King
ENGINEERING ASSOCIATES, INC.

City of Tampa Railroad Crossing

Quiet Zone Cost & Feasibility Study | October 2014

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1. INTRODUCTION

1.1 INTRODUCTION

The City of Tampa, like most major metropolitan areas in Florida, developed and grew with the railroad as an integral part of the community and its history. Henry Plant brought the first trains to Tampa in 1884 with the establishment of the South Florida Railroad line that came in along Ybor City's Sixth Avenue, and then curved southwest to run along Tampa's downtown Polk Street. In the 1890's, the Florida Central & Peninsular Railway company expanded the rail line from downtown to Port Tampa. The initial rail service served both passenger and freight; however, since the advent of the Interstate Highway System and air travel in the 1960's, only freight rail continues through downtown to Port Tampa.

The practice of trains sounding their horns to alert motorists and pedestrians of an on-coming train at highway-rail grade crossing has become synonymous with living near railroad tracks after decades of practice. As residential communities throughout the City of Tampa have continued to encroach on the pre-existing train rail lines, the number of noise complaints being lodged by citizens has increased. As a nation, we are also becoming more sensitive to disruptive sources of noise in our environment. This reflects success in building quieter communities and in engineering noise out of our daily life.

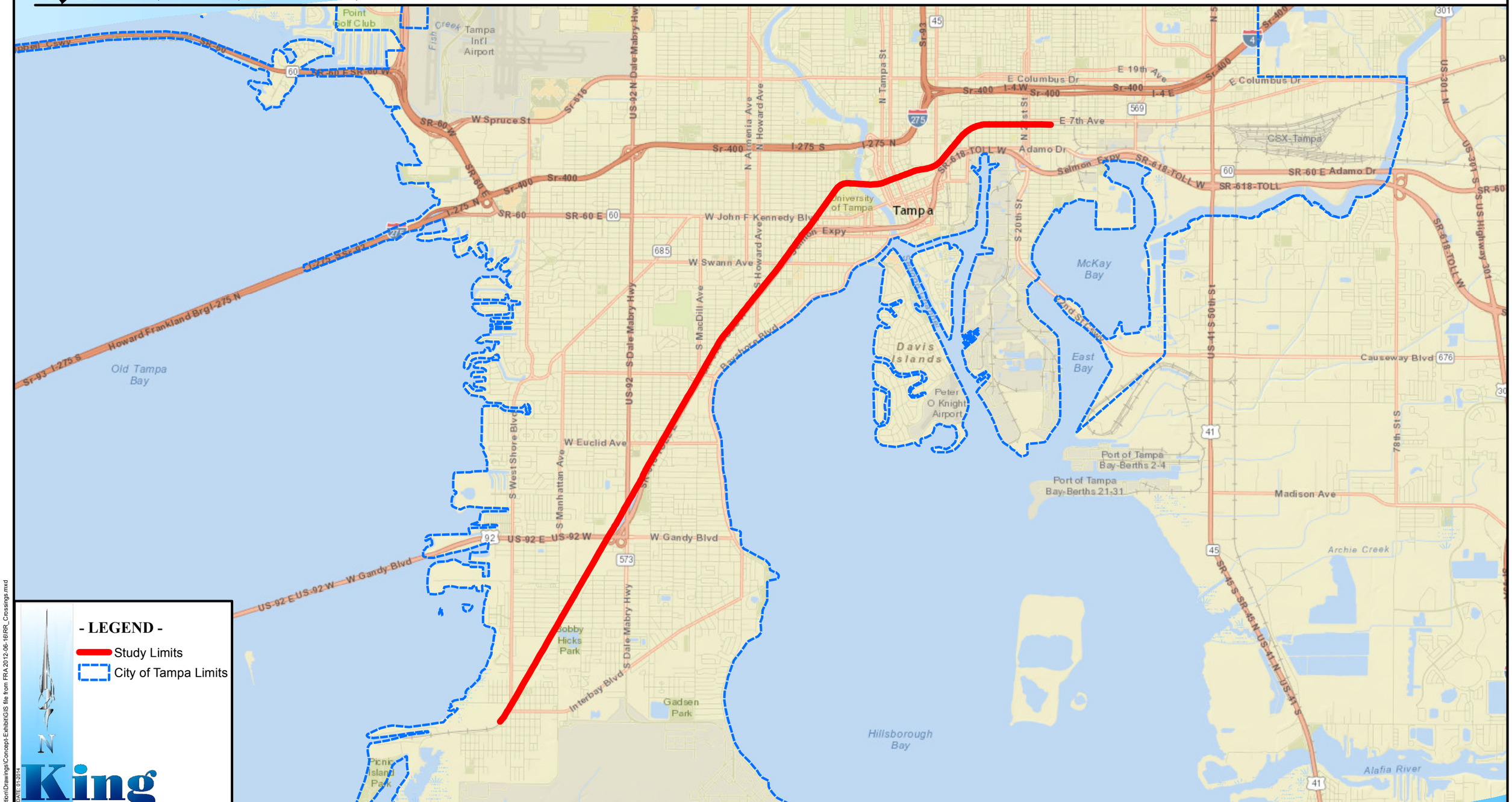
The Federal Government, in response to the national concerns on train horn noise, enacted Public Law 103-440, which mandates that the Federal Railroad Administration (FRA) issue regulations to require the use of locomotive horns at public grade crossings, but gives the agency the authority to make reasonable exceptions. The law permitted the FRA to issue new rules providing exceptions to that requirement to enable communities to create Quiet Zones in which locomotive horns are not routinely sounded at grade crossings. The rule promotes the quality of life by permitting the silencing of locomotive horns at grade crossings while at the same time ensuring that safety is maintained at those crossings.

In response to increased citizen complaints and at the direction of the City Council, the City of Tampa Public Works retained King Engineering and Associates (King) to study the feasibility and cost of establishing Quiet Zones for crossings located along the rail line between Ybor City and Port Tampa. The rail line location and study limits are shown on the Exhibit 1-1: Project Location Map (see next sheet). The study area consists of 47 at-grade railroad crossings located over along approximately 9.5 miles of rail.

The main objective of this study is to evaluate each of the crossings based on FRA's "Train Horn Rule" to determine the cost and feasibility of establishing Quiet Zones and to identify sources of funding.

QUIET ZONE STUDY

EXHIBIT 1-1: PROJECT LOCATION



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Study Limits

City of Tampa Limits

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It is emphasized that this study is a preliminary assessment of a complex issue. Moreover, this study does *not* attempt to expound upon the more general question of whether the practice of sounding railroad horns will significantly reduce the incidence of highway-rail grade crossing collisions. Nor does it consider whether the FRA's criteria for quiet zones are reasonable or cost-effective.

1.2 BACKGROUND

On January 13, 2000, the Federal Railroad Administration (FRA) published a Notice of Proposed Rule Making (NPRM) in the Federal Register (65 FR 2230) addressing the use of locomotive horns at public highway-rail grade crossings. This rulemaking was mandated by Public Law 103-440, which added section 20153 to title 49 of the United States Code. The statute requires the Secretary of Transportation (whose authority in this area has been delegated to the Federal Railroad Administrator under 49 CFR 1.49), to issue regulations to require the use of locomotive horns at public grade crossings, but gives the agency the authority to make reasonable exceptions.

The ruling clarifies that locomotive horns must be sounded while approaching and entering upon each public highway-rail grade crossing. The horn sound level must be a minimum of 96 dB(A) and no louder than 110 dB(A) measured 100 feet in front of the locomotive and 15 feet above the rail. All locomotives must sound the horn in the standard sequence of two longs, one short, and one long starting at least 15 seconds, but no more than 20 seconds before reaching the grade crossing, however, in no case may the horn be sounded more than ¼ mile before the crossing.

The rule provides an exception in circumstances in which there is not a significant risk of loss of life or serious personal injury, use of the locomotive horn is impractical, or safety measures fully compensate for the absence of the warning provided by the horn. The FRA allows for the creation of federally designated 'Quiet Zones', i.e., areas in which railroad train operators are formally relieved of their obligation to sound their horn in non-emergency situations. The proposed rule also defines the procedures to be followed and the federally approved safety measures to be installed in order to establish a Quiet Zone. The rule also details actions communities with pre-existing "whistle bans" can take to preserve the quiet they have become accustomed to. The City of Tampa, however, does not have any pre-existing whistle bans.

FRA issued Final Rule on April 27, 2005 after reviewing almost 1400 public comments on Interim Final Rule, which was published on December 18, 2003. Interim Final Rule was issued after reviewing almost 3000 public comments on the NPRM and the Draft Environmental Impact Statement. The rule became effective until **June 24, 2005**. Once this rule was in effect, the sounding of locomotive horns at all public highway-rail grade crossings nationwide was mandated by this ruling.

2. LITERATURE REVIEW

2.1 OVERVIEW

In an effort to evaluate the pros and cons of establishing a quiet zone, a statewide and national research was done to see if any local authorities have already implemented pre-rule quiet zones. The research results indicated no existing pre-rule quiet zones in the State of Florida. However, nighttime whistle bans were established in the State of Florida before the issuance of interim final rule. This section describes the results of the Florida nighttime whistle bans and two pre-rule quiet zones that were established conforming to the standards indicated in the Interim Final Rule.

2.2 FRA'S STUDY OF THE FLORIDA TRAIN WHISTLE BAN

Effective July 1, 1984, Florida authorized local governments to ban the nighttime use of whistles by intrastate trains approaching highway-rail grade crossings equipped with flashing lights, bells, crossing gates, and highway signs that warned motorists that train whistles would not be sounded at night. Fla. Stat. section 351.03(4)(a) (1984). After enactment of this Florida law, many local jurisdictions passed whistle ban ordinances. Hillsborough County did not participate in this ordinance.

In August 1990, FRA issued a study of the effect of the Florida train whistle ban up to the end of 1989. The study compared the number of collisions at crossings subject to bans with four control groups.

Using the first control group, FRA compared collision records for time periods before and during the bans. FRA found there were almost three times more collisions after the whistle bans were established, a 195 percent increase.

In the second control group, FRA found that the *daytime* collision rates remained virtually unchanged for the same highway-rail crossings where the whistle bans were in effect during nighttime hours.

The third control group showed that nighttime collisions increased only 23 percent along the same rail line at crossings with no whistle ban.

Finally, FRA compared the 1984 through 1989 accident record of the Florida East Coast Railway Company (FEC), which, because it was considered an ''intrastate'' carrier under Florida law, was required to comply with local whistle bans, with that of the parallel rail line of interstate carrier, CSX Transportation Company (CSX), which was not subject to the whistle ban law. By December 31, 1989, 511 of the FEC's 600 gate-equipped crossings were affected by whistle bans. Collision data from the same period were available for 224 similarly equipped CSX crossings in the six counties in which both railroads operate. As noted above, FRA found that

FEC's nighttime collision rate increased 195 percent after whistle bans were imposed. At similarly equipped CSX crossings, the number of collisions increased 67 percent.

On July 26, 1991, FRA issued an emergency order to end whistle bans in Florida. Notice of that emergency order (Emergency Order No. 15) was published in the **Federal Register** at 56 FR 36190. This order preempted State and local laws that permitted the nighttime ban on the use of locomotive horns.

As indicated earlier, Florida nighttime whistle ban was issued before the interim final rule (2003) was issued, therefore, the railroad crossings did not conform to the safety standards identified in interim final rule (2003). This may be one of the possible causes of high collision rates at railroad crossings during the period that the whistle ban was effective. The following studies identify the successful pre-rule quiet zones that were established which do conform to the FRA safety standards on use of locomotive horns at public highway-rail grade crossings.

2.3 LOUISVILLE, KY

Working closely with the FRA, the City of Louisville, CSX Transportation and the Kentucky Transportation Cabinet (KYTC) created the first major quiet zone in the country. The corridor is located in Louisville, Kentucky along CSX Transportation's Louisville Division. The project area included 12 highway-rail grade crossings. The project was undertaken by the City of Louisville, the Commonwealth of Kentucky, the Federal Railroad Administration and the CSX railroad to reduce the locomotive whistle complaints in the area. The objective of the project was to provide a highway/rail grade crossing safety plan that would allow trains to pass through a specified corridor without blowing the locomotive horn. In addition, improvements were made to the existing crossing warning devices as well as closure of certain crossings so as to gain support from the residents and local businesses.

Many obstacles were encountered in implementing the project. Heading these were parallel streets, dual tracks, one-way streets, and a curved railroad alignment, in addition to antiquated signal devices and numerous unsignalized alley crossings.

In the final assessment, traffic pattern changes were agreed upon by city officials, including closures of some street crossings and of the alley crossings. Upgrades to the existing crossing warning devices were undertaken by CSX to meet the proposed FRA rules and curb cuts and bollards were installed by the city along with widening of the streets themselves.

Modification of the traffic pattern, in particular of one-way streets, allowed utilization of signal equipment which maximized crossing closure and required only upgrades to existing appliances which held down capital costs.

Full cooperation between all parties culminated in the success of the project. The project zone was comprised initially of 12 crossings, which were reduced to five with implementation of the quiet zone project. Each of the participants defrayed a part of the total cost. The agreement to

close crossings lowered railroad liability risks, allowing CSX to agree to the following schedule of financial participation:

Funding for Quiet Zone

$750,000 Commonwealth of Kentucky
$100,000 City of Louisville
$ 50,000 CSX Transportation (CSX absorbed the cost of upgrading all five of the remaining crossings and the removal of the seven closed crossings.)

These are only estimated costs, based on year 2000 dollars. The entire process obviously could not have been accomplished without cooperation from all the participants.

2.4 CHARLOTTE, NC

In North Carolina there is a joint effort of the state's Department of Transportation, Norfolk Southern Corporation's Innovative Research Group and the Federal Railroad Administration to develop high-speed rail.

The designation of this corridor as a potential "High Speed Rail Corridor" by the U.S. Congress allowed federal funding to be utilized. This classification also allowed for studies to be implemented to ensure that the decisions made for a safe installation were indeed proven effective.

Sugar Creek Road, located in the Charlotte area on a double–track main line of the Norfolk Southern, was the site for an elaborate project to measure safety impacts of alternative improvements. This rail line carries over 24 freight and 6 passenger trains every 24 hours. The trains are operated at maximum speeds of 59-mph for freight and 79-mph for passenger. The crossing also sees a heavy volume of vehicular traffic (more than 21,000 per day) and was targeted as a test location because of its numerous accidents and many near misses.

The Sugar Creek Road test project began with a four-phase program. Video cameras were installed on both sides of the crossing to observe driver behavior. Each camera, activated by the existing grade-crossing circuitry, took images every half-second of vehicles approaching and leaving the crossing. Infrared sensors and split-image video screen technology were used to determine if violations had occurred. These data were then analyzed to determine effectiveness of each of the project phases.

Phase 1 (three months in length) focused on observation and evaluation of driver behavior and collected baseline data without making changes to the crossing which was equipped with conventional crossing warning devices consisting of lights, bells, and single-arm gates.

Phase 2 consisted of the installation of median barrier channelization devices. These consisted of a separator measuring 12 inches in width, raised 4 inches above the roadway surface. High

intensity yellow reflective sheeting was placed on each separator and reflective arcs were installed on 36 inch high posts installed at six-foot intervals to a distance of 100 feet on both sides of the crossing. This arrangement was tested for another three-month period.

In Phase 3 the channelization devices were removed and replaced with four-quadrant gates. The test of this configuration also was of three months duration. For the final portion of the test (Phase 4), the channelization devices were reinstalled to supplement the four quadrant gate system still in place, and the configuration studied for a three month period.

The findings from each phase demonstrated that when a change was made improving the safety of the crossing, the incidence of accidents and near miss collisions was reduced.

Safety improvements made in the second phase decreased the percentage of near misses or accidents by 77 percent. In the next phase the near misses or accidents were reduced by 87 percent over the base. The final phase of maximum protection resulted in a 97 percent reduction of incidents from the Phase 1 level.

The findings at Sugar Creek Road confirm that four-quadrant gates with channelization devices significantly reduce the chances of automobile-train accidents. Although capital investment is increased, risk and liability exposure decreased. NCDOT concluded that the cost-benefit ratio justified the added investment.

2.5 CURRENT QUIET ZONE LOCATIONS

According to a report by the Federal Rail Administration, as of 10/17/2013, there had been a total of 570 Quiet Zones established in the United States, of which eleven (11) were currently established in the State of Florida, mostly in the Miami Area. Recently, other municipalities have established quiet zones in their regions. On June 7, 2014, Downtown Lakeland, Florida was officially recognized as a quiet zone.

3. INVENTORY OF AT-GRADE RAILROAD CROSSINGS

3.1 OVERVIEW

The Federal Railroad Administration maintains the Highway-Rail Crossing Inventory Program, as required by law, to inventory every rail crossing in the nation. Every crossing is assigned a unique Crossing Inventory Number which is a six digit number followed by an alphabetical character. The inventory information for each crossing includes the physical location with latitude/longitude coordinates, classification, traffic control and warning devices, railroad information, and highway information. The inventory information is obtained and recorded in the U.S. DOT National Highway-Rail Crossing Inventory File based on input provided by the State and the Railroad. Under normal circumstances, FRA will only accept updates to the Inventory File from the State and the Railroad Inventory Contacts who are employed by the State or the Railroad with the authority to make changes. Public authorities who are looking to create a Quiet Zone are required to initially update the Inventory File for the crossings within the proposed Quiet Zone. Once a Quiet Zone is established, the Inventory File must be updated periodically.

3.2 DATA COLLECTION AND SITE REVIEW

The most recent inventory information for each of the highway-rail grade crossings was obtained from the FRA's Office of Safety Analysis website. The online inventory contains information related to the following items:

1. Location and Classification of Crossing
2. Location Railroad Information
3. Traffic Control Device Information
4. Physical Characteristics
5. Highway Information

All appropriate information necessary to evaluate each of the crossings for a quiet zone was gathered from the website (http://safetydata.fra.dot.gov/officeofsafety/). In addition to the inventory information from the website, FRA provided GIS data shape files of the inventory. Crossing inventory information was also obtained from CSX's Public Project Division to confirm that the most recent/accurate inventory information was recorded for each of the crossings. Table 3-1 is a summary of the inventory information provided by FRA and CSX for all of the crossings within the study area. A site review of each crossing was conducted to confirm the crossing number, the coordinate location, physical conditions, and the Traffic Control Devices (Crossing Warning Devices). The railroad information such as number of daily train movements, train detection system, and maximum speeds of the train were verified with CSX. Photographs were taken for each grade crossing identifying the traffic control devices and general physical features of the roadway from each approach. A copy of these photographs is provided in Appendix A (see attachment).

Crossing Number	CROSSING	HIGHWAY	STREET	MILEPOST	TYPE CROSSING	TRAIN SPEED	AADT	AADTYEAR	TOTAL AVG DAILY TRAINS	HIGHWAY SPEED	CROSSING WARNING DEVICES	TRAIN DETECTION
1	626275P		26TH ST	088062	Public	45	002603	2008	5	30	Flashing Lights & Gates	Motion
2	626277D		24TH ST	088073	Public	45	000674	2008	5	30	Flashing Lights & Gates	Motion
3	626278K		23RD ST	088081	Public	45	001177	2008	5	30	Flashing Lights & Gates	Motion
4	626279S	SR 585	N SR 585/22ND ST	088087	Public	45	016000	2008	5	30	Flashing Lights & Gates	Motion
5	626280L	SR 585	E SR 585/21ST ST	088094	Public	45	014000	2001	5	30	Flashing Lights & Gates	Motion
6	626281T		20TH ST	088102	Public	45	000744	2008	5	35	Flashing Lights & Gates	Motion
7	626282A		19TH ST	088109	Public	45	003171	2008	5	35	Flashing Lights & Gates	Motion
8	626283G		18TH ST	088116	Public	45	001340	2008	5	30	Flashing Lights & Gates	Motion
9	626284N		17TH ST	088123	Public	45	001397	2008	5	30	Flashing Lights & Gates	Motion
10	626285V		16TH STREET	088130	Public	45	000193	1988	5	15	Flashing Lights & Gates	Motion
11	626286C		15TH ST	088138	Public	25	002285	2008	5	35	Flashing Lights & Gates	Constant Warning Time
12	626287J		REPUBLICA DE CUBA	088145	Public	25	001937	2008	5	35	Flashing Lights & Gates	Constant Warning Time
13	643886Y		TBD	88164	Public	TBD			TBD	N/A	Flashing Lights & Gates	
14	626293M	SR 45	NEBRASKA AVE	088203	Public	10	006100	2008	0	35	Flashing Lights & Gates	Constant Warning Time
15	626294U		N JEFFERSON ST	088227	Public	10	005000	2003	0	30	Flashing Lights only	Motion
16	626295B		N PIERCE ST	088233	Public	10	011500	2008	0	35	Flashing Lights only	Motion
17	626296H		MORGAN ST	088238	Public	10	004700	2008	0	35	Flashing Lights only	Motion
18	626297P		MARION ST	088244	Public	10	001324	2008	0	30	No signs or signals	Motion
19	626298W	SR 685	N FLORIDA AVE	088249	Public	10	019000	2001	0	35	Flashing Lights only	Motion
20	626299D		FRANKLIN ST MALL	088255	Public	10	000115	2008	0	35	Flashing Lights only	Motion
21	626300V	SR 685	S TAMPA ST	088260	Public	10	013500	2001	0	35	Flashing Lights only	Motion
22	626301C		ASHLEY DR	088266	Public	10	034500	2008	0	35	Flashing Lights only	Motion
23	626302J		DOYLE CARLTON DR	088279	Public	10	005491	2008	0	30	Flashing Lights only	Motion
24	626303R		NORTH BLVD	088313	Public	10	013300	2008	0	35	Flashing Lights & Gates	Motion
25	626304X	SR 60	W KENNEDY BLVD	088359	Public	10	032500	2001	0	40	Flashing Lights & Gates	Constant Warning Time
26	626305E		WILLOW AVE.	088358	Public	5	000001	2010	4	30	Flashing Lights & Gates	Constant Warning Time
27	626306L		W CLEVELAND ST	088371	Public	10	012454	2003	0	40	Flashing Lights & Gates	Motion
28	626308A		E PLATT ST	088385	Public	10	011792	2003	0	35	Flashing Lights & Gates	Motion
29	626334P		SWANN AVE	088423	Public	10	021506	2008	0	30	Flashing Lights & Gates	Motion
30	626335W		MORRISON AVE	088455	Public	10	002854	2003	0	30	Flashing Lights & Gates	Motion
31	626336D		HOWARD AVE	088465	Public	10	015165	2003	0	30	Flashing Lights & Gates	Motion
32	626337K		WATROUS AVE	088470	Public	10	001740	2008	0	25	Flashing Lights & Gates	Motion
33	626338S		MISSISSIPPI AVE	088498	Public	10	005006	2008	0	35	Flashing Lights & Gates	Motion
34	626341A		BAY TO BAY BLVD	088574	Public	10	020304	2003	0	35	Flashing Lights & Gates	Motion
35	626342G		MACDILL AVE	088579	Public	10	029126	2003	0	35	Flashing Lights & Gates	Motion
36	626343N		EL PRADO BLVD	088639	Public	10	006050	2003	0	30	Flashing Lights & Gates	Motion
37	626344V		EUCLID AVE	088661	Public	10	014662	2008	0	30	Flashing Lights & Gates	Motion
38	626345C		S HIMES AVE	088683	Public	10	015096	2003	0	35	Flashing Lights & Gates	Motion
39	626346J	SR 600	DALE MABRY HWY	088737	Public	10	033500	2008	0	45	Flashing Lights & Gates	Motion
40	626349E	SR 600	GANDY BLVD	088779	Public	10	042000	2008	0	45	Flashing Lights & Gates	Constant Warning Time
41	626350Y		PEARL AVE	088827	Public	10	006709	2008	0	25	Flashing Lights & Gates	Motion
42	626361L		OKLAHOMA AVE	088857	Public	10	003367	2008	0	30	Flashing Lights only	TBD
43	626362T		IOWA AVE	088880	Public	10	003257	2008	0	25	Flashing Lights & Gates	Motion
44	626363A		MANHATTAN AVE	088888	Public	10	009969	2003	0	35	Flashing Lights & Gates	Motion
45	626366V		MCCOY ST	088968	Public	10	002354	2008	0	25	Flashing Lights only	Motion
46	626367C		PRESCOTT ST	088988	Public	10	001154	2008	0	25	Flashing Lights only	Motion
47	626368J	CR 587	WEST SHORE BLVD	088991	Public	10	010391	2003	0	30	Flashing Lights & Gates	Motion

Table 3-1: Existing Crossing Inventory

4. ESTABLISHING QUIET ZONES

4.1 OVERVIEW

A Quiet Zone means a segment of a rail line, within which is situated one or a number of consecutive public crossings at which locomotive horns are not routinely sounded.

On January 13, 2000, the FRA published a Notice of Proposed Rulemaking to address the use of locomotive horns at public highway-rail crossings. Due to the substantial and wide-ranging public interest in the proposed rulemaking, FRA conducted a series of public hearings throughout the United States. Due to overwhelming comments, FRA sponsored the 'General Health Effects of Transportation Noise' (FRA/RDV-03/01) report to support a rulemaking process about the use of locomotive horns and the accompanying environmental impact statement. The findings of the report provided justification for FRA to include the provisions for the creation and establishment of Quiet Zones under the 'Use of Locomotive Horns at Highway-Rail Grade Crossings; Final Rule'. The main purpose of establishing the quiet zone is to improve the quality of life of the communities in close proximity to the crossing.

Under the current conditions, all of the crossings within the study area are public and require the sounding of the locomotive horn by the approaching train with two long blasts, one short blast and one long blast until such time as the locomotive enters the crossing. The locomotive is to begin the train horn approximately 15 to 20 seconds in advance of the crossing.

4.2 POTENTIAL QUIET ZONES

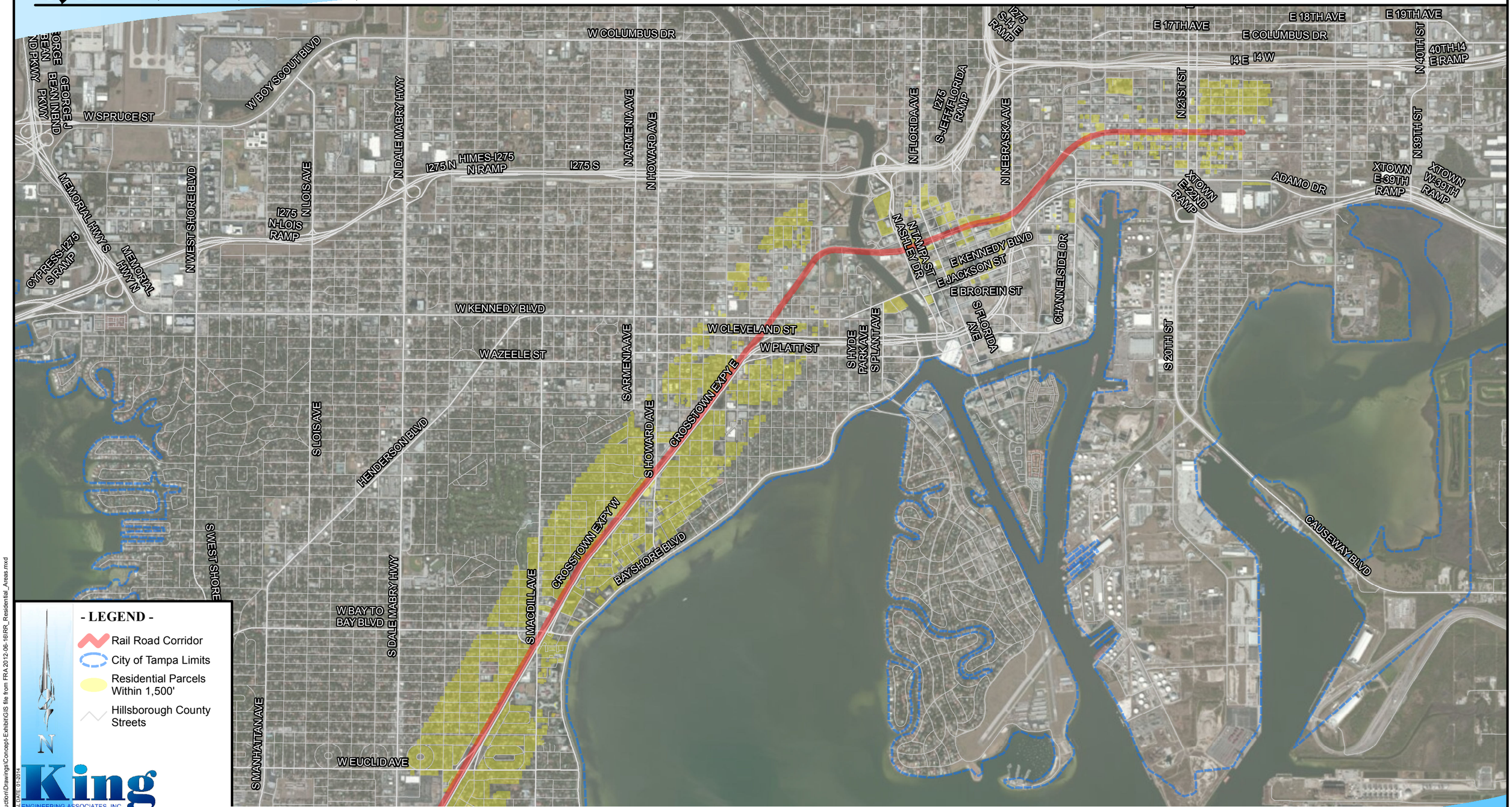
Since Quiet Zones are a quality of life issue, crossings that are located adjacent to or within close proximity to residential dwellings are considered as primary candidates for establishment of a Quiet Zone. Exhibits 4-1a &4-1b: Residential Areas North & South (see next 2 sheets) show the residential parcels within close proximity (1,500 feet) of the subject rail line between Ybor City and Port Tampa. Based on this criterion, all of the rail grade crossings within the study area were evaluated for a Quiet Zone.

The 47 crossings within the study area were divided into 11 separate potential Quiet Zone segments or groupings based upon:

- Geographic proximity – The crossings in the Ybor City area are all located within 1/8 mile of one another. The effectiveness of the Quiet Zone would be diminished if another crossing within this area were not part of the Quiet Zone.
- Strategic Upgrades – Some crossings are found to qualify for a Quiet Zone with little to no cost for upgrades while others may be costly to qualify. As such, some crossings are cost prohibitive to qualify for a Quiet Zone and would substantially increase the cost of a group of crossings if included.

QUIET ZONE STUDY

EXHIBIT 4-1A: RESIDENTIAL AREAS NORTH



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QUIET ZONE STUDY

EXHIBIT 4-1B: RESIDENTIAL AREAS SOUTH

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Of special interest to the City are the downtown area crossings along Polk Street. As downtown continues to experience growth in the development of condominiums and apartment complexes, the complaints and desire to silence the train horns has grown also.

A map of each of the potential Quiet Zones, QZ-1 thru QZ -11, is included in Appendix B.

4.3 MINIMUM REQUIREMENTS

The following requirements must be met in order to establish the proposed quiet zones:

4.3.1 Minimum Length of a Quiet Zone

FRA indicates that the minimum length of a quiet zone must be one-half mile (2,640 feet) along the length of railroad right-of-way. While locomotive horns cannot be routinely sounded at all crossings within the quiet zone, it is entirely possible that sound from a locomotive horn for a crossing just outside the quiet zone will begin in the quiet zone or will intrude into the area of the quiet zone. This issue was carefully considered in establishing quiet zones.

Even though FRA has refrained from establishing a minimum distance between neighboring Quiet Zones, there must be at least one public highway-rail crossing between New Quiet Zones located on the same rail line. New Quiet Zones cannot be established on the same rail line within the boundaries of a single political jurisdiction unless they are separated by at least one public highway-rail grade crossing. If the City elects to construct two (2) or more adjacent Quiet Zones at the same time, the Quiet Zones will be joined to form one (1) continuous Quiet Zone. If the adjacent Quiet Zones are created at different times, the later Quiet Zone will be treated as an extension of the prior existing Quiet Zone.

4.3.2 Active Grade Crossing Warning Devices

FRA identifies in the Federal Register that quiet zone may not be implemented until all public crossings are equipped with active grade crossing warning devices comprising of both flashing lights and gates.

The active grade crossing warning devices must be equipped with power out indicators capable of indicating to trains approaching a grade crossing equipped with an active warning system whether commercial electric power is activating the warning system at that crossing. The requirement can be met with remote health monitoring of grade crossing warning systems if such systems are equipped to indicate power status.

Figure 4-1:
Figure 4-1 shows the standard flashing lights and gates equipped at Manhattan Ave. crossing located in southeast region of The City of Tampa.

In addition to power out indicators, FRA requires constant warning time (CWT) devices for all gate crossings 'if reasonably practical'. A Constant Warning Time (CWT) system has the capability of sensing a train as it approaches a crossing, measuring its speed and distance from the crossing, and activating the traffic control devices to provide the desired warning time. Traffic control systems equipped with CWT provide relatively uniform warning times where train speeds vary and trains do not accelerate or decelerate within the approach circuits once the devices have activated.

4.3.3 Advance Warning Signs

FRA indicates that each highway approach to every public and private highway-rail grade crossing within a quiet zone must be equipped with an advance warning sign which advises the motorist that train horns are not sounded at the crossing in addition to standard warning signs shown in Figure 4-2. This sign must conform to the standards contained in the MUTCD issued by the Federal Highway Administration.

Figure 4-2: Standard Advance Warning Signs for Quiet Zones
(Source: MUTCD, 2009)

4.4 METHODOLOGY

In order for FRA to approve a quiet zone, the City is required to show that the lack of train horn would not present a significant risk with respect to loss of life or serious personal injury, or that the significant risk has been compensated for by other means. As directed in the Final Ruling, this may be accomplished by either of the following two (2) approaches:

4.4.1 Approach # 1

Approach #1 calls for treating every public crossing in a proposed quiet zone with FRA "approved" supplementary safety measures (SSMs) as described in Appendix A to Part 222 of the Federal Register. FRA approves the following four (4) SSMs in the Federal Register.

1. *Temporary closure of a public highway-rail grade crossing:* Close the crossing to highway traffic during designated quiet periods. Upon reviewing the existing conditions at each of the potential quiet zone crossing and based on the discussions with the City, it was determined that the temporary closure is not a practicable option for any of the crossings proposed.

2. *Four quadrant gate system:* Install gates at a crossing sufficient to fully block highway traffic from entering the crossing when the gates are lowered, including at least one gate for each direction of traffic on each approach. Upon reviewing the existing conditions at each of the potential quiet zone crossings, it was determined that the four quadrant gate system is practicable for most of the crossings in The City of Tampa.

3. *Gates with medians or channelization devices:* Install non-traversable medians or channelization devices on both highway approaches to a public highway-rail grade crossing denying to the highway user the ability of circumventing the approach lane gates by switching into the opposing (oncoming) traffic lane in order to drive around lowered gates to cross the tracks. FRA does not recognize surface-mounted tubular delineators as an approved supplementary safety measure (SSMs). Tubular delineators may only be used as SSMs under the final rule if they have been affixed to raised longitudinal channelizers. Medians or channelization devices must extend at least 100 feet from the gate arm, or if there is an intersection within 100 feet of the gate, the median or channelization device must extend at least 60 feet from the gate arm. Most of the crossings being considered are within 60 feet of an intersection of two or more streets and, therefore, would create undesirable access restrictions.

4. *One-way streets with gates:* Gate(s) must be installed such that all approaching highway lanes to the public highway-rail grade crossings are completely blocked. One-way streets with gates are possible for the crossings located in areas such as downtowns.

In addition to the above-mentioned supplementary safety measures, the Final Rule contains provisions to allow the use of stationary wayside horns within a Quiet Zone as an alternative means of providing an audible warning of an approaching train. The wayside horn consists of horns mounted on poles that are placed at crossings and directed down the street toward oncoming motorists.

5. *Wayside Horn:* Wayside horns are activated by the same track circuits used to detect the train's approach by other automated warning devices. Use of wayside horns in lieu of train-mounted horns reduces net community noise impacts. Although wayside horns do not provide motorists or pedestrians with information about the proximity, speed, and direction of approaching trains, demonstrations have thus far indicated that they should be as effective as train horns. The final rule permits their use either within or outside of quiet zones as a one-for-one substitution at individual crossings equipped with automatic flashing lights and gates.

Each of the above-mentioned SSMs is described in greater detail in Appendix C of this report. Approach #1 was not applied to the Quiet Zones because it requires SSM's at each crossing without consideration of how the FRA's risk calculator can be used to minimize the number of SSM's, and thus, reduce the cost of creating a Quiet Zone.

Figure 4-3: Example of a Crossing with SSM'S within a Quiet Zone

4.4.2 Approach # 2

According to Approach #2, a quiet zone may be established if the City can analytically demonstrate that the probability of a collision will not increase after the horns are silenced. This may be accomplished by calculating the Quiet Zone Risk Index (QZRI), which is the average risk index for all public highway-rail grade crossings in a proposed quiet zone taking into account the silencing of locomotive horns, and reducing the QZRI to a level that is acceptable by FRA using any one of the following three (3) scenarios.

Scenario #1. The QZRI is equal to, or less than, the National Significant Risk Threshold (NSRT) value, which is the average risk index of individual gated horn-sounding crossings nationwide; without implementation of additional safety measures at any crossings in the quiet zone; or

Scenario #2. Additional safety measures are implemented at selected crossings resulting in the QZRI being reduced to a level equal to, or less than, the NSRT; or

Scenario #3. Additional safety measures are taken at selected crossings resulting in the QZRI being reduced to a level equal to, or less than, the Risk Index with Horns (RIWH), which is the average risk index for all public highway-rail grade crossings in a proposed quiet zone that would exist if train horns were sounded at every public crossing in a quiet zone.

Appendix C of this report explains in detail each of these scenarios.

FRA, Office of Safety Analysis is responsible for determining the value of NSRT annually. The NSRT index value is dependent on the risk indices of the public highway-rail grade crossings throughout the country and therefore, it varies each year. For this reason, quiet zones that are established using scenarios 1 & 2 will be reviewed annually by FRA to determine if the quiet zone still qualifies under the rule to retain the quiet zone status. The present calculated NSRT value as of October 2014 is 14347.

The use of the third scenario reduces the risk level to at least the level that would exist if train horns were sounding in the quiet zones. Quiet zones that are established based on this scenario will not be subject to annual reviews by FRA. According to FRA, by using this scenario, the Agency will never need to be concerned about the NSRT, annual reviews of the QZRI, or failing to be qualified because the QZRI is higher than the NSRT.

Since Approach #2 does not mandate installing SSMs at each and every crossing, the number of crossings needing improvement declines, thus the overall cost to create a Quiet Zone is reduced substantially in comparison to Approach #1.

An analysis was conducted on each of the eleven (11) identified Quiet Zones to determine the QZRI for each of the above-mentioned scenarios. FRA's web-based quiet zone calculator was used for calculating the risk index without horns for each crossing and the risk index after recommending an appropriate supplemental safety measure.

The Quiet Zone Calculator output file for each Quiet Zone is presented in Appendix D. Table 4.1 lists the proposed minimum upgrades necessary at each crossing to qualify for a Quiet Zone. Appendix E contains exhibits showing required active grade crossing warning devices and minimum SSM's for each Crossing.

Eleven of the existing Ybor City area Quiet Zone QZ-1 crossings lack the minimum required Constant Warning Time detection devices necessary to qualify for a Quiet Zone. Once the Constant Warning Time detection is installed for QZ-1, Supplemental Safety Measures would only be necessary for three (3) of the crossings.

Quiet Zone QZ-2 would qualify for a Quiet Zone under Scenario #1 with improvements.

Because of the unique arrangement of the track running parallel down Polk Street for the downtown Quiet Zone, QZ-3 (see Figure 4-4), a diagnostic team review was conducted of the crossings. The FRA Crossing/Trespasser Regional Manager was present for the review and identified the minimum crossing warning devices that would be necessary as a minimum qualification. All of the existing downtown crossings will require the minimum gates with flashing lights for each of the nine (9) crossings. It was determined that no supplemental warning devices would be necessary along Polk Street to address the parallel train movement.

Quiet Zones QZ-4 thru QZ-9 meet the minimum requirements to apply for a Quiet Zone. Per the FRA Crossing/Trespasser Regional Manager, Constant Warning Time detection as a minimum is not required because the maximum track speed is 10 mph which makes the CWT impractical. Supplemental Safety Measures, mountable medians with reflective delineators, are necessary at some of the crossings to qualify for Quiet Zone status.

Figure 4-4: CSX Rail in Downtown Tampa along Polk Street

Quiet Zone #	Crossing Number	CROSSING	HIGHWAY	STREET	MILEPOST	TYPE CROSSING	TRAIN SPEED	AADT	AADTYEAR	TOTAL AVG DAILY TRAINS	HIGHWAY SPEED	CROSSING WARNING DEVICES	TRAIN DETECTION	PROPOSED QZ MIN. UPGRADES	QUIET ZONE SSM'S
1	1	626275P		26TH ST	088062	Public	45	002603	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators
	2	626277D		24TH ST	088073	Public	45	000674	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators
	3	626278K		23RD ST	088081	Public	45	001177	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators
	4	626279S	SR 585	N SR 585/22ND ST	088087	Public	45	016000	2008	5	30	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)
	5	626280L	SR 585	E SR 585/21ST ST	088094	Public	45	014000	2001	5	30	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)
	6	626281T		20TH ST	088102	Public	45	000744	2008	5	35	Flashing Lights & Gates	Motion	CWT	
	7	626282A		19TH ST	088109	Public	45	003171	2008	5	35	Flashing Lights & Gates	Motion	CWT	
	8	626283G		18TH ST	088116	Public	45	001340	2008	5	30	Flashing Lights & Gates	Motion	CWT	
	9	626284N		17TH ST	088123	Public	45	001397	2008	5	30	Flashing Lights & Gates	Motion	CWT	
	10	626285V		16TH STREET	088130	Public	45	000193	1988	5	15	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)
	11	626286C		15TH ST	088138	Public	25	002285	2008	5	35	Flashing Lights & Gates	Constant Warning Time	CWT	
	12	626287J		REPUBLICA DE CUBA	088145	Public	25	001937	2008	5	35	Flashing Lights & Gates	Constant Warning Time	None	
	13	643886Y		TBD	88164	Public	TBD			TBD	N/A	Flashing Lights & Gates		CWT	
2	14	626293M	SR 45	NEBRASKA AVE	088203	Public	10	006100	2008	0	35	Flashing Lights & Gates	Constant Warning Time	None	QZ Risk Index below NSRT
3	15	626294U		N JEFFERSON ST	088227	Public	10	005000	2003	0	30	Flashing Lights only	Motion		
	16	626295B		N PIERCE ST	088233	Public	10	011500	2008	0	35	Flashing Lights only	Motion		
	17	626296H		MORGAN ST	088238	Public	10	004700	2008	0	35	Flashing Lights only	Motion		
	18	626297P		MARION ST	088244	Public	10	001324	2008	0	30	No signs or signals	Motion		
	19	626298W	SR 685	N FLORIDA AVE	088249	Public	10	019000	2001	0	35	Flashing Lights only	Motion		
	20	626299D		FRANKLIN ST MALL	088255	Public	10	000115	2008	0	35	Flashing Lights only	Motion		
	21	626300V	SR 685	S TAMPA ST	088260	Public	10	013500	2001	0	35	Flashing Lights only	Motion		
	22	626301C		ASHLEY DR	088266	Public	10	034500	2008	0	35	Flashing Lights only	Motion		
	23	626302J		DOYLE CARLTON DR	088279	Public	10	005491	2008	0	30	Flashing Lights only	Motion		
4	24	626303R		NORTH BLVD	088313	Public	10	013300	2008	0	35	Flashing Lights & Gates	Motion	None	QZ Risk Index below NSRT
5	25	626304X	SR 60	W KENNEDY BLVD	088359	Public	10	032500	2001	0	40	Flashing Lights & Gates	Constant Warning Time	None	
	26	626305E		WILLOW AVE.	088358	Public	5	000001	2010	4	30	Flashing Lights & Gates	Constant Warning Time	None	
	27	626306L		W CLEVELAND ST	088371	Public	10	012454	2003	0	40	Flashing Lights & Gates	Motion	None	One-way street (exist cond)
	28	626308A		E PLATT ST	088385	Public	10	011792	2003	0	35	Flashing Lights & Gates	Motion	None	One-way street (exist cond)
6	29	626334P		SWANN AVE	088423	Public	10	021506	2008	0	30	Flashing Lights & Gates	Motion	None	
	30	626335W		MORRISON AVE	088455	Public	10	002854	2003	0	30	Flashing Lights & Gates	Motion	None	
	31	626336D		HOWARD AVE	088465	Public	10	015165	2003	0	30	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
	32	626337K		WATROUS AVE	088470	Public	10	001740	2008	0	25	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
	33	626338S		MISSISSIPPI AVE	088498	Public	10	005006	2008	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
7	34	626341A		BAY TO BAY BLVD	088574	Public	10	020304	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
	35	626342G		MACDILL AVE	088579	Public	10	029126	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
8	36	626343N		EL PRADO BLVD	088639	Public	10	006050	2003	0	30	Flashing Lights & Gates	Motion	None	Exist curb median
	37	626344V		EUCLID AVE	088661	Public	10	014662	2008	0	30	Flashing Lights & Gates	Motion	None	
	38	626345C		S HIMES AVE	088683	Public	10	015096	2003	0	35	Flashing Lights & Gates	Motion	None	Non-Traversable Curb Median
9	39	626346J	SR 600	DALE MABRY HWY	088737	Public	10	033500	2008	0	45	Flashing Lights & Gates	Motion	None	Revise exist. curb median to non-mountable
	40	626349E	SR 600	GANDY BLVD	088779	Public	10	042000	2008	0	45	Flashing Lights & Gates	Constant Warning Time	None	None to meet NSRT
10	41	626350Y		PEARL AVE	088827	Public	10	006709	2008	0	25	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
	42	626361L		OKLAHOMA AVE	088857	Public	10	003367	2008	0	30	Flashing Lights only	TBD	Gates	
	43	626362T		IOWA AVE	088880	Public	10	003257	2008	0	25	Flashing Lights & Gates	Motion	None	
	44	626363A		MANHATTAN AVE	088888	Public	10	009969	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators
11	45	626366V		MCCOY ST	088968	Public	10	002354	2008	0	25	Flashing Lights only	Motion	Gates	Mountable median w/ refl delineators
	46	626367C		PRESCOTT ST	088988	Public	10	001154	2008	0	25	Flashing Lights only	Motion	Gates	
	47	626368J	CR 587	WEST SHORE BLVD	088991	Public	10	010391	2003	0	30	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators

Table 4-1: Proposed SSM's at Each Crossing

5. IMPACT AREA

5.1 OVERVIEW

This section identifies the impact of train horn noise on residential/commercial properties at those crossings proposed to be included in a quiet zone.

5.2 NOISE CONCEPTS

The universal "loudness" descriptor used for environmental noise is the A-weighted sound level. Typical A-weighted sound levels range from the 40s to the 90s, where 40 is very quiet and 90 is very loud. The scale notation "dBA" indicates A-weighted sound levels. The letters "dB" signify "decibels" and refer to the general strength of the noise. The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does. Without this A-weighting, sound-monitoring equipment would respond to events people cannot hear, such as high-frequency dog whistles and low-frequency seismic disturbances. On the average, each A-weighted sound level increase of 10 decibels corresponds to an approximate doubling of subjective loudness. To better understand the loudness, the following examples were taken from "Evaluation of an Automated Horn Warning System at Three Highway-Railroad Grade Crossings in Ames, Iowa", a study prepared by City of Ames, Iowa.

Food blender at 3 feet – 87 dBA
Person shouting at 3 feet -- 78 dBA
Gas lawn Mower at 100 feet -- 70 dBA
Normal speech at 3 feet -- 65 dBA
Train Horn (proposed ruling) @ 100 feet – 110 dBA (Max)

5.3 ACCEPTABLE NOISE IN RESIDENTIAL AREAS

The new noise environment with train horns in a residential area is computed in terms of "Day-Night Sound Level (Ldn)". Day-Night Sound Level (Ldn) is the cumulative sound exposure from all events over a 24-hour period. The typical ambient noise level for a residential area is identified by the following two agencies.

Figure 5-1: Typical Crossing in Residential Area

As a qualifying condition for funding proposed housing developments, U.S Department of Housing and Urban Development (HUD) defines what level of ambient noise at a proposed location is acceptable for residential land use. In the HUD Standards an Ldn below 65 dBA is considered "Acceptable," while an Ldn above 75 dBA is "Unacceptable," with ambient levels between Ldn of 65 dBA and 75 dBA categorized as "Normally Unacceptable."

- According to the U.S. Environmental Protection Agency, the typical ambient noise level in a suburban residential area is an Ldn of 55 dBA and in an urban residential area is an Ldn of 60 dBA.

Most of the crossings proposed in the quiet zones are located in suburban areas, and therefore, an Ldn of 55 dBA is considered as the noise "floor" in the noise impact analysis.

5.4 TRAIN HORN NOISE

The FRA's Final Rule published on April 27, 2005 on the use of locomotive horns at Highway-Rail grade crossings prescribes both a minimum and maximum sound level for the train horn. The minimum level is retained at 96 dBA, and the maximum will be 110 dBA measured 100 feet in front of locomotive and 15 feet above rail. Prior to issuance of this rule, there was no maximum horn sound limit. According to Florida Department of Transportation (FDOT), the current train horn sound levels have gone unchecked and have been recorded as high as 140 dBA.

In addition, under this new rule, all locomotives must sound the horn starting no sooner than 15 to 20 seconds before reaching a public highway-rail grade crossing. Moreover, FRA's new rule indicates that in no case may the horn be sounded more than ¼ mile before the crossing.

5.4.1 Impact Areas

Impact and severe noise impact distances of public highway-rail grade crossings were calculated using the FRA horn noise model based on the following assumptions:

1) All public highway-rail grade crossings proposed to be included in a quiet zone are located in a suburban area. Refer to Exhibits 4-1a & 4-1b for residential areas.

2) The maximum A-weighted sound level of the train horn at 100 feet from the train is 110 dBA.

3) The number of trains crossing public highway-rail grade crossings proposed to be included in a quiet zone generally ranges from 2 to 49. An average value of 9.5 trains per crossing is assumed in the horn noise model.

4) The existing maximum train speed at the crossings range from 10 mph to 79 mph. A conservative speed of 40 mph is assumed in the horn noise model.

5) A light urban land use intensity is assumed as the shielding factor.

Based on the above assumptions, an output file is generated by the horn noise model that records the distances to impact and severe impacts for use in creating impact polygons. Figure 5-3 identifies the instructions for use of the train horn noise model. Figure 5-4 identifies the input/output table.

5.5 FRA's TRAIN HORN MODEL

A computer model was developed by FRA to estimate the impact area by a train horn at highway-rail grade crossings. The typical impact area generated from the model is made up of two areas: impact area, and severe impact area as shown in Figure 5-2. Generally, in a suburban residential area, sever impact area is the area included in 65 dBA noise contours and impact area is the area included in 55 dBA noise contours.

The FRA's horn noise model is used in the present study to estimate the impact area by a train horn at the public highway-rail grade crossings proposed to be included in the quiet zones.

Figure 5-2: Typical Impact Area

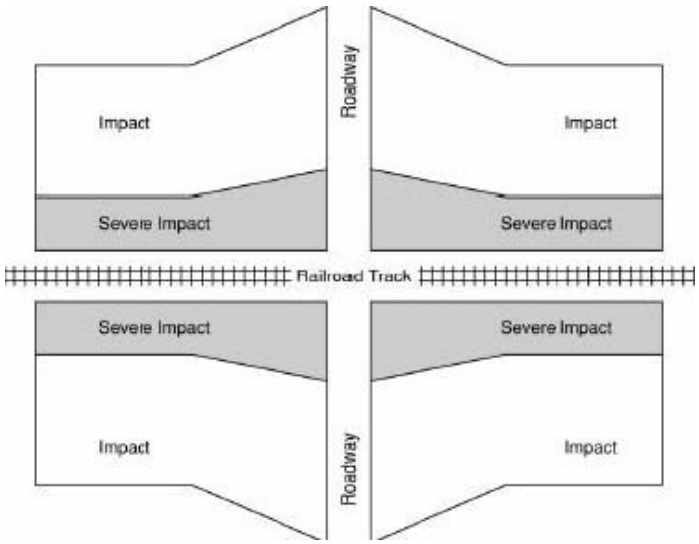


Figure 5-3: Instructions for Using the Train Horn Model

Instruction sheet for using the FRA horn noise model.

Cells in Blue are inputs.
Cells in Green are lookup tables.
Cells in Yellow are output.

Only cells in blue can be changed. The rest of the spreadsheet is locked and is not to be altered by the user.
The four cells in dark blue can be changed, but they contain formulas critical to the operation of the spreadsheet.
If they are changed, do not save the spreadsheet (or save it under a different name) or the formulas will be lost.
Note that the spreadsheet may take a few seconds to update after any changes to the input (especially with slower computers).

1 Noise Situation: Use the lookup table to specify the horn sounding condition of interest.

2 Horn Lmax: The maximum A-weighted sound level of the train horn at 100 feet from the front of the train.
If your Lmax is not at 100 feet, use the following converter to get the Lmax at 100 feet.

Your Lmax	96	dBA
Your distance	50	feet
Lmax at 100 feet	90	dBA

3 Horn Location on Locomotive: Use the lookup table to specify the location of the horns on the locomotives.
There are 4 options:

1 National average. Use this if the mix of horns is not known. It represents the national average of several thousand locomotives.
2 All front mounted: All the horns are located at the front of the locomotive.
3 All middle mounted: All the horns are mounted in the middle of the locomotive.
4 User defined percentage: If there is detailed knowledge about the horn location mix, use this and input the percentage of the front mounted horns in the blue input box in the lookup table.

4 Non Train Noise Environment: This represents the noise environment without any train noise (the background noise). Use the lookup table to determine the type of noise environment. A specific noise environment can be input, if the data is available. The values used for the non train noise environment are as follows:

Urban: 65 dBA Ldn
Suburban: 55 dBA Ldn
Rural: 45 dBA Ldn

5 Shielding: Use the lookup table to specify the type of shielding by the type of area where the grade crossing is located.
Near grade crossings, shielding is generally provided by rows of buildings. Using no shielding is not recommended.

6 Length of Impact Area: This determines the length of the impact area along the tracks. The default is 1/4 mile. The 20 second and 15 second options calculate the distance based on the speed of the train, up to a maximum of 1/4 mile for higher speed trains.

7 Train Speed: The speed of the train, in miles per hour. There are separate entries for existing and future trains.

8 Existing and future numbers of Trains: Use this to input the number of trains at the crossing. You should input the number of trains in one direction only, do not sum both directions. The split between day and night trains assumes an even distribution over the entire 24 hours of the day. Night is considered to be 10 pm to 7 am and day is 7 am to 10 pm. The user can input specific numbers for the day and night trains in the dark blue boxes if the split is not uniform (for commuter rail systems, as an example), but do not save the spreadsheet (or save it as a different name) or the formulas in those boxes will be lost. If you do lose the formulas, the following are the formulas you should use in those four cells.

Cell C14: +C12*15/24
Cell C15: +C13*15/24
Cell C16: +C12*9/24
Cell C17: +C13*9/24

9 Number of Cars: Enter the average number of cars, for both the existing and future cases.

10 Number of Locomotives: Enter the average number of locomotives, for both the existing and future cases.

11 Numeric Output: These two tables give the numeric output of the program. All distances are in feet.

Ldn 65 Contours Numeric Output: The first two numbers represent the distance perpendicular to the tracks to the Ldn 65 contour at the crossing, for both the existing and future conditions. The next two numbers represent the distance perpendicular to the tracks to the Ldn 65 contour at the halfway point of the horn zone. The final two numbers represent the distances along the track that define the half and full impact zone lengths.
Impact Zones Numeric Output: The first two numbers represent the distance perpendicular to the tracks to impact and severe impact at the crossing. The next two numbers represent the distance perpendicular to the tracks to the impact and severe impact at the halfway point of the horn zone. The final two numbers represent the distances along the track that define the half and full impact zone lengths.

12 Graphs: The graphs provide a visual means of comparing changes in the input parameters. Both scales remain constant, so you can do relative comparisons.
The Ldn 65 graph shows the existing (in blue) and the future (in red) Ldn 65 contours for the data provided by the user.
The Impact graph shows the impact (in blue) and the severe impact (in red) for the data provided by the user.

Figure 5-4 Impact Zones for a Typical Suburban Crossing

FRA Grade Crossing Noise Model

User Input	
Noise Situation (Pick from List)	2
Horn Lmax (dBA) @ 100 feet	110
Horn Location on Locomotive(Pick from List)	1
Non Train Noise Environment (pick from list)	2
Shielding (Pick from List)	2
Length of Impact Area (pick from list)	1
Existing Train Speed (mph)	40
Future Train Speed (mph)	40
Number of Existing Trains in one Direction	9.5
Number of Future Trains in one Direction	9.5
Existing Number of Day Trains (7 am to 10 p.m.)	5.9375
Future Number of Day Trains (7 am to 10 p.m.)	5.9375
Existing Number of Night Trains (10 p.m. to 7 am)	3.5625
Future Number of Night Trains (10 p.m. to 7 am)	3.5625
Existing Average Number of Cars	20
Future Average Number of Cars	20
Existing Average Number of Locomotives	2
Future Average Number of Locomotives	2

Noise Situation	
Horns Existing and Future	1
Horns in Future Only	2
No Horns Existing and Future	3

Horn Location on Locomotive			
National Average (50% front, 50% middle)			1
All Front Mounted			2
All Middle Mounted			3
User Defined	80	% front mounted horns	4

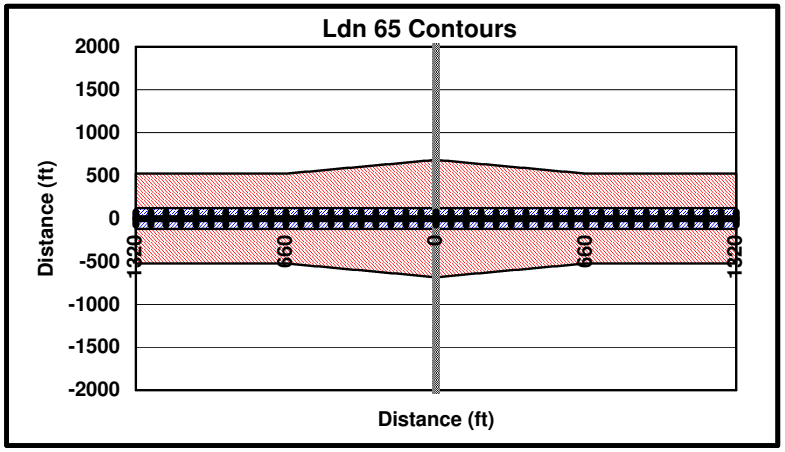
Non Train Noise Environment			
Urban			1
Suburban			2
Rural			3
User Defined Ldn =	50	dBA	4

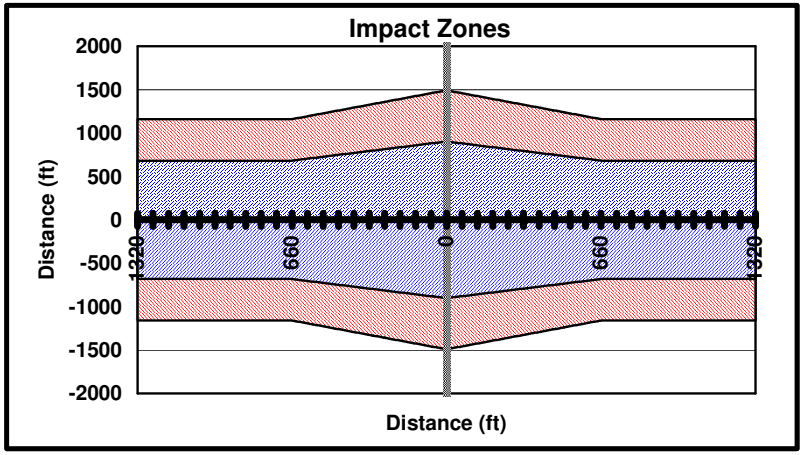
Shielding	
Dense Urban	1
Light Urban	2
Dense Suburban	3
Light Suburban	4
Rural	5
No Shielding	6

Length of Impact Area	
1/4 mile	1
20 seconds	2
15 seconds	3

Ldn 65 Contours Numeric Output (in feet)	
Existing 65 Ldn Contour at X-ing	121
Future 65 Ldn Contour at X-ing	683
Existing 65 Ldn Contour at 1/2 zone length	121
Future 65 Ldn Contour at 1/2 zone length	523
Zone Length	1320
1/2 Zone Length	660

Impact Zones Numeric Output (in feet)	
Impact Distance at X-ing	1492
Severe Impact Distance at X-ing	903
Impact Distance at 1/2 zone length	1160
Severe Impact Distance at 1/2 zone length	683
Zone Length	1320
1/2 Zone Length	660





6. PRELIMINARY COST ESTIMATES

6.1 OVERVIEW

This section identifies the estimated total capital cost of each quiet zone established based on Approach # 2 which were described in Section 4 of this report.

6.2 METHODS OF ESTIMATING COSTS

There are two (2) formally recognized ways to estimate the costs of implementing quiet zones:

1. Cost Estimates provided by CSX Transportation
2. FRA Cost Estimates

CSX Transportation owns and maintains the railroad tracks and typically a 100' wide right-of-way centered along the tracks. CSX is responsible for installation and maintenance of any active warning devices at the crossings. However, the City must bear all the costs associated with upgrading the crossings to qualify for inclusion in a quiet zone. According to CSX Transportation, the installation cost of similar equipment installed at different crossings may differ due to the physical characteristics of the crossings. For this reason, CSX Transportation visits every crossing to obtain the better cost estimates for implementing the recommended improvements.

FRA agrees that the cost estimates provided by CSX Transportation would be closer to the project built cost than the cost estimates prepared using FRA unit costs and assumptions. The above-mentioned methods of estimating costs are explained in greater detail below.

6.2.1 Cost Estimates provided by CSX Transportation

The City would be required to send a list of all the crossings within the proposed quiet zones to CSX Transportation. In addition, the City would identify the improvements at the crossings. CSX Transportation would then assign a team to evaluate the cost estimates of the improvements at each crossing. Generally, the process of determining the cost estimates would involve three (3) steps as follows:

1. *Initial Cost Estimates:* Upon receipt of the list of crossings, the CSX team would determine the initial cost estimates based on the inventory data available to CSX Transportation for each of the crossings and unit costs of the equipment. According to CSX Transportation, the cost estimates developed in this step are only the budgetary numbers and may not reflect the actual project built costs. Based on the resources available to CSX at this time, it would take 2 to 3 months in determining the cost estimates for the present project with 47 crossings in 11

quiet zones. After the initial cost estimates are prepared, CSX Transportation submits the cost estimates along with the planning agreement to the City. This agreement would identify the time and effort spent by the team in determining the initial cost estimates.

2. *Meetings:* The City, after reviewing the initial cost estimates, would meet with CSX Transportation if the City wishes to go further in implementing the project. CSX Transportation would discuss the time frame, and time and effort that would be spent in determining the detailed cost estimates.

3. *Detailed Cost Estimates:* During this step, CSX Transportation would prepare the detailed cost estimates by physically visiting the crossings where the improvements are recommended. The field inspection would help CSX Transportation verify the existing equipment available at the crossing and the constructability of improvements recommended at the crossing.

6.2.2 FRA Cost Estimates

FRA unit costs of the equipment are used to prepare cost estimates of proposed improvements within the quiet zones under this methodology. FRA estimates the capital costs and the annual operation and maintenance costs.

Due to time constraints, the preliminary cost estimates for the present study are prepared based on FRA estimates. The preliminary cost estimates include all costs (known at this time) to implement the project including: the capital cost of upgrading the crossing, and annual maintenance cost. The capital cost estimates include a contingency of 30%. The contingency is necessary because the capital costs are planning estimates made prior to any preliminary engineering. The cost estimates prepared for each quiet zone vary depending on the approach method adapted to establishing the quiet zones.

Table 6-1: Unit Costs of the Proposed Equipment

Equipment	Capital Cost	Annual Operation & Maintenance Cost
Flashing Lights and Gates w/ CWT	$300,000	$2,500
No Gates to Four-quadrant gates and flashing lights	$400,000	$5,000
Channelization	$20,000	$500
CWT	$250,000	$500
Wayside Horn	$50,000	$2,000

6.4 COST ESTIMATES OF QUIET ZONES ESTABLISHED BASED ON APPROACH #2 (Analytically calculate the Quiet Zone Risk Index)

The preliminary cost estimates of the quiet zones that were established based on Approach # 2 is based on FRA's web-based Quiet Zone Calculator. The Quiet Zone Calculator estimates the capital cost of the proposed equipment. Table 6-2 identifies the costs for Quiet Zone 3: Downtown Tampa. Table 6-3 identifies the costs associated with each quiet zone established based on each of the three (3) scenarios under Approach # 2.

As seen in Table 6-3, it would cost the City approximately $6.9 million to implement all eleven (11) quiet zones. Much of this cost is associated with the minimum improvements such as flashing lights and gates, Constant Warning Time (CWT) devices etc., that must be installed at most of the crossings to qualify as a crossing within a quiet zone.

Figure 6-1: An Established Quiet Zone Featuring Advance Warning Devices (Signs, Flashing Lights, Gates) and Channelization Devices

CITY OF TAMPA

PROPOSED QUIET ZONE COST ESTIMATE - DOWNTOWN TAMPA AREA

Date: 10/14/2014

Prepared by: John Seals, P.E.

CROSSING	RAILROAD	HIGHWAY	STREET	Proposed QZ Min upgrades	Construction Labor	Engineering Labor	Total Equipment	Total Subcontract Services	Total Travel & Lodging	Material	Total Cost per Crossing	Cost with 20% Contingency
626294U	CSX		N JEFFERSON ST	Lights/Gates/Bungalow/Signs	$84,615	$27,544	$10,009	$14,400	$11,712	$71,836	$220,116	$264,139
626295B	CSX		N PIERCE ST	Lights/Gates/Bungalow/Signs	$84,615	$27,544	$10,009	$14,400	$11,712	$72,396	$220,676	$264,811
626296H	CSX		MORGAN ST	Lights/Gates/Bungalow/Signs	$103,235	$27,544	$12,405	$24,000	$14,640	$71,706	$253,530	$304,236
626297P	CSX		MARION ST	Lights/Gates/Bungalow/Signs	$103,235	$27,544	$12,405	$24,000	$14,640	$72,511	$254,335	$305,202
626298W	CSX	SR 685	N FLORIDA AVE	Lights/Gates/Bungalow/Signs	$84,615	$27,544	$10,009	$9,600	$11,712	$72,396	$215,876	$259,051
626299D	CSX		FRANKLIN ST MALL	Lights/Gates/Bungalow/Signs	$103,235	$27,544	$12,405	$24,000	$14,640	$72,396	$254,220	$305,064
626300V	CSX	SR 685	S TAMPA ST	Lights/Gates/Bungalow/Signs	$84,615	$27,544	$10,009	$14,000	$11,712	$72,396	$220,276	$264,331
626301C	CSX		ASHLEY DR	Lights/Gates/Bungalow/Signs/Median	$103,235	$26,372	$12,405	$24,000	$14,640	$101,493	$282,145	$338,574
626302J	CSX		DOYLE CARLTON DR	Lights/Gates/Bungalow/Signs	$84,615	$27,544	$10,009	$14,400	$11,712	$72,397	$220,677	$264,812
											Total Estimated Construction Cost=	**$2,570,221**
											Design ($15,000/crossing)=	**$135,000**
											Total Estimated Quiet Zone Cost=	**$2,705,221**

Table 6-2: Cost of Implementing Quiet Zone #3 (QZ3) in Downtown Tampa

Quiet Zone #	Crossing Number	CROSSING	HIGHWAY	STREET	MILEPOST	TYPE CROSSING	TRAIN SPEED	AADT	AADTYEAR	TOTAL AVG DAILY TRAINS	HIGHWAY SPEED	CROSSING WARNING DEVICES	TRAIN DETECTION	PROPOSED QZ MIN. UPGRADES	QUIET ZONE SSM'S	COST	COST PER QUIET ZONE
1	1	626275P		26TH ST	088062	Public	45	002603	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators	$270,000	$3,060,000
	2	626277D		24TH ST	088073	Public	45	000674	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators	$270,000	
	3	626278K		23RD ST	088081	Public	45	001177	2008	5	30	Flashing Lights & Gates	Motion	CWT	Mountable median w/ refl delineators	$270,000	
	4	626279S	SR 585	N SR 585/22ND ST	088087	Public	45	016000	2008	5	30	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)	$250,000	
	5	626280L	SR 585	E SR 585/21ST ST	088094	Public	45	014000	2001	5	30	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)	$250,000	
	6	626281T		20TH ST	088102	Public	45	000744	2008	5	35	Flashing Lights & Gates	Motion	CWT		$250,000	
	7	626282A		19TH ST	088109	Public	45	003171	2008	5	35	Flashing Lights & Gates	Motion	CWT		$250,000	
	8	626283G		18TH ST	088116	Public	45	001340	2008	5	30	Flashing Lights & Gates	Motion	CWT		$250,000	
	9	626284N		17TH ST	088123	Public	45	001397	2008	5	30	Flashing Lights & Gates	Motion	CWT		$250,000	
	10	626285V		16TH STREET	088130	Public	45	000193	1988	5	15	Flashing Lights & Gates	Motion	CWT	One-way street (exist cond)	$250,000	
	11	626286C		15TH ST	088138	Public	25	002285	2008	5	35	Flashing Lights & Gates	Constant Warning Time	CWT		$250,000	
	12	626287J		REPUBLICA DE CUBA	088145	Public	25	001937	2008	5	35	Flashing Lights & Gates	Constant Warning Time	None		$0	
	13	643886Y		TBD	88164	Public	TBD			TBD	N/A	Flashing Lights & Gates		CWT		$250,000	
2	14	626293M	SR 45	NEBRASKA AVE	088203	Public	10	006100	2008	0	35	Flashing Lights & Gates	Constant Warning Time	None	QZ Risk Index below NSRT	$0	$0
3	15	626294U		N JEFFERSON ST	088227	Public	10	005000	2003	0	30	Flashing Lights only	Motion				$2,705,221 SEE ATTACHED
	16	626295B		N PIERCE ST	088233	Public	10	011500	2008	0	35	Flashing Lights only	Motion				
	17	626296H		MORGAN ST	088238	Public	10	004700	2008	0	35	Flashing Lights only	Motion				
	18	626297P		MARION ST	088244	Public	10	001324	2008	0	30	No signs or signals	Motion				
	19	626298W	SR 685	N FLORIDA AVE	088249	Public	10	019000	2001	0	35	Flashing Lights only	Motion				
	20	626299D		FRANKLIN ST MALL	088255	Public	10	000115	2008	0	35	Flashing Lights only	Motion				
	21	626300V	SR 685	S TAMPA ST	088260	Public	10	013500	2001	0	35	Flashing Lights only	Motion				
	22	626301C		ASHLEY DR	088266	Public	10	034500	2008	0	35	Flashing Lights only	Motion				
	23	626302J		DOYLE CARLTON DR	088279	Public	10	005491	2008	0	30	Flashing Lights only	Motion				
4	24	626303R		NORTH BLVD	088313	Public	10	013300	2008	0	35	Flashing Lights & Gates	Motion	None	QZ Risk Index below NSRT	$0	$0
5	25	626304X	SR 60	W KENNEDY BLVD	088359	Public	10	032500	2001	0	40	Flashing Lights & Gates	Constant Warning Time	None		$0	$0
	26	626305E		WILLOW AVE.	088358	Public	5	000001	2010	4	30	Flashing Lights & Gates	Constant Warning Time	None		$0	
	27	626306L		W CLEVELAND ST	088371	Public	10	012454	2003	0	40	Flashing Lights & Gates	Motion	None	One-way street (exist cond)	$0	
	28	626308A		E PLATT ST	088385	Public	10	011792	2003	0	35	Flashing Lights & Gates	Motion	None	One-way street (exist cond)	$0	
6	29	626334P		SWANN AVE	088423	Public	10	021506	2008	0	30	Flashing Lights & Gates	Motion	None			$60,000
	30	626335W		MORRISON AVE	088455	Public	10	002854	2003	0	30	Flashing Lights & Gates	Motion	None			
	31	626336D		HOWARD AVE	088465	Public	10	015165	2003	0	30	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
	32	626337K		WATROUS AVE	088470	Public	10	001740	2008	0	25	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
	33	626338S		MISSISSIPPI AVE	088498	Public	10	005006	2008	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
7	34	626341A		BAY TO BAY BLVD	088574	Public	10	020304	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	$40,000
	35	626342G		MACDILL AVE	088579	Public	10	029126	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
8	36	626343N		EL PRADO BLVD	088639	Public	10	006050	2003	0	30	Flashing Lights & Gates	Motion	None	Exist curb median		$25,000
	37	626344V		EUCLID AVE	088661	Public	10	014662	2008	0	30	Flashing Lights & Gates	Motion	None			
	38	626345C		S HIMES AVE	088683	Public	10	015096	2003	0	35	Flashing Lights & Gates	Motion	None	Non-Traversable Curb Median	$25,000	
9	39	626346J	SR 600	DALE MABRY HWY	088737	Public	10	033500	2008	0	45	Flashing Lights & Gates	Motion	None	Revise exist. curb median to non-mountable	$25,000	$25,000
	40	626349E	SR 600	GANDY BLVD	088779	Public	10	042000	2008	0	45	Flashing Lights & Gates	Constant Warning Time	None	None to meet NSRT		
10	41	626350Y		PEARL AVE	088827	Public	10	006709	2008	0	25	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	$340,000
	42	626361L		OKLAHOMA AVE	088857	Public	10	003367	2008	0	30	Flashing Lights only	TBD	Gates		$300,000	
	43	626362T		IOWA AVE	088880	Public	10	003257	2008	0	25	Flashing Lights & Gates	Motion	None			
	44	626363A		MANHATTAN AVE	088888	Public	10	009969	2003	0	35	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
11	45	626366V		MCCOY ST	088968	Public	10	002354	2008	0	25	Flashing Lights only	Motion	Gates	Mountable median w/ refl delineators	$320,000	$640,000
	46	626367C		PRESCOTT ST	088988	Public	10	001154	2008	0	25	Flashing Lights only	Motion	Gates		$300,000	
	47	626368J	CR 587	WEST SHORE BLVD	088991	Public	10	010391	2003	0	30	Flashing Lights & Gates	Motion	None	Mountable median w/ refl delineators	$20,000	
																TOTAL COST FOR ESTABLISHING ALL 11 QUIET ZONES:	**$6,895,221**

Table 6-3: Cost of Implementing Each Quiet Zone

7. FUNDING SOURCES / OPTIONS

7.1 OVERVIEW

Limited Federal or State assistance could be available to the City. As required by the Swift Act, which is the statutory authority upon which the horn-sounding rule has been developed, the FRA will provide technical assistance upon request. This assistance should improve applicants' chances of obtaining ultimate approval of waiver petitions. However, no new federal financial support has been provided in conjunction with the new, stiffened, federal safety standards. FRA identified few federal funding programs in its "Use of Locomotive Horns at Highway-Rail Grade Crossings; Interim Final Rule".

The City could attempt to obtain access to existing funding programs, although these are of limited scope and will likely be stretched even more thinly when the FRA's rule becomes effective. The City of Tampa may have to rely heavily on innovative finance techniques and the application of general funds if it intends to create locomotive horn quiet zones.

7.2 FEDERAL GOVERNMENT PROGRAMS

7.2.1 Federal Highway Administration: Section 130 Program

The Highway Safety Act of 1973 established the Rail-Highway Crossing Program informally as the "Section 130 Program" in reference to its placement in Title 23 of the U.S. Code. The program, which provides the bulk of the federal crossing improvement funding, is administered by the Federal Highway Administration (FHWA). Funds are apportioned on a similar basis as are those for the federal aid highway system, although weight is also given to the relative number of grade crossings in the State.

23 USC Sec. 130 (a) provides that the Federal government may underwrite "the entire cost of construction of projects for the elimination of hazards of railway-highway crossings, including the separation or protection of grades at crossings, the reconstruction of existing railroad grade crossing structures, and the relocation of highways to eliminate grade crossings," Up to 10 percent of the cost of crossing improvements may be assessed to the affected railroad(s), which percentage "shall be deemed to represent the net benefit to the railroad or railroads" for the purpose of determining the railroad's share of the cost of construction. Funds are apportioned to the State – which then must maintain "a survey of all highways to identify those railroad crossings which may require separation, relocation, or protective devices, and establish and implement a schedule of projects for this purpose." Thus, the City's efforts at receiving Section 130 funds would be directed towards the State, not Federal government.

The program also provides for an incentive payment to encourage the closure of crossings. 23 USC 130 (i) provides that "a State may, from sums available to the State under this section, make incentive payments to local governments in the State upon the permanent closure by such governments of public at-grade railway-highway crossings " under the jurisdiction of such governments. The payment cannot exceed the lesser of $7,500 or the payment made by the railroad to the government in consideration of permitting the closure. As crossing closures may constitute a significant benefit to railroads, localities should normally be able to extract at least $7,500 from the railroad, for a total payment of $15,000. Closure of any of the proposed crossings, however, is not a realistic option for The City of Tampa.

7.2.2 Federal Highway – Noise Reduction

FHWA, in its role of administering the federal aid highway program, also may provide for noise reduction projects associated with highway projects where the cause of noise is motor trucks. One of the FHWA regulations requires that a noise study be accomplished to determine what noise impacts, if any, will result from a proposed highway improvement and what measures will be taken to lessen these noise impacts.

If noise impacts are expected, then noise reduction measures that are determined by the State highway agency and the FHWA to be practicable, reasonable, and acceptable to the public must be incorporated into the highway improvement. The costs of the noise reduction measures are included with the other costs of the highway improvement and are eligible for federal funding in the same proportion as other aspects of the project.

Federal funds may also be used for the construction of noise barriers, for acquisition of land on which to build such barriers, and for the purchase of undeveloped lands as a preemptive buffer zone. Traffic operational measures such as truck routes and restriction of hours of operation are often feasible noise abatement measures, and the costs of such measures are eligible for federal funding. Based on our research, federal highway funds have never been used to abate locomotive horn noise. However, it may be argued that the horns are "indirect" highway noise on a "but-for" basis. "But for" the roadway crossing its right-of-way, the locomotive horn would not need to have been sounded. As State highway agencies may use federal highway grants for noise reduction projects on existing roads on the federal aid system, this may be presented to the State as an opportunity to increase the effective share of highway funds, which can be applied to grade crossing programs.

7.2.3 Federal Railroad Administration Programs

Railroad Rehabilitation and Improvement Financing (''RRIF Program''). The RRIF Program authorizes the Secretary to provide direct loans and loan guarantees to State and local governments, government sponsored authorities and corporations, railroads, and joint ventures that include at least one railroad. In assessing applications, FRA is required to give priority to projects that enhance public safety and enhance the

environment. Therefore, quiet zones and grade crossings would appear to qualify for funds available under this program. However, as the program does not provide funding of outright grants and regulations narrowly tailor its applicability, the City may be as well served by traditional municipal bond financing.

7.2.5 Environmental Protection Agency

The U.S. Environmental Protection Agency created the Office of Noise Abatement and Control (ONAC) following enactment of the Noise Control Act of 1972 (codified in 49 United States Code 4901 - 4918). ONAC engaged in a wide variety of activities to abate noise pollution until 1981, when it's funding was terminated. At present, the only noise-abatement program of significance involving the EPA is in an advisory role to the Federal Aviation Administration, which oversees aviation noise legislation. Despite the current absence of meaningful federal activity in the area of noise pollution, periodic efforts to reestablish ONAC arise, and legislation similar to the Quiet Communities Act of 1997 may pass, at which time The City of Tampa may seek to explore the possibility of assistance from EPA.

7.3 STATE GOVERNMENT PROGRAMS

The City of Tampa has applied for funding through the Florida Department of Transportation's $10 million State Grant Funding Program for Quiet Zones. The funds from this program are to be distributed statewide within the July 1, 2014 – June 30, 2015, fiscal year through a Joint Participation Agreement. This funding could provide up to 50 percent of the total costs of any Quiet Zone capital improvement project. FDOT will distribute the funds with consideration given to the percentage contributed by the Quiet Zone Applicant, the number of rail crossing closures submitted within the Quiet Zone corridor to enhance safety, and the availability of funds within the fiscal year deadline.

7.4 LOCAL GOVERNMENT PROGRAMS: "INNOVATIVE FINANCE" TECHNIQUES

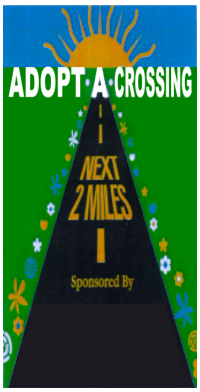
7.4.1 Special Benefit Assessments

A common method of funding municipal capital improvements that generate highly localized benefits and increase property value is the special assessment district. Often, the assessment value determined for each property will simply appear in the form of a line item in a property tax bill soon after a new improvement is installed. Some local improvements can excite controversy, such as the installation of "traffic calming" devices such as speed humps. In such instances, communities are well-advised to have neighborhood assent mechanisms in place – for example, a formal procedure for running neighborhood-size referendums, perhaps requiring supermajorities for approval. If a neighborhood is comprised largely of hard-of-hearing stay-at-homes, but the grade

crossing is located on the favored drag strip leading to the local high school, a referendum process will severely mismatch the people being asked to pay for the benefit and the persons who would most benefit. (A not always subtle distinction may exist between those who would most benefit – say accident prone teenage drivers, and those most willing to pay for the benefit – perhaps their parents.)

The principal benefit sought in establishing quiet zones is, unsurprisingly, reduction in noise. Collision risk should decline, but only marginally. This simplifies the challenge of identifying beneficiaries – there is no need to survey nervous parents in nearby neighborhoods. Beneficiaries will be those persons or businesses living, working or located in close proximity to quiet zones. A large number of factors will affect how valuable a quiet zone is for each – but introducing more than the barest minimum in calibrating special assessments may be more than the City would realistically want to consider. The most objectively determinable and possibly simplest to administer factors would include distance from rail line, trains per day on relevant line, and zone classification. The costs that the City would seek to recover through this form of mechanism, and the time over which the assessment would be in force are legal and political questions for the City. There would need to be a legally defensible connection to property value enhancement for this type of funding alternative to be viable.

7.4.2 "Adopt-a-Crossing"



The "Adopt-a-Highway" concept is well known throughout the nation; organizations volunteer to remove litter from a segment of roadway, usually a minimum of two miles or so, in exchange for a sign identifying the organization and the good will thereby generated. Similar programs have been put in place under the names of "Adopt-a-stream," "Adopt-a-park," "Adopt-a-place" and so forth. The "Adopt-a-Crossing" program would have to differ – the objective would not be to offset negligible cleanup costs, but to produce a non-trivial contribution to either capital or recurring costs. "Adopt-a-crossing" volunteers would be recruited from the neighborhoods in which quiet zones are proposed. "Adopt-a-crossing" programs could be designed to be either pre- or post implementation.

"Pre-installation" efforts would be designed so that County funding of crossing improvements would be contingent upon volunteers raising a specified portion of capital costs before the City will commit to funding the remainder of implementation costs. Volunteers would serve as "toll collectors" at the crossings proposed for improvements. "Tolls" would be voluntary, and, documented on signed receipts. Contributions from local residents could be encouraged by, for example, distributing laudatory bumper stickers to those whose cumulative donations exceed, say $20. The local "Adopters" would be expected to select and pay for such frills. Standards would be required for the collection of tolls, including time-of-day, protective and identifying clothing, issuance

and tracking of receipts, coordination with police, etc. "Post-installation" programs could be used to help cover recurring costs at specific locations, repay bonds, or to generate funds intended for future installations.

7.4.3 Property Tax Reassessments

The value of a quiet zone in making a community more "livable" or "attractive" should, in theory, have an effect of increasing the local property values. FRA cites a number of studies that verify an inverse correlation between proximity to railroad tracks and housing values. Locomotive horn soundings are, of course, only one of several factors influencing this pattern, but they are likely to be a significant one in several places. Increased property values flowing from a whistle ban will not be reflected in increased tax revenues from the benefiting owners unless the change in value is reflected in property assessments, which may be performed at infrequent intervals. There would need to be a legally defensible connection to property value enhancement for this type of funding alternative to be viable.

7.4.4 Encouraging Railroad Contributions

Railroads rarely have an incentive to contribute to crossing protection improvements. They would prefer that crossings weren't there – which is the underlying basis for the crossing closure incentive payment program. The presence of crossings has operational impacts on railroads, as well as present huge liability concerns. Railroads concern with liability is acute – and any means by which to reduce the cost of risks will be looked on with favor. The City may consider, if legally permissible, an exchange of risk for monetary contribution. That is, the City may promise to hold the railroad harmless against personal injury or property awards resulting from crossing accidents in exchange for a contribution to the cost of crossing protection. The liability the City will accept should be carefully defined, e.g., limited to amounts over $5 million, and not applicable to instances of gross negligence on the part of the railroad or with respect to punitive damages.

8. IMPLEMENTATION PROCESS

8.1 OVERVIEW

All railroads operating over public highway-rail grade crossings within a quiet zone established will cease routine use of the locomotive horn as of the date established by the City. Implementing a quiet zone does not prohibit the occasional use of the horn in emergency situations, or as a method of warning railroad workers of the approaching train. This section addresses the procedures, as identified by FRA, in implementing a quiet zone.

8.2 STEPS INVOLVED IN IMPLEMENTING A QUIET ZONE

The step-by-step procedure in implementing a quiet zone is shown on Figure 8-1. The various steps involved in this procedure are explained in detail below:

Step 1: Initial Notification

As an initial step in designating a quiet zone, the City must provide written notice to the following agencies and obtain their cooperation.

- CSX Transportation;
- The highway or traffic control authority and law enforcement authority having control over vehicular traffic at the crossings in the quiet zone;
- The state agency (FDOT) responsible for highway and road safety; and
- The FRA Associate Administrator for Safety.

Step 2: Minimum Requirements

As identified in Section 4 of this report, the proposed quiet zones have to meet the minimum requirements specified by FRA in the Federal Register on "Use of Locomotive Horns on Public Highway-Rail Grade Crossings."

Step 3: Private Crossings within a Quiet Zone

It is emphasized that FRA does not require sounding of the locomotive horns at private highway-rail grade crossings. However, the following devices must be installed at the private highway-rail grade crossings within a quiet zone.

- Crossbucks
- Advance Warning Signs
- STOP signs in conformance with standards in the MUTCD

In addition, FRA indicates that a diagnostic team must review all the private highway-rail grade crossings within a quiet zone and provide appropriate recommendations. The City must comply with the diagnostic team's recommendations concerning the safety of these crossings.

Step 4: Initial Inventory Update

U.S. DOT Grade Crossing Inventory Form must be updated to reflect the existing conditions at each public and private highway-rail grade crossing. This form must be complete, accurate, and dated within six (6) months prior to implementing a quiet zone. The instructions on how to update the form may be found at http://www.fra.dot.gov/us/content/801.

Step 5: Quiet Zone Qualification

If the City elects to implement quiet zones using Approach #1, no analysis is required and the quiet zones are not subject to annual review by FRA.

If the City elects to implement quiet zones under Approach #2, QZRI calculations must be submitted and annual review may be required.

Step 6: Update National Inventory and Notify the Agencies

The City must coordinate with the State and CSX Transportation in updating the national inventory forms of each public highway-rail grade crossing within the quiet zones that were established based on either of the approaches, as explained in Section 4. Normally, FRA only accepts updates to the Inventory File from the State and Railroad Inventory Contacts, those individuals employed by the State or Railroad that are responsible for this activity.

The City must notify all the agencies listed in Step 1 by certified mail, return receipt requested. The notice must designate a specific date on which the routine sounding of horns at crossings within the quiet zone will cease. On no account shall this date be earlier than 21 days after the mailing of the written notification.

Step 7: Affirmation and Periodic Update of the DOT Grade Crossing Inventory

Periodically, the City would be required to affirm in writing to FRA and other agencies that were initially notified that the quiet zones continue to conform to the requirements for quiet zones. In addition, the City must submit to FRA an updated U.S. DOT National Inventory Form for each crossing in the quiet zone.

These periodic updates depend on the approach method used to establishing quiet zones. The following specifies the time frame for the quiet zones based on the approach method used:

Quiet Zones established based on Approach # 1 ------ 4.5 - 5 years

Quiet Zones established based on Approach # 2 ----- 2.5 - 3 years
(QZRI falls below RIWH)

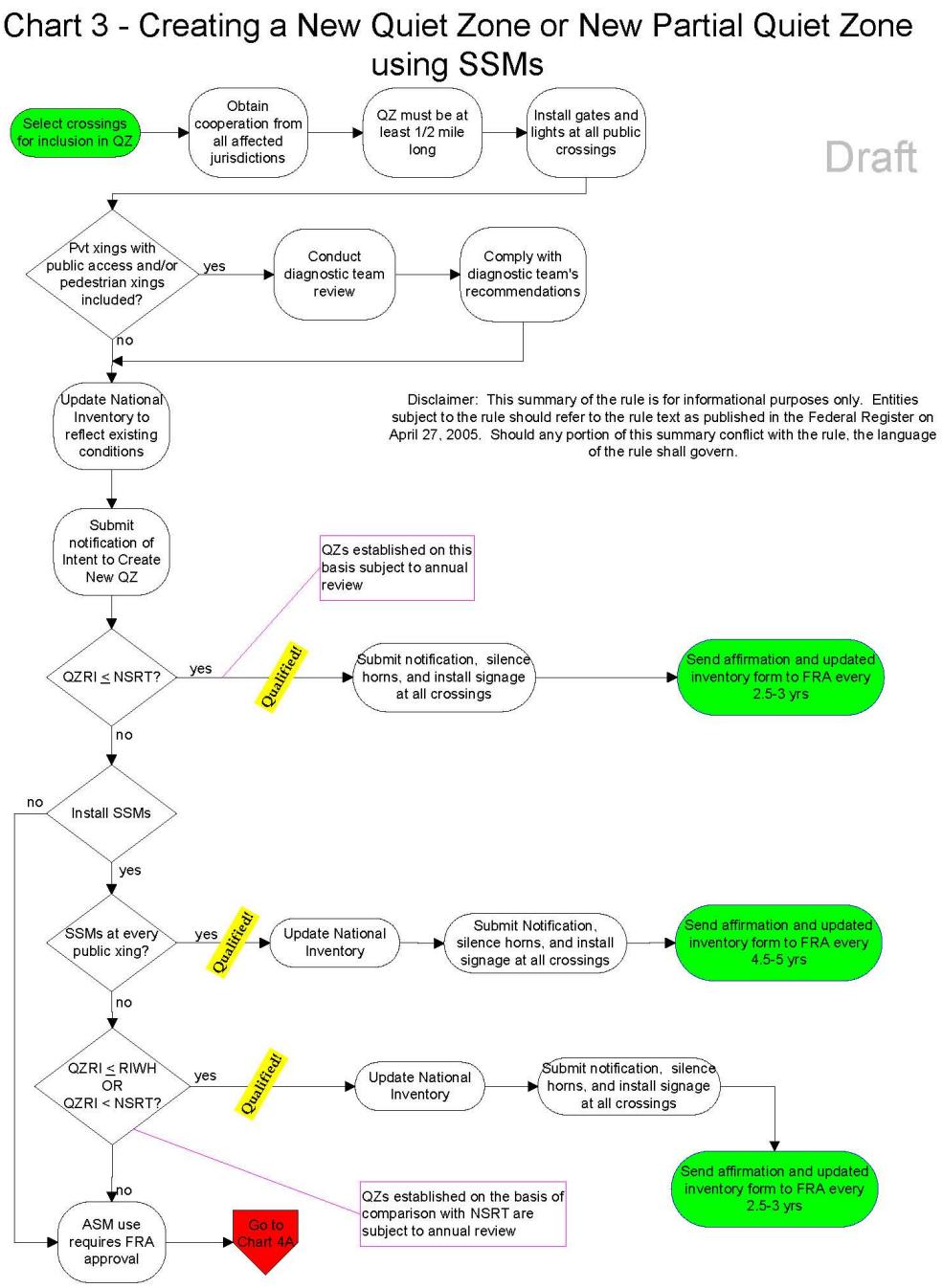
8.3 RAILROAD NEGOTIATIONS

Once a decision is made to implement a particular quiet zone, its funding has been arranged and specific safety measures to be installed are agreed upon; it is then appropriate to enter into negotiations with the owning railroad. It will be necessary to develop an agreement regarding the intended use of the railroad's property and its financial participation, since railroad agreement with the quiet zone installation plan will be necessary for FRA approval in the early stages of the project.

8.4 FRA PROGRAM SCHEDULE FOR HORN SOUND LEVELS

The Final Rule requires railroads to comply with the maximum horn level of 110 dBA using the new measurement procedures to certify their locomotives. Compliance with the provision is required for new locomotives upon the effective date of the final rule (June 24, 2005). Additionally, locomotives built before June 24, 2005 must be tested and brought into compliance with part 229.129 by June 24, 2010. Locomotives, when rebuilt, as determined pursuant to 49 CFR 232.5, must be tested to ensure that the horn installed on such locomotives is in compliance with the provisions under the final rule. FRA also anticipates that whenever repairs or modifications are performed to locomotives that affect the performance of the horn system, the railroad will recertify the locomotive horn to comply with Final Rule.

Figure 8-1: Graphical Representation of Steps Involved in Implementing a Quiet Zone
Source: "Guidance on the Quiet Zone Creation Process", Federal Railroad Administration (hhtp://www.fra.dot.gov/us/content/1318)



GLOSSARY

GLOSSARY

Alternative Safety Measure (ASM): A safety system or procedure provided by the appropriate traffic control authority which, after individual review and analysis, is determined by the FRA to be an effective substitute for the locomotive horn at specific crossings.

ASMs include:

- Modified SSMs (see definition)
- Programmatic law enforcement
- Programmatic education
- Photo enforcement

Approach #1: A Quiet Zone may be established if every public crossing in a proposed quiet zone is upgraded with FRA "approved" supplementary safety measures (SSMs).

Approach #2: A quiet zone may be established if the local authority (County) can analytically demonstrate that the probability of a collision will not increase after the horns are silenced.

Constant Warning Time (CWT): The Constant Warning Time (CWT) device activates the gates to ensure that activation occurs at the same amount of time prior to the arrival of a train irrespective of speed. This avoids long unnecessary waits at crossings that have very slow moving trains and discourage motorists from attempting to drive around gates to beat trains.

Diagnostic Team: A group of qualified or specially trained individuals assembled to make objective expert judgments about physical and/or operating conditions at highway-rail crossings. In the context of this rule, a diagnostic team assesses grade crossing safety requirements according to safety management principles.

Direct Current Audio Frequency Overlay (DC/AFO): DC/AFO is a track circuit system that uses audio frequencies to detect train location and direction. Several audio "loops" are embedded in the track allowing the system to detect the direction of approach of a train to a particular location such as a grade crossing.

Environmental Impact Statement (EIS): Environmental Impact Statements are required of federal agencies for major projects or legislative proposals that may significantly affect the environment. These statements describe the positive and negative effects of the proposed undertaking and cite possible alternative actions. Impact Statements are required by the National Environmental Policy Act. The EPA reviews and responds to filed impact statements and makes available a national EIS filing system as well as publishing a weekly notice of EIS documents available for review.

Four-Quadrant Gate: Train-activated warning gates that, when lowered, fully block highway traffic from entering the crossing. Gates lower across both approach and departure lanes on both sides of the crossing.

Modified SSM: An SSM that has in some way been adjusted to accommodate unique circumstances existing at a specific crossing and no longer conforms to the SSM requirements. Modified SSMs are considered ASMs. An example would be traffic channelization devices that due to a nearby intersection are only 45 feet in length instead of the required 60 feet.

MUTCD: *The Manual on Uniform Traffic Control Devices*; a guidance document published by the Federal Highway Administration (FHWA) establishing specifications for highway signs, signals, and pavement markings.

Power Out Indicators: Power out indicators consist of a simple light bulb, wired to the electrical power circuits that detect whether electrical power is available to properly actuate the warning device. When power is available, the light is continuously lit. The light is located outside the instrument case that houses the control circuitry for the automatic crossing warning devices, and is in plain view of approaching trains. If electrical power is not available to actuate the warning device, the light goes dark.

Private Highway-Rail (Grade) Crossing: A location where a private roadway crosses railroad tracks at grade.

Public Highway-Rail (Grade) Crossing: A location where a public highway, road, or street crosses railroad tracks at grade. For this rule, this includes crossings where a public authority maintains the roadway on at least one side of the crossing.

Quiet Zone: A quiet zone is a section of a rail line that contains one or more consecutive public crossings at which locomotive horns are not routinely sounded.

Quiet Zone Risk Index: The average risk index for all public crossings in a proposed quiet zone taking into consideration the increased risk caused by the absence of train horns and any decrease in risk attributable to the use of SSMs or ASMs.

Non-engineering ASM: A consistent and systematic program of traffic law enforcement, public education programs, or a combination thereof, that produces a measurable reduction of risk at quiet zone grade crossings.

NSRT: The Nationwide Significant Risk Threshold is the average Risk Index of all public, gated crossings in the nation at which train horns are sounded.

Relevant collision: A highway-rail crossing collision that FRA believes could be prevented by sounding the train horn. Specifically, the term excludes collisions with motor vehicles resulting from an activation failure of an active grade crossing warning system; collisions in which there is no driver in the motor vehicle; and collisions where the highway vehicle struck the side of the train beyond the fourth locomotive unit or rail car.

Risk Index: The predicted cost to society of casualties that are expected to result from collisions at an individual crossing.

Supplementary Safety Measure (SSM): SSMs are engineering improvements, which when installed at crossings within a quiet zone, would reduce the risk of a collision at the crossing. SSMs are installed to reduce the risk level either to the level that would have existed if the train horn were sounded (compensating for the lack of the train horn) or to a level below the Nationwide Significant Risk Threshold.

Approved SSMs include:
• Four quadrant gates.
• Medians or channelization devices at gated crossings.
• One-way streets equipped with gates that fully block the street.
• Temporary closure (i.e., nighttime closure).

Wayside Horn: A stationary horn located at a highway-rail grade crossing that is designed to provide audible warning to oncoming motorists when a train is approaching. The horn is controlled by the same track circuits that operate the automatic warning devices at the crossing.

Whistle Ban or Pre-Rule Quiet Zone: A whistle ban is a local prohibition of the sounding of locomotive horns at specific highway-rail grade crossings. Historically, Whistle bans were established by local ordinance or through agreements with specific railroads in accordance with existing state law. At whistle ban crossings, no specific safety improvements have been made to compensate for the absence of the audible warning. Pre-Rule Quiet Zones established under this rule may only consist of Whistle Ban crossings that were in effect on October 9, 1996 and on December 18, 2003.

APPENDIX A
PHOTOS OF EXISTING RAILROAD CROSSINGS

26th Street Northbound, Crossing 1 – 626275P

26th Street Southbound, Crossing 1 – 626275P

24th Street Northbound, Crossing 2 – 626277D

24th Street Southbound, Crossing 2 – 626277D

23rd Street Northbound, Crossing 3 – 626278K

23rd Street Southbound, , Crossing 3 – 626278K

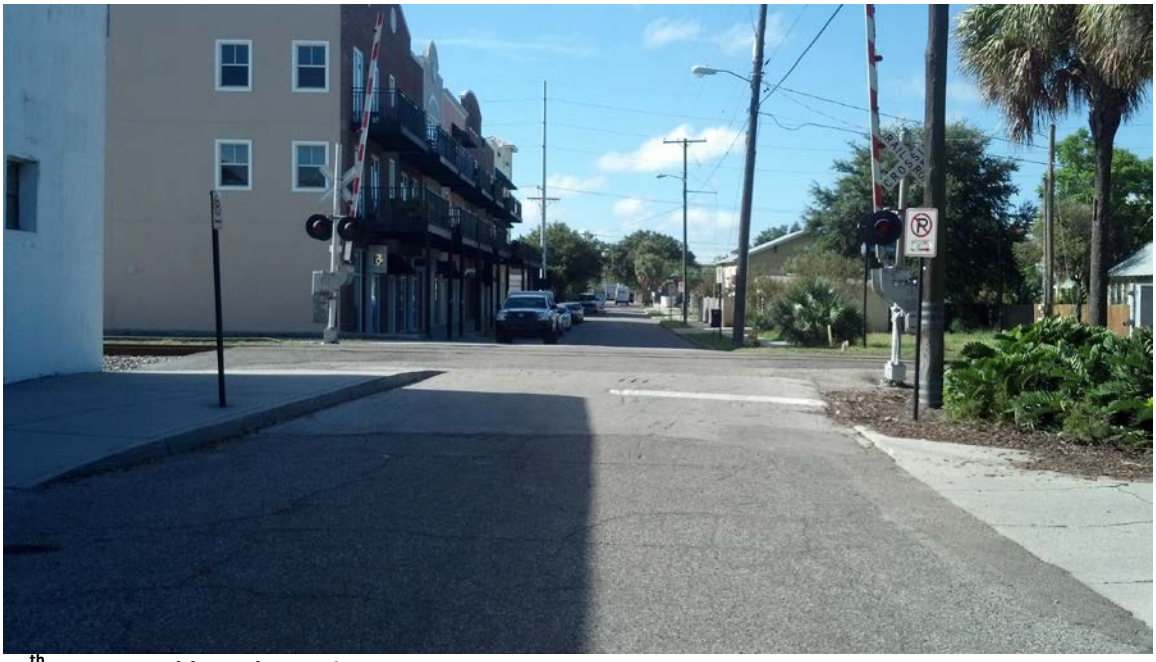
N SR 585/22nd St Northbound, Crossing 4 – 626279S

N SR 585/22nd Street Southbound, Crossing 4 – 626279S

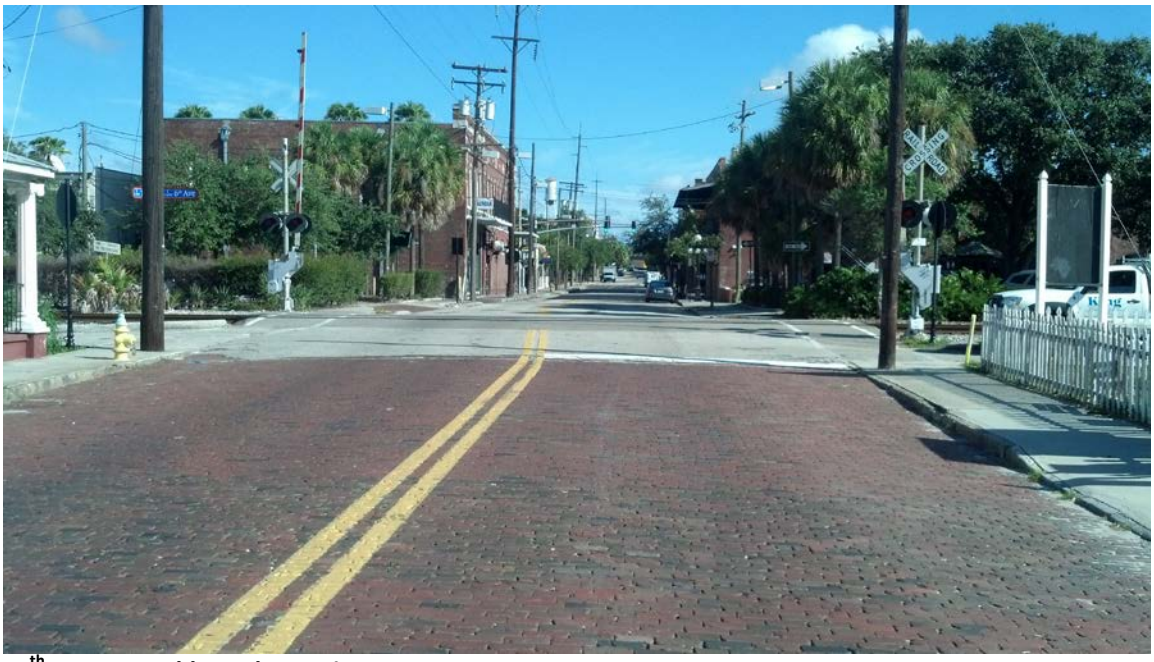
E SR 585/21st Street Northbound. Crossing 5 – 626280L

E SR 585/21st Street Southbound. Crossing 5 – 626280L

20th Street Northbound, Crossing 6 – 626281T



20th Street Southbound, Crossing 6 – 626281T



19th Street Northbound, Crossing 7 – 626292F

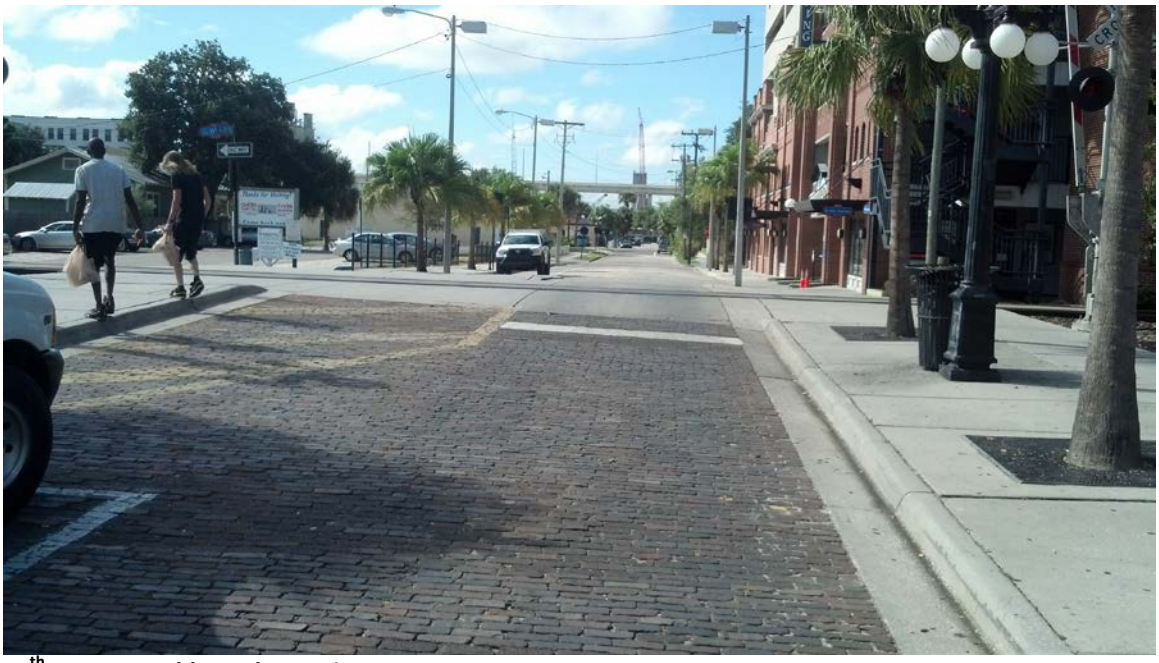
19th Street Southbound, Crossing 7 – 626292F

18th Street Northbound, Crossing 8 – 626293G

18th Street Southbound, Crossing 8 – 626293G

17th Street Northbound, Crossing 9 – 626284N

17th Street Southbound, Crossing 9 – 626284N



16th Street Northbound, Crossing 10 – 626285V

16th Street Northbound, Crossing 10 – 626285V

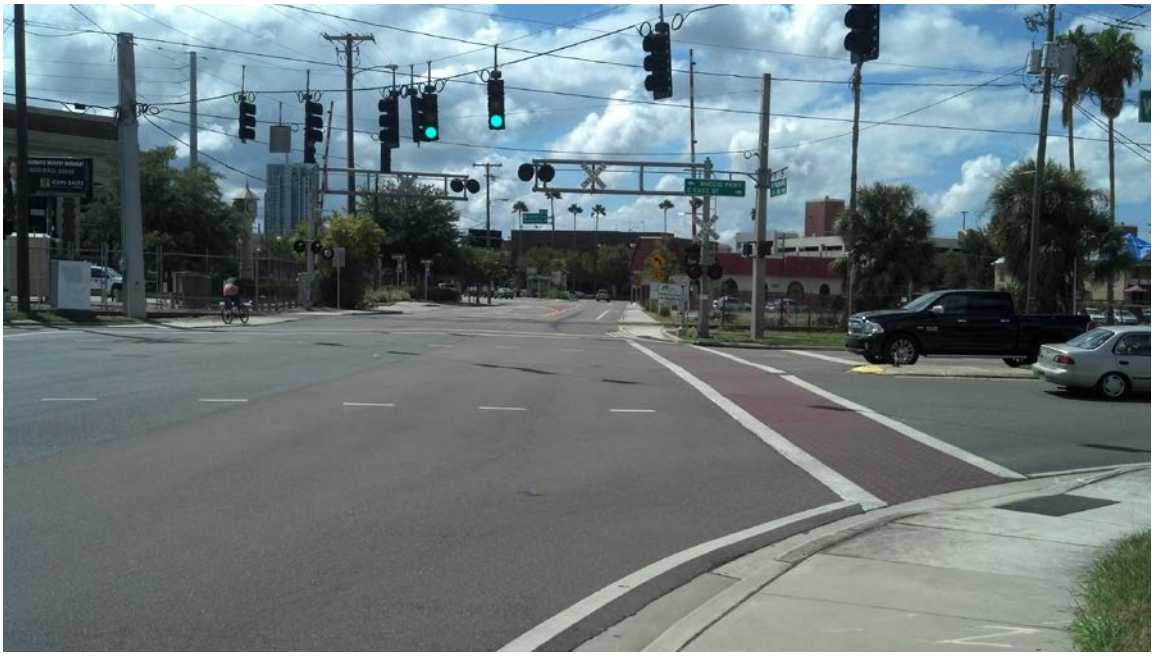
15th Street Northbound, Crossing 11 – 626286C

15th Street Southbound, Crossing 11 – 626286C

Republica De Cuba Northbound, Crossing 12 – 626287J

Republica De Cuba Northbound, Crossing 12 – 626287J

Nebraska Avenue Northbound, Crossing 14 – 626293M



Nebraska Avenue Southbound, Crossing 14 – 626293M

N. Jefferson Street Northbound, Crossing 15 – 626294U

N. Pierce Street Northbound. Crossing 16 – 626295B

Morgan Street Northbound, Crossing 17 – 626296H

Morgan Street Southbound, Crossing 17 – 626296H

Marion Street Northbound, Crossing 18 – 626297P

Marion Street Southbound, Crossing 18 – 626297P

N. Florida Avenue Southbound, Crossing 19 – 626298W

Franklin St. Mall Northbound, Crossing 20 – 626299D

Franklin Street Mall Southbound, Crossing 20 – 626299D

S. Tampa Street Southbound, Crossing 21 – 626300V

Ashley Drive Northbound, Crossing 22, 626301C

Ashley Drive Southbound, Crossing 22, 626301C

Doyle Carlton Drive Southbound. Crossing 23 – 626302J

North Blvd. Northbound, Crossing 24 – 626303R

North Blvd. Southbound, Crossing 24 – 626303R

W. Kennedy Blvd. Westbound, Crossing 25 – 626304X

F W. Kennedy Blvd. Eastbound, Crossing 25 – 626304X

Willow Avenue Northbound, Crossing 26 – 626305E

Willow Avenue Southbound, Crossing 26 – 626305E

W. Cleveland Street Northbound, Crossing 27 – 626306L

E. Platt Street Eastbound, Crossing 28 – 626308A

Swann Avenue Eastbound, Crossing 29 – 626334P

Swann Avenue Westbound, Crossing 29 – 626334P

Morrison Avenue Eastbound, Crossing 30 – 626335W

Morrison Avenue Westbound, Crossing 30 – 626335W

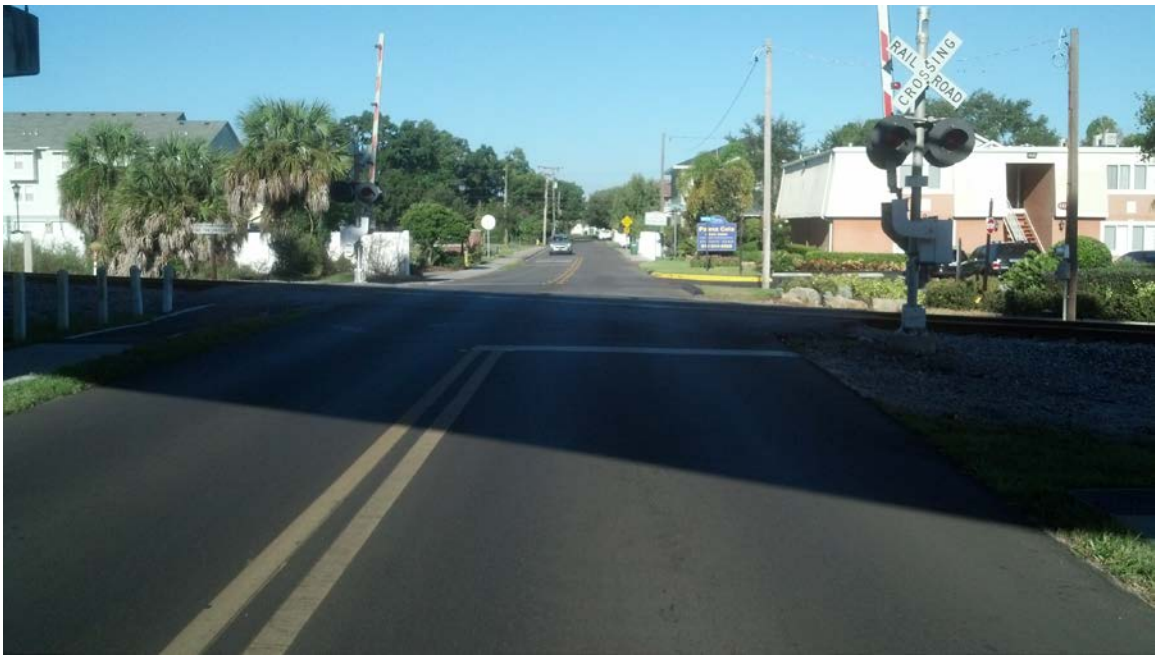
Howard Avenue Northbound, Crossing 31 – 636336D

Howard Avenue Southbound, Crossing 31 – 636336D

Watrous Avenue Eastbound, Crossing 32 – 626337K

Watrous Avenue Westbound, Crossing 32 – 626337K

Mississippi Avenue Eastbound, Crossing 33 – 626338S



Mississippi Avenue Westbound, Crossing 33 – 626338S

Bay to Bay Blvd. Eastbound, Crossing 34 – 626341A

Bay to Bay Blvd. Westbound, Crossing 34 – 626341A

MacDill Avenue Southbound, Crossing 35 – 626342G

MacDill Avenue Westbound, Crossing 35 – 626342G

El Prado Blvd. Eastbound, Crossing 36 – 626343N

El Prado Blvd. Westbound, Crossing 36 – 626343N

Euclid Avenue Eastbound, Crossing 37 – 626344V

Euclid Avenue Westbound, Crossing 37 – 626344V

S. Himes Avenue Northbound, Crossing 38 – 626345C

S. Himes Avenue Southbound, Crossing 38 – 626345C

Dale Mabry Hwy Northbound, Crossing 39 – 626346J

Dale Mabry Hwy Southbound, Crossing 39 – 626346J

Gandy Blvd. Northbound, Crossing 40 – 626349E

Gandy Blvd. Southbound, Crossing 40 – 626349E

Pearl Avenue Eastbound, Crossing 41 – 626350Y

Pearl Avenue Westbound, Crossing 41 – 626350Y

Oklahoma Avenue Eastbound, Crossing 42 – 626361L

Oklahoma Avenue Westbound, Crossing 42 – 626361L

Iowa Avenue Eastbound, Crossing 43 – 626362T

Iowa Avenue Westbound, Crossing 43 – 626362T

Manhattan Avenue Northbound, Crossing 44 – 626363A

Manhattan Avenue Southbound, Crossing 44 – 626363A

McCoy Street Eastbound. Crossing 45 – 626366V

McCoy Street Westbound, Crossing 45 – 626366V

Prescott Street Eastbound, Crossing 46 – 626367C

Prescott Street Westbound, Crossing 46 – 626367C

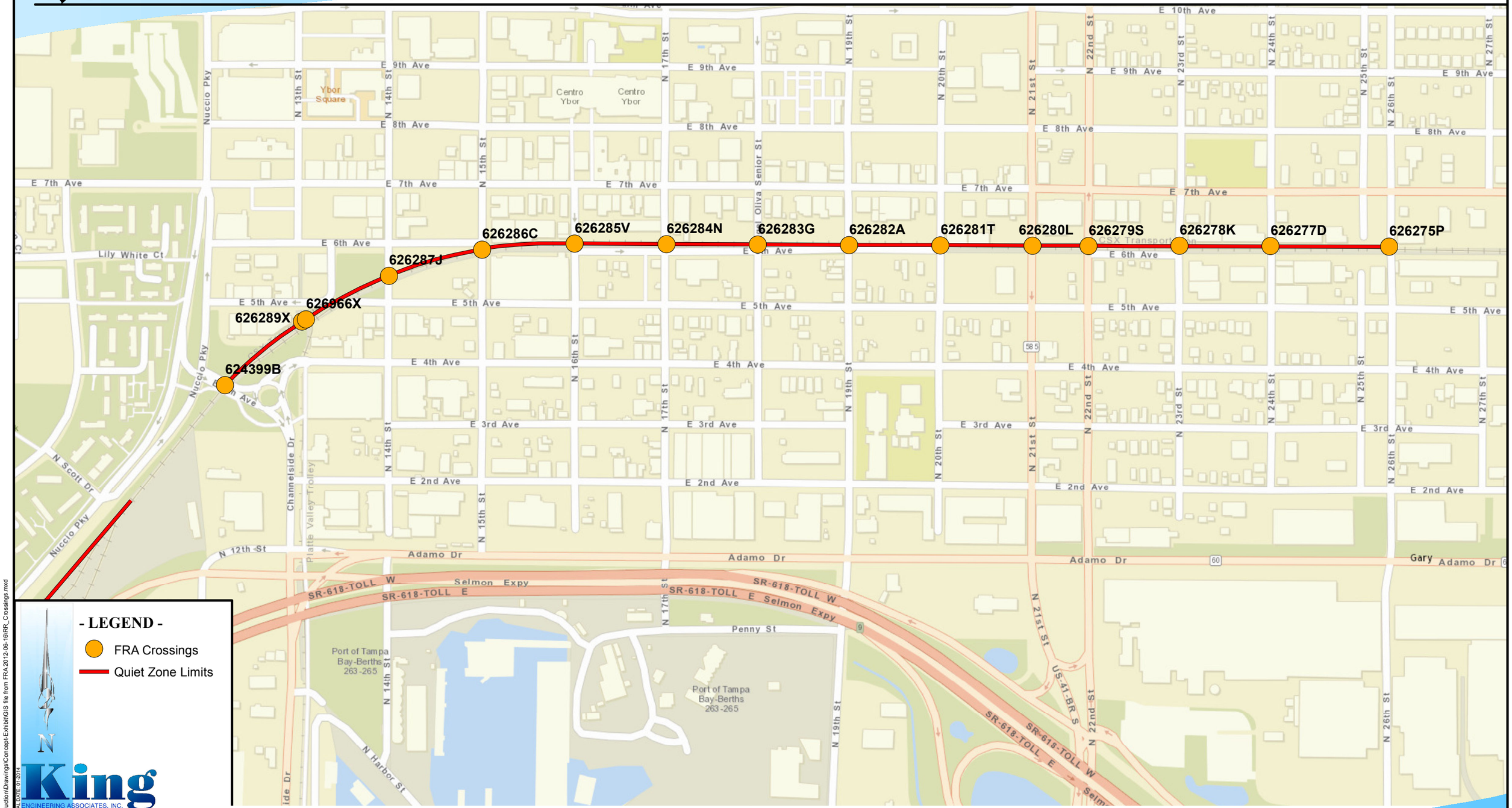
Westshore Blvd. Northbound, Crossing 47 – 626368J

Westshore Blvd. Southbound, Crossing 47 – 626368J

APPENDIX B
QUIET ZONE MAPS

QUIET ZONE STUDY

QUIET ZONES - QZ1: EAST YBOR



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FRA Crossings

Quiet Zone Limits

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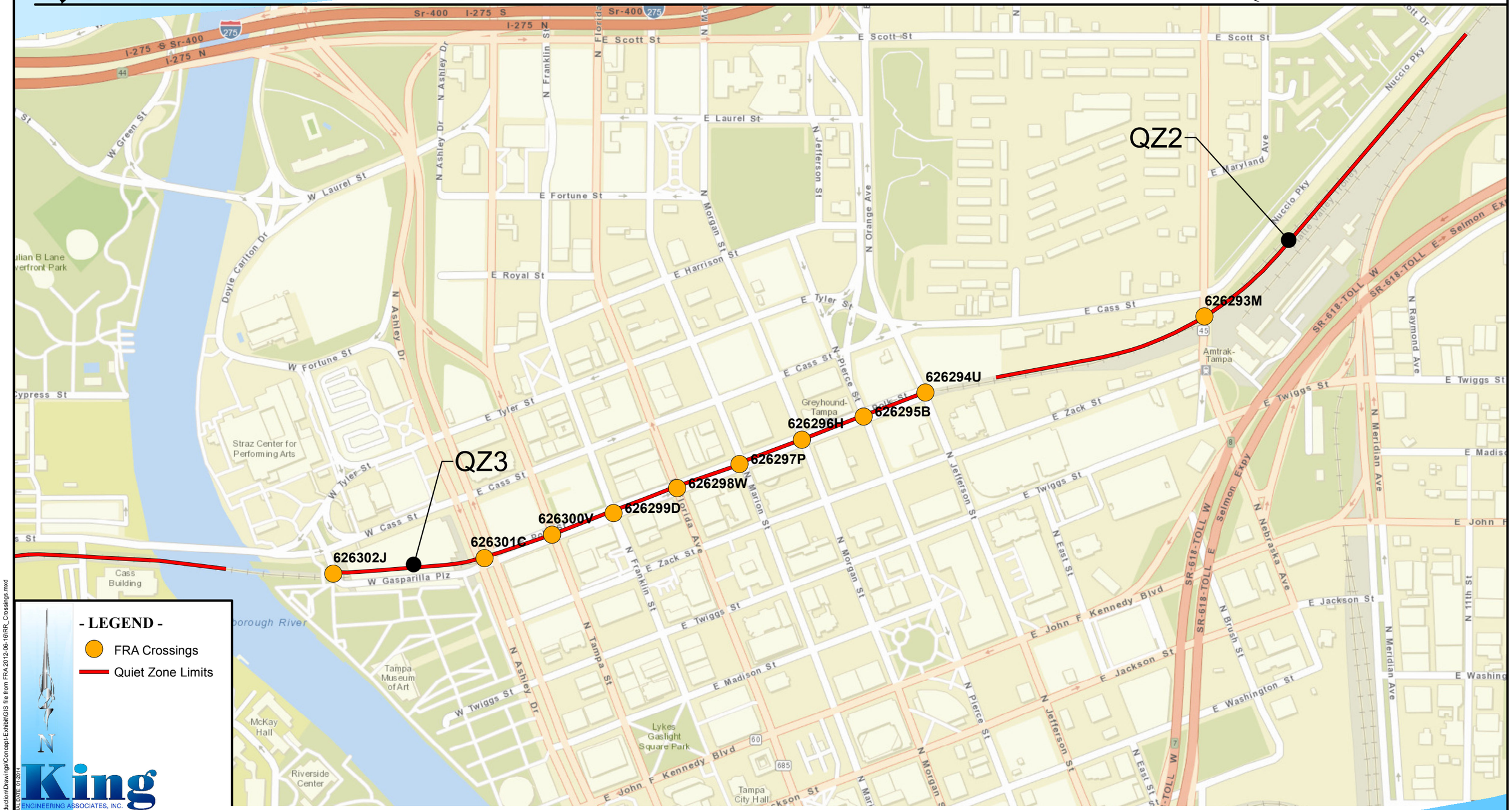
QUIET ZONE STUDY

QUIET ZONES - QZ2: NEBRASKA AVE. &
QZ3: DOWNTOWN TAMPA



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QUIET ZONE STUDY

QUIET ZONES - QZ4: NORTH BLVD

QZ4

626298W
626299D
626300V
626301C
626302J
626303R
626305E
626304X
626306L

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QUIET ZONE STUDY

QUIET ZONES - QZ5: KENNEDY BLVD TO PLATT ST.

626305E
626304X
626306L
626308A
626334P

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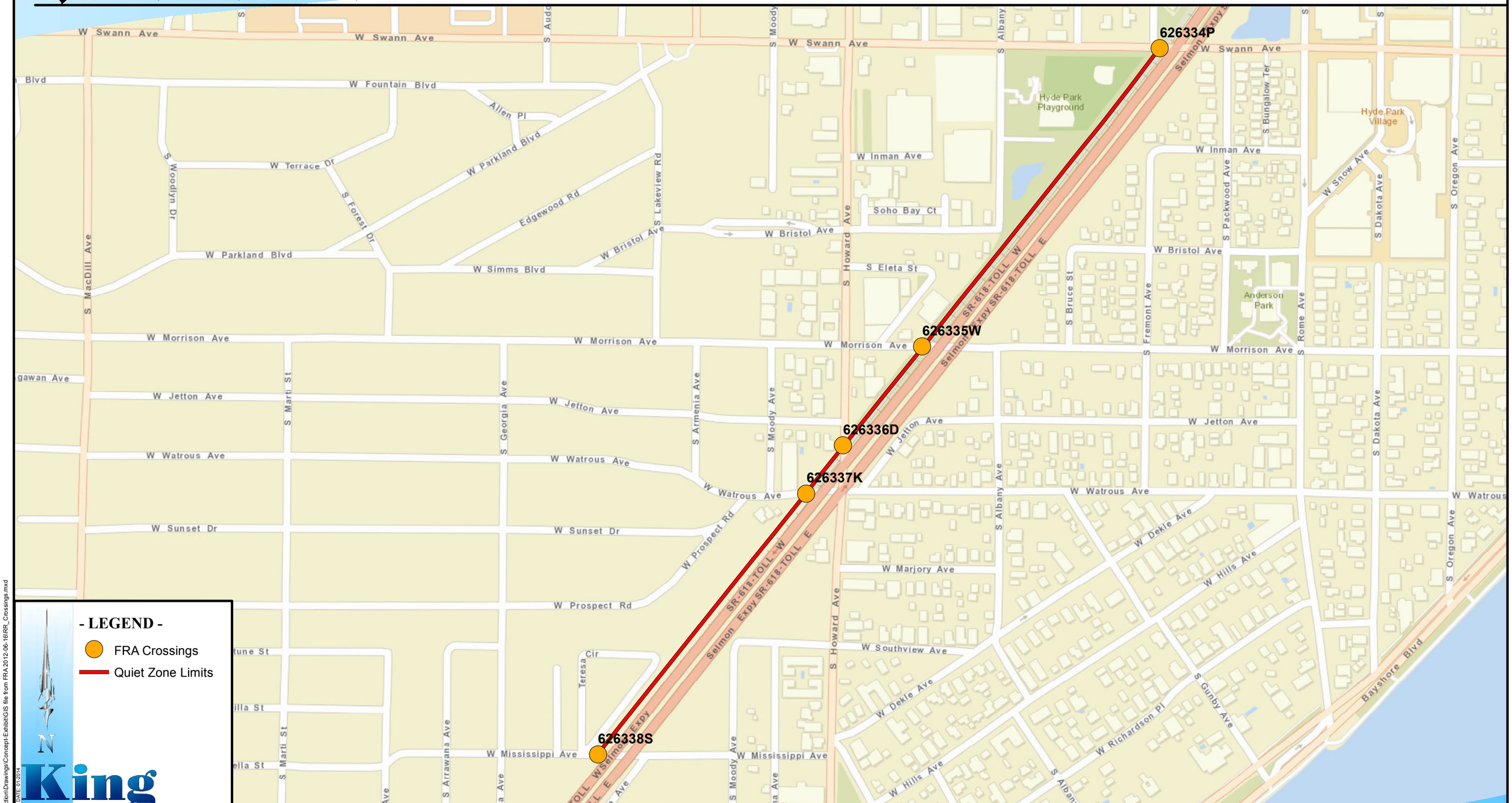
QUIET ZONE STUDY

QUIET ZONES - QZ6: MORRISON AVE TO MISSISSIPPI AVE.



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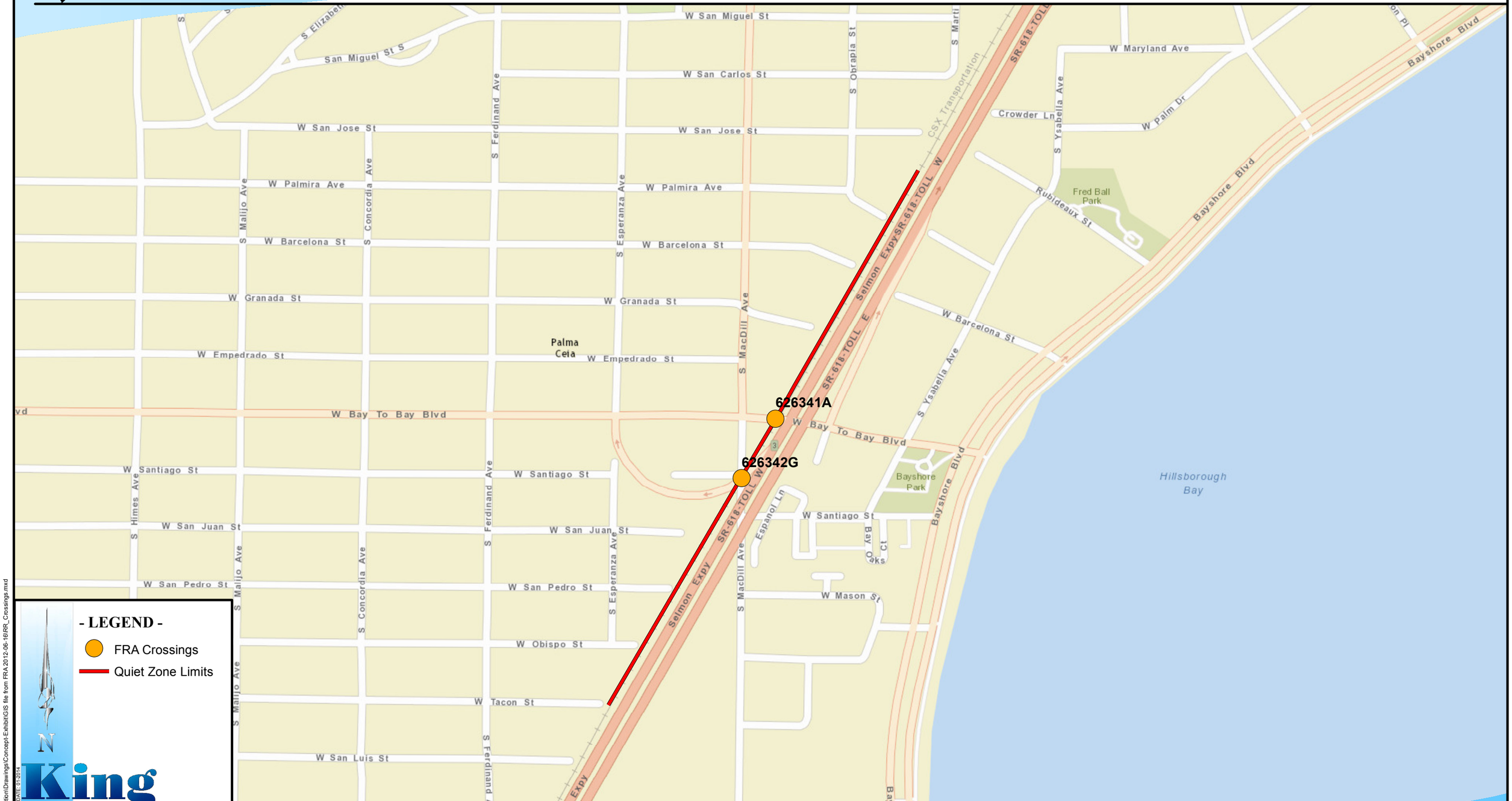
QUIET ZONE STUDY

QUIET ZONES - QZ7: BAY TO BAY BLVD TO MACDILL



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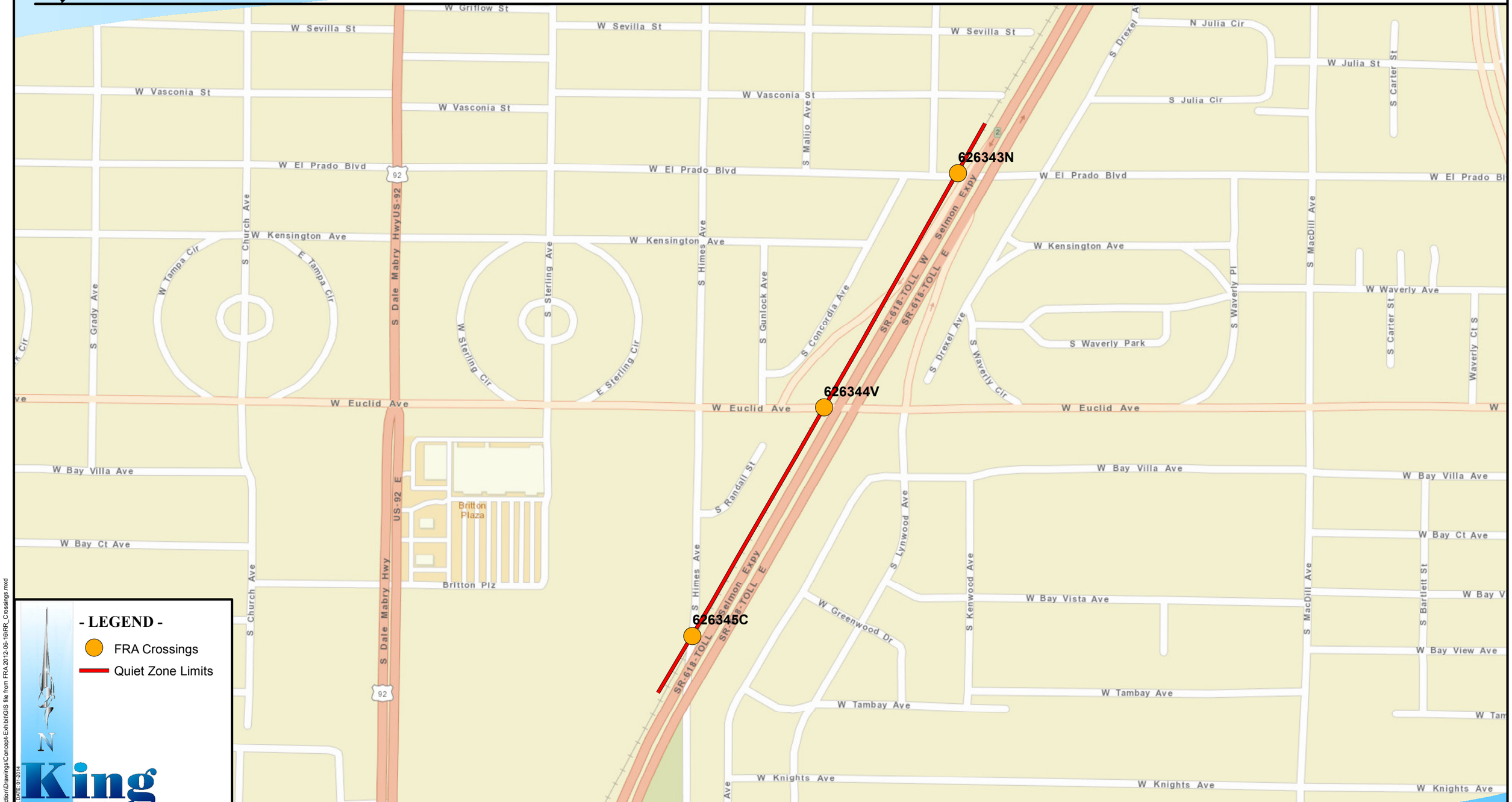
QUIET ZONE STUDY

QUIET ZONES - QZ8: EL PRADO BLVD TO HIMES AVE



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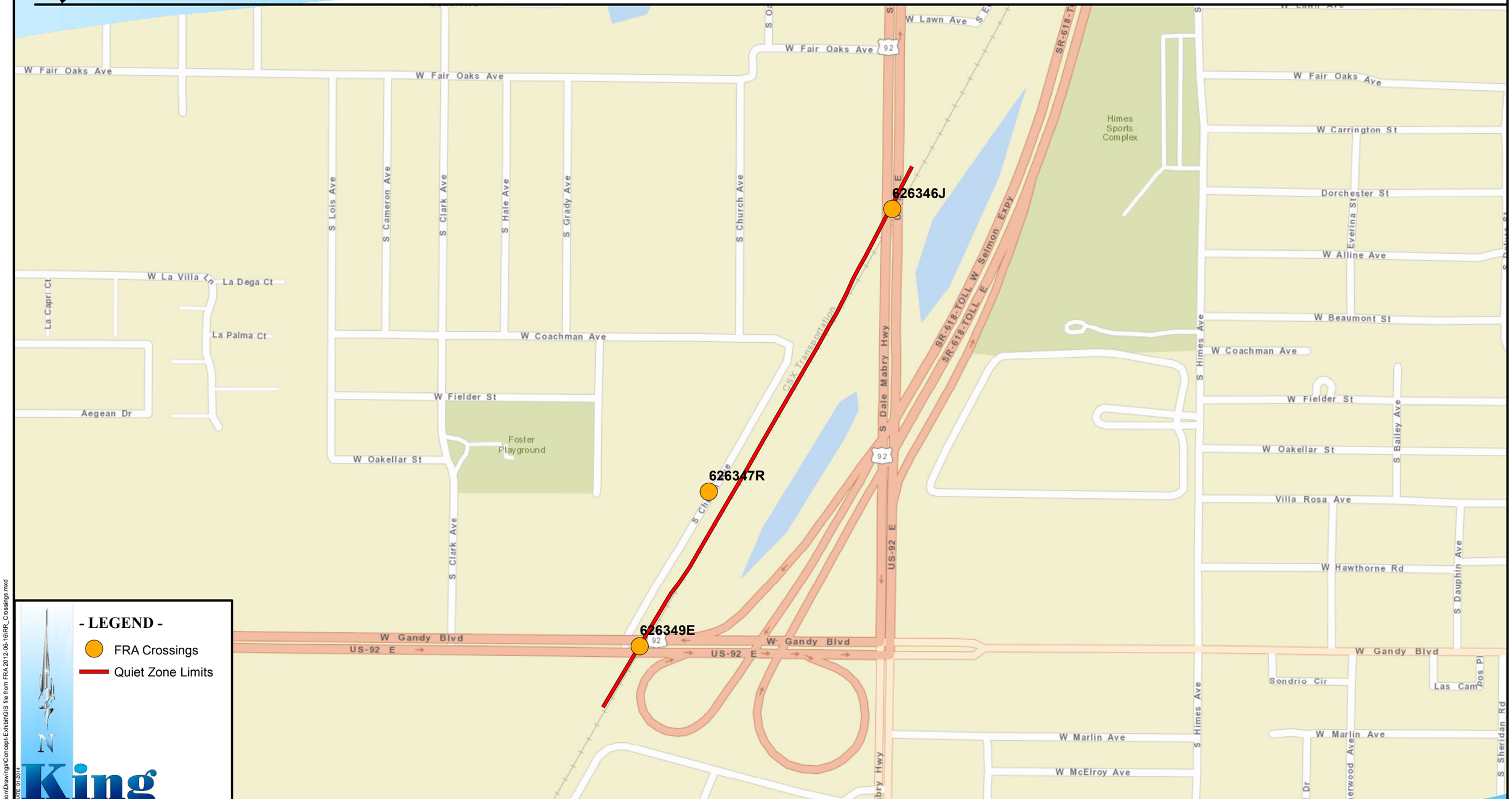
QUIET ZONE STUDY

QUIET ZONES - QZ9: DALE MABRY HWY TO GANDY BLVD



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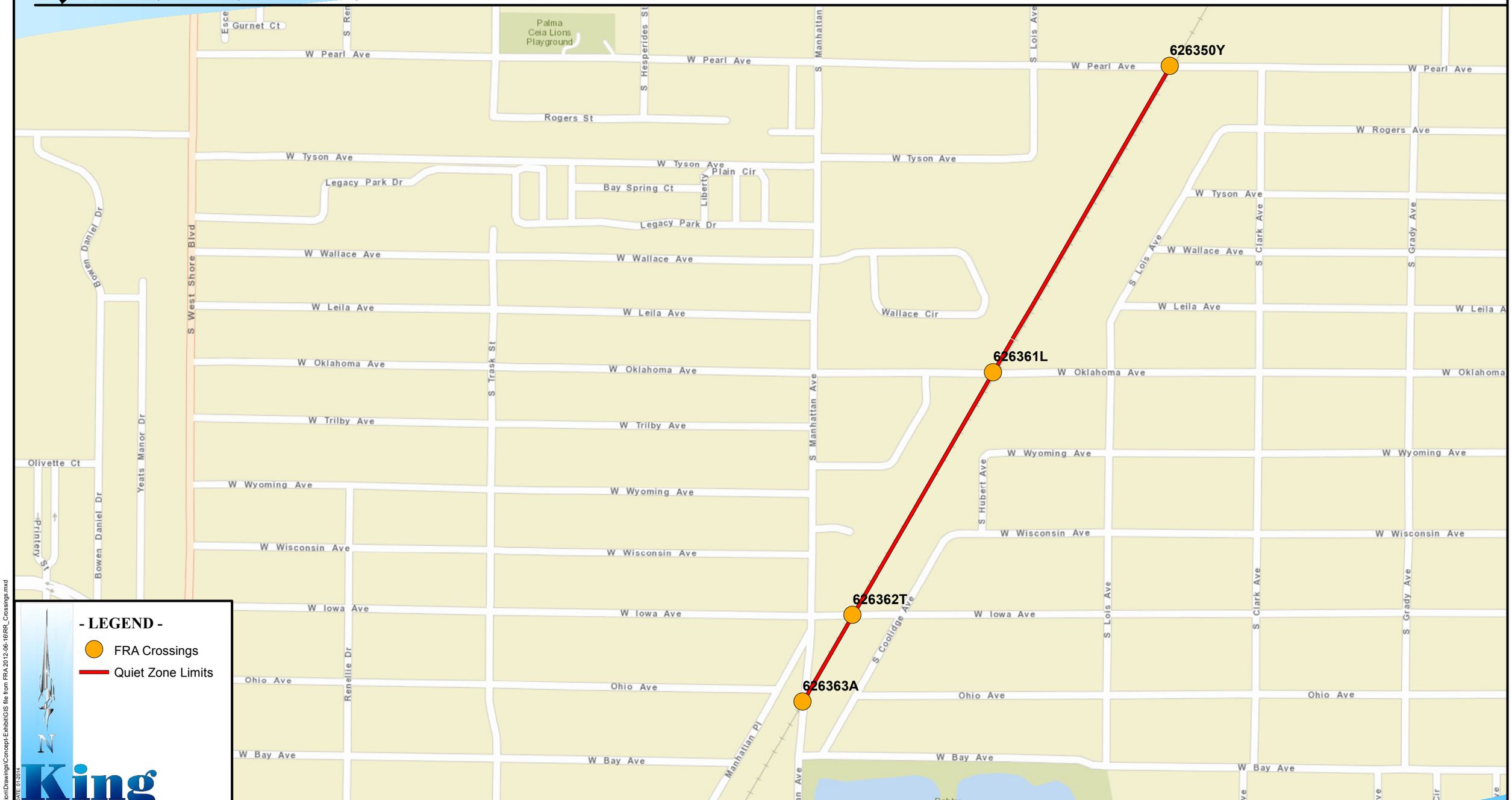
QUIET ZONE STUDY

QUIET ZONES - QZ10: PEARL AVE. TO MANHATTAN AVE.



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FRA Crossings

Quiet Zone Limits

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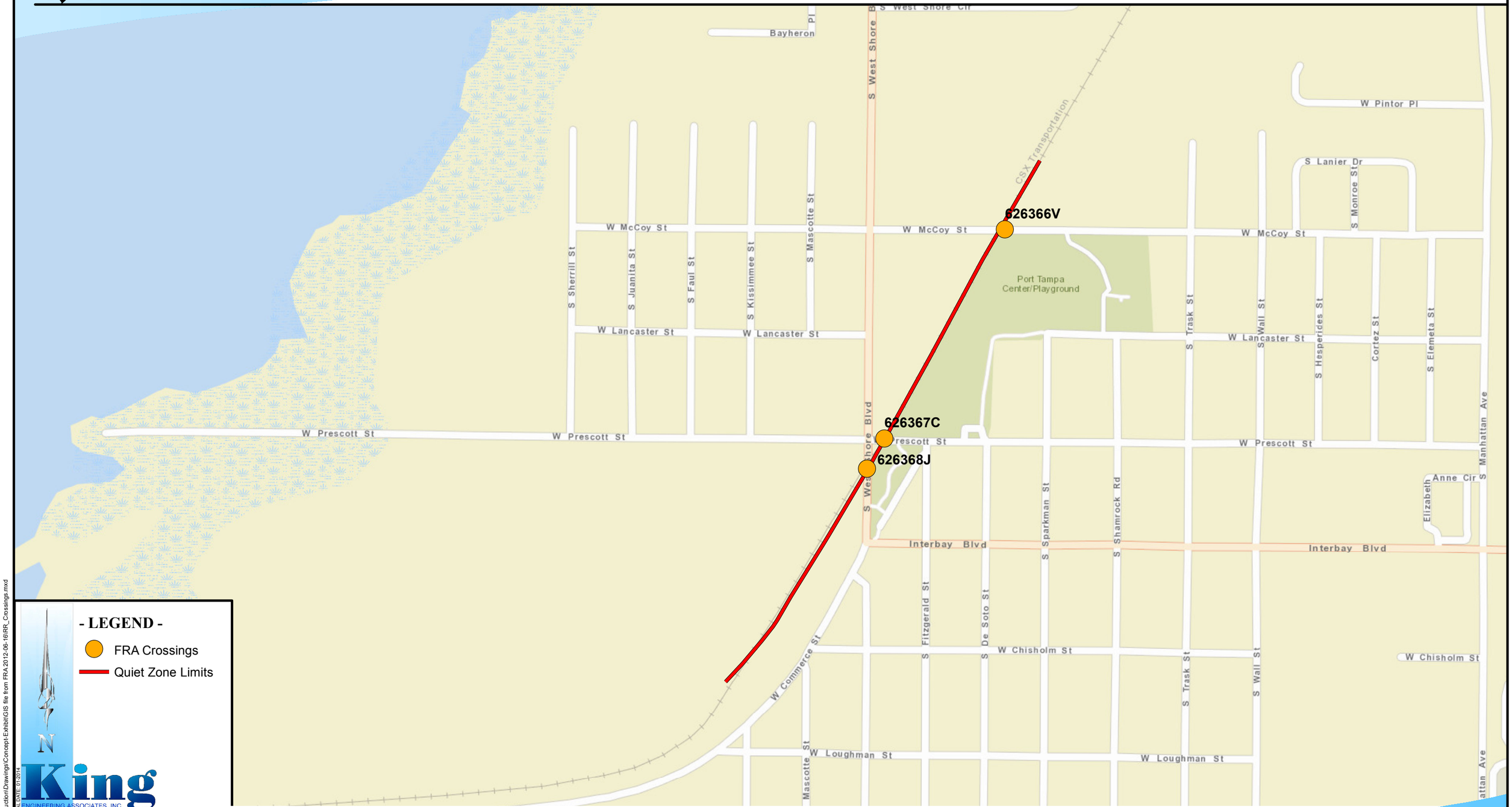
QUIET ZONE STUDY

QUIET ZONES - QZ11: MCCOY ST. TO WEST SHORE BLVD.



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CITY OF TAMPA

GRAPHIC REPRESENTATIONS ARE GENERAL IN NATURE AND SHOULD BE USED FOR PLANNING PURPOSES ONLY

APPENDIX C
GUIDELINES FOR ESTABLISHING QUIET ZONES & APPROVED SAFETY MEASURES

APPENDIX C

GUIDELINES FOR ESTABLISHING QUIET ZONES & APPROVED SAFETY MEASURES

(Source: Federal Register 49 CFR Parts 222 & 229 on "Use of Locomotive Horns at Public Highway-Rail Grade Crossings; Final Rule")

(Source: Federal Register 49 CFR Parts 222 & 229 on "Use of Locomotive Horns at Public Highway-Rail Grade Crossings; Final Rule")

APPENDIX C
GUIDELINES FOR ESTABLISHING QUIET ZONES
& APPROVED SAFETY MEASURES

This Guide to Establishing Quiet Zones (Guide) is divided into three sections in order to address the variety of methods and conditions that affect the establishment of quiet zones under this rule.

Section I of the Guide provides an overview of the different ways in which a quiet zone may be established under this rule. This includes a brief discussion on the safety thresholds that must be attained in order for train horns to be silenced and the relative merits of each. It also includes the two general methods that may be used to reduce risk in the proposed quiet zone, and the different impacts that the methods have on the quiet zone implementation process.

Section II of the Guide provides information on establishing New Quiet Zones. A New Quiet Zone is one at which train horns are currently being sounded at crossings. The Public Authority Designation and Public Authority Application to FRA methods will be discussed in depth.

Section III of the Guide deals with the required notifications that must be provided by public authorities when establishing New Quiet Zones.

Section I – Overview

In order for a quiet zone to be qualified under FRA's rule on use of locomotive horns at highway-rail grade crossings, it must be shown that the lack of the train horn does not present a significant risk with respect to loss of life or serious personal injury, or that the significant risk has been compensated for by other means. The rule provides four basic ways in which a quiet zone may be established.

A. Qualifying Conditions

One of the following four conditions or scenarios must be met in order to show that the lack of the train horn does not present a significant risk, or that the significant risk has been compensated for by other means:

1. One or more SSMs as identified in Appendix A of 49 CFR Parts 222 and 229 "use of locomotive horns at highway-rail grade crossings; final rule" are installed at each public crossing in the quiet zone; or
2. The Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold without implementation of additional safety measures at any crossings in the quiet zone; or
3. Additional safety measures are implemented at selected crossings resulting in the Quiet Zone Risk Index being reduced to a level equal to, or less than, the Nationwide Significant Risk Threshold; or

4. Additional safety measures are taken at selected crossings resulting in the Quiet Zone Risk Index being reduced to at least the level of risk that would exist if train horns were sounded at every public crossing in the quiet zone.

It is important to consider the implications of each approach before deciding which one to use. If a quiet zone is qualified based on reference to the Nationwide Significant Risk Threshold (i.e. the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold – see the second and third scenarios above), then an annual review will be done by FRA to determine if the Quiet Zone Risk Index remains equal to, or less than, the Nationwide Significant Risk Threshold. Since the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index may change from year to year, there is no guarantee that the quiet zone will remain qualified. The circumstances that cause the disqualification may not be subject to the control of the public authority. For example, an overall national improvement in safety at gated crossings may cause the Nationwide Significant Risk Threshold to fall. This may cause the Quiet Zone Risk Index to become greater than the Nationwide Significant Risk Threshold. If the quiet zone is no longer qualified, then the public authority will have to take additional measures, and may incur additional costs that might not have been budgeted, to once again lower the Quiet Zone Risk Index to at least the Nationwide Significant Risk Threshold in order to retain the quiet zone. Therefore, while the initial cost to implement a quiet zone under the second or third scenario may be lower than the other options, these scenarios also carry a degree of uncertainty about the quiet zone's continued existence.

The use of the first or fourth scenarios reduces the risk level to at least the level that would exist if train horns were sounding in the quiet zone. These methods may have higher initial costs because more safety measures may be necessary in order to achieve the needed risk reduction. Despite the possibility of greater initial costs, there are several benefits to these methods. The installation of SSMs at every crossing will provide the greatest safety benefit of any of the methods that may be used to initiate a quiet zone. With both of these methods (first and fourth scenarios), the public authority will never need to be concerned about the Nationwide Significant Risk Threshold, annual reviews of the Quiet Zone Risk Index, or failing to be qualified because the Quiet Zone Risk Index is higher than the Nationwide Significant Risk Threshold. Public authorities are strongly encouraged to carefully consider both the pros and cons of all of the methods and to choose the method that will best meet the needs of its citizens by providing a safer and quieter community.

For the purposes of this Guide, the term "Risk Index with Horns" is used to represent the level of risk that would exist if train horns were sounded at every public crossing in the proposed quiet zone. If a public authority decides that it would like to fully compensate for the lack of a train horn and not install SSMs at each public crossing in the quiet zone, it must reduce the Quiet Zone Risk Index to a level that is equal to, or less than, the Risk Index with Horns. The Risk Index with Horns is similar to the Nationwide Significant Risk Threshold in that both are targets that must be reached in order to establish a quiet

zone under the rule. Quiet zones that are established by reducing the Quiet Zone Risk Index to at least the level of the Nationwide Significant Risk Threshold will be reviewed annually by FRA to determine if it still qualifies under the rule to retain the quiet zone. Quiet zones that are established by reducing the Quiet Zone Risk Index to at least the level of the Risk Index with Horns will not be subject to annual reviews.
The use of FRA's web-based Quiet Zone Calculator is recommended to aid in the decision making process (http://www.fra.dot.gov/Content3.asp?P=1337**)**. The Quiet Zone Calculator will allow the public authority to consider a variety of options in determining which SSMs make the most sense. It will also perform the necessary calculations used to determine the existing risk level and whether enough risk has been mitigated in order to create a quiet zone under this rule.

B. Risk Reduction Methods

FRA has established two general methods to reduce risk in order to have a quiet zone qualify under this rule. The method chosen impacts the manner in which the quiet zone is implemented.

1. *Public Authority Designation (SSMs)* - The Public Authority Designation method (§ 222.39(a)) involves the use of SSMs at some or all crossings within the quiet zone. The use of only SSMs to reduce risk will allow a public authority to designate a quiet zone without approval from FRA. If the public authority installs SSMs at every crossing within the quiet zone, it need not demonstrate that they will reduce the risk sufficiently in order to qualify under the rule since FRA has already assessed the ability of the SSMs to reduce risk. However, if only SSMs are installed within the quiet zone, but not at every crossing, the public authority must calculate that sufficient risk reduction will be accomplished by the SSMs. Once the improvements are made, the public authority must make the required notifications, and the quiet zone may be implemented. FRA does not need to approve the plan as it has already assessed the ability of the SSMs to reduce risk.

2. *Public Authority Application to FRA* (ASMs) - The Public Authority Application to FRA method (§ 222.39(b)) involves the use ASMs (see Appendix B). ASMs include both modified SSMs that do not fully comply with the provisions found in Appendix A (e.g. shorter than required traffic channelization devices), and non-engineering ASMs such as programmed law enforcement. If the use of ASMs (or a combination of ASMs, SSMs, and modified SSMs) is elected to reduce risk, then the public authority must apply to FRA for approval of the quiet zone. The application must contain sufficient data and analysis to confirm that the proposed ASMs do indeed provide the necessary risk reduction. FRA will review the application and will issue a formal approval if it determines that risk is reduced to a level that is necessary in order to comply with the rule. Once FRA approval has been received and the safety measures fully implemented, the public authority would then proceed to make the necessary notifications, and the quiet zone may be implemented. The use of non-

engineering ASMs will require continued monitoring and analysis throughout the existence of the quiet zone to ensure that risk continues to be reduced.

3. *Calculating Risk Reduction* - The following should be noted when calculating risk reductions in association with the establishment of a quiet zone.
   Crossing closures: If any public crossing within the quiet zone is proposed to be closed, include that crossing when calculating the Risk Index with Horns. Do not include the crossing to be closed when calculating the Quiet Zone Risk Index since the crossing will no longer exist. This will reflect the fact that the risk associated with the crossing has been eliminated entirely. However, be sure to increase the traffic counts at other crossings within the quiet zone and recalculate the risk indices for those crossings that will handle the traffic diverted from the closed crossing.
   Grade Separation: Grade separated crossings that were in existence before the creation of a quiet zone are not included in any of the calculations. However, any public crossings within the quiet zone that are proposed to be treated by grade separation should be treated in the same manner as crossing closures as explained above. Highway traffic that may be diverted from other crossings within the quiet zone to the new grade separated crossing should be considered when computing the Quiet Zone Risk Index
   Wayside Horns: Crossings with wayside horn installations will be treated as a one for one substitute for the train horn and are not to be included when calculating the Crossing Corridor Risk Index, the Risk Index with Horns or the Quiet Zone Risk Index.

Section II -- New Quiet Zones

This following discussion provides the steps necessary to establish New Quiet Zones and includes both the Public Authority Designation and Public Authority Application to FRA methods. It must be remembered that in a New Quiet Zone all public crossings must be equipped with flashing lights and gates.

A. Requirements for Both Public Authority Designation and Public Authority Application

The following steps are necessary when establishing a New Quiet Zone. This information pertains to both the Public Authority Designation and Public Authority Application to FRA methods.

1. The public authority must provide a written Notice of Intent (§ 222.43(a)(1) and § 222.43(b)) to the railroads that operate over the proposed quiet zone, the State agency responsible for highway and road safety and the State agency responsible for grade crossing safety. The purpose of this Notice of Intent is to provide an opportunity for the railroads and the State agencies to provide comments and recommendations to the public authority as it is planning the quiet zone. They will have 60 days to provide these comments to the public authority. The quiet zone cannot be created unless the Notice of

Intent has been provided. FRA encourages public authorities to provide the required Notice of Intent early in the quiet zone development process. The railroads and State agencies can provide an expertise that very well may not be present within the public authority. FRA believes that it will be very useful to include these organizations in the planning process. For example, including railroads and State agencies in the inspections of the crossing will help ensure accurate Inventory information for the crossings. The railroad can provide information on whether the flashing lights and gates are equipped with constant warning time and power out indicators. Pedestrian crossings and private crossings with public access, industrial or commercial use that are within the quiet zone must have a diagnostic team review and be treated according to the team's recommendations. Railroads and the State agency responsible for grade crossing safety must be invited to the diagnostic team review. Note: Please see Section IV of Federal Register 49 CFR Parts 222 and 229 for details on the requirements of a Notice of Intent.

2. Determine all public, private and pedestrian at-grade crossings that will be included within the quiet zone. Also, determine any existing grade-separated crossings that fall within the quiet zone. Each crossing must be identified by the US DOT Crossing Inventory number and street or highway name. If a crossing does not have a US DOT crossing number, then contact FRA's Office of Safety (202–493–6299) for assistance.

3. Ensure that the quiet zone will be at least one-half mile in length. (§ 222.35(a)(1))

4. A complete and accurate Grade Crossing Inventory Form must be on file with FRA for all crossings (public, private and pedestrian) within the quiet zone. An inspection of each crossing in the proposed quiet zone should be performed and the Grade Crossing Inventory Forms updated, as necessary, to reflect the current conditions at each crossing. (§ 222.43(e)(2)(vi))

5. Every public crossing within the quiet zone must be equipped with active warning devices comprising both flashing lights and gates. The warning devices must be equipped with power out indicators. Constant warning time circuitry is also required unless existing conditions would prevent the proper operation of the constant warning time circuitry. FRA recommends that these automatic warning devices also be equipped with at least one bell to provide an audible warning to pedestrians. If the warning devices are already equipped with a bell (or bells), the bells may not be removed or deactivated. The plans for the quiet zone may be made assuming that flashing lights and gates are at all public crossings; however the quiet zone may not be implemented until all public crossings are actually equipped with the flashing lights and gates. (§§ 222.35(b)(1) and 222.35(b)(2))

6. Private crossings must have cross-bucks and ''STOP'' signs on both approaches to the crossing. Private crossings with public access, industrial or commercial use must have a diagnostic team review and be treated according to the team's recommendations. The

public authority must invite the State agency responsible for grade crossing safety and all affected railroads to participate in the diagnostic review. (§§ 222.25(b) and (c))

7. Each highway approach to every public and private crossing must have an advanced warning sign (in accordance with the MUTCD) that advises motorists that train horns are not sounded at the crossing. (§§ 222.25(c)(1), 222.35(c)(1) and 222.35(c)(2))
8. Each pedestrian crossing must be reviewed by a diagnostic team and equipped or treated in accordance with the recommendation of the diagnostic team. The public authority must invite the State agency responsible for grade crossing safety and all affected railroads to participate in the diagnostic review. At a minimum pedestrian crossings must be equipped with signs that conform to the MUTCD that advise pedestrians that train horns are not sounded at the crossing. (§ 222.27)

B. New Quiet Zones - Public Authority Designation

Steps necessary to establish a New Quiet Zone using the Public Authority Application to FRA method:

1. If one or more SSMs as identified in Appendix A are installed at each public crossing in the quiet zone, the requirements for a public authority designation quiet zone have been met. It is not necessary for the same SSM to be used at each crossing. Once the necessary improvements have been installed, notifications may take place and the quiet zone implemented in accordance with the rule. If SSMs are not installed at each crossings, proceed on to Step 2 and use the risk reduction method.

2. To begin, calculate the risk index for each public crossing within the quiet zone (FRA's web-based Quiet Zone Calculator may be used to do this calculation). If flashing lights and gates have to be installed at any public crossings, calculate the risk indices for such crossings as if lights and gates were installed. (Note: Flashing lights and gates must be installed prior to initiation of the quiet zone.) If the Inventory record does not reflect the actual conditions at the crossing, be sure to use the conditions that currently exist when calculating the risk index. Note: Private crossings are not included when computing the risk for the proposed quiet zone.

3. The Crossing Corridor Risk Index is then calculated by averaging the risk index for each public crossing within the proposed quiet zone. Since train horns are routinely being sounded for crossings in the proposed quiet zone, this value is also the Risk Index with Horns.

4. In order to calculate the initial Quiet Zone Risk Index, first adjust the risk index at each public crossing to account for the increased risk due to the absence of the train horn. The absence of the horn is reflected by an increased risk index of 66.8% at gated crossings. (New Quiet Zones within the Chicago Region will reflect an

increased risk index of 17.3%). The initial Quiet Zone Risk Index is then calculated by averaging the increased risk index for each public crossing within the proposed quiet zone. At this point the Quiet Zone Risk Index will equal the Risk Index with Horns multiplied by 1.668.

5. Compare the Quiet Zone Risk Index to the Nationwide Significant Risk Threshold. If the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold, then the public authority may decide to designate a quiet zone and proceed with the notification process. With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone is above the Nationwide Significant Risk Threshold, FRA will notify the Public Authority so that appropriate measures can be taken. (See § 222.51(a)).

6. If the Quiet Zone Risk Index is greater than the Nationwide Significant Risk Threshold, then select an appropriate SSM for a crossing. Reduce the inflated risk index calculated in Step 4 for that crossing by the effectiveness rate of the chosen SSM. (See Appendix A for the effectiveness rates for the various SSMs). Recalculate the Quiet Zone Risk Index by averaging the revised inflated risk index with the inflated risk indices for the other public crossings. If this new Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold, the quiet zone would qualify for public authority designation. If the Quiet Zone Risk Index is still higher than the Nationwide Significant Risk Threshold, treat another public crossing with an appropriate SSM and repeat the process until the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold. Once this is obtained the quiet zone has qualified for the public authority designation method, and notification may take place once all the necessary improvements have been installed. With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone is above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken. (See § 222.51(a)).

7. If the public authority wishes to reduce the risk of the quiet zone to the level of risk that would exist if the horn were sounded at every crossing within the quiet zone, the public authority should calculate the initial Quiet Zone Risk Index as in Step 4. The objective is to now reduce the Quiet Zone Risk Index to the level of the Risk Index with Horns by adding SSMs at the crossings. The difference between the Quiet Zone Risk Index and the Risk Index with Horns is the amount of risk that will have to be reduced in order to fully compensate for lack of the train horn. The use of the Quiet Zone Calculator will aid in determining which SSMs may be used to reduce the risk sufficiently. Follow the procedure stated in Step 6, except that the Quiet Zone Risk Index must be equal to, or less than, the Risk Index with Horns instead of the Nationwide Significant Risk Threshold. Once this risk level is attained, the quiet zone has qualified for the public authority designation method, and notification may

take place once all the necessary improvements have been installed. One important distinction with this option is that the public authority will never need to be concerned with the Nationwide Significant Risk Threshold or the Quiet Zone Risk Index. The rule's intent is to make the quiet zone as safe as if the train horns were sounding. If this is accomplished, the public authority may designate the crossings as a quiet zone and need not be concerned with possible fluctuations in the Nationwide Significant Risk Threshold or annual risk reviews.

C. New Quiet Zones - Public Authority Application to FRA

A public authority must apply to FRA for approval of a quiet zone under two conditions. First, if any of the SSMs selected for the quiet zone do not fully conform to the design standards set forth in Appendix A. These are referred to as modified SSMs in Appendix B. Second, when programmed law enforcement, public education and awareness programs, or photo enforcement is used to reduce risk in the quiet zone, these are referred to as non-engineering ASMs in Appendix B. It should be remembered that non-engineering ASMs will require periodic monitoring as long as the quiet zone is in existence. Please see Appendix B for detailed explanations of ASMs and the periodic monitoring of non-engineering ASMs.

The public authority is strongly encouraged to submit the application to FRA for review and comment *before* the Appendix B treatments are initiated. This will enable FRA to provide comments on the proposed modified SSMs or non-engineering ASMs to help guide the application process. If non-engineering ASMs are proposed, the public authority also may wish to confirm with FRA that the methodology it plans to use to determine the effectiveness rates of the proposed ASMs is appropriate. A quiet zone that utilizes a combination of SSMs from Appendix A and ASMs from Appendix B must make a Public Authority Application to FRA. A complete and thoroughly documented application will help to expedite the approval process.

The following discussion is meant to provide guidance on the steps necessary to establish a new quiet zone using the Public Authority Application to FRA method. Once again it should be remembered that all public crossings must be equipped with automatic warning devices consisting of flashing lights and gates in accordance with § 222.35(b).

1. Gather the information previously mentioned in the section on "Requirements for both Public Authority Designation and Public Authority Application."

2. Calculate the risk index for each public crossing as directed in Step 2 – Public Authority Designation.

3. Calculate the Crossing Corridor Risk Index, which is also the Risk Index with Horns, as directed in Step 3 - Public Authority Designation.

4. Calculate the initial Quiet Zone Risk Index as directed in Step 4 – Public Authority Designation.

5. Begin to reduce the Quiet Zone Risk Index through the use of ASMs and SSMs. Follow the procedure provided in Step 6 - Public Authority Designation until the Quiet Zone Risk Index has been reduced to equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns. (Remember that the public authority may choose which level of risk reduction is the most appropriate for its community.) Effectiveness rates for ASMs should be provided as follows:

   a. Modified SSMs - Estimates of effectiveness for modified SSMs may be proposed based upon adjustments from the effectiveness rates provided in Appendix A or from actual field data derived from the crossing sites. The application should provide an estimated effectiveness rate and the rationale for the estimate.

   b. Non-engineering ASMs - Effectiveness rates are to be calculated in accordance with the provisions of Appendix B, paragraph 2(b).

6. Once it has been determined through analysis that the Quiet Zone Risk Index has been reduced to equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns, the public authority may make application to FRA for a quiet zone under §222.39(b). FRA will review the application to determine the appropriateness of the proposed effectiveness rates, and whether or not the proposed application demonstrates that the quiet zone meets the requirements of the rule. When submitting the application to FRA for approval, the application must contain the following (§ 222.39(b)(1)):

   - Sufficient detail concerning the present safety measures at the public crossings within the proposed quiet zone. This includes current and accurate crossing inventory forms for each public and private crossing.

   - Detailed information on the SSMSs or ASMs that are proposed to be implemented and at which public crossings within the proposed quiet zone.

   - Membership and recommendations of the diagnostic team (if any) that reviewed the proposed quiet zone.

   - Statement of efforts taken to work with affected railroads and the State agency responsible for grade crossing safety, including a list of any objections raised by the railroads or State agency.

   - A commitment to implement the proposed safety measures.

- Demonstrate through data and analysis that the proposed measures will reduce the Quiet Zone Risk Index to equal, to or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns.

- A copy of the application must be provided to: all railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone; the landowner having control over any private crossings within the quiet zone; the State agency responsible for highway and road safety; the State agency responsible for grade crossing safety; and the Associate Administrator. (§ 222.39(b)(3))

7. Upon receiving written approval from FRA of the quiet zone application, the public authority may then proceed with notifications and implementation of the quiet zone. If the quiet zone is qualified by reducing the Quiet Zone Risk Index to at the least the level of the Nationwide Significant Risk Threshold, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone is above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken. (See § 222.51(a))

   Note: The provisions stated above for crossing closures, grade separations and wayside horns apply for Public Authority Application to FRA as well.

Section III – Required Notifications

A. Introduction
The public authority is responsible for providing notification to parties that will be affected by the quiet zone. There are several different types of notifications and a public authority may have to make more than one notification during the entire process of complying with the regulation. The notification process is to ensure that interested parties are made aware in a timely manner of the establishment or continuation of quiet zones. It will also provide an opportunity for State agencies and affected railroads to provide input to the public authority during the development of quiet zones. Specific information is to be provided so that the crossings in the quiet zone can be identified. Providing the appropriate notification is important because once the rule becomes effective, railroads will be obligated to sound train horns when approaching all public crossings unless notified in accordance with the rule that a New Quiet Zone has been established or that a Pre-Rule or Intermediate Quiet Zone is being continued.

B. Notice of Intent—§222.43(b)
The purpose of the Notice of Intent is to provide notice to the railroads and State agencies that the public authority is planning on creating a New Quiet Zone and to provide an opportunity for the railroad and the state agencies to give input to the public authority

during the quiet zone development process. (**Note:** This includes Intermediate and Intermediate Partial Quiet Zones that must qualify as New Quiet Zones in order to keep the train horn silenced as of June 24, 2006.) The State agencies and railroads will be given sixty days to provide information and comments to the public agency. Each public authority that is creating a New Quiet Zone must provide written notice, by certified mail, return receipt requested, to the following:
1. All railroads operating within the proposed quiet zone.
2. State agency responsible for highway and road safety.
3. State agency responsible for grade crossing safety.

The Notice of Intent must contain the following information:

1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossings within the proposed quiet zone. The crossings are to be identified by both the U.S. DOT Crossing Inventory Number and the street or highway name.
2. A statement of the time period within which the restrictions would be in effect on the routine sounding of train horns (*i.e.*, 24 hours or from 10 p.m. to 7 a.m.).

3. A brief explanation of the public authority's tentative plans for implementing improvements within the proposed quiet zone.

4. The name and title of the person who will act as the point of contact during the quiet zone development process and how that person can be contacted.

5. A list of the names and addresses of each party that will receive a copy of the Notice of Intent.

The parties that receive the Notice of Intent will be able to submit information or comments to the public authority for 60 days. The public authority will not be able to establish the quiet zone during the 60 day comment period unless each railroad and State agency that receives the Notice of Intent provides either written comments to the public authority or a written statement waiving its right to provide comments on the Notice of Intent. The public authority must provide an affirmation in the Notice of Quiet Zone Establishment that each of the required parties was provided the Notice of Intent and the date it was mailed. If the quiet zone is being established within 60 days of the mailing of the Notice of Intent, the public authority also must affirm each of the parties have provided written comments or waived its right to provide comments on the Notice of Quiet Zone Establishment.

C. Notice of Quiet Zone Continuation—§ 222.43(c)
The purpose of the Notice of Quiet Zone Continuation is to provide a means for the public authority to formally advise affected parties that an existing quiet zone is being continued after the effective date of the rule. All Pre-Rule, Pre-Rule Partial, Intermediate

and Intermediate Partial Quiet Zones must provide this Notice of Quiet Zone Continuation no later than June 3, 2005 to ensure that train horns are not sounded at public crossings when the rule becomes effective on June 24, 2005. This will enable railroads to properly comply with the requirements of the Final Rule. Each public authority that is continuing an existing Pre-Rule, Pre-Rule Partial, Intermediate and Intermediate Partial Quiet Zone must provide written notice, by certified mail, return receipt requested, to the following:

1. All railroads operating over the public highway-rail grade crossings within the quiet zone.
2. The highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone.
3. The landowner having control over any private crossings within the quiet zone.
4. The State agency responsible for highway and road safety.
5. The State agency responsible for grade crossing safety.
6. The Associate Administrator.

The Notice of Quiet Zone Continuation must contain the following information:

1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone, identified by both U.S. DOT National Highway-Rail Grade Crossing Inventory Number and street or highway name.
2. A specific reference to the regulatory provision that provides the basis for quiet zone continuation, citing as appropriate, § 222.41 or 222.42.
3. A statement of the time period within which restrictions on the routine sounding of the locomotive horn will be imposed (*i.e.*, 24 hours or nighttime hours only.)
4. An accurate and complete Grade Crossing Inventory Form for each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone that reflects conditions currently existing at the crossing.
5. The name and title of the person responsible for monitoring compliance with the requirements of this part and the manner in which that person can be contacted.
6. A list of the names and addresses of each party that will receive the Notice of Quiet Zone Continuation.
7. A statement signed by the chief executive officer of each public authority participating in the continuation of the quiet zone, in which the chief executive officer certifies that the information submitted by the public authority is accurate and complete to the best of his/her knowledge and belief.

Public authorities should remember that this notice is required to ensure that train horns will remain silent. Even if a public authority has not been able to determine whether its Pre-Rule or Pre-Rule Partial Quiet Zone qualifies for automatic approval under the rule, it should issue a Notice of Quiet Zone Continuation to keep the train horns silent after the effective date of the rule.

D. Notice of Detailed Plan—§222.43(d)

The purpose of the Notice of Detailed Plan is to provide notice to the railroads and State agencies that the public authority is planning on filing a detailed plan for a Pre-Rule or Pre-Rule Partial Quiet Zone that was not established by automatic approval under § 222.41. The public authority is required to provide to FRA a detailed plan on how the quiet zone will be brought into compliance with the rule. The Notice of Detailed Plan will provide an opportunity for the railroad and the state agencies to give input to the public authority during the quiet zone development process. The Notice of Detailed Plan must be provided at least four months before the public authority submits its detailed plan to FRA. The State agencies and railroads will be given 60 days to provide information and comments to the public agency. Each public authority that is required to provide FRA with a detailed plan must provide written notice, by certified mail, return receipt requested, to the following:
1. All railroads operating within the quiet zone.
2. State agency responsible for highway and road safety.
3. State agency responsible for grade crossing safety.

The Notice of Detailed Plan must contain the following information:
1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone. The crossings are to be identified by both the U.S. DOT Crossing Inventory Number and the street or highway name.
2. A statement of the time period within which the restrictions would be in effect on the routine sounding of train horns (*i.e.*, 24 hours or nighttime hours only).
3. A brief explanation of the public authority's tentative plans for implementing improvements within the proposed quiet zone.
4. The name and title of the person who will act as the point of contact during the quiet zone development process and how that person can be contacted.
5. A list of the names and addresses of each party that will receive a copy of the Notice of Detailed Plan.

The parties that receive the Notice of Detailed Plan will be able to submit information or comments to the public authority for 60 days. The public authority must provide an affirmation that each of the parties has provided been provided the Notice of Detailed Plan and provide the date that the notice was mailed.

E. Notice of Quiet Zone Establishment—§ 222.43(e)
The purpose of the Notice of Quiet Zone Establishment is to provide a means for the public authority to formally advise affected parties that a quiet zone is being established. Notice of Quiet Zone Establishment must be provided under the following circumstances:
1. A New Quiet Zone or New Partial Quiet Zone is being created.
2. A Pre-Rule Quiet Zone or a Pre-Rule Partial Quiet Zone that qualifies for automatic approval under the rule is being established.
3. An Intermediate Quiet Zone or Intermediate Partial Quiet Zone that is creating a New Quiet Zone under the rule. Please note that these quiet zones must be brought into compliance with the rule by June 24, 2006.

4. A Pre-Rule Quiet Zone or a Pre-Rule Partial Quiet Zone that was not established by automatic approval and has since implemented improvements to establish a quiet zone in accordance to the rule.

Each public authority that is establishing a quiet zone under the above circumstances must provide written notice, by certified mail, return receipt requested, to the following:
1. All railroads operating over the public highway-rail grade crossings within the quiet zone.
2. The highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone.
3. The landowner having control over any private crossings within the quiet zone.
4. The State agency responsible for highway and road safety.
5. The State agency responsible for grade crossing safety.
6. The Associate Administrator.

The Notice of Quiet Establishment must contain the following information:
1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone, identified by both U.S. DOT National Highway-Rail Grade Crossing Inventory Number and street or highway name.
2. A specific reference to the regulatory provision that provides the basis for quiet zone establishment, citing as appropriate,
§ 222.39(a)(1), 222.39(a)(2)(i), 222.39(a)(2)(ii),
222.39(a)(3), 222.39(b), 222.41(a)(1)(i),
222.41(a)(1)(ii), 222.41(a)(1)(iii),
222.41(a)(1)(iv), 222.41(b)(1)(i),
222.41(b)(1)(ii), 222.41(b)(1)(iii), or
222.41(b)(1)(iv).
(a) If the Notice of Quiet Establishment contains a specific reference to
§ 222.39(a)(2)(i), 222.39(a)(2)(ii), 222.39(a)(3),
222.41(a)(1)(ii), 222.41(a)(1)(iii),
222.41(a)(1)(iv), 222.41(b)(1)(ii),
222.41(b)(1)(iii), or 222.41(b)(1)(iv), it shall include a copy of the FRA web page that contains the quiet zone data upon which the public authority is relying.
(b) If the Notice of Quiet Establishment contains a specific reference to § 222.39(b), it shall include a copy of FRA's notification of approval.
3. If a diagnostic team review was required under § 222.25 (private crossings) or § 222.27 (pedestrian crossings), the Notice of Quiet Establishment shall include a statement affirming that the State agency responsible for grade crossing safety and all affected railroads were provided an opportunity to participate in the diagnostic team review. The Notice of Quiet Establishment shall also include a list of recommendations made by the diagnostic team.
4. A statement of the time period within which restrictions on the routine sounding of the locomotive horn will be imposed (*i.e.*, 24 hours or from 10 p.m. until 7 a.m.).

5. An accurate and complete Grade Crossing Inventory Form for each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone that reflects the conditions existing at the crossing before any new SSMs or ASMs were implemented.
6. An accurate, complete and current Grade Crossing Inventory Form for each public highway-rail grade crossing, private highwayrail grade crossing, and pedestrian crossing within the quiet zone that reflects SSMs and ASMs in place upon establishment of the quiet zone. SSMs and ASMs that cannot be fully described on the Inventory Form shall be separately described.
7. If the public authority was required to provide a Notice of Intent:
(a) The Notice of Quiet Zone Establishment shall contain a statement affirming that the Notice of Intent was provided in accordance with the rule. This statement shall also state the date on which the Notice of Intent was mailed.
(b) If the Notice of Quiet Zone Establishment will be mailed less than 60 days after the date on which the Notice of Intent was mailed, the Notice of Quiet Zone Establishment shall also contain a written statement affirming that comments and/or written waiver statements have been received from each railroad operating over public grade crossings within the proposed quiet zone, the State agency responsible for grade crossing safety, and the State agency responsible for highway and road safety.
8. If the public authority was required to provide a Notice of Detailed Plan, the Notice of Quiet Zone Establishment shall contain a statement affirming that the Notice of Detailed Plan was provided and the date on which the Notice of Detailed Plan was mailed.
9. The name and title of the person responsible for monitoring compliance with the requirements of this part and the manner in which that person can be contacted.
10. A list of the names and addresses of each party that is receiving a copy of the Notice of Quiet Establishment.
11. A statement signed by the chief executive officer of each public authority participating in the establishment of the quiet zone, in which the chief executive officer shall certify that the information submitted by the public authority is accurate and complete to the best of his/her knowledge and belief.

APPENDIX C
GUIDELINES FOR ESTABLISHING QUIET ZONES
& APPROVED SAFETY MEASURES

This Appendix lists those supplemental safety measures (SSMs) which FRA has determined effectively compensate for the lack of a locomotive horn. FRA has approved the following five (5) supplemental safety measures (SSMs):

1. Temporary closure of a public highway-rail grade crossing
2. Four quadrant gate system
3. Gates with medians or channelization devices
4. One way street with gates
5. Permanent Closure of a Public Highway-Rail Grade Crossing

In addition to the above-mentioned supplementary safety measures, the Final Rule contains provisions to allow the use of stationary wayside horns within a Quite Zone as an alternative means of providing an audible warning of an approaching train. The wayside horn consists of horns mounted on poles that are placed at crossings and directed down the street toward oncoming motorists. Included in the discussion of each SSM is an effectiveness figure for that measure. Effectiveness rate means a number between zero and one which references the reduction of the likelihood of a collision at the public highway-rail grade crossings as a result of the installation of an SSM when compared to the same crossings equipped with conventional active warning systems of flashing lights and gates. Zero effectiveness means that the SSM provides no reduction in the probability of a collision, while an effectiveness rating of one means that the SSM is totally effective in reducing collisions. Measurements between zero and one reflect the percentage by which the SSM reduces the probability of a collision. Effectiveness rates are based on actual experience showing how much each SSM has reduced the probability of a collision.

1. TEMPORARY CLOSURE OF A PUBLIC HIGHWAY RAIL GRADE CROSSING:

Close the crossing to highway traffic during designated quiet periods.

Effectiveness: 1.0
Because an effective closure system prevents vehicle entrance onto the crossing, the probability of a collision with a train at the crossing is zero during the period the crossing is closed. Effectiveness would therefore equal 1. However, analysis should take into consideration that traffic would need to be redistributed among adjacent crossings or grade separations for the purpose of estimating risk following the silencing of train horns, unless the particular “closure” was accomplished by a grade separation.

Required:

a. The closure system must completely block highway traffic from entering the crossing.

b. The crossing must be closed during the same hours every day.
c. The crossing may only be closed during one period each 24-hours.
d. Barricades and signs used for closure of the roadway shall conform to the standards contained in the MUTCD.
e. Daily activation and deactivation of the system is the responsibility of the public authority responsible for maintenance of the street or highway crossing the railroad. The entity may provide for third party activation and deactivation; however, the public authority shall remain fully responsible for compliance with the requirements of this part.
f. The system must be tamper and vandal resistant to the same extent as other traffic control devices.

Recommended:
Signs for alternate highway traffic routes should be erected in accordance with MUTCD and State and local standards and should inform pedestrians and motorists that the streets are closed, the period for which they are closed, and that alternate routes must be used.

2. FOUR-QUADRANT GATE SYSTEM:

Install gates at a crossing sufficient to fully block highway traffic from entering the crossing when the gates are lowered, including at least one gate for each direction of traffic on each approach.

Effectiveness:
Four-quadrant gates only, no presence detection: .82
Four-quadrant gates only, with presence detection: .77
Four-quadrant gates with traffic channelization of at least 60 feet (with or without presence detection): .92

Required:
Four-quadrant gate systems shall conform to the standards for four-quadrant gates contained in the MUTCD, and shall in addition comply with the following:
a. When a train is approaching, all highway approach and exit lanes on both sides of the highway-rail crossing must be spanned by gates, thus denying to the highway user the option of circumventing the conventional approach lane gates by switching into the opposing (oncoming) traffic lane in order to enter the crossing and cross the tracks.
b. Crossing warning systems must be activated by use of constant warning time devices unless existing conditions at the crossing would prevent the proper operation of the constant warning time devices.
c. Crossing warning systems must be equipped with power-out indicators.

d. The gap between the ends of the entrance and exit gates (on the same side of the railroad tracks) when both are in the fully lowered, or down, position must be less than two feet if no median is present. If the highway approach is equipped with a median or a channelization device between the approach and exit lanes, the lowered gates must reach to within one foot of the median or channelization device, measured horizontally across the road from the end of the lowered gate to the median or channelization device or to a point over the edge of the median or channelization device. The gate and the median top or channelization device do not have to be at the same elevation.
e. "Break-away" channelization devices must be frequently monitored to replace broken elements.

Recommendations for new installations only:

f. Gate timing should be established by a qualified traffic engineer based on site specific determinations. Such determination should consider the need for and timing of a delay in the descent of the exit gates (following descent of the conventional entrance gates). Factors to be considered may include available storage space between the gates that is outside the fouling limits of the track(s) and the possibility that traffic flows may be interrupted as a result of nearby intersections.
g. A determination should be made as to whether it is necessary to provide vehicle presence detectors (VPDs) to open or keep open the exit gates until all vehicles are clear of the crossing. VPD should be installed on one or both sides of the crossing and/or in the surface between the rails closest to the field. Among the factors that should be considered are the presence of intersecting roadways near the crossing, the priority that the traffic crossing the railroad is given at such intersections, the types of traffic control devices at those intersections, and the presence and timing of traffic signal preemption.
h. Highway approaches on one or both sides of the highway-rail crossing may be provided with medians or channelization devices between the opposing lanes. Medians should be defined by a non-traversable curb or traversable curb, or by reflectorized channelization devices, or by both.
i. Remote monitoring (in addition to power-out indicators, which are required) of the status of these crossing systems is preferable. This is especially important in those areas in which qualified railroad signal department personnel are not readily available.

3. GATES WITH MEDIANS OR CHANNELIZATION DEVICES:

Install medians or channelization devices on both highway approaches to a public highway-rail grade crossing denying to the highway user the option of circumventing the approach lane gates by switching into the opposing (oncoming) traffic lane in order to drive around lowered gates to cross the tracks.

Effectiveness:
channelization devices -- .75
non-traversable curbs with or without channelization devices-- .80

Required:

a. Opposing traffic lanes on both highway approaches to the crossing must be separated by either: (1) medians bounded by non-traversable curbs or (2) channelization devices.
b. Medians or channelization devices must extend at least 100 feet from the gate arm, or if there is an intersection within 100 feet of the gate, the median or channelization device must extend at least 60 feet from the gate arm.
c. Intersections of two or more streets, or a street and an alley, that are within 60 feet of the gate arm must be closed or relocated. Driveways for private, residential properties (up to four units) within 60 feet of the gate arm are not considered to be intersections under this part and need not be closed. However, consideration should be given to taking steps to ensure that motorists exiting the driveways are not able to move against the flow of traffic to circumvent the purpose of the median and drive around lowered gates. This may be accomplished by the posting of "no left turn" signs or other means of notification. For the purpose of this part, driveways accessing commercial properties are considered to be intersections and are not allowed. It should be noted that if a public authority can not comply with the 60 feet or 100 feet requirement, it may apply to FRA for a quiet zone under § 222.39(b), "Public authority application to FRA." Such arrangement may qualify for a risk reduction credit in calculation of the Quiet Zone Risk Index. Similarly, if a public authority finds that it is feasible to only provide channelization on one approach to the crossing, it may also apply to FRA for approval under §222.39(b). Such an arrangement may also qualify for a risk reduction credit in calculation of the Quiet Zone Risk Index.
d. Crossing warning systems must be activated by use of constant warning time devices unless existing conditions at the crossing would prevent the proper operation of the constant warning time devices.
e. Crossing warning systems must be equipped with power-out indicators.
f. The gap between the lowered gate and the curb or channelization device must be one foot or less, measured horizontally across the road from the end of the lowered gate to the curb or channelization device or to a point over the curb edge or channelization device. The gate and the curb top or channelization device do not have to be at the same elevation.
g. "Break-away" channelization devices must be frequently monitored to replace broken elements.

4. ONE WAY STREET WITH GATE(S):

Gate(s) must be installed such that all approaching highway lanes to the public highway rail grade crossing are completely blocked.

Effectiveness – .82

Required:

a. Gate arms on the approach side of the crossing should extend across the road to within one foot of the far edge of the pavement. If a gate is used on each side of the road, the gap between the ends of the gates when both are in the lowered, or down, position must be no more than two feet.
b. If only one gate is used, the edge of the road opposite the gate mechanism must be configured with a non-traversable curb extending at least 100 feet.
c. Crossing warning systems must be activated by use of constant warning time devices unless existing conditions at the crossing would prevent the proper operation of the constant warning time devices.
d. Crossing warning systems must be equipped with power-out indicators.

5. PERMANENT CLOSURE OF A PUBLIC HIGHWAY-RAIL GRADE CROSSING:

Permanently close the crossing to highway traffic.

Effectiveness: 1.0

Required:

a. The closure system must completely block highway traffic from entering the grade crossing.
b. Barricades and signs used for closure of the roadway shall conform to the standards contained in the MUTCD.
c. The closure system must be tamper and vandal resistant to the same extent as other traffic control devices.
d. Since traffic will be redistributed among adjacent crossings, the traffic counts for adjacent crossings shall be increased to reflect the diversion of traffic from the closed crossing.

6. WAYSIDE HORN

According to Federal Register on “Use of Locomotive Horns at Highway-Rail Grade Crossings, Final Rule”, crossings with wayside horn installations will be treated as a one

for one substitute for the train horn. A wayside horn conforming to the following minimum requirements may be installed within a quiet zone:

1. Highway-rail grade crossing must be equipped with constant warning time device, if reasonably practical, and power-out indicator;
2. Horn system must be equipped with an indicator or other system to notify the locomotive engineer as to whether the wayside horn is operating as intended in sufficient time to enable the locomotive engineer to sound the locomotive horn for at least 15 seconds prior to arrival at the crossing in the event the wayside horn is not operating as intended;
3. The railroad must adopt an operating rule, bulletin or special instruction requiring that the train horn be sounded if the wayside horn indicator is not visible approaching the crossing, or if this, or an equivalent system, does not indicate that the system is operating as intended;
4. Horn system must provide a minimum of 92 dB(A) and a maximum of 110 dB(A) when measured 100 feet from the centerline of the nearest track;
5. Horn system must sound at a minimum of 15 seconds prior to the train's arrival at the crossing and while the lead locomotive is traveling across the crossing. It is permissible for the horn system to begin to sound simultaneously with activation of the flashing lights or descent of the crossing arm; and
6. Horn shall be directed toward approaching traffic.

When may a wayside horn be used?

a. Notwithstanding any provisions in this part to the contrary:
   (1) A wayside horn conforming to the above-mentioned requirements may be used in lieu of a locomotive horn at any highway-rail grade crossing equipped with an active warning system consisting of, at a minimum, flashing lights and gates; and
   (2) A wayside horn conforming to the above-mentioned requirements may be installed within a quiet zone. For purposes of calculating the length of a quiet zone, the presence of a wayside horn at a highway-grade crossing within a quiet zone shall be considered in the same manner as a grade crossing treated with an SSM. A grade crossing equipped with a wayside horn shall not be considered in calculating the Quiet Zone Risk Index or Crossing Corridor Risk Index.

b. A public authority installing a wayside horn at a grade crossing within a quiet zone shall identify by both the U.S. DOT National Highway-Rail Grade Crossing Inventory Number and street or highway name the grade crossing equipped with such wayside horn in its notice to railroads and other parties required by § 222.43.

c. A public authority installing a wayside horn at a grade crossing outside a quiet zone shall provide written notice to the Associate Administrator and to each railroad operating over the grade crossing that a wayside horn is being installed and the date on which the wayside horn will be operational. The grade crossing shall be identified by both the U.S. DOT National Highway-Rail Grade Crossing

Inventory Number and street or highway name. The public authority shall provide notification of the operational date at least 21 days in advance.

d. A railroad operating over a grade crossing equipped with an operational wayside horn installed within a quiet zone pursuant to this section shall cease routine locomotive horn use at the grade crossing. A railroad operating over a grade crossing equipped with an operational wayside horn installed outside of a quiet zone may cease routine locomotive horn use by agreement with the public authority.

APPENDIX D
QUIET ZONE CALCULATOR OUTPUT FILES

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Cancel | Change Scenario: MCCOY - WE_43678 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626366V	MCCOY ST	2354	Gates NEEDED	0	12	947.90	MODIFY
626367C	PRESCOTT ST	1154	Gates NEEDED	0	0	2,829.50	MODIFY
626368J	WEST SHORE BLVD	10391	Gates	0	12	1,697.96	MODIFY

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	MCCOY - WEST SHORE
Type:	New 24-hour QZ
Scenario:	MCCOY - WE_43678
Estimated Total Cost:	$26,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	2680.44
Quiet Zone Risk Index:	**1825.12**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: PEARL - MA_43677 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626350Y	PEARL AVE	6709	Gates	0	12	1,508.27	MODIFY
626361L	OKLAHOMA AVE	3367	Gates TO BE ADDED	0	0	4,391.81	MODIFY
626362T	IOWA AVE	3257	Gates	0	0	4,948.67	MODIFY
626363A	MANHATTAN AVE	9969	Gates	0	12	1,679.09	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	PEARL - MANHATTAN
Type:	New 24-hour QZ
Scenario:	PEARL - MA_43677
Estimated Total Cost:	$26,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	3310.84
Quiet Zone Risk Index:	**3131.96**

Select

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Cancel | Change Scenario: DALE MABRY_43682 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626346J	DALE MABRY HWY	33500	Gates	0	13	2,371.35	MODIFY
626349E	GANDY BLVD	42000	Gates	0	0	14,123.44	MODIFY

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	DALE MABRY & GANDY
Type:	New 24-hour QZ
Scenario:	DALE MABRY_43682
Estimated Total Cost:	$15,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	7787.83
Quiet Zone Risk Index:	8247.4

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626346J	DALE MABRY HWY	33500	Gates	0	13	2,371.35	MODIFY
626349E	GANDY BLVD	42000	Gates	0	13	2,824.69	MODIFY

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	DALE MABRY & GANDY
Type:	New 24-hour QZ
Scenario:	DALE MABRY_43682
Estimated Total Cost:	$30,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	7787.83
Quiet Zone Risk Index:	**2598.02**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626346J	DALE MABRY HWY	33500	Gates	0	13	2,371.35	MODIFY

EXIST MEDIAN SEPARATOR

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	DALE M - GANDY
Type:	New 24-hour QZ
Scenario:	DALE M - G_43676
Estimated Total Cost:	$15,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	7108.37
Quiet Zone Risk Index:	**2371.35**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: EL PRADO - 43675 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626343N	EL PRADO BLVD	6050	Gates	0	13	1,521.95	MODIFY
626344V	EUCLID AVE	14662	Gates	0	0	7,448.86	MODIFY
626345C	S HIMES AVE	15096	Gates	0	13	1,501.41	MODIFY

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	EL PRADO - HIMES
Type:	New 24-hour QZ
Scenario:	EL PRADO - 43675
Estimated Total Cost:	$30,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	4509.53
Quiet Zone Risk Index:	**3490.74**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: EL PRADO - 43675 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626343N	EL PRADO BLVD	6050	Gates	0	13	1,521.95	MODIFY
626344V	EUCLID AVE	14662	Gates	0	0	7,448.86	MODIFY
626345C	S HIMES AVE	15096	Gates	0	0	7,507.07	MODIFY

EXIST. MEDIAN

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	EL PRADO - HIMES
Type:	New 24-hour QZ
Scenario:	EL PRADO - 43675
Estimated Total Cost:	$15,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	4509.53
Quiet Zone Risk Index:	**5492.63**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: BAY TO BAY_43674 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626341A	BAY TO BAY BLVD	20304	Gates	0	12	2,610.85	MODIFY
626342G	MACDILL AVE	29126	Gates	0	12	2,861.66	MODIFY

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: **ASM** * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	BAY TO BAY
Type:	New 24-hour QZ
Scenario:	BAY TO BAY_43674
Estimated Total Cost:	$26,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	6561.76
Quiet Zone Risk Index:	**2736.26**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: SWANN TO M_43673 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626334P	SWANN AVE	21506	Gates	0	0	8,246.42	MODIFY
626335W	MORRISON AVE	2854	Gates	0	0	4,771.25	MODIFY
626336D	HOWARD AVE	15165	Gates	0	12	1,879.05	MODIFY
626337K	WATROUS AVE	1740	Gates	0	12	1,039.57	MODIFY
626338S	MISSISSIPPI AVE	5006	Gates	0	12	1,392.39	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	SWANN TO MISSISSIPPI
Type:	New 24-hour QZ
Scenario:	SWANN TO M_43673
Estimated Total Cost:	$39,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	3628.5
Quiet Zone Risk Index:	**3465.74**

Select

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Cancel | Change Scenario: KENNEDY TO_43669 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626304X	W KENNEDY BLVD	32500	Gates	0	0	11,766.91	MODIFY
626305E	WILLOW AVE.	1	Gates	0	0	486.21	MODIFY
626306L	W CLEVELAND ST	12454	Gates	0	14	1,343.53	MODIFY
626308A	E PLATT ST	11792	Gates	0	14	1,438.65	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	KENNEDY TO PLATT
Type:	New 24-hour QZ
Scenario:	KENNEDY TO_43669
Estimated Total Cost:	$70,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	4153.13
Quiet Zone Risk Index:	3758.82

Select

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Cancel | Change Scenario: Tampa - N _43652 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626303R	**NORTH BLVD**	**13300**	**Gates**	0	4	1,133.94	MODIFY

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	Tampa - N Blvd
Type:	New 24-hour QZ
Scenario:	Tampa - N _43652
Estimated Total Cost:	$100,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	3776.77
Quiet Zone Risk Index:	**1133.94**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: TAMPA - N _43650 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626303R	NORTH BLVD	13300	Gates	0	0	6,299.66	MODIFY

EXIST. COND

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	TAMPA - N BLVD
Type:	New 24-hour QZ
Scenario:	TAMPA - N _43650
Estimated Total Cost:	$0.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	3776.77
Quiet Zone Risk Index:	6299.66

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Cancel | Change Scenario: TAMPA - NE_43649 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626293M	**NEBRASKA AVE**	**6100**	**Gates**	0	4	1,545.13	MODIFY

* Only Public At Grade Crossings are listed.

ALERT: Quiet Zone qualifies because SSM has been applied in each crossing.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	TAMPA - NEBRASKA AVE
Type:	New 24-hour QZ
Scenario:	TAMPA - NE_43649
Estimated Total Cost:	$100,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	5146.32
Quiet Zone Risk Index:	**1545.13**

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626293M	NEBRASKA AVE	6100	Gates	0	0	8,584.06	MODIFY

EXISTING COND.

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	Tampa - Nebraska Ave
Type:	New 24-hour QZ
Scenario:	Tampa - Ne_43679
Estimated Total Cost:	$0.00
Nationwide Significant Risk Threshold:	14347.00
Risk Index with Horns:	5146.32
Quiet Zone Risk Index:	8584.06

Select

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

Step 3: Repeat Step (2) until the SELECT button is shown at the bottom right side of this page. Note that the SELECT button is shown ONLY when the Quiet Zone Risk Index falls below the NSRT or the Risk Index with Horn.

Step 4: To save the scenario and continue, click the SELECT button

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Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626275P	26TH ST	2603	Gates	0	12	3,490.35	MODIFY
626277D	24TH ST	674	Gates	0	12	2,432.96	MODIFY
626278K	23RD ST	1177	Gates	0	12	2,828.06	MODIFY
626279S	N SR 585/22ND ST	16000	Gates	0	14	4,468.48	MODIFY
626280L	E SR 585/21ST ST	14000	Gates	0	14	4,328.84	MODIFY
626281T	20TH ST	744	Gates	0	0	9,996.36	MODIFY
626282A	19TH ST	3171	Gates	0	0	14,699.79	MODIFY
626283G	18TH ST	1340	Gates	0	0	11,711.77	MODIFY
626284N	17TH ST	1397	Gates	0	0	11,842.76	MODIFY
626285V	16TH STREET	193	Gates	0	14	1,241.77	MODIFY
626286C	15TH ST	2285	Gates	0	0	11,202.63	MODIFY
626287J	REPUBLICA DE CUBA	1937	Gates	0	0	10,725.01	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

Step 2: Select proposed warning device or SSM. Then click the UPDATE button.To generate a spreadsheet of the values on this page, click on ASM button—This spreadsheet can then be used for ASM calculations.

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Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	Tampa - Ybor
Type:	New 24-hour QZ
Scenario:	TAMPA - YB_43645
Estimated Total Cost:	$144,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	8041.39
Quiet Zone Risk Index:	**7414.06**

Select

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Cancel | Change Scenario: TAMPA - DO_43639 | Continue

Create New Zone

Manage Existing Zones

Log Off

Crossing	Street	Traffic	Warning Device	Pre-SSM	SSM	Risk	
626294U	N JEFFERSON ST	5000	Gates	0	14	838.05	MODIFY
626295B	N PIERCE ST	11500	Gates	0	14	1,416.10	MODIFY
626296H	MORGAN ST	4700	Gates	0	0	5,448.38	MODIFY
626297P	MARION ST	1324	Gates	0	0	1,326.38	MODIFY
626298W	N FLORIDA AVE	19000	Gates	0	14	1,740.31	MODIFY
626299D	FRANKLIN ST MALL	115	Gates	0	0	824.75	MODIFY
626300V	S TAMPA ST	16500	Gates	0	14	1,368.26	MODIFY
626301C	ASHLEY DR	31500	Gates	0	13	3,428.77	MODIFY
626302J	DOYLE CARLTON DR	5491	Gates	0	14	604.46	MODIFY

Step by Step Instructions:

Step 1: To specify New Warning Device (For Pre-Rule Quiet Zone Only) and/or SSM, click the MODIFY Button

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Step 4: To save the scenario and continue, click the SELECT button

* Only Public At Grade Crossings are listed.

Click for Supplementary Safety Measures [SSM]

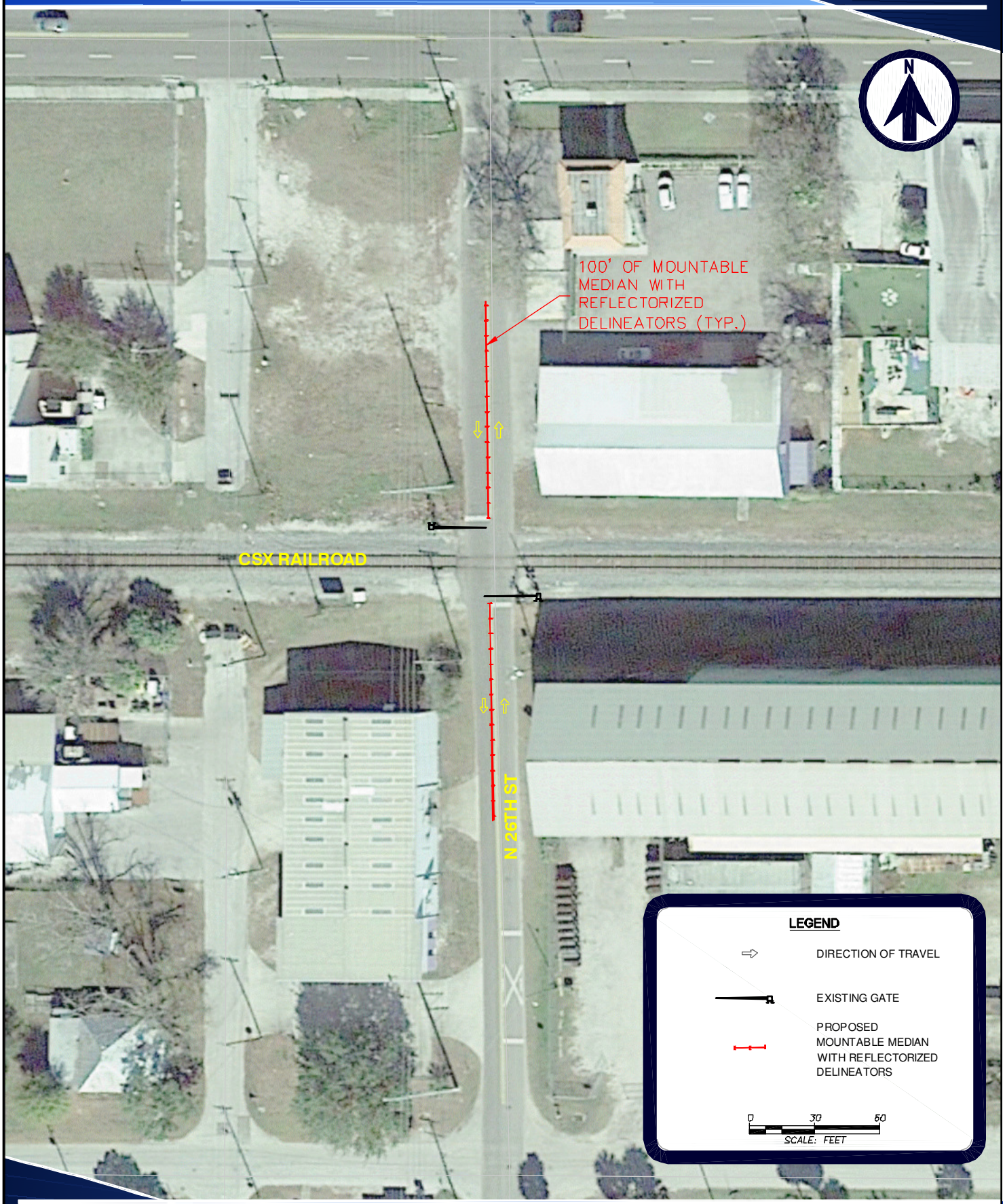
Click for ASM spreadsheet: ASM * Note:The use of ASMs requires an application to and approval from the FRA.

Summary	
Proposed Quiet Zone:	TAMPA - DOWNTOWN
Type:	New 24-hour QZ
Scenario:	TAMPA - DO_43639
Estimated Total Cost:	$190,000.00
Nationwide Significant Risk Threshold:	14347 .00
Risk Index with Horns:	3856.54
Quiet Zone Risk Index:	1888.38

Select

APPENDIX E
REQUIRED ACTIVE GRADE CROSSING WARNING DEVICES AND MINIMUM SSM'S AT RAILROAD CROSSINGS

Railroad Crossing -Quiet Zone



26th Street

King
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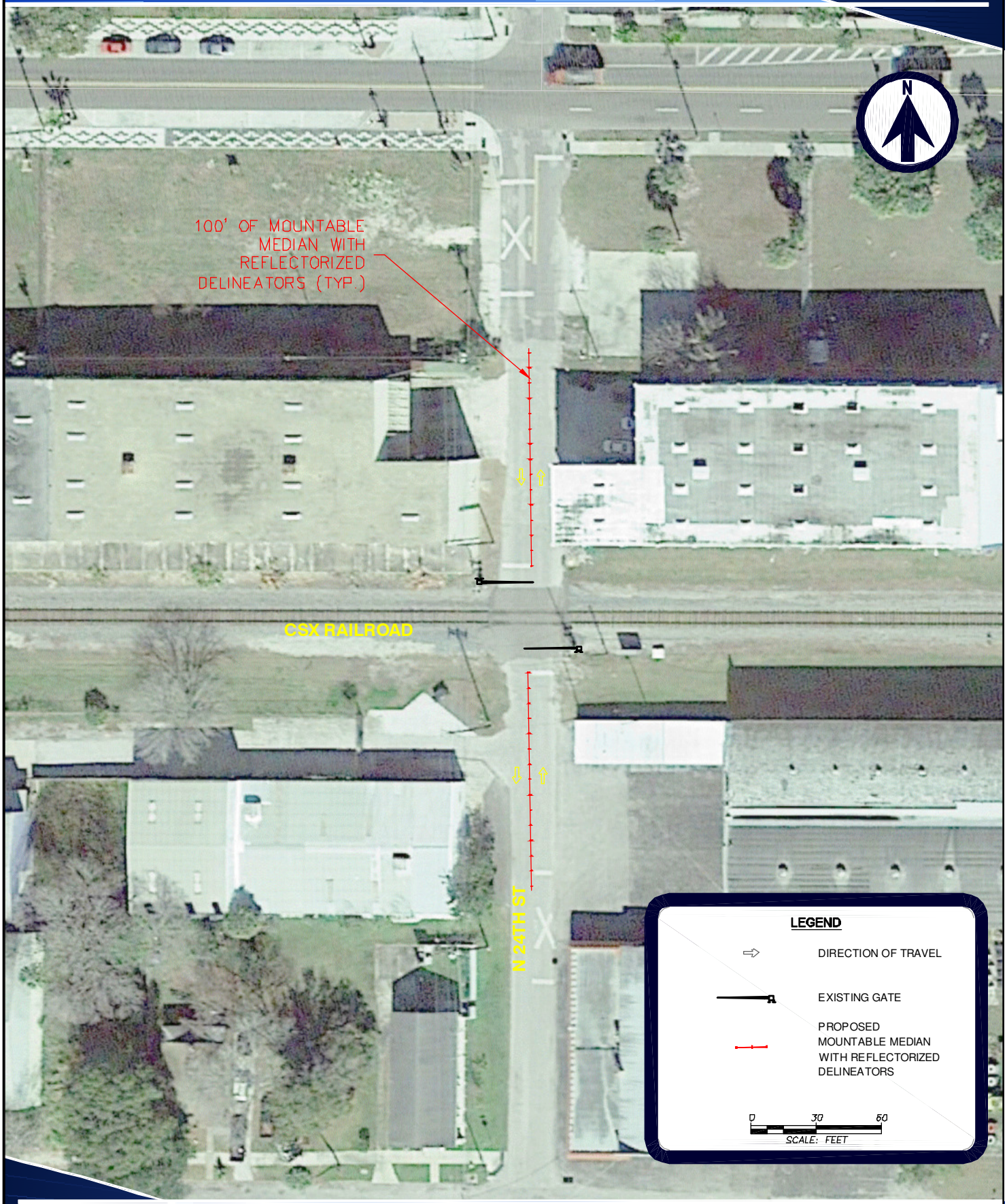
Railroad Crossing -Quiet Zone



24th Street

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Railroad Crossing -Quiet Zone

23rd Street

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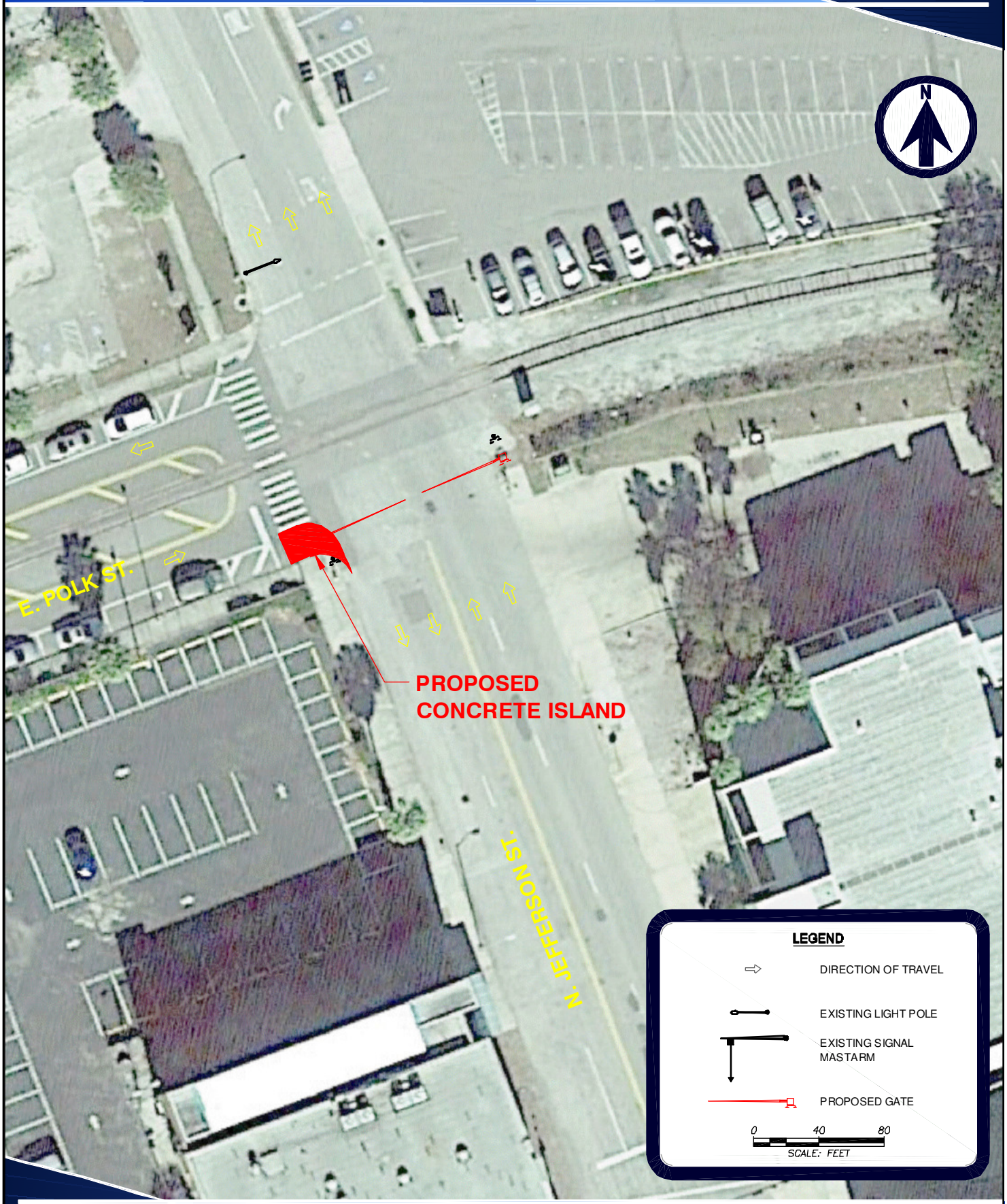
Railroad Crossing -Quiet Zone



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N. Jefferson St.

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Pierce St.

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N. Morgan St.

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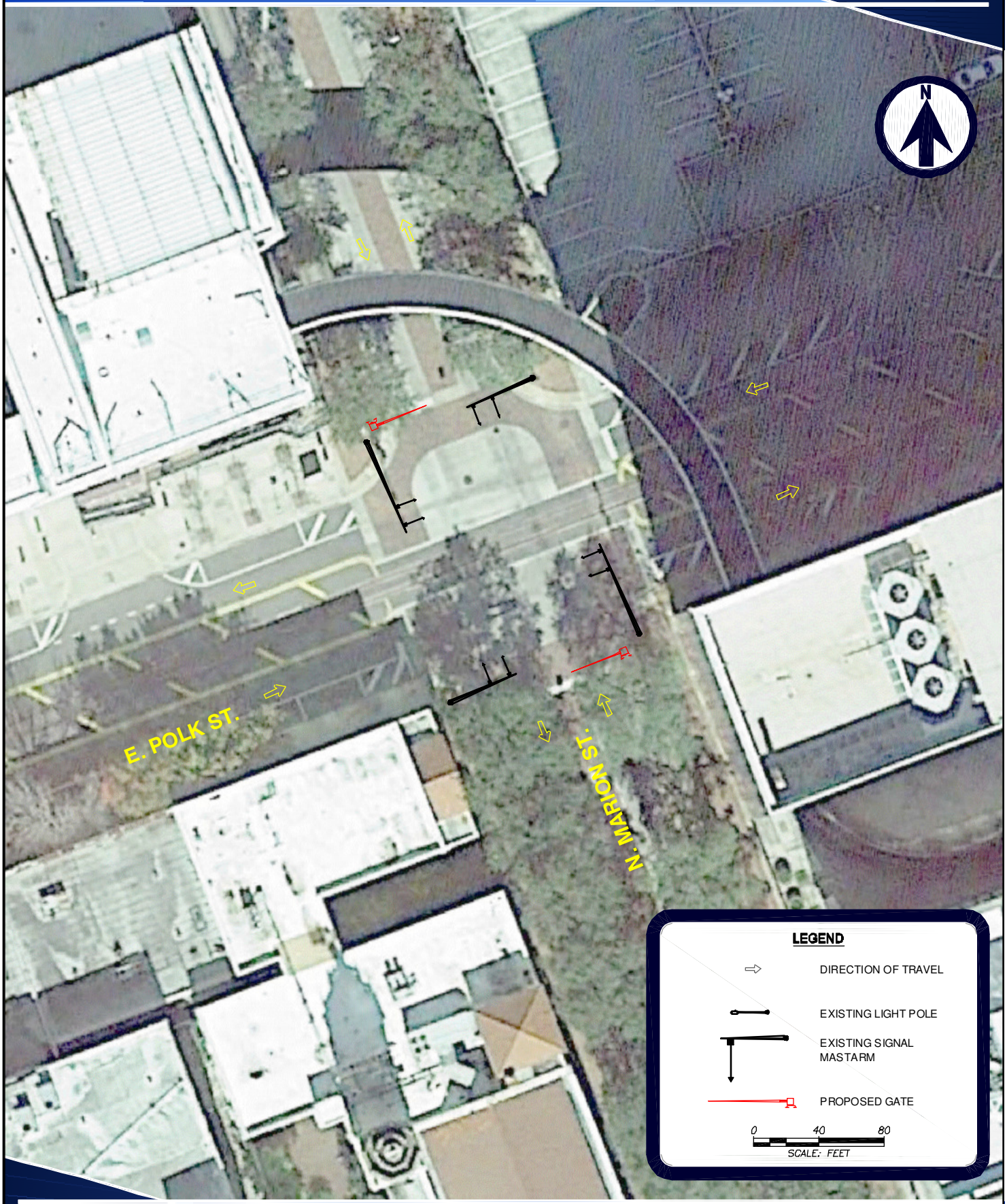
Railroad Crossing -Quiet Zone



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N. Marion St.

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Railroad Crossing -Quiet Zone

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N. Florida Ave.

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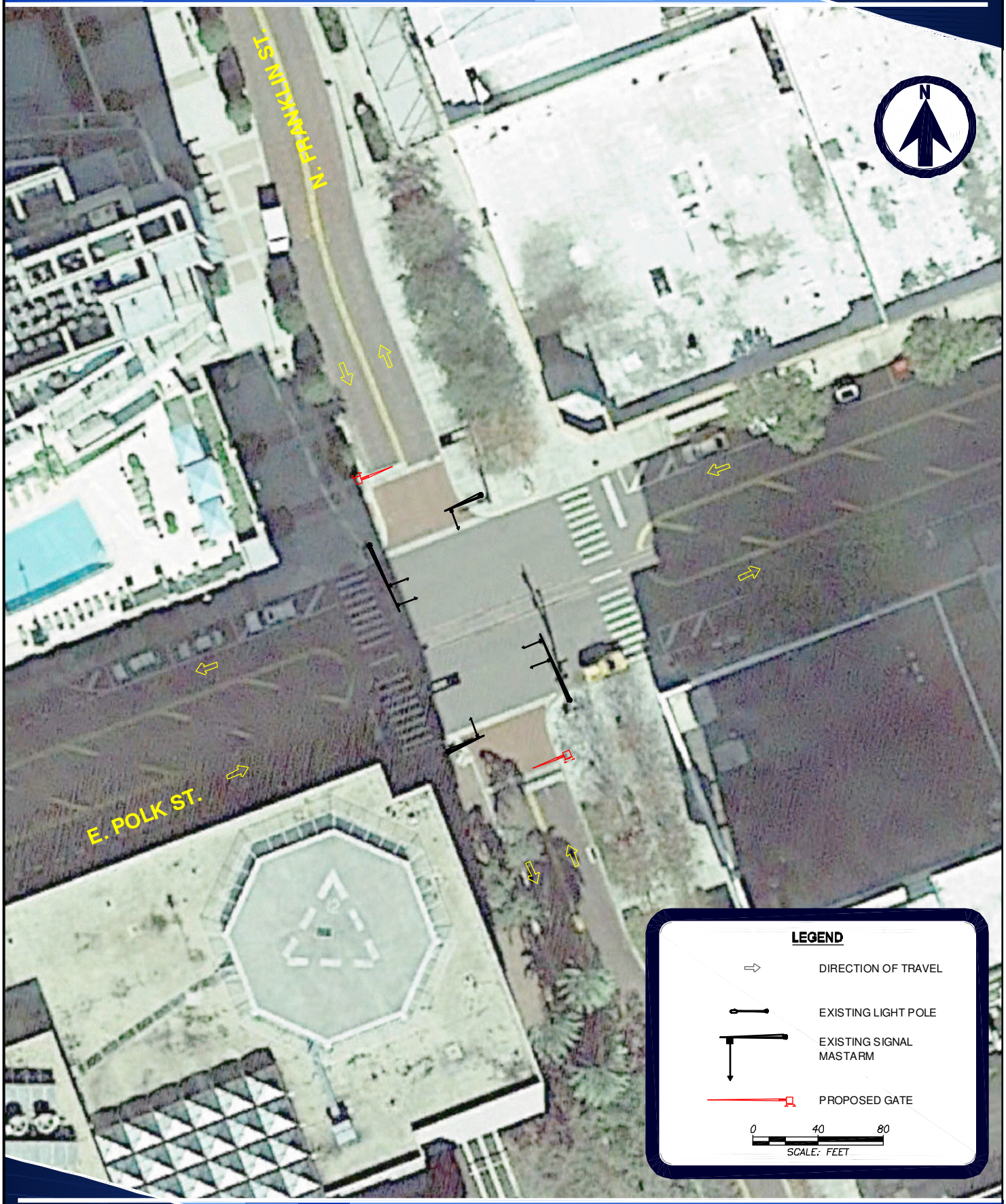
Railroad Crossing -Quiet Zone



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N. Franklin Street

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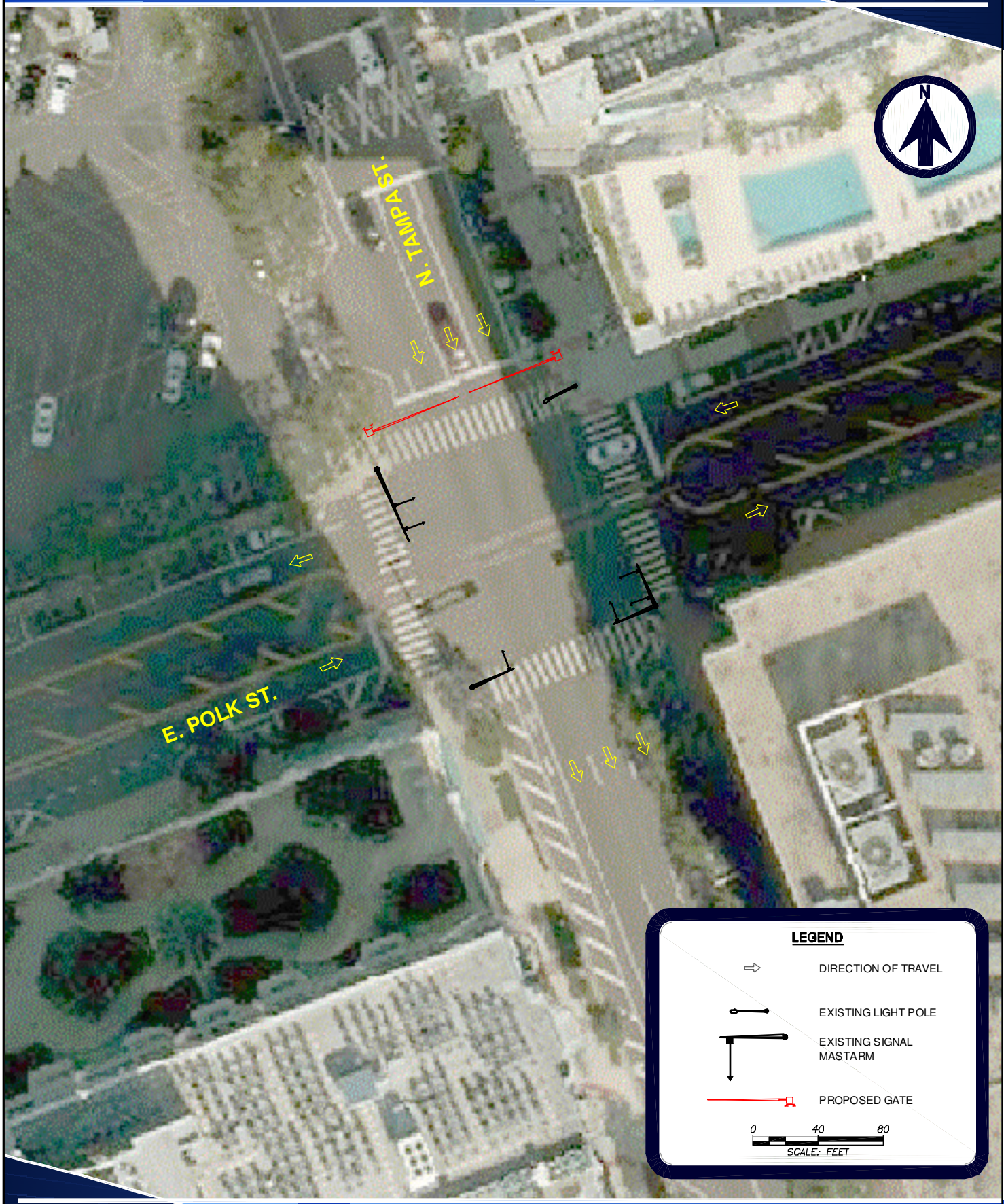
Railroad Crossing -Quiet Zone



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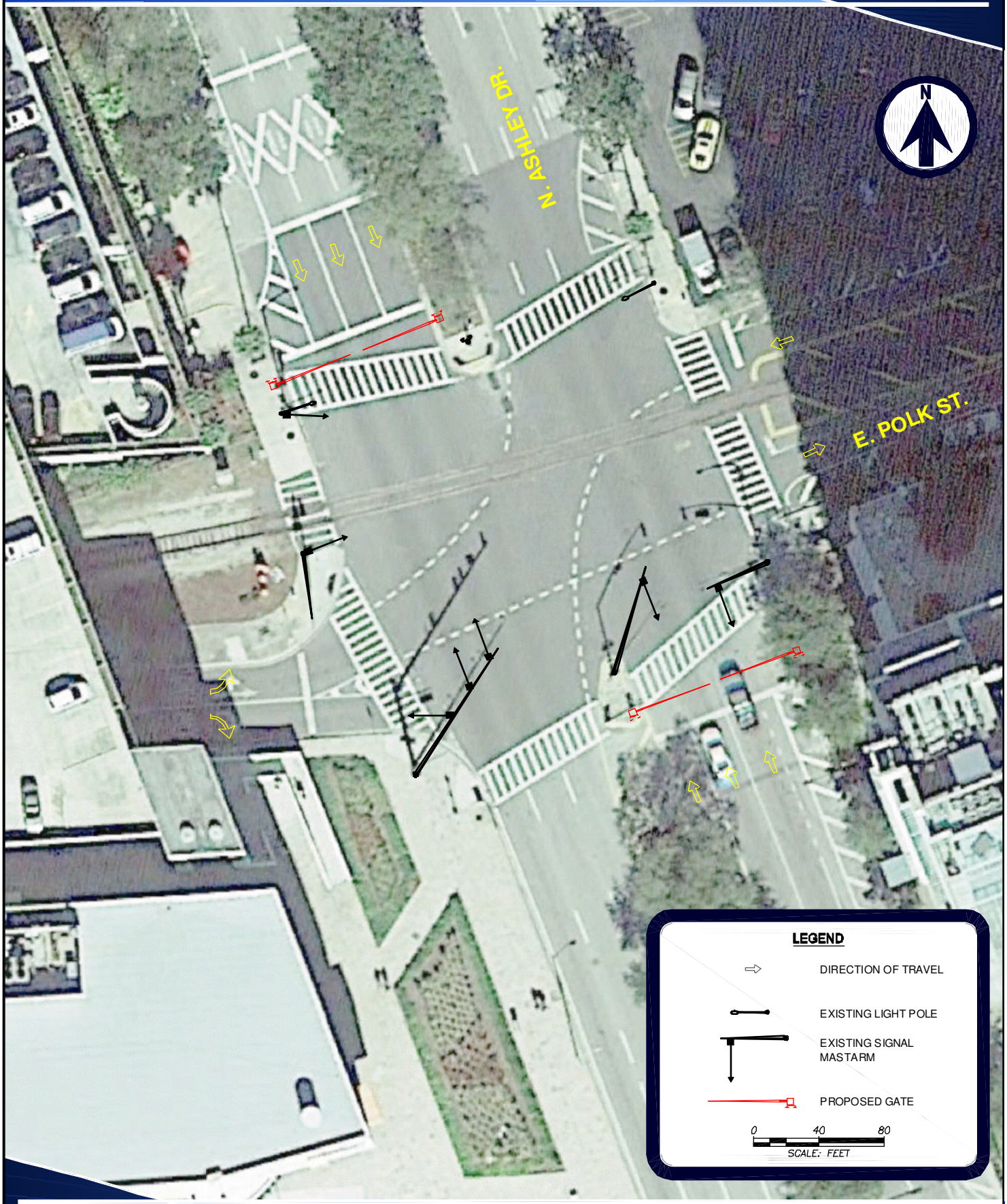
N. Tampa Street

GRAPHIC REPRESENTATIONS ARE GENERAL IN NATURE AND SHOULD BE USED FOR PLANNING PURPOSES ONLY

Railroad Crossing -Quiet Zone



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N. Ashley Drive

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Railroad Crossing -Quiet Zone

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HOWARD AVENUE

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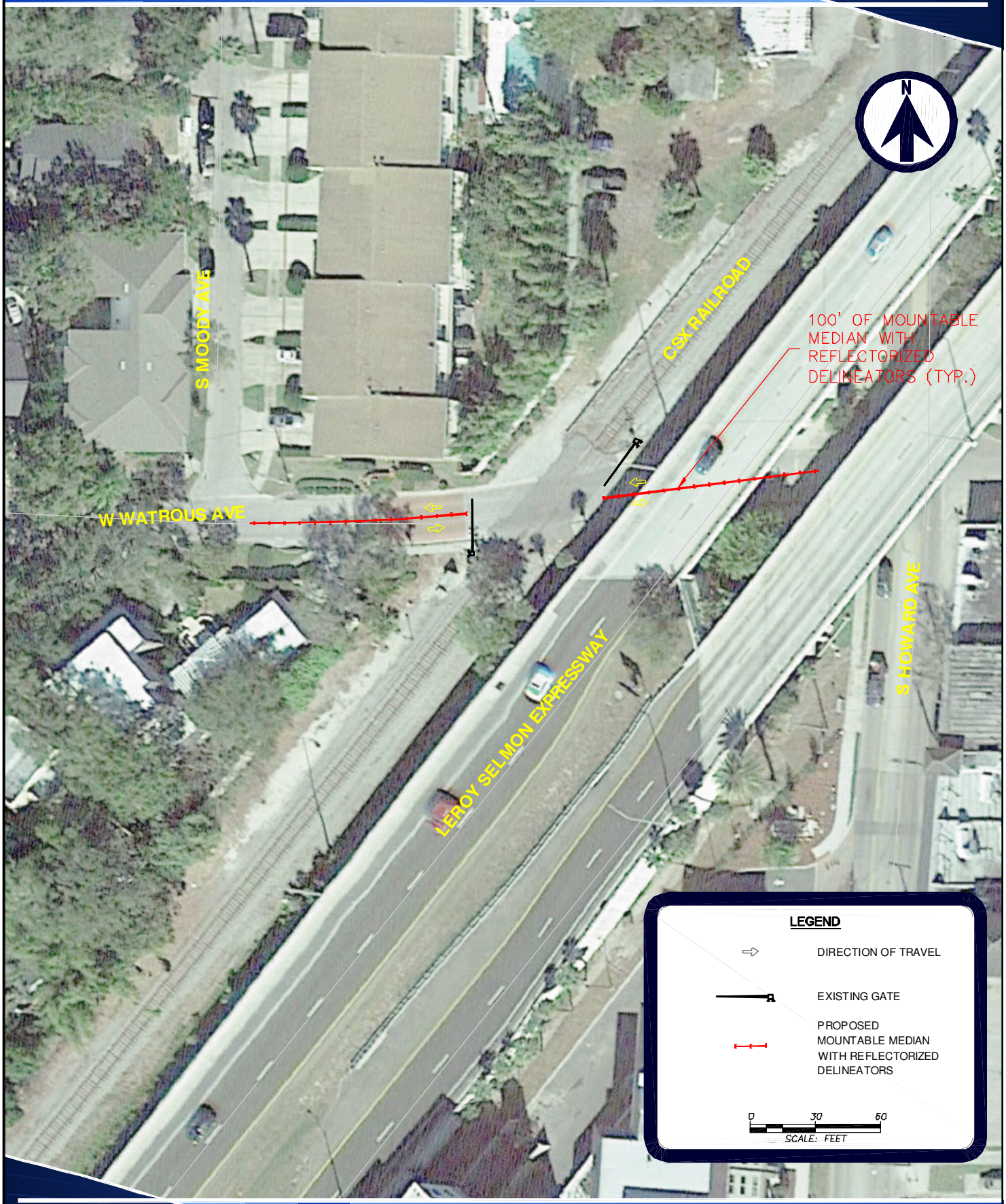
Railroad Crossing -Quiet Zone



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WATROUS AVE

Railroad Crossing -Quiet Zone

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W. MISSISSIPPI AVE.

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Railroad Crossing -Quiet Zone

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W. BAY TO BAY BLVD.

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Railroad Crossing -Quiet Zone

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S. MACDILL AVE.

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Railroad Crossing -Quiet Zone

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S. HIMES AVE.

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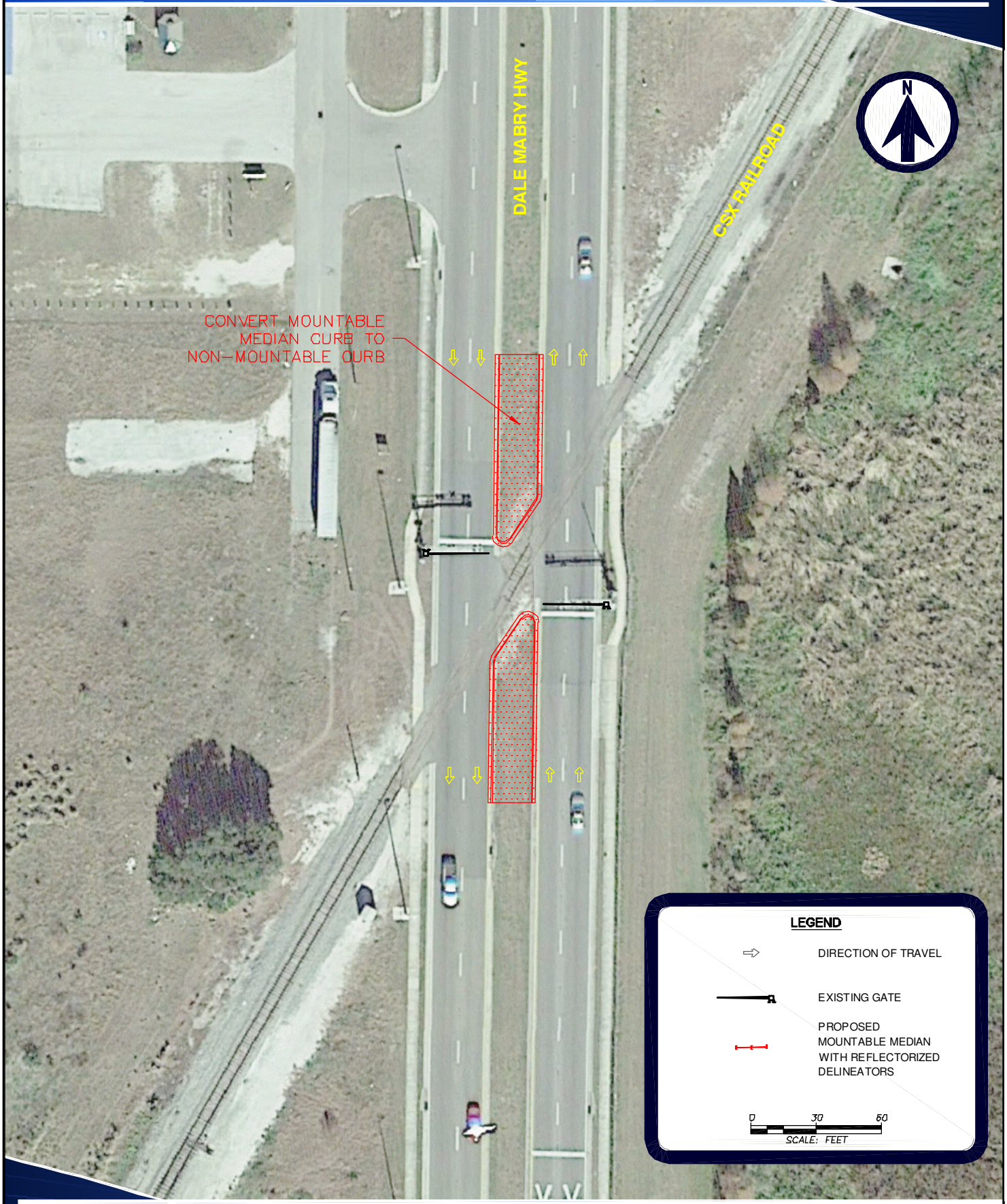
Railroad Crossing -Quiet Zone



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DALE MABRY HWY

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Railroad Crossing -Quiet Zone

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W. PEARL AVE.

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Railroad Crossing -Quiet Zone

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Oklahoma Ave.

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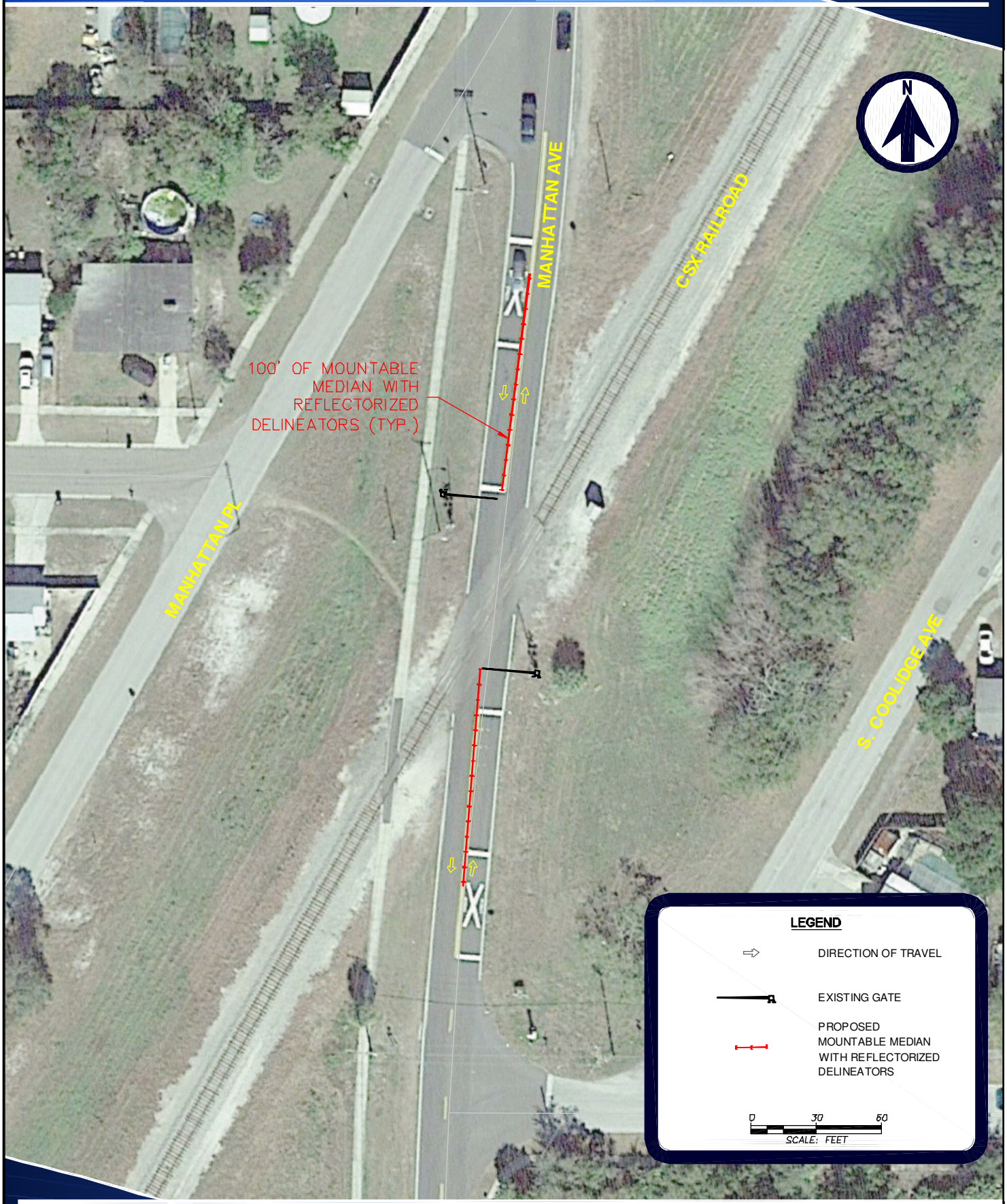
Railroad Crossing -Quiet Zone



King
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MANHATTAN AVE.

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Railroad Crossing -Quiet Zone

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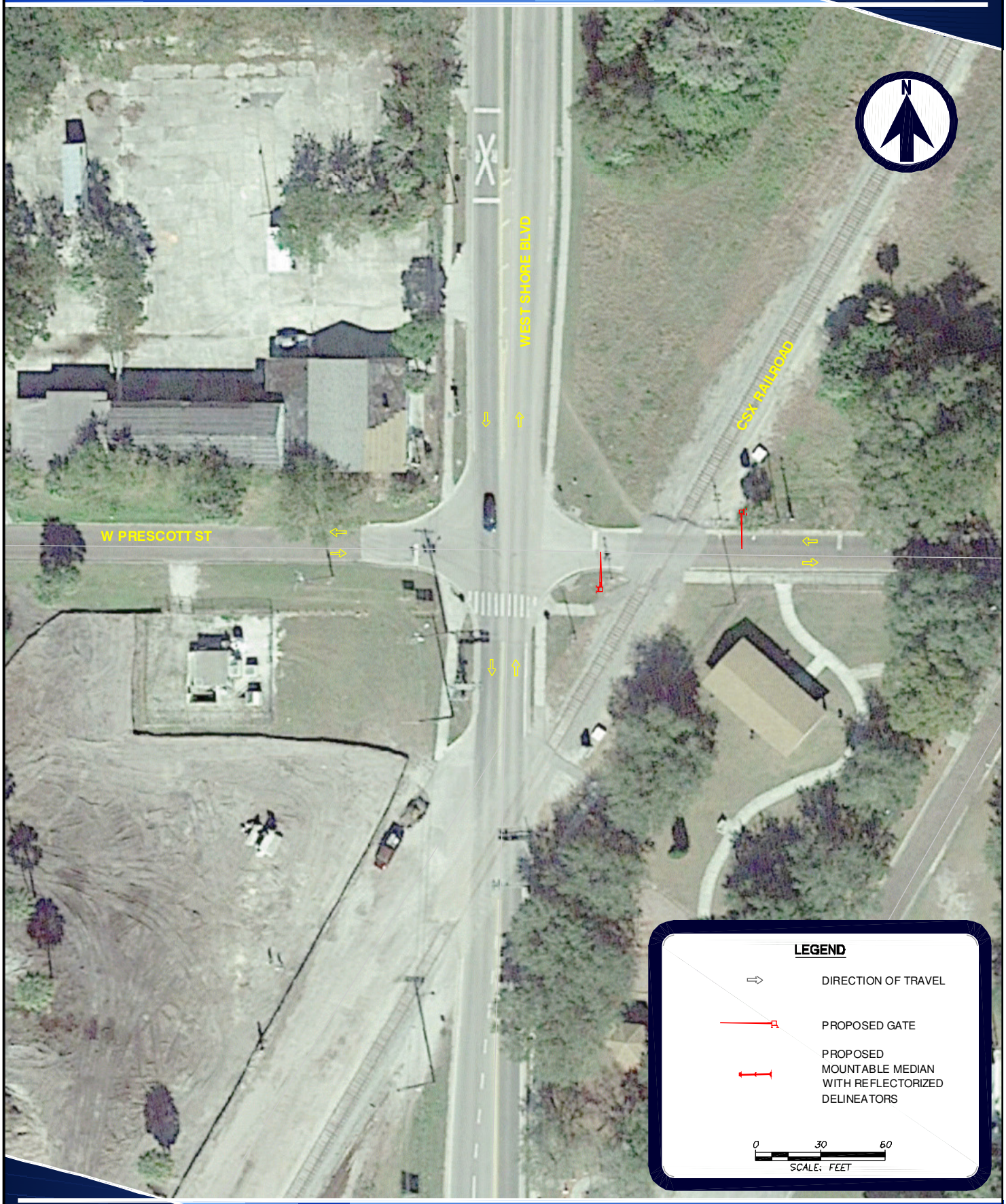
MCCOY ST

GRAPHIC REPRESENTATIONS ARE GENERAL IN NATURE AND SHOULD BE USED FOR PLANNING PURPOSES ONLY

Railroad Crossing -Quiet Zone



King
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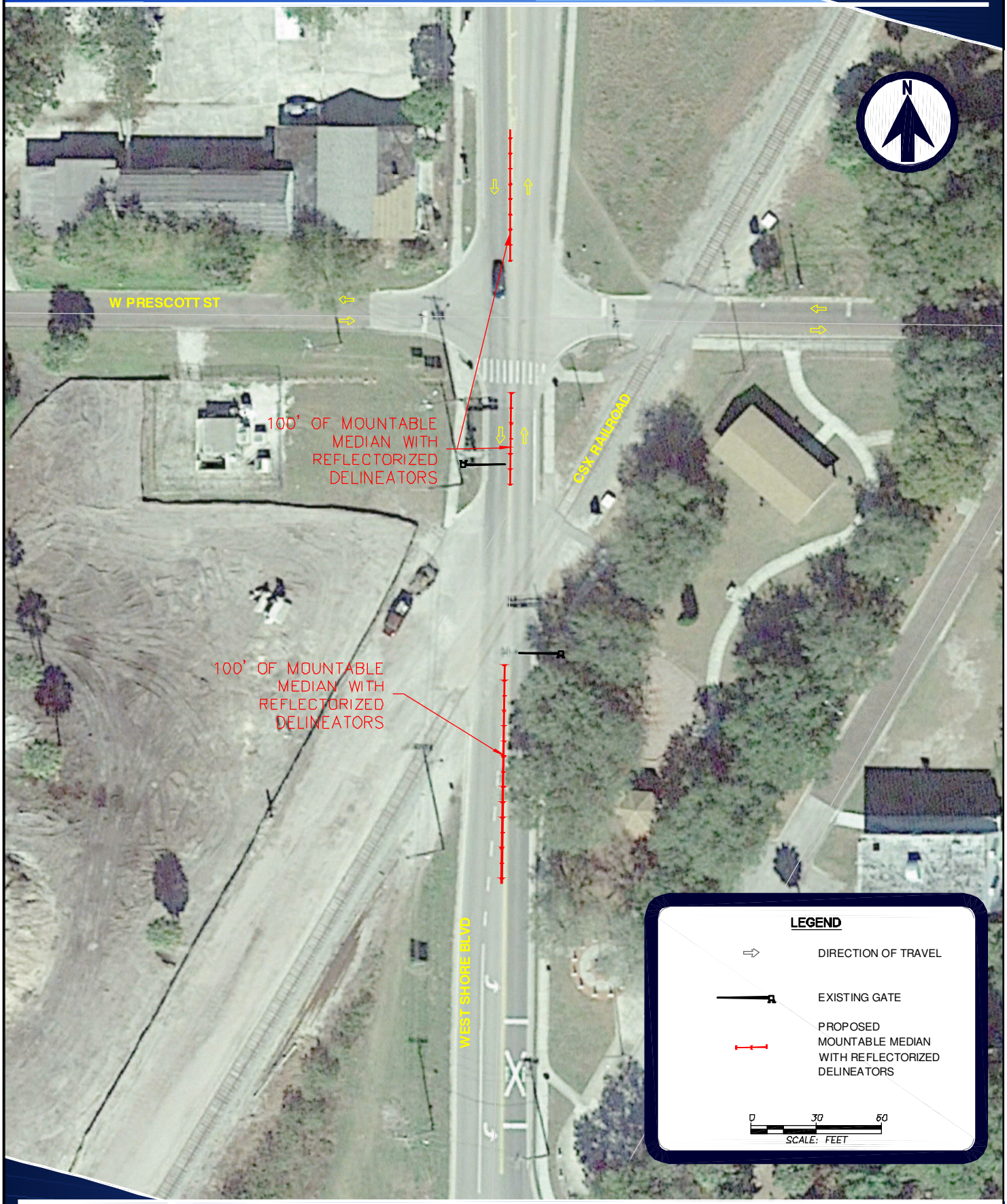
PRESCOTT ST

GRAPHIC REPRESENTATIONS ARE GENERAL IN NATURE AND SHOULD BE USED FOR PLANNING PURPOSES ONLY

Railroad Crossing -Quiet Zone



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WESTSHORE BLVD.

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