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**Staff Memorandum
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To: THE COMMISSION

2009 JUL 17 P 4: 33

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From: Safety Division

AZ CORP COMMISSION
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Date: July 17, 2009

RE: IN THE MATTER OF THE APPLICATION OF THE TOWN OF SAHUARITA TO UPGRADE AN EXISTING CROSSING OF THE UNION PACIFIC RAILROAD AT RANCHO SAHUARITA BOULEVARD, AND PIMA MINE ROAD, IN THE TOWN OF SAHUARITA, PIMA COUNTY, ARIZONA, DOT CROSSING NO. 742-177-R.
DOCKET NO. RR-03639A-09-0282

Background

On June 2, 2009 the Town of Sahuarita ("Town") filed with the Arizona Corporation Commission ("Commission") an application for approval for the Union Pacific Railroad ("Railroad") to upgrade an existing crossing at the Railroad's tracks at Rancho Sahuarita Boulevard, and Pima Mine Road, in the Town of Sahuarita, Pima County ("County"), Arizona, on the Railroad's Nogales Subdivision, Department of Transportation ("DOT") Crossing No. 742-177-R.

On May 2, 2007, Safety Division Staff ("Staff"), the Railroad, County, and the Town participated in a diagnostic review of the proposed improvements at Rancho Sahuarita Boulevard. All parties present were in agreement to the proposed improvements at the crossing. The following is an analysis of the crossing in this application, including information about the crossing that was provided to Staff by the Town.

Geographical Information

Rancho Sahuarita Boulevard is located in Pima County within the town limits of Sahuarita. The Arizona Department of Commerce estimates the Town's population at 23,190 for the year 2008. As one of Arizona's fastest-growing communities, the Town of Sahuarita is the newest jurisdiction in Pima County, incorporated in 1994. Currently 30 square miles, Sahuarita is located just 15 minutes south of Tucson and approximately 40 minutes north of the Mexican border. Transportation access is convenient with Interstate 19, part of the CANAMEX Corridor, running from Tucson through Sahuarita to the Mexican border.

The rail line running through this crossing is known as the "Pima Mine Spur" with access coming from the Nogales Subdivision main line. The spur line runs in an east to west direction, with the main line running in a north to south direction from Tucson into Nogales. The general area surrounding the railroad crossing is a mix of residential and industrial businesses, with a large mining operation to the northwest of the crossing that is owned and operated by Asarco Mining Company. (See Appendix "A")

Rancho Sahuarita Boulevard

The Town's proposed crossing upgrades include replacing the existing yield and stop signs, as well as the existing cross bucks, with the latest in industry standards to include: 12 inch LED flashing lights, w/sidelights, cantilevers with 12 inch LED flashing lights, automatic gates, bells, and constant warning time circuitry. Additionally, new traffic signals will be installed at the intersection of Pima Mine Road and Rancho Sahuarita Boulevard; with simultaneous pre-emption interconnected between the traffic signal controller and the train detection circuitry. The interconnected circuitry is necessary due to the close proximity of the roadway intersection of Pima Mine Road and Rancho Sahuarita Boulevard to the railroad tracks. The Federal Highway Administration's ("FHWA"), "Manual on Uniform Traffic Control Devices" Part 8, Section 8D.07, sets the standard for the interconnection whenever the railroad tracks are within 200 feet of the traffic intersection. Also, a new concrete crossing surface will be added, along with replacing any impacted pavement markings. The proposed measures are consistent with safety measures employed at similar at-grade crossings in the state. The estimated cost of the proposed railroad crossing upgrade is \$500,327, which will be funded entirely by the Town.

Traffic Study

The most recent traffic study which included traffic counts was conducted for a 12-hour period in February 2007 by ACCEPT Consulting for use by Psomas, also a consulting firm. The traffic information was included in the "Traffic Signal Needs Study for the Intersection of Pima Mine Road and Rancho Sahuarita Boulevard", prepared by Psomas in 2007 for the Town. The estimated Average Daily Traffic (ADT) for Rancho Sahuarita Boulevard just south of Pima Mine Road is 8,500 vehicles per day. The estimated ADT for Pima Mine Road is 5,800 vehicles per day.

Rancho Sahuarita Boulevard and Pima Mine Road is currently a non signalized intersection. Therefore, the Level of Service (LOS) is only available for movements under traffic control. Based on the "Traffic Signal Needs Study for the Intersection of Pima Mine Road and Rancho Sahuarita Boulevard", the northbound movements (stop sign controlled) operate at LOS D in the AM peak hour and LOS C in the PM peak hour.

The American Association of State Highway and Transportation Officials Geometric Design of Highways and Streets, 2004, states that the Level of Service characterizes the operating conditions on a facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. This is a measure of roadway congestion ranging from LOS A--least congested--to LOS F--most congested. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be.

The posted speed limit on Rancho Sahuarita Boulevard is 30 miles per hour ("mph"). Staff records, as well as Federal Railroad Administration ("FRA") accident/incident records indicate no accidents at this crossing.

Alternative routes from this crossing are as follows; to the east 1.1 miles is the Nogales Highway, an at-grade crossing, and to the west is I 19, 1.3 miles, a grade separated crossing.

Train Data

Data provided by the Town regarding train movements through this crossing are as follows:

Train Count: 2 train per day

Train Speed: 10 mph freight

Thru Freight/Switching Moves: All moves through this crossing are thru freight, serving the mine. This is not a passenger train route.

Schools and Bus Routes

There are no schools within 1 mile of this crossing. The closest school is a public K-8 school (Anza Trail) 3 miles south of the crossing at the intersection of Rancho Sahuarita Boulevard and Calle Las Tunas, west of La Villita Road. Five different school buses cross the Rancho Sahuarita crossing a total of 8 times each school day. On July 16th, 2009, Staff verified the number of bus crossings with Mr. Rick Robinson, Department of Public Works, Town of Sahuarita.

Hospitals

Staff requested information concerning hospitals in the area and the Town's response is as follows:

There are no hospitals in the vicinity of the crossing. Roadway use by emergency vehicles is typical of other areas/roads around Town.

Hazardous Materials

The Town gave the following response when asked about hazardous materials crossing this crossing:

There are no regular occurrences of hazardous material vehicles utilizing this crossing to the Town's knowledge.

Zoning

Staff requested the Town provide information regarding the type of zoning in adjacent areas from the crossing. The following was its response:

The area to the north of the project is the San Xavier District of the Tohono Oódam Nation. Southeast of the crossing, there is an existing Unisource Energy Corporation substation. The area south of the crossing is mostly developed as high density residential and is part of the Rancho Sahuarita specific plan area.

Spur Lines

The Town gave the following answer regarding spur lines located in the area:

There have not been any spur lines removed within the area over the last three years, to the Town's knowledge.

FHWA Guidelines Regarding Grade Separation

The FHWA Railroad-Highway Grade Crossing Handbook (Revised Second Edition August 2007) provides nine criteria for determining whether highway-rail crossings should be considered for grade separation or otherwise eliminated across the railroad right of way. The Crossing Handbook indicates that grade separation or crossing elimination should be considered whenever one or more of the nine conditions are met. The nine criteria are applied to this crossing application as follows:

FHWA - GRADE SEPARATION GUIDELINES			
Highway-rail grade crossings should be considered for grade separation or otherwise eliminated across the railroad right of way whenever one or more of the following conditions exist:			
Condition/Criteria		Response	Remarks
The highway is a part of the designated Interstate Highway System	Crossing Currently meets the criteria	No	Rancho Sahuarita Boulevard is an arterial for the Town of Sahuarita, but does not provide regional connectivity, and is not part of the interstate system.
	Crossing meets the criteria by 2030	No	
The highway is otherwise designed to have full controlled access	Crossing Currently meets the criteria	No	Rancho Sahuarita Boulevard provides access to/from several subdivisions, and is not designated to have access control.
	Crossing meets the criteria by 2030	No	
The posted highway speed equals or exceeds 70 mph	Crossing Currently meets the criteria	No	The speed limit is 30 mph, and the design speed is 35 mph.
	Crossing meets the criteria by 2030	No	
AADT exceeds 100,000 in urban areas or 50,000 in rural areas	Crossing Currently meets the criteria	No	ADT is approximately 8,500 vehicles per day. The capacity of the road is approximately 15,000 vehicles per day. (2006 Counts by PAG)
	Crossing meets the criteria by 2030	N/A	
Maximum authorized train speed exceeds 110 mph	Crossing Currently meets the criteria	No	From DOT inventory reports, the maximum timetable speed is 10 mph. The curves along the spur track (approaching Nogales Highway) prevent high speeds.
	Crossing meets the criteria by 2030	No	
An average of 150 or more trains per day or 300 million gross tons/year	Crossing Currently meets the criteria	No	Average of 2 trains per day according to DOT inventory.
	Crossing meets the criteria by 2030	No	
Crossing exposure (trains/day x AADT) exceeds 1M in urban or 250k in rural; or passenger train crossing exposure exceeds 800k in urban or 200k in rural	Crossing Currently meets the criteria	No	Exposure value is approximately 17,000 (8,500 vpd x 2 tpd)
	Crossing meets the criteria by 2030	No	
Expected accident frequency for active devices with gates, as calculated by the US DOT Accident Prediction Formula including five-year accident history, exceeds 0.5	Crossing Currently meets the criteria	No	There have been no accidents related to the crossing in the most recent three years of available data (2005-2007). The predicted accidents per year is 0.045.
	Crossing meets the criteria by 2030	N/A	
Vehicle delay exceeds 40 vehicle hours per day	Crossing Currently meets the criteria	No	With one vehicle arriving every 10 seconds, and assuming three minutes of crossing time each per day, the estimated vehicle delay is $(180s/10s/veh \times 180s/2 \times 2 \text{ trains/day}) = 0.9 \text{ hrs/day}$.
	Crossing meets the criteria by 2030	N/A	

N/A = Information was not available to perform these calculations. However, based on information currently available, Staff does not anticipate that these criteria will be met by 2030.

Vehicular Delays at Crossings

Delay time is measured from the point that the warning devices are activated at the crossing to the time after the train has cleared the crossing and the warning devices are reset. Based on the current single track configuration, the Town gave the following response about delay time for vehicles at the crossing in this application:

Vehicle delays due to train crossing - With one vehicle arriving every 10 seconds (ADT is 8,500 over 86,400 sec/day), and assuming 3 minutes of crossing time per day, the estimated vehicle delay is $(180s/10s/veh \times 180s/2 \times 2 \text{ trains/d}) = 0.9 \text{ hrs/day}$ Trains do not typically stop in the vicinity of the crossing and therefore vehicle delay due to trains stopping on the track is approximately 0 hours per day.

Current delays fall well below the FHWA recommended threshold of 40 delay hours per day.

Another commonly used measure outlined in the FHWA Guidelines; the so-called Crossing Exposure Index (which is simply the product of the number of trains per day multiplied by the number of vehicles crossing daily) is currently **not** met at this crossing. It should be noted that the criteria identified in the FHWA material are not mandates, but guidelines established by the Federal Highway Administration, which serve to alert those having jurisdiction that potential problems may arise.

Grade Separation

With regard to grade separating this crossing, the Town gave the following reasons for not grade separating this crossing:

Because of the proximity of the crossing to the intersection with Pima Mine Road, elevating Rancho Sahuarita Boulevard would require also elevating Pima Mine Road. This would likely require construction and permanent impacts within the San Xavier District of the Tohono Oódam Nation. In addition, an elevated intersection would affect view sheds for landowners south of the railroad. Further, train volumes at this location are low (3 or less trains per day) and train operating speeds are also very low. Finally, none of the conditions in the FHWA Grade Separation Guidelines are met.

Staff has utilized the FHWA Guidelines to determine the potential need for grade separation at this crossing. Based on existing conditions, the crossing in this application meets none of the nine criteria for consideration of grade separation.

Crossing Closure

The area surrounding this crossing is highly developed with residential and commercial businesses. To close this crossing would have a negative effect on many of the local businesses. Therefore, Staff would not recommend closure of this crossing at this time.

Staff Conclusions and Recommendations

Having reviewed all applicable data, Staff believes that the upgrades are in the public interest and are reasonable. Staff believes that the measures proposed by the Town are consistent with other similar at-grade crossings in the State and will provide for the public's safety. Therefore, Staff recommends approval of the Town's application.



Brian H. Lehman
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Safety Division

Originator: BHL

Original and thirteen (13) copies
of the foregoing were filed this
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Appendix “A”



PIMA MINE ROAD

UPRR XING

RANCHO SAHUARITA ROAD

Image U.S. Geological Survey

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Imagery Date: May 2005

32°00'03.92" N 110°58'10.75" W elev 2679 ft

Eye alt: 3060 ft

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Imagery Date: May 2005

32°00'06.00"N 110°58'48.47"W elev 2720 ft

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Eye alt 10774ft

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