NCB 6	4	2AC/2R 9.30	30 3 9.16	3 9.18	3 9.19 4		2000	ON	9	ON	ON	13'	·9	Lead track west of main line xings.
MILLBRAE BROADWAY BURLINGAME	13.6 MLBR 15.2 BURL 16.3 BURL	OB 2	2	C 11.54	54 11.66	3			2003		,	YES NW,	NW,NE,SW,SE 4			
BROADWAY	15.2 BURL 16.3 BURL	OB 3	OP-1	- 13.60	30				1		_	YES	NO			
BURLINGAME	16.3 BURL	NCB 2	8	R 15.24	24 3 15.26	3 15.29	3		2000	YES	YES	ON	ON	13,	12,	Striping: painted platform, AWS: Signs & stencil in AC.
		NCB 2	8	R 16.22	22 3 16.24	3 16.25	e		1975 4	YES	YES	OZ	Q.	'		Striping: platform painted (yellow), AWS: stencil in platform. 2 ML tracks, 1 storage (abandoned)
10 SAN MATEO SMT	17.7 SMTO	OB 2	UP-1	- 17.74	74 1					ON.	YES	YES (1st	(1st St) SW,SE 2	30,	, 10,	Passengers use 1st Street crossing. AWS pertains to xing. End of platform xings with "EXIT" only on swing gate
11 HAYWARD PARK HPK	19.1 SMTO	OB 2	2	C 18.98	19.11	1 1			2000	ON	YES	YES NW,	NW,NE,SW,SE 4	1 30,	, 10,	End of platform xings with "EXIT" only swing gate
12 BAY MEADOWS BMD	20.0 SMTO	OB 2	1	R 20.03	33 2				1980	ON	NO	NO	ON	18,	,,	
13 HILLSDALE HIL	20.3 SMTO	NCB 2	2	C 20.29	20.31	1 20.33	20.36		2001			NO NW,	NW,NE,SW,SE 4			
14 BELMONT BEL	21.9 BLMT	CB 2	UP-1	- 21.95	35						_	ON	ON			Stop Signs
15 SAN CARLOS SC	SCS 23.2 SCAR (	OB 2	UP-1	- 23.24	54				1		_	YES	NO			
16 REDWOOD CITY RM	RWC 25.4 RDWC 0	OB 2	1	C 25.47	1 21				2000	YES	YES	YES NW,	NW,NE,SW,SE 4	18,	10,	Xing @ N end shares w/ Broadway sidewalk xing, both have xing arms
17 ATHERTON AT	ATH 27.8 ATN N	NCB 2	2	R 27.78	78 2 27.80	2 27.82	2 27.84 2	27.86	2003	Q.	9	02	O <sub>N</sub>	18	12,	Xing dist. apart (from North): 65', 85', 122', 105'
18 MENLO PARK MF	MPK 28.9 MLPK 0	OB 2	2	C 28.92	35				2004	YES	YES	YES NW,	NW,NE,SW,SE 4	18,	15-10	) North xing shares with Oak Grove Street sidewalk
19 PALO ALTO PAL	30.1 PA	OB 2	-	C 30.02	20				2004	YES	9	ON	NE, NW	18,	_	Xing will be improved for ADA. Gates will be provided.
20 STANFORD STF	30.6 PA	OB 2	-	R 30.68	38				2003	YES	ON	ON	ON	15'	12.	
21 CALIFORNIA AVE CAL	31.8 PA	NCB 2	3	R 31.71	71 2 31.74	2 31.77	2		2003	YES	ON	ON	ON	14,	. 10,	
22 SAN ANTONIO SAT	34.1 MTVW	OB 2	,	,					,		,	YES	ON ON			
23 MOUNTAIN VIEW MV	MVW 36.1 MTVW 0	OB 2	2	C 36.02	02 1 36.15	1 2			2000	YES	NO	YES NW,	NW,NE,SW,SE 4	18'	10,	
24 SUNNYVALE SL	SUN 38.8 SUNV	OB 2	2	C 38.68	68 1 38.80	1			2004	YES	> ON	YES NW,	NW,NE,SW,SE 4	4 18'	10,	
25 LAWRENCE LAW	40.8 SUNV	OB 2	UP-1	C 40.87	37 1				2004	ON	> O Z	YES	O <sub>N</sub>	15-18'	18, 20,	Emergency xings @ both ends, private AC xing at North end, gated at each end and at center fencing
26 SANTA CLARA SCL	44.9 SCIC	NCB 2	8	C 44.92	92 3 44.95	4 44.98	c C		1999	YES	ON ON	ON	ON ON			
27 COLLEGE PARK CPK	46.3 SJS	NCB 2	1	R 46.33	33				1980's 3	YES	NO	NO	NO			AC Xing in front of shelter
28 SAN JOSE DIRIDON SJD	47.5 SJS	CB 2	2 1	1C / 1AC 47.43	43 1 47.58	3			2004	ON	ON	ON	ON	15'	18,	Terminal xings for maintenance / emergency
29 TAMIEN TA	TAM 49.2 SJS	CB 2	,	,								ON	ON			
30 LICK HI-RAIL ACCESS	51.6 SJS	3	-	AC					2004	ON	9	ON	N/A	15'/18'	18, 30,	Hi-rail access crossing on setout track and MT-2
31 CAPITOL <sup>↑</sup> CAP	NP 52.4 SJS															
32 BLOSSOMHILL * BHL	IL 55.7 SJS															
33 MORGAN HILL* MHL	1L 67.5 MGHL												NO	2		
34 SAN MARTIN* SN	SMR 71.2 SMAR															
35 GILROY* GI	GIL 77.4 GLRY (	OB .	1	AC					1993 3	ON	ON	NO		VARIES	IES 20'	Yard Crossing

STATION PRIVATE PEDESTRIAN AND EMERGENCY CROSSINGS SUMMARY

CHOSSING TYPE HMAC SURFACE CONCRETE PANEL RUBBER PANEL	NUMBER OF CHOSSINGS
TOTAL:	49

TOTAL NUMBER OF STATION PEDESTRIAN XING GATES: 30
Total no. of pedestrian swing gates at stations: 34
Total no. of pedestrian swing gates not at stations: 10

# **APPENDIX C: LISTING OF CROSSINGS**

A list of at-grade road crossings of the Caltrain tracks was provided, from milepost 0.00 to milepost 48.22. An approximate list of at-grade road crossings not listed on the worksheets, south of milepost 48.22, was provided by Caltrain staff.

MARINO Name   DOT# - Dotabusy Name   DOT# - Dotabush   DOT#   DOT# - Dotabush   DOT#   D	TRE = Pedestrian g  9 = Standy and above  - Stripling exists  - Stripling exists  - To be updated for  To be updated of  Conc  Conc	podesirian gares  podesirian gares  file	F   CONTROL     CONTROL	G D D EVICES  N B A 8.9  9 A 8.9  9 A 9 B 9 B 9  10 B 9 B 9  11 B 9 B 9  12 B 9 B 9  13 B 9 B 9  14 B 9 B 9  15 B 9 B 9  16 B 9 B 9  17 B 9 B 9  18 B 9  1	SHR = Surface APR = Approach APR = Supproach APR = Supproach APR = Supproach APR = Supproach SPW = Vew for Numbers Ouad APR = Numbers Ouad APR = Supproach APR	### Surface #### Surface ####################################	YRR 2003 2003 2004 2004 2004 2001 2001 2001 2003 2003 2000 2000 1999 1970 1970 2000 2000 2000 2000 2000 2000 2000 2	Sur A A C C C C C C C C C C C C C C C C C	CONDITION  CONDITION  Expedient  Condition  Condition	PATING O + 0 0 + 0 0 0 + 0 0 0 0 0 0 0 0 0 0 0	Cosw   Cosw	NOTES  Approach, striping, advance warning signs not constructed yet, siw to be constructed 4 quads. Not open Partial striping, advance warning signs not constructed yet, siw to be constructed 4 quads. Not open Partial striping. Creasing under construction Partial striping. Creasing under construction Solicyping East, learnes between the construction Solicyping East, learnes both sides (E. Erra lights learnes) Solicyping East, learnes both sides (E. Erra lights learnes) Solicyping East, learnes both sides (E. Erra lights learnes) Solicyping East, learnes both sides (E. Erra lights) Solicyping East, learnes both sides (E. Erra lights) Solicyping East, learnes both sides (E. Erra lights) West Advance warning sign need to be corrected. Simal island west side, none east Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT alocation 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 667. MTZ to California 1057. Advance Warning signs West of NAT to Carolian 672. MTG to California 1057. Advance Warning signs West of NAT to Carolian 672. MTG to Carolian 673. Advance Warning signs West of NAT to Carolian 674. MTG to Carolian 674. MTG to Carolian 674. Advance Warning signs West of National Advance Advance Warning signs West of National Advance Advance Warning Sidns Advance Warning signs West of National Advance & Sario Advance Warning signs West of National Advance & Sario Advance Warning Sidns Advance Warning signs West of National Advance & Sario
1056.00   1056	PAMEL XING SUPFACE Conc Conc Conc Conc Conc Conc Conc Conc			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	us significant and significant		2003 2004 2004 1975 2001 2001 2001 2003 2008 2008 2008 2009 2009 1970 1970 1970 1970 1970 2000 2000 2000 2000 2000 2000 2000 2	APA 4 20 21 22 22 22 22 22 23 24 24 25 25 25 25 25 25 25 25 25 25 25 25 25	AWS	NO 0		NOTES  Notes advance wanning signs not constructed yet, sw to be constructed 4 quads. Not open intiging. Crossing under reconstruction and the state of the state
COMMON   100   1	Suprace   Come   Come			9.00	L L L L L L L L L L L L L L L L L L L		2003 2004 1970 1970 2001 2001 2001 2003 2003 2003 2003 200	APA 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	A A A A A A A A A A A A A A A A A A A	MO 0 4 0 0 4 1 4 1 0 0 7 1 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0		This priping, advance wanning signs not constructed by the constructed 4 quasts. Not open infinition. Consenty under reconstruction for the constructed 4 quasts. Not open infinition. Consenty under reconstruction.  It is consenty and in the consent in
0.79         Common         822712X         0.80           10.27         Linden Avenue         7548690         1.02           10.22         Linden Avenue         7548690         1.02           11.08         San Buno Avenue         7548679         1.10           11.39         Avague Avenue         7548679         1.10           11.30         San Buno Avenue         754879         1.10           11.30         San Mane Der Ossing         754879         1.20           15.17         San Buno Avenue         754879         1.50           15.62         Morrell Bed Crossing         754879         1.50           15.62         Morrell Lane         754879         1.50           16.29         North Lane         7548894         1.50           16.59         North Lane         7548804         1.50           16.59         Perinsula Avenue         7548904         1.50           16.59         Perinsula Avenue         7548904         1.50           17.80         18 Avenue         7548904         1.70           17.80         214 Avenue         7548904         1.70           17.80         314 Avenue         7549048         18.10	Cone	100.0 100.0 70.0 77.1 44.7 50.0 15.0 16.0 16.0 16.0 16.0 16.0 17.1 16.0 16.0 17.1 17.1 16.0 16.0 17.0		98889 9 8 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			2003 2004 2004 2001 2001 2001 2003 2000 1990 1970 1970 1970 1970 1970 2000 2000 1970 1970 1970 2000 2000 2000 2000 2000 2000 2000 2			N 4 0 N 4 1 4 0 0 0 0 0 0 0 N 0 4 0		This fishing, as dwaren examining signs and constructed yet, siw to be constructed 4 quads. Not open thirthing. Construction of watering signs and constructed yet, siw to be constructed 4 quads. Not open the signs of the signs
10.27	AC A	700.0 50.5 77.1 1155.2 44.7 50.0 15.0 96.0 10.0 16.0 16.0 72.5 77.4 59.1 62.0 77.4 59.1 77.4 77.4 77.0 70.0		M	ub;s		2004 2004 2001 2001 2003 2003 2003 2000 1970 1970 1970 1970 1970 1970 1970 1		0 4 4 0 0 4 4 0 0 4 4 0 0 4 4 0 0 4 4 0 0 4 4 0 0 6 4 6 6 6 6			Ingress, roceaning vote the control control of the
10.62         Soott Street         7548979         10.00           11.13         San Mano Aenue         7548199         11.00           11.13         San Mateo Aenue         7548719         11.10           12.27         Angue Aenue         7548719         11.10           15.17         Confers Stees         7548714         13.00           15.17         Broadway         7548724         13.00           15.17         Broadway         7548724         13.00           15.17         Broadway         7548724         15.00           15.28         Mornell Ped Crossing         7548879         15.60           16.34         South Lare         7548870         16.00           16.34         South Lare         7548870         16.00           16.54         Horard Avenue         7548821         16.00           16.59         Pentrisulla Arenue         7548824         16.90           16.59         Villa Terrace         7548924         16.90           17.80         Ist Avenue         7548924         17.00           17.80         Alth Avenue         754804         17.00           18.20         Sth Avenue         754804         17.00 <t< td=""><td>AC AC Conc AC AC</td><td>50.5 77.1 1155.2 44.7 50.0 15.0 96.0 10.0 96.0 10.0 96.0 10.0</td><td></td><td>CONTROL OF CONTROL OF</td><td>ub is</td><td>+++++++++++++++++++++++++++++++++++++++</td><td>1975 2001 2001 2001 2003 2003 2003 2000 1999 1970 1970 1970 1999 1970 1970</td><td></td><td>9 4 4 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4</td><td>0 0 4 1 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td></td><td>arnain down recessively long time for Northboard Easts. Islands both does grantly West) Its NE Bollards both does grantly West) Its NE Bollards to discourage drivers from going around gates Marches arnain sign need to be corrected.  Narice availage sign need to be corrected with station improvements and west side, where only, will be courted in the Narice to California 105° Tortheast only, no stands at out larcis to be removed with station improvements in to MAT for beith and Station and self-self-self-self-self-self-self-self-</td></t<>	AC AC Conc AC	50.5 77.1 1155.2 44.7 50.0 15.0 96.0 10.0 96.0 10.0 96.0 10.0		CONTROL OF	ub is	+++++++++++++++++++++++++++++++++++++++	1975 2001 2001 2001 2003 2003 2003 2000 1999 1970 1970 1970 1999 1970 1970		9 4 4 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0 4 1 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		arnain down recessively long time for Northboard Easts. Islands both does grantly West) Its NE Bollards both does grantly West) Its NE Bollards to discourage drivers from going around gates Marches arnain sign need to be corrected.  Narice availage sign need to be corrected with station improvements and west side, where only, will be courted in the Narice to California 105° Tortheast only, no stands at out larcis to be removed with station improvements in to MAT for beith and Station and self-self-self-self-self-self-self-self-
11.08   San Burno Avenue   75-8690   11.00     11.39   Angus Avenue   75-8690   11.10     12.77   Counte Sheet   75-8732   12.80     12.77   Counte Sheet   75-8732   12.80     15.77   Counte Sheet   75-8732   12.80     15.85   Mohrell Bordway   75-88734   13.10     15.85   Counte Sheet   75-88734   13.10     15.85   Counte Sheet   75-88734   15.00     15.85   Counte Avenue   75-88734   15.00     15.84   Howard Avenue   75-88734   15.00     15.89   Counte Avenue   75-88734   15.00     15.80   Counte Avenue   75-88734   15.00     15.80   Counte Avenue   75-88734   15.00     15.80   Counte Avenue   75-88734   15.00     17.80   Santa Avenue   75-88934   15.00     18.20   Santa Avenue   75-88934   13.00     18.20   Santa Avenue   75-89014   17.00     18.20   Santa Avenue   75-89016   17.00     24.80   Santa Avenue   75-89016   17.00     25.81   Santa Avenue   75-89016   17.00     26.82   Santa Avenue   75-89016   17.00     27.83   Sant	Rubber Conc AC AC Conc Conc Conc Conc Conc Conc Conc AC AC AC AC AC AC Conc Conc Conc Conc Conc Conc Conc Con	77.1 1155.2 44.7 60.0 15.0 96.0 10.0 66.0 66.0 55.0 55.3 78.3 77.4 77.4 62.4 70.0		0 0 0 0 0 6 6 0 0 0 0 0 0 0 0 0 0 0 0 0	sign sign		2001 2001 2003 2003 2003 2000 1970 1970 1970 1970 1970 1970 1970 1		4 4 4 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 . 4 . 0 0 . 0 0 . 0 0 0 0 0		East Islands both sides (small West)  Ints NE, Bollards to discourage drivers from going around gates  Yearce warning sign need to be corrected.  International and the seast season was a season of the season of t
1113   San Matteo Avenue   754870,   11.10     12.77   Angue Avenue   7548716   12.40     12.77   San Avenue   7548716   12.40     13.10   San Broadway   754874,   13.10     15.14   Broadway   754874,   13.10     15.82   Angue Avenue   7548857   15.60     15.82   Oak Grave Avenue   7548857   15.60     16.34   Hours and Avenue   7548857   15.60     16.34   Hours and Avenue   754887   16.50     16.34   Hours and Avenue   754887   16.50     16.35   Pennistal Avenue   754882   16.50     17.80   Bellevue Avenue   754882   16.50     17.80   Bellevue Avenue   754882   17.10     17.80   Bellevue Avenue   754892   17.10     17.80   Bellevue Avenue   754892   17.10     18.20   Stil Avenue   754892   18.10     25.61   Avenue   754892	Cone Cone Cone Cone Cone Cone Cone Cone	155.2 44.7 50.0 15.0 16.0 66.0 66.0 65.0 55.3 78.0 77.4 62.4 62.4 70.0		9 9 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	sign		2001 2003 2003 2003 2000 1999 2000 1970 1970 1970 1970 1970 1970 1970 2000		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			hts NE. Bollards to discourage drivers from going around gates  Vance wanning sign need to be corrected.  Bard west side, none east  g stop signs w/ Pv. Sign. MT to Carolain 66; MT to California 105  Wanning signs West only, MT to Localoin 72 ±, MT to California 90 ±.  Wanning signs West only, MT to Localoin 72 ±, MT to California 90 ±.  Wanning signs West only, MT to Localoin 72 ±, MT to California 90 ±.  Wanning signs West only, MT to Localoin 72 ±, MT to California 90 ±.  Wanning signs West only, MT to Carolain 66; MT to California 90 ±.  Wanning signs West only, MT to Carolain 66; MT to California 90 ±.  Wanning signs West only, MT to Carolain 75 ±.  Wanning signs West only, MT to Carolain 75 ±.  Wanning signs West only, MT to Carolain 75 ±.  Wanning Signs West only 10 ±.  Wanning Signs West
1.30   Angua Avenue   7548718   114.0     12.71   Control Street   7548724   12.80     15.17   Broadway   7548734   13.00     15.18   Broadway   7548734   15.20     15.28   Author   7548734   15.20     15.39   Oak Grove Avenue   754886F   15.80     16.34   South Lane   754886F   15.80     16.34   South Lane   7548874   16.20     16.34   South Lane   7548874   16.20     16.35   Bayswalter Avenue   7548824   16.30     16.36   Permisula Avenue   7548824   16.30     16.39   Valla Ferrace   7548824   16.30     17.39   Safe Avenue   7548924   17.30     18.20   Safe Avenue   7548926   17.30     18.20   Safe Avenue   7548926   17.30     24.30   Safe Avenue   7548926   17.30     25.31   Avenue   7548926   13.30     25.31   Avenue   7548926   13.30     25.31   Avenue   7548926   13.30     25.31   Avenue   7548926   13.30     25.32   Safe Avenue   7548926   13.30	AC Cone Cone Cone Cone Cone Cone AC AC AC AC AC AC AC Cone Cone Cone Cone Cone Cone Cone Con	44.7 50.0 15.0 16.0 10.0 66.0 55.0 55.3 78.0 72.5 77.4 62.4 70.0		8 9 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	sign		2003 2003 2003 2000 1999 1970 1970 1970 1970 1970 1970 1		0 4 4 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			Nature warning sign need to be corrected.  Sand years side, none east and west side, none east Stop Sign Will are side of the corrected.  Stop Sign Sign Will are side of the corrected of the correct of
12.77         Conte Steel         7548728         12.00           15.17         Conte Steel         754874         13.00           15.17         Mortel Bonadway         7548794         15.00           15.58         Mortel Bonadway         7548794         15.00           15.59         Mortel Chossing         7548874         15.00           16.29         Noff Dive A Across         7548874         15.00           16.23         South Lare         7548874         16.20           16.59         Noff Lare         7548824         16.50           16.59         Portal Arenue         7548824         16.50           16.59         Portal Arenue         7548824         16.50           17.80         Villa Tenace         7548824         16.50           17.80         Villa Tenace         7548924         16.50           17.80         Sald Arenue         7548924         17.50           17.80         Sald Arenue         754804         17.70           18.00         Shi Arenue         754804         17.70           18.20         Shi Arenue         754904         18.10           18.20         Shi Arenue         754904         18.00 <tr< td=""><td>Conc Conc Conc Conc AC Conc AC Conc AC Conc AC Conc Conc Conc</td><td>50.0 15.0 96.0 10.0 66.0 55.0 55.3 78.0 77.4 62.4 62.4 70.0</td><td></td><td>8 9 8 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9</td><td>sign</td><td></td><td>2003 2000 1999 2000 1970 1970 1970 1970 1970 1970 1970 1</td><td> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4</td><td></td><td></td><td>Namice warning sign need to be corrected.  and west side, none east gato signs with VI. Sign. MIT to Carolan 66', MIZ to Callorina 106' gato signs with VI. Sign. MIT to Carolan 66', MIZ to Callorina 106' Warning signs West only, MIT to Carolan 66', MIZ to Callorina 90' ±. In the MITOD. No listed IN Wonly defined sidewalk to NA WILD. No signs stand alone. Sight tout but #89's SW &amp; NE TOP bar East. SA Modified 99's. "Dead" siding rall in place.  6 SW side does nonlider 89's. "Dead" siding rall in place.  10 outb. 22 Sinpad traveled way.  10 outb. 22 Sinpad traveled way.  11 shired A Mandid 69's and A Mandid 15's Mandid 15's</td></tr<>	Conc Conc Conc Conc AC Conc AC Conc AC Conc AC Conc Conc Conc	50.0 15.0 96.0 10.0 66.0 55.0 55.3 78.0 77.4 62.4 62.4 70.0		8 9 8 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	sign		2003 2000 1999 2000 1970 1970 1970 1970 1970 1970 1970 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			Namice warning sign need to be corrected.  and west side, none east gato signs with VI. Sign. MIT to Carolan 66', MIZ to Callorina 106' gato signs with VI. Sign. MIT to Carolan 66', MIZ to Callorina 106' Warning signs West only, MIT to Carolan 66', MIZ to Callorina 90' ±. In the MITOD. No listed IN Wonly defined sidewalk to NA WILD. No signs stand alone. Sight tout but #89's SW & NE TOP bar East. SA Modified 99's. "Dead" siding rall in place.  6 SW side does nonlider 89's. "Dead" siding rall in place.  10 outb. 22 Sinpad traveled way.  10 outb. 22 Sinpad traveled way.  11 shired A Mandid 69's and A Mandid 15's
13.04   Santa Paula Cossing   7548741,   31.01     15.62   Mornell Ped Cossing   7548795   15.00     15.63   Mornell Ped Crossing   7548795   15.00     15.63   Ouk Grown   7548866   15.50     16.34   North Lane   7548804   16.20     16.34   Hourd Awenue   7548802   16.50     16.34   Hourd Awenue   754892   16.50     16.34   Willia Terrace   754892   16.50     16.34   Willia Terrace   754892   16.50     17.09   Selevice Awenue   754892   17.10     17.20   Selevice Awenue   754892   17.10     17.20   Selevice Awenue   754892   17.10     17.20   Selevice   754892   17.10     18.20   Selevice   754892   17.10     18.20   Selevice   754892   18.10     18.20   Selevice   754892   18.10     18.20   Selevice   754892   18.10     18.20   Selevice   754892   18.10     18.21   Selevice   754892   18.10     18.22   Selevice   754892   18.10     18.23   Selevice   754892   18.10     18.24   Selevice   754892   18.10     18.25   Selevice   754892   18.00     18.26   Selevice   754892   18.00     18.27   Selevice   754892   18.00     18.28   Selevice   754892   18.00     18.29   Selevice   754892   18.00     18.20   Selevice   75	Conc Conc HUBBER Conc AC AC AC Conc Conc Conc Conc	15.0 96.0 10.0 66.0 55.0 72.5 77.4 59.1 62.4 62.4		9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	sign		2003 2000 1999 2000 1970 1970 1970 1970 1970 1970 1970 1	-	w 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			and weel side, none east g stop signs w/ Pur, Sign. MT to Carolan 66; MT2 to California 105 g stop signs w/ Pur, Sign. MT to Carolan 66; MT2 to California 105 Watering signs Weat only, MT1 to Carolan 72 ±, MT2 to California 80° ±. Watering signs Weat only, MT1 to Carolan 72 ±, MT2 to California 80° ±. Watering signs Weat only, MT1 to Carolan 72 ±, MT2 to California 80° ±. Watering signs Weat only with transition to the signs of th
15.62   Morrell Ped, Crossing   75481794   15.00     15.59   Oak Grove Avenue   7548196   15.00     15.34   South Lane   7548196   15.00     16.34   South Lane   754810   16.20     16.34   South Lane   754810   16.30     16.34   South Lane   754810   16.30     16.35   Pennisal Avenue   754810   16.30     17.30   Selbuva Avenue   754810   17.00     17.30   Selbuva Avenue   754810   17.00     17.34   2nd Avenue   754810   17.00     17.34   2nd Avenue   754810   17.00     18.20   Shi Avenue   754810   17.00     18.20   Shi Avenue   754810   18.00     24.80   Shi Avenue   754810   18.00     25.81   Shewater Avenue   754810   24.80     25.81   Shewater Avenue   754810     25.81   Shewater Avenue   754810     2	Conc Conc Conc Conc Conc Conc Conc Conc	96.0 10.0 66.0 55.0 77.4 77.4 77.4 70.0		9A STOP sign STO 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	igi		2000 1999 2000 1970 2000 1970 1970 1970 1970	0 0 0 4 0 = 4 0 4 = 4 0 0 0 4 4 = 0 0 0 4 = 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			and Vest Side, Jones Mast Inc Carclain 66; MT2 to California 106's along sides against MP. Sign. MT1 to Carclain 66; MT2 to California 106's MT2 with Vest only, which was donly, which to California 80's are stored so to the size of set out lacks to be removed with station improvements to the MT2 to California 80's are set of set out lacks to be removed with station improvements to the MT2 to be sized set out lacks to be removed with station improvements to the MT2 to be sized. We set out set of the set
15.85	HUBBEH HUBBEH AC AC AC AC AC AC AC AC Conc	10.0 66.0 55.0 77.4 77.4 59.1 62.4 70.0			uDis		1999 1970 1970 2000 1970 1999 1970 1970 1970	x x x x x x x x x x x x x x x x x x x	70 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			grado sgriss Win-Yu. 2017. M. In 10 Carolann To, M. 10. Calmornal 10. Carolannal
15.35	Cone Cone Cone Cone Cone Cone Cone Cone	55.0 55.3 78.0 77.4 59.1 62.4 70.0		n o o o o o o o o			2000 1970 2000 1970 1939 1930 1970 1970	2 4 8	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			** a varining spins were only with 10 cut board 12 ± x, with the spins of the spin of the
North Lane   75485M   16.20     South Lane   754891C   16.40     Howard Avenue   754892   16.50     Bayswater Avenue   754893   16.50     Will Tensoe   754894   16.50     Bayswater Avenue   754894   16.50     Bayswater Avenue   754894   17.80     Early Avenue   754891   17.80     Early Avenue   754891   18.00     Early Avenue   754895   18.00	AC Cone Cone Cone Cone Cone Cone Cone Con	55.3 78.0 72.5 77.4 59.1 62.4 70.0		n o o o o o o o			1970 2000 1970 1999 1970 1970 2000	4 4 1 8 0 4 7 4 6 0	4 0 0 4 4 6			Trimeast only, no stands, as foul drades to be enriched with station improvements to the MUTO's be island. NW only defined sidewalk dis NW and SE ped gates stand alone. Slight curb at #9's SW & NE (OP par East, SM Modified #9's. "Dead" siding rail in place. SW & Modified #9's. "Dead" siding rail in place. SW & Second Professional Resides with reside. The curb, 22 Simped traveled way. In stand SE Caudio @ S. Ralinoad Ave and 1st Ave int Second @ S. Halinoad Ave and 1st Ave
10.54	AC AC Cone Cone Cone Cone Cone Cone Cone Con	72.5 77.4 77.4 59.1 62.4 70.0		0 0 0 0 0 0			1970 1970 1970 1970 2000	2	4 0 0 4 4			In bind LOC, NO Issue. IN VI July guillers schewar.  As NW and RE ped gates stand alone. Sight cut at 1879 SW & NE  FOR bar East, SA Modified 48%. "Dead" siding rall in place.  EN side does nonling, Sidewak on the inside.  For ording 18%.  In ording 18%.  In ording 18%.  In ording 18%.  In siding 18% and 18%
Bayswater Avenue   754892J   16.50     Pennsua Avenue   754892A   16.50     Villa Tennoe   754892A   16.50     Villa Tennoe   754892A   16.50     Edebura Avenue   754891E   77.10     21d Avenue   754891E   77.20     21d Avenue   754891H   77.50     31d Avenue   754891H   18.50     31d Avenue   754891H   18.50     31d Avenue   754891E   18.50     31d Avenue   754894E   18.50     31d Avenue	Conc Conc Conc	72.5 77.4 59.1 62.4 70.0 70.0		0 0 0 0 0			1970 1999 1970 1970 2000	2 2 4 E E	4 4 4			TOP lear East. SA Modelled #95s. "Dead" soliding place. Set Wile deb does nothing, Sidewark on the inside. Local Carlot and the set of the set
Peninsula Avenue   75-489.84   16.00	Conc Conc Conc	59.1 62.4 70.0 70.0		0 0 0 0			1999 1970 2000	2 4 - 2	4 4 4			e SW side does nothing, Sidewalk on the inside.  bine (SA) modified #9s to curb, 22 Sinped taveled way asher SE Cuad @ S. Ralinoad Ave and 1st Ave sint SE Cuad @ S. Ralinoad Ave and 1st Ave
Villa Tentace   75-499A   16.90     Believu Aeruse   75-4956   77.10     151 Aeruse   75-4901   77.90     2nd Aeruse   75-4901   77.80     3nd Aeruse   75-4901   77.80     3nd Aeruse   75-4902   77.80     4nd Aeruse   75-4902   81.00     5nd Aeruse   75-4904   81.00     5nd Aeruse   75-4904   81.00     5nd Aeruse   75-4904   81.00     5nd Aeruse   75-4906   81.00     75-4906     75-4906   81.00     75-4906   81.00     75-4906   81.00     75	AC Conc Conc	59.1 62.4 70.0 70.0		0 0 0			1970 1970 2000	4 - 2	7 7 7 C	-		lone (SA) modified #9s to to cuth, 22 Sintped traveled way asafer SE Cuad ® S. Ralincad Ave and 1st Ave Rint SE Quad ® S. Ralincad Ave & 2nd Ave
Belleviue Avenue   7746956E   7710	Conc	62.4 70.0 70.0		o o			1970	- 2	4 4	Н		In outh, 22 Striped traveled way. Strained Ave and 1st Ave int SC Duad © 3. Falliored Ave and 1st Ave int SC Duad © 3. Falliored Ave & 2nd Ave
1st Avenue 7549007 17.70 2nd Avenue 7549016 17.80 2nd Avenue 754902M 18.00 4th Avenue 754904M 18.00 2sh Avenue 754904M 18.00 2sh Avenue 754904M 18.30 2sh Avenue 754905M 18.30 Whitple Avenue 754905M 259 Whitple Avenue 754905M 24.80	Conc	70.0		6			2000	1 2			4 No left flas	asher SE Quad @ S. Railroad Ave and 1st Ave nnt SE Quad @ S. Railroad Ave & 2nd Ave
2014 Avenue 754401F 17 80 2014 Avenue 7544020U 17.90 411 Avenue 7544020U 18.00 518 Avenue 754404E 18.10 2518 Avenue 754405E 18.70 Whipple Avenue 754405E 19.70 Whitple Avenue 754405E 19.70	Conc	70.0					,		5 d	3 4		ight SE Quad @ S. Railroad Ave & 2nd Ave
274892M   7790	Conc			6		+	2000	1 2	4	4	4 No left ligh	
411 Avenue 7549040 18.00 511 Avenue 7549048 18.10 511 Avenue 754905H 18.30 5261 Avenue 754905E 19.70 Whipple Avenue 754935A 24.80 Bewsler Avenue 754935A 24.80	Cucio	0.08 0.0	CWD	94	2	2 14,000	2000	-	4	9 4	4 Advance w	Advance warning sign West only. Ped gates: NW, SE - SA; NE - w/94; SW - w/9. No left flasher SE on RR Ave @ 3rd Ave
9th Avenue 754905H 18.30 25th Avenue 754910E 19.70 Whipple Avenue 754936G 25.20	2000	70.0	+	n o	¥ 0	6,000	2000		e c	2 c	2 46 Iravele	46 ITAVERO WAYON S. KAIIFOAD AVE. SE GUAD NO RIT TUTH IIGNT (SA) INW QUAD NO IRT TUTH IIGNT (SA)
25th Avenue 7549105 19.70 Whipple Avenue 7549364 24.80 Brewster Avenue 7549364 25.20	Conc	2007	+	n o	n 0	9,000	2000	-	0 0	÷	٠	40 Have way, no let unit independent light & NE Coad. 54' curb to curb travated way 45' to Railwad Ave from MT2 40' to S. Railwad Ave from MT1.
Whipple Avenue 754935A 24.80 Brewster Avenue 754936G 25.20	200	840	+	٥	ν δ	12 000	2000	0	0 0			יוט טווט וומראינים אינון דע נוט וומוויסם לאיני ווטוו אין בן דע נוט טי וומוויסם איני ווטוו אין ו
Brewster Avenue 754936G 25.20	Conc	120.0	-	5 6	6 0	27.000	2000	4 -	2 2	2 2	No ped dat	No ped cates. Center island both approaches
	Conc	_		9A	A6	0000'9	2000	- 2	2	2	No ped gates	gates
25.34 Broadway 754937N 25.40 RDWC	Conc	-	H	9A	A6	10,000	2000	-	-	-	Ped gates	Ped gates SW and SE only
25.78 Maple Street 754940W 25.70 RDWC	Conc	<b>&gt;</b> 0.07 0.07	CWD	6	6	2,000	2000	-	-	2	3 No ped gates	gates
Main Street 754941D 25.80	Conc	0		6	6	000'6	1999	1 2	3 2	3 1	No ped gates	
Chestrut Street 754942K 26.00 F	Conc	70.0	CWD	6	6	000'9	2000	1 2	2 2	1 1	No ped gates.	gates. Raised median island on street approaches.
Fair Oaks Lane 754986K 27.70	AC	50.3		6	6	4,000	1996	3	2 2	-	3 Sidewalk S	Sidewalk SW only, No ped gates
Watkins Avenue 754987S 28.00	AC	37.0		6	6	2,000	1995	1 2	2 2	-	No sidewa	No sidewalk, no ped. Gates
Encinal Avenue 754988Y 28.40	Conc	0.09		6	6	5,000	1999	-	5		_	
36 28.58 Gienwood Avenue 754989F 28.50 MLPK	Conc	0.09 0.09	CWD	n o	<b>5</b> 0	7,000	1999	-			This areas	This according north of Manla Boak Challan
28 98 Bayeneward Avenue 754991G 29.00	one Const	- 00	+	n o	6 6	27,000	1999				Manlo Parl	This crossing hours of well of rath Station. Manly Park Station is at North Madian island center nates
Alma Street 754992N 29.80	Conc	74.0	+		, o	21 000	2005	6		er.	Sidewalko	Sidewalk only on NF Bike lanes. Median islands
Churchill Avenue 754998E 31.00	L	62.9	+	6	9A 2	2 10.100	1992	3	8	4	SA Ped G	SA Ped Gate @ NW. Trees, fences, etc. all quadrants
W Meadow Drive 755010S 33.00	Rubber	75.3		6		2 9,000	1992	3 2	3 4	8	3 SA Traffic	fic Signals @ Intersection, View traffic east to west poor view
Charlston Avenue 755011Y 33.40	Rubber	78.3 78.2	CWD	6	9A 2		1992	3 2	2 3	3	3 Signalized	Signalized Intersection
Rengstorff Avenue 755013M 34.70	AC	0.86		6	6	20,000	1980	3 2	1 1	1 1	2 5' Median i	5 Median islands both approaches.
35.94 Castro Street 755015B 35.90	Conc	110.0		6	1	1 38,000	2000	-	-	-	2 Median isk	Median island on both approaches. Eastbound gate on island
Mary Avenue 755037B 37.90	Conc	140.0	+	94	6	45,000	2000	-	2 2	- 8	5° wide me	5' wide median island with gates for both approaches
Sunnyvale Avenue 755042X 38.90	Conc	80.0 80.1	CWD	o o	6	21,000	2000	-		- ·	- 2	And Complete the second
Stockton Avenue 755082V 45.55	S AC	-	+	•		4,000	1970	0	n c	4	JPB & City	JPB & City of san Jose are currently working for closure of this crossing.
47.60	Ė	02.0	CWD	n c	n 0	0,000	2004	- 0	2 0			

VEHICULAR AND PUBLIC PEDESTRIAN GRADE CROSSINGS SUMMARY

- 53.51 Skyway Ave.
- 54.01 Branham Lane
- 54.91 Chynoweth Ave.
- 59.66 Blanchard Rd.
- 60.31 Emada Ave.
- 60.76 Bailey Ave.
- 61.11 Farm road
- 61.41 Laguna Ave.
- 61.80 Richmond Ave.
- 62.20 Private crossing
- 62.70 Palm Ave.
- 64.10 Live Oak Ave.
- 65.17 Tilton Ave.
- 66.70 Private crossing
- 67.30 Main St.
- 67.70 Dunne Ave.
- 66.90 Tennant Ave.
- 71.30 San Martin Ave.
- 72.70 Church Ave.
- 73.00 Private crossing
- 73.60 Masten Ave.
- 73.90 Rucker Ave.
- 74.70 Buena Vista Ave.
- 75.10 Cohansey Ave.
- 75.30 Private crossing
- 75.40 Las Animas Ave.
- 76.20 Leavesly Ave.
- 76.29 Pedestrian crossing
- 76.80 I.O.O.F. St.
- 77.00 Lewis St.
- 77.15 Martin St.
- 77.30 6th St.
- 77.40 7th St.

Appendix C: Listing of Crossings	

60

### **APPENDIX D: CALTRAIN SCHEDULE**

The Caltrain northbound and southbound weekday service schedule of trains was obtained from the Caltrain website, <a href="http://www.caltrain.com/schedule.html">http://www.caltrain.com/schedule.html</a>, accessed February 2010.

### Northbound - Weekday Service

Morning to Early Afternoon - Page 1 of 2

See Page 2 For Early Afternoon and Evening Times WEEKDAY SERVICE = 2:02 2:13 8 2:27 ë 10:10 11:10 12:10 12:02 1:02 12:41 147 11:24 12:24 11:29 12:29 11:33 12:33 12:37 10:44 11:44 12:44 11:53 12:53 12:17 1:17 11:37 11:41 11:49 11:58 11:05 12:05 11:13 12:13 12:21 143 11:08 12:08 10:24 10:29 10:33 10:41 10:53 11:02 10:37 138 10:33 10:45 10:14 10:36 10:41 9:40 0:03 10:26 10:29 11:02 0:07 9:59 237 10:05 10:13 10:08 10:17 10:27 135 233 8:45 9:36 8:59 9:29 9:07 9:17 231 9:11 8 733 7:55 8:02 8:23 8:36 8:51 8:59 9:05 8:31 8:27 227 GILROY / SAN JOSE to SAN FRANCISCO - Northbound 8:32 8:57 225 323 8:48 8:08 6:58 7:20 1.25 8:05 8:33 8:21 227 319 89 8:05 217 6:57 215 7:57 313 7.42 6:22 211 899 900 29. 6:36 7:19 5:57 6.23 207 7:05 6:51 6.42 38 5.28 5:39 103 5.33 4:53 Train # 101 Santa Clara 4:35 Sunnyvale 4:44 Palo Alto 5:01 Menio Park 5:04 5:22 5:28 San Bruno 5:37 Jose Diridon 4:30 Mountain View 4:49 California Avenue 4:57 6:01 Lawrence 4:40 Belmont Millbrae San Martin Morgan Hill Tamien San Antonio Hillsdale San Mateo San Francisco Bayshore San Carlos Hayward Park Burlingame 22"d Street San Francisco Gliroy Redwood City College Park Blossom Hill Capitol San

Train bypassos station. + Train may leave up to 5 minutes early.

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Morning to Early Afternoon - Page 1 of 2

## **WEEKDAY SERVICE** SAN FRANCISCO to SAN JOSE / GILROY - Southbound

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+ Train may leave up to 5 minutes early

Train bypasses station.

Timed Transfers

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Train bypasses station. + Train may leave up to 5 minutes early.

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Appendix D:	Caltrain	Schedule	

66

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### **ABBREVIATIONS AND ACRONYMS**

ACE	Altamont Commuter Express
BART	Bay Area Rapid Transit
Caltrans	California Department of Transportation
CDC	Centers for Disease Control
ECML	East Coast Main Line
PCJPB	Peninsula Corridor Joint Powers Board
SOVRN	Suicides and Open Verdicts on the Railway Network [project]
VTA	Valley Transit Authority

Abbreviations and Acronyms	

72

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