HIGHWAY FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

Oxnard, CA

HWY15MH006

(21 pages)

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C.

HIGHWAY FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

A. CRASH INFORMATION

Location:	Train & Utility Truck Crash on Railroad Right-of-way (not a Grade Crossing)
Vehicle #1:	2005 Ford F-450 Utility Truck towing a 2000 Wells Cargo Tandem Axle Utility Trailer
Vehicle #2:	Metrolink Commuter Train #102
Vehicle #3:	1998 Toyota Camry
Date:	February 24, 2015
Time:	5:44 a.m. Pacific Standard Time (PST)
NTSB #:	**HWY15MH006**

B. HIGHWAY FACTORS GROUP

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C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

D. DETAILS OF THE HIGHWAY FACTORS INVESTIGATION

The Highway Factors Factual Report provides the reader with a factual record of the highway and train conditions that existed at the time of the crash. The broad areas covered in the Highway Factors Factual Report include prefatory data, highway data, train data, research on raised delineator posts and extension of highway markings across grade crossings, and improvements after the crash.

1. Prefatory Data

1.1 Crash Location

The crash occurred near the South Rice Avenue and Union Pacific Railroad grade crossing (DOT crossing number 745-855H) at railroad milepost number 406.23 in Oxnard, Ventura County, California. **Figure 1** is a crash map that illustrates the crash location.

Figure 1 – Crash map

1.2 Average Daily Traffic Volumes on South Rice Avenue and East Fifth Street

Table 1 summarizes the average daily traffic volumes on South Rice Avenue and East Fifth Street. The volumes are taken from a City of Oxnard 2008 traffic study.

Table 1 – Average Daily Traffic Volumes on South Rice Avenue and East Fifth Street

Street	Average Daily Traffic Volumes
South Rice Avenue	
North of East Fifth Street	32,000
South of East Fifth Street	34,000
East Fifth Street	
East of South Rice Avenue	17,000
West of South Rice Avenue	13,000

1.3 Percentage of Heavy Trucks on South Rice Avenue

A Cities of Port Hueneme/Oxnard Truck Traffic Study dated June 5, 2008 indicated the truck average daily traffic on South Rice Avenue north of East Fifth Street was approximately 2,187 vehicles per day and the percentage of heavy trucks was 7.6 percent.

1.4 Direction of Travel of Metrolink Commuter Train and Accident Vehicle

Figure 2 illustrates the direction of travel of the Metrolink commuter train and the crash vehicle involved in the February 24, 2015 crash.

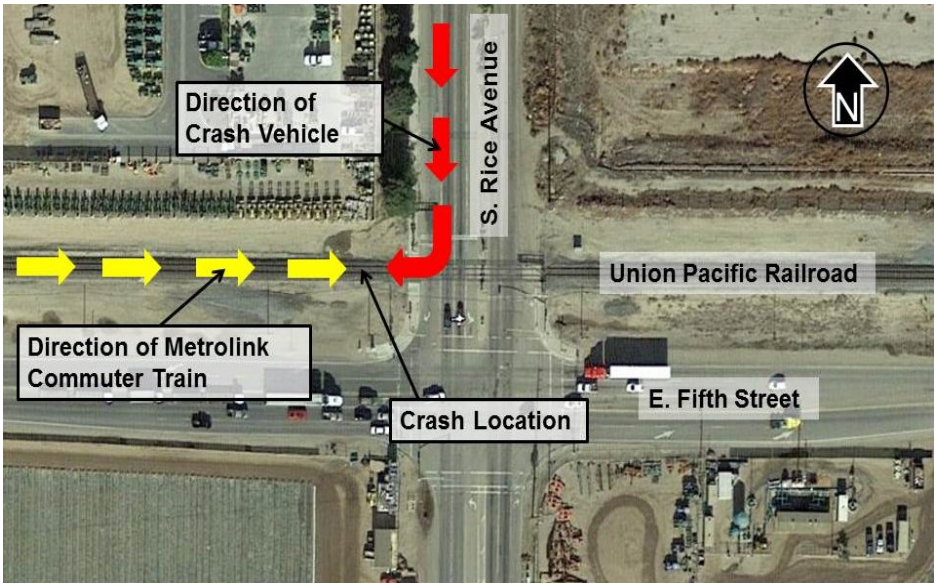

Figure 2 – Direction of travel map

2. Highway Data

2.1 Scene Diagram

Figure 3 illustrates a scene diagram of the grade crossing and the South Rice Avenue and East Fifth Street intersection.

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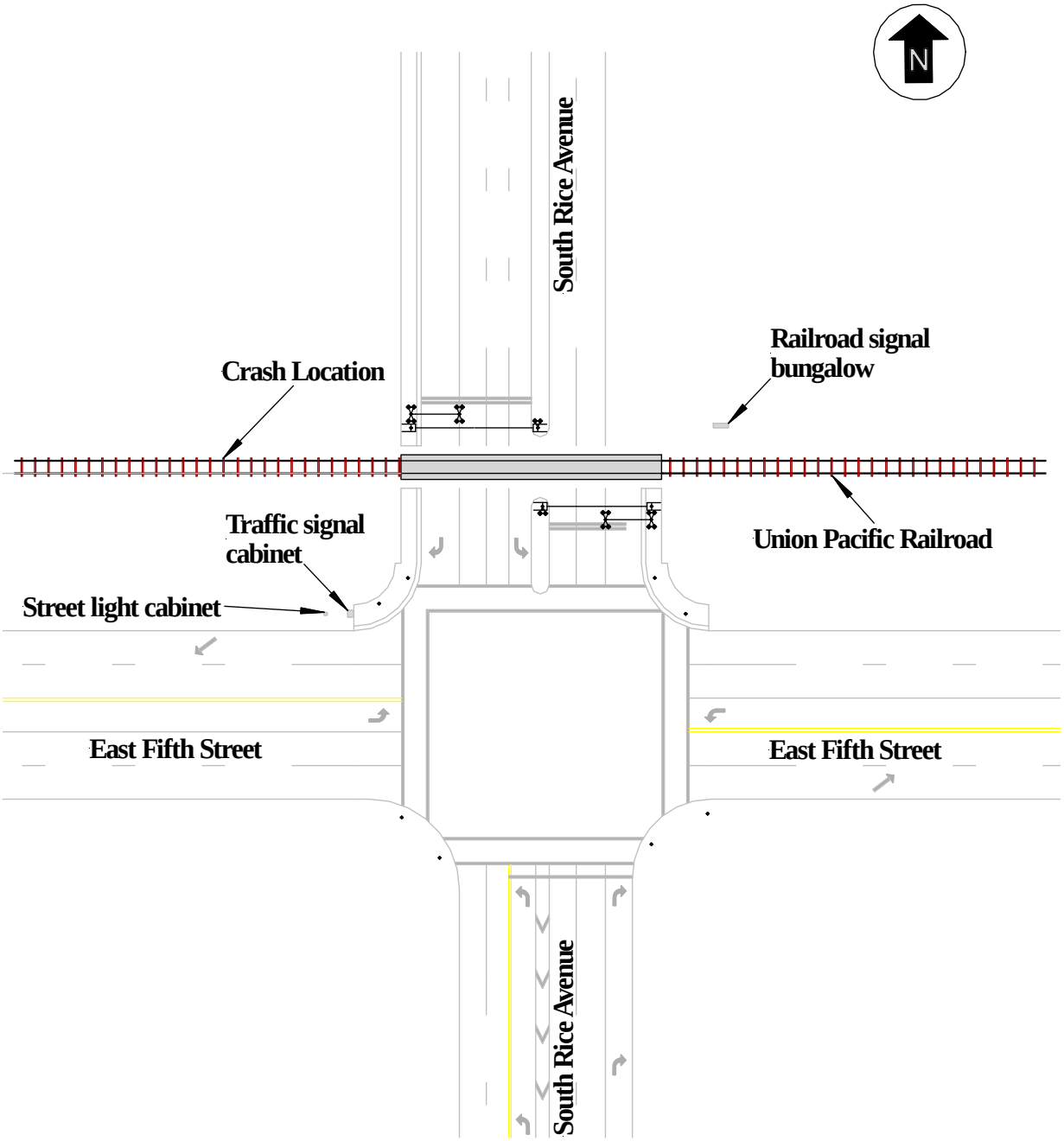

Figure 3 – Scene diagram of the grade crossing and the South Rice Avenue and East Fifth Street intersection

2.2 Highway Design

South Rice Avenue in the vicinity of the grade crossing consisted of a 6-lane cross section. The 6-lane cross section consisted of 4 southbound lanes and 2 northbound lanes. The southbound and northbound lanes were separated by an 8 foot wide raised median. The 4 southbound lanes consisted of 1 right turn lane, 2 through lanes, and 1 left turn lane. The 2 northbound lanes consisted of 2 through lanes. A raised concrete curb separated the travel lanes from a concrete sidewalk located on the outside edges of the roadway. The total width of the 6-lane cross section was approximately 102 feet wide south of the grade crossing.

The distance from the nearest rail to the intersection of East Fifth Street was approximately 57 feet.

2.3 Speed Limit

The posted speed limit for South Rice Avenue north of East Fifth Street was 50 miles per hour (mph). The posted speed limit for South Rice Avenue south of East Fifth Street was 55 mph. The posted speed limit for East Fifth Street was 50 mph.

2.4 Signage and Pavement Markings in the Vicinity of the Grade Crossing

Figure 4 illustrates the signage in the vicinity of the grade crossing on the southbound approach to the grade crossing. On the southbound approach to the grade crossing, a 'Do Not Stop on Tracks' sign was located approximately 18 feet from the nearest rail, a do not park symbol was located approximately 105 feet from the nearest rail, a 'Right Lane Must Turn Right' sign was located approximately 208 feet from the nearest rail, and a grade crossing advance warning symbol was located approximately 355 feet from the nearest rail. On the northbound approach to the East Fifth Street intersection, a traffic signal warning sign was located approximately 500 feet from the intersection and a grade crossing advance warning symbol was located approximately 400 feet from the intersection.

The pavement markings in the vicinity of the grade crossing consisted of grade crossing pavement marking symbols located in the southbound and northbound through lanes of South Rice Avenue. The center of the southbound grade crossing pavement marking symbols were located approximately 463 feet from the nearest rail and the center of the northbound grade crossing pavement marking symbols were located approximately 400 feet from the East Fifth Street intersection.

Figure 4 – Signage in the vicinity of the grade crossing on the southbound approach to the grade crossing.

2.5 Crossing Angle

The crossing of South Rice Avenue and the Union Pacific Railroad formed an angle that was approximately 90 degrees or perpendicular.

2.6 Stop Lines

On the southbound approach to the grade crossing, parallel white stop lines were located approximately 11 feet from the automatic gate arm. On the northbound approach to the grade crossing, parallel white stop lines were located approximately 5 feet from the automatic gate arm.

2.7 Jurisdiction and Maintenance of South Rice Avenue and East Fifth Street

The City of Oxnard has jurisdiction and maintenance of South Rice Avenue north of the grade crossing. The City of Oxnard also has jurisdiction and maintenance of East Fifth Street west of South Rice Avenue. Caltrans has jurisdiction and maintenance of the intersection and the traffic signal at South Rice Avenue and East Fifth Street. Caltrans also has jurisdiction and maintenance of East Fifth Street east of South Rice Avenue. The County of Ventura has jurisdiction and maintenance of South Rice Avenue south of East Fifth Street. Union Pacific Railroad has jurisdiction and maintenance of the grade crossing warning devices and the precast concrete track panels within the area two feet outside each rail.

2.8 Street Lighting

Street lights exist on all 4 quadrants of the South Rice Avenue and East Fifth Street intersection. The street lights were tested on February 26, 2015 and found to be in full working order. The street light poles are 30 feet high with LED lenses. The lenses emit approximately 200 watts to illuminate the intersection and grade crossing.

2.9 Future Grade Separation of South Rice Avenue over the Union Pacific Railroad Tracks and East Fifth Street

The City of Oxnard has plans to grade separate South Rice Avenue over the Union Pacific Railroad tracks and East Fifth Street. The environmental clearance has just begun and is anticipated to conclude in the summer of 2016. The estimated time to prepare the construction drawings is one year. Once funding is approved, the City of Oxnard estimates construction to be approximately 2 years. The estimated cost of the future grade separation is approximately $35 million.

Figure 5 illustrates the future grade separation of South Rice Avenue over the Union Pacific Railroad tracks and East Fifth Street. The configuration of the future grade separation is conceptual and subject to change.

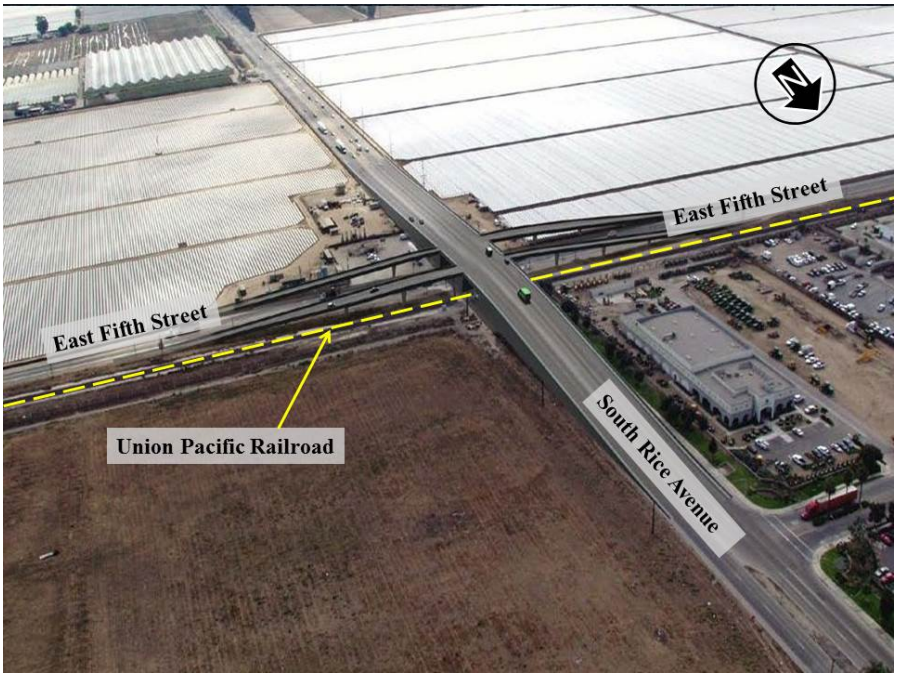

Figure 5 – Future grade separation of South Rice Avenue over the Union Pacific Railroad tracks and East Fifth Street.

2.10 Traffic Signal at South Rice Avenue and East Fifth Street

A *Review of Interconnected Highway-Rail Grade Crossing*[1] Report prepared by CTC, Inc. dated March 2013 for the South Rice Avenue at East Fifth Street grade crossing indicated the following:

> *"The traffic signal controller is a DynalROL model 170E. The firmware installed in the controller unit was C8 version 3. The location is currently equipped with simultaneous preemption. A two conductor cable is available for the interconnect circuit in the railroad bungalow. The current interconnection is a 2-wire single break normally open preemption circuit.*
>
> *The crossing is located on the Santa Barbara Subdivision, at MP 406.24. The grade crossing warning system is equipped with a railroad controller providing constant warning and simultaneous preemption. The design speed is 88 MPH eastbound and 102 MPH westbound. The total approach length is 3880 feet eastbound and 4524 feet westbound. Current time table speed is 79 MPH.*
>
> *The train detection system at the subject grade crossing is designed as follows:*

TRACK →	1 WB	1 EB
CIRCUIT TYPE & EQUIPMENT TYPE		
Constant Warning Time Circuit	GCP 3000	GCP 3000
DESIGN TIME		
Minimum Time	20	20
PRESCRIBED WARNING TIME	20	20
Buffer Time	5	5
Total Warning Time CWT Setting	25	25
Equipment Response Time	5	5
Approach Time	30	30
MAS – MPH	102	88
APPROACHES		
MAS – FPS	149.60	129.07
Total Approach Length (ft)	4524	3880
Remote DAX (yes / no)	No	No

[1]Prepared by CTC, Inc. for the Union Pacific Railroad, Review of Interconnected Highway-Rail Grade Crossing, South Rice Avenue at East Fifth Street, DOT # 745855H, MP 406.24, Santa Barbara Division, March 2013.

Immediate Recommendations for the Agency

Based on the calculated Queue Clearance Time (QCT), ***it is recommended that the track clearance green time be increased from 13 seconds to 20 seconds while on site. The Agency agreed and made the update on site.***

Immediate Recommendations for the Railroad

Programming Issues:

Approach length is not programmed per the new design plans. The approach is programmed for 4080 feet and not 4524 feet as designed. ***It was recommended that the Railroad program the approach length according to the design. The update was made as of February 27, 2013."***

2.11 Collision Report Summary in the Vicinity of the South Rice Avenue and East Fifth Street Intersection

Table 2 summarizes a collision report summary in the vicinity of the South Rice Avenue and East Fifth Street intersection. There were a total of 17 crashes within the South Rice Avenue and East Fifth Street intersection from August 2010 to January 2013 and a total of 4 crashes near the South Rice Avenue and Union Pacific Railroad grade crossing from August 2010 to May 2013. Information contained in **Table 2** was received from the Oxnard Police Department.

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Table 2 – Collision report summary in the vicinity of the South Rice Avenue and East Fifth Street intersection

Date	Type of Collision	Probable Cause Factor	Fatalities	Injuries
Collisions within the Intersection				
8/9/2010	Broadside	Auto R/W Violation	0	0
8/19/2010	Rear-End	Unsafe Speed	0	1
8/21/2010	Broadside	Auto R/W Violation	0	2
9/10/2010	Sideswipe	Driving Under Influence	0	0
9/16/2010	Head-On	Auto R/W Violation	0	4
9/29/2010	Broadside	Traffic Signals and Signs	0	1
11/2/2010	Broadside	Traffic Signals and Signs	0	1
12/13/2010	Rear-End	Unsafe Speed	0	2
2/17/2011	Broadside	Traffic Signals and Signs	0	1
3/5/2011	Broadside	Traffic Signals and Signs	0	1
6/12/2011	Broadside	Traffic Signals and Signs	0	2
7/17/2011	Broadside	Traffic Signals and Signs	0	3
12/7/2011	Broadside	Traffic Signals and Signs	0	1
1/18/2012	Rear-End	Unsafe Speed	0	0
8/17/2012	Broadside	Traffic Signals and Signs	0	3
9/7/2012	Broadside	Improper Turning	0	0
1/4/2013	Broadside	Auto R/W Violation	0	2
Sub-Total – Collisions within the Intersection			0	24
Collisions near the Grade Crossing				
8/19/2010	Other	Hazardous Parking	0	0
3/3/2011	Sideswipe	Unsafe Lane Change	0	0
12/6/2012	Sideswipe	Improper Turning	0	0
5/24/2013	Rear-End	Driving Under Influence	0	0
Sub-Total – Collisions near the Grade Crossing			0	0
Total			0	24

3. Train Data

3.1 U.S. DOT Crossing Inventory Information

Table 3 summarizes the U.S. DOT Crossing Inventory Information at the South Rice Avenue and Union Pacific Railroad grade crossing.

Table 3 – U.S. DOT Crossing Inventory Information

Subject	Crossing Inventory Information
Crossing Number	745855H
Railroad	Union Pacific Railroad Company
Type and Position	Public At Grade
Division	Los Angeles
Subdivision	Santa Barbara
Railroad Milepost	406.25
State	California
County	Ventura
City	Near Oxnard
Street or Road Name	Rice Avenue
Highway Type	City Road
Latitude	34.1971230
Longitude	-119.1422770

3.2 Highway-Rail Grade Crossing Accident/Incident Reports

Table 4 summarizes the highway-rail grade crossing accident/incident reports at the South Rice Avenue and Union Pacific Railroad grade crossing. Information contained in **Table 4** was received from the Federal Railroad Administration (FRA) highway-rail grade crossing accident/incident report database.

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Table 4 – Highway-rail grade crossing accident/incident reports at the South Rice Avenue and Union Pacific Railroad grade crossing

Date	Fatalities	Injuries
06/03/2014	2	0
11/29/2010	0	1
08/19/2010	0	0
08/27/2009	0	0
03/04/2008	0	0
06/12/1998	1	0
03/13/1998	0	0
03/03/1998	0	0
06/02/1995	0	0
10/02/1990	0	0
01/04/1984	0	0
01/19/1979	0	0
02/15/1976	0	0
Totals	**3**	**1**

An accident occurred on November 29, 2010 in which an automobile turned onto the tracks instead of the street and was struck by a northbound train. The November 29, 2010 accident resulted in 1 injury (see **Highway Attachment 1** – Highway-Rail Grade Crossing Accident/Incident Report dated November 29, 2010).

3.3 Train Volumes

A total of 6 Metrolink and 12 Amtrak trains travel over the South Rice Avenue and Union Pacific Railroad grade crossing per day. **Table 5** summarizes the train times for the Metrolink and Amtrak service at the Oxnard Station.

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Table 5 – Train times for the Metrolink and Amtrak Service at the Oxnard Station

Description	Train Times
Ventura County Line – Metrolink Service	
Metrolink – East Ventura to L.A.	
Oxnard	5:39 am, 6:17 am, 6:56 am
Metrolink – L.A. to East Ventura	
Oxnard	5:53 pm, 6:38 pm, 8:14 pm
Ventura County Line – Amtrak Service	
Amtrak – Oxnard to L.A.	
Oxnard	7:43 am, 10:18 am, 2:57 pm, 5:07 pm, 5:30 pm, 7:51 pm
Amtrak – L.A. to Oxnard	
Oxnard	9:21 am, 9:21 am, 10:38 am, 2:00 pm, 4:33 pm, 8:41 pm

3.4 Design Speed and Maximum Track Speed

The design speed of the Union Pacific Railroad in the vicinity of the South Rice Avenue grade crossing was 88 mph and the maximum passenger track speed was 79 mph.

4. Research

4.1 Raised Delineator Posts and Extension of Highway Markings across Grade Crossings

Photograph 1 illustrates a view of the Green Lane grade crossing (DOT crossing number 529-898H) looking to the northwest in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks. In 2008, there were 2 train-car accidents that involved drivers whose GPS devices guided them onto the tracks. In addition to the raised delineator posts, the highway markings were extended across the grade crossing.

Photograph 1 – View of the Green Lane grade crossing looking to the northwest in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks

Photograph 2 illustrates another view of the Green Lane grade crossing looking to the southeast in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks.

Photograph 2 – Another view of the Green Lane grade crossing looking to the southeast in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks

5. Improvements after the Crash

5.1 Short Term Improvements to the Grade Crossing

The City of Oxnard and the Union Pacific Railroad are working collaboratively to make short term improvements to the grade crossing. The short term improvements will consist of installing a 4-inch wide solid white edge line located approximately 18 inches off the curb face. The 4-inch wide solid white edge line will be extended approximately 30 feet beyond the railroad track pad on either side of the tracks. White flexible delineators with white reflective bands will also be installed approximately 13 feet from the track center on either side of the tracks. It is anticipated the short term improvements will be completed by July 2015.

5.2 Proposed Changes to the Manual on Uniform Traffic Control Devices (MUTCD)

The Railroad & Light Rail Transit Technical Committee of the National Committee on Uniform Traffic Control Devices (NCUTCD) sent the following proposed changes to the 2009 MUTCD to the Federal Highway Administration (see **Highway Attachment 2** – Proposed Changes to the 2009 MUTCD - Edge Line Markings at Highway-Rail and Light Rail Transit Grade Crossings).

> *"**TOPIC: Edge Line Markings at Highway-Rail and Light Rail Transit Grade Crossings***
>
> ***SUMMARY OF PROPOSED CHANGE:***
>
> *The purpose of this change is to address several train-auto crashes which have occurred within the last few years. In these incidents, a roadway user made an improper turn and turned onto the railroad rather than at an adjacent intersection immediately beyond the grade crossing. In June of 2011, the RRLRT TC recommended the addition of new Section 8B.31 to address the optional inclusion of edge line markings across a grade crossing. In light of a continuing number of crashes due to motorists turning onto tracks at a grade crossing, NTSB has made a preliminary safety recommendation to allow the use of tubular delineators to further supplement the edge line markings. The RRLRT TC, FHWA, and the Association of American Railroads support this recommendation and have proposed the following changes to Section 8B.31.*

DISCUSSION

RECOMMENDED CHANGE(S) TO THE MUTCD

Note: Proposed changes to the MUTCD are shown in underline.

Proposed Change to Section 8B.31:

Section 8B.31 Edge Lines and Lane Lines at Grade Crossings

Guidance:
When used, edge lines (see Section 3B.06) and lane lines (see Section 3B.04) should extend to and across the track(s) at a grade crossing to delineate the edge of the traveled way and the separation of traffic lanes across the track(s).

Option:
The edge lines and lane lines may be omitted from the crossing surface if the surface cannot retain the application of the marking.

Raised pavement markers or tubular delineators may be used to supplement the edge line markings to delineate the edge of the traveled way across the track(s).

Support:
This delineation is desirable where the crossing is in close proximity to a highway intersection.

Standard:
Where used, raised pavement markers or tubular delineators placed along the edge line of the traveled way shall be white or yellow in color to match the color of edge lines stipulated in Section 3B.06.

Guidance:
When used, tubular delineators should not be installed within 6 feet of any rail."

5.3 Official interpretation by FHWA of Proposed Changes to the MUTCD placed on their website

FHWA anticipates placing an official interpretation of the proposed changes to the 2009 MUTCD regarding the use of tubular delineators and extension of highway markings across grade crossings on their website by August 2015.

5.4 Next MUTCD Version

The Federal Highway Administration sent an email to NTSB investigators dated April 23, 2015 regarding the publishing of the next version of the MUTCD.

> *"Unfortunately, publishing the next version of the MUTCD has been delayed. We had previously targeted having the Notice of Proposed Amendment (NPA) published by May 2015 and the Final Rule published by around June 2017. However, assuming that we are able to publish the NPA sometime during 2016, we would be looking at publishing the Final Rule sometime during 2018."*

E. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS

Highway Attachment 1 – Highway-Rail Grade Crossing Accident/Incident Report dated November 29, 2010

Highway Attachment 2 – Proposed Changes to the 2009 MUTCD – Edge Line Markings at Highway-Rail and Light Rail Transit Grade Crossings

Highway Attachment 3 – Average Daily Traffic Volumes on South Rice Avenue and East Fifth Street

Highway Attachment 4 – Cities of Port Hueneme/Oxnard Truck Traffic Study Final Report dated June 5, 2008

Highway Attachment 5 – Review of Interconnected Highway-Rail Grade Crossing dated March 2013

Highway Attachment 6 – Collision Report Summary in the Vicinity of the South Rice Avenue and East Fifth Street Intersection

LIST OF PHOTOGRAPHS

Highway Photo 1 – View of the Green Lane grade crossing looking to the northwest in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks

Highway Photo 2 – Another view of the Green Lane grade crossing looking to the southeast in Mount Kisco, New York in which raised delineator posts have been used to prevent vehicles from inadvertently turning onto the tracks

Highway Photo 3 – Existing conditions to the grade crossing on South Rice Avenue looking to the south before the crash

Highway Photo 4 – View illustrating derailed and overturned Coach Car Number 206 at final rest with a portion of the car laying in the travel lanes of East Fifth Street looking to the west

Highway Photo 5 – View of remnants of truck at final rest located east of the grade crossing and on the south side of the tracks with the grade crossing shown in the background looking to the west

Highway Photo 6 – View of island gate mechanism entangled with wreckage of the trailer at final rest located in the northbound lanes of South Rice Avenue with the rear locomotive shown in the background looking to the east

Highway Photo 7 – View of the grade crossing and the path of the truck that inadvertently entered the railroad track right-of-way looking to the southwest

Highway Photo 8 – View of the grade crossing and looking back towards the path of the truck that inadvertently entered the railroad track right-of-way looking to the east

Highway Photo 9 – View of the southbound lanes of South Rice Avenue standing in the middle of the right through lane with the grade crossing shown in the background looking to the south

Highway Photo 10 – View of the southbound lanes of South Rice Avenue standing in the center median with the grade crossing shown in the background looking to the south

Highway Photo 11 – View of the grade crossing and the scrape and gouge marks located on the railroad track pad and adjacent asphalt transition looking to the west

Highway Photo 12 – View of the southbound right turn lane and turn lane-use arrow pavement marking on South Rice Avenue with the grade crossing shown in the background looking to the north

END OF REPORT

Dan Walsh, P.E.
Senior Highway Factors Investigator