

Old Richardson Highway Intersection Improvements

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Diagnostic Team Report

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Prepared For:
Alaska Department of
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Facilities Northern Region

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Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
APV	Accident Prediction Value
ARRC	Alaska Railroad Corporation
ATM	Alaska Traffic Manual
DOT&PF	Alaska Department of Transportation and Public Facilities
DT	Diagnostic Team
FNSB	Fairbanks North Star Borough
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration Office of Safety Analysis
Green Book / GB	A Policy on Geometric Design of Highways and Streets
KE	Kinney Engineering, LLC
mph	Miles per Hour
MUTCD	Manual on Uniform Traffic Control Devices
ROW	Right of Way
vpd	Vehicles per Day

Definition of Terms

Accident Prediction Value (APV): A calculated value intended to predict the likelihood of a collision occurring over a given period of time given conditions at the crossing.

Active Traffic Control: Traffic control devices at a railroad-highway crossing involving signs, striping, and flashing lights and/or automatic gates.

Average Annual Daily Traffic (AADT): A measurement of the number of vehicles traveling on a segment of highway each day, averaged over the year.

Diagnostic Team (DT): A group of experienced individuals from several sources with the purpose of performing an engineering study to evaluate railroad-highway crossings as to its deficiencies and presenting recommended improvements.

Dynamic Envelope: Effective width of a train.

Passive Traffic Control: Traffic control at a railroad-highway crossing involving signs and striping only.

Sight Triangle: An area free of obstructions, which allows a vehicle approaching a railroad-highway crossing to safely observe an approaching train.

Case I: Sight triangle for a vehicle moving at the posted speed limit and a train traveling at the maximum timetable approaching the crossing.

Case II: Sight triangle for a stopped vehicle departing from the crossing and a train traveling at the maximum timetable approaching the crossing.

Vehicle Storage: The distance before and after a railroad-highway crossing that is required to safely contain vehicles stopped at the crossing.

Executive Summary

This Diagnostic Team (DT) study was undertaken to evaluate the existing conditions and the effects of potential improvements at the Alaska Railroad crossings at East 5th Avenue and East 8th Avenue in North Pole, Alaska.

The 5th Avenue crossing is currently controlled with flashing lights. The 8th Avenue crossing is currently stop/yield controlled. There have been no crashes attributed to either crossing in at least the past 10 years. Considering all of the relevant characteristics of the crossings, the existing traffic control at both crossings complies with the *Alaska Policy on Railroad/Highway Crossings* and the *Alaska Traffic Manual*.

The DT found that some actions should be taken to improve sight distance and vehicle storage space at both crossings:

- 5th Avenue
 - Relocate train signal controller box, currently on the northeast quadrant of the crossing, to be outside of the sight triangle.
 - Relocate the light pole, currently on the northeast quadrant of the crossing, to be outside of the sight triangle.
 - Relocate the stop bar on 5th Avenue at Old Richardson Highway to clear stopped vehicles from the dynamic envelope area of the train.
- 8th Avenue
 - Relocate the existing crosswalk at the 8th Avenue-Snowman Lane/Grange Road intersection to the east side of the Snowman Lane intersection, to eliminate the potential for westbound vehicles to stop on the tracks.

To improve sight distance in the entire area, DOT&PF should consider removing all vegetation within the space between Old Richardson Highway and the railroad tracks between 5th Avenue and 8th Avenue.

If any of the build-alternatives are chosen for the intersection improvement project, the DT recommends the following:

- At 5th Avenue, any new pathway crossing of the railroad tracks should be constructed adjacent to the roadway, so additional pathway traffic control devices are not required. By attaching the pathway to the roadway, the railroad signal and other utility appurtenance will require relocation.
- At 8th Avenue, construct a new pathway on the north side of 8th Avenue between Old Richardson Highway and Snowman Lane, to better connect current and future pedestrian facilities. This should be constructed adjacent to the roadway, so additional pathway traffic control devices are not required.
- At 8th Avenue, if a bus lane is constructed, which will widen the crossing, an additional engineering analysis of active traffic control (flashing lights and automatic gates) installation should be completed.

1 Introduction

1.1 Purpose and Need

The Alaska Department of Transportation and Public Facilities (DOT&PF) has retained Kinney Engineering, LLC (KE) to lead a Diagnostic Team (DT) Study and prepare this DT Report for the Old Richardson Highway Intersection Improvements project. The purpose of the project is to examine, design, and ultimately construct features to improve safety and traffic operations at and around the intersections of Old Richardson Highway at 5th Avenue and 8th Avenue/NPHS Boulevard. The specific scope of this DT Report is to document the findings and recommendations from the study, which assessed existing conditions and proposed design alternatives at the intersections as they relate to the railroad/highway at-grade crossings on Eielson Branch.

The evaluation of existing crossings was conducted in accordance with the *Alaska Policy on Railroad/Highway Crossings* (hereafter referred to as the Policy), adopted by the Alaska Railroad Corporation (ARRC) and DOT&PF in 1988. Section 4.3.1 of the Policy states:

“A professional diagnostic team should perform an on-site evaluation before any major improvement is planned for an existing crossing or a new crossing is approved.”

The following existing crossings were evaluated:

Table 1: Project Railroad-Highway Crossings

USDOT Crossing ID	Crossing Name	Railroad Milepoint	Public or Private	Maintenance Responsibility	Existing Crossing Protection
868461J	5 th Avenue	G16.30	Public	DOT&PF	Crossbucks, Flashing Lights, Advance Warning Signs, Markings
868463X	8 th Avenue	G16.37	Public	City of North Pole	Crossbucks, Stop/Yield Signs, Advanced Warning Signs, Markings

The project is located within the city limits of North Pole, Alaska, as depicted in Figure 1. Figure 2 highlights the railroad-highway grade crossings included in the DT study.

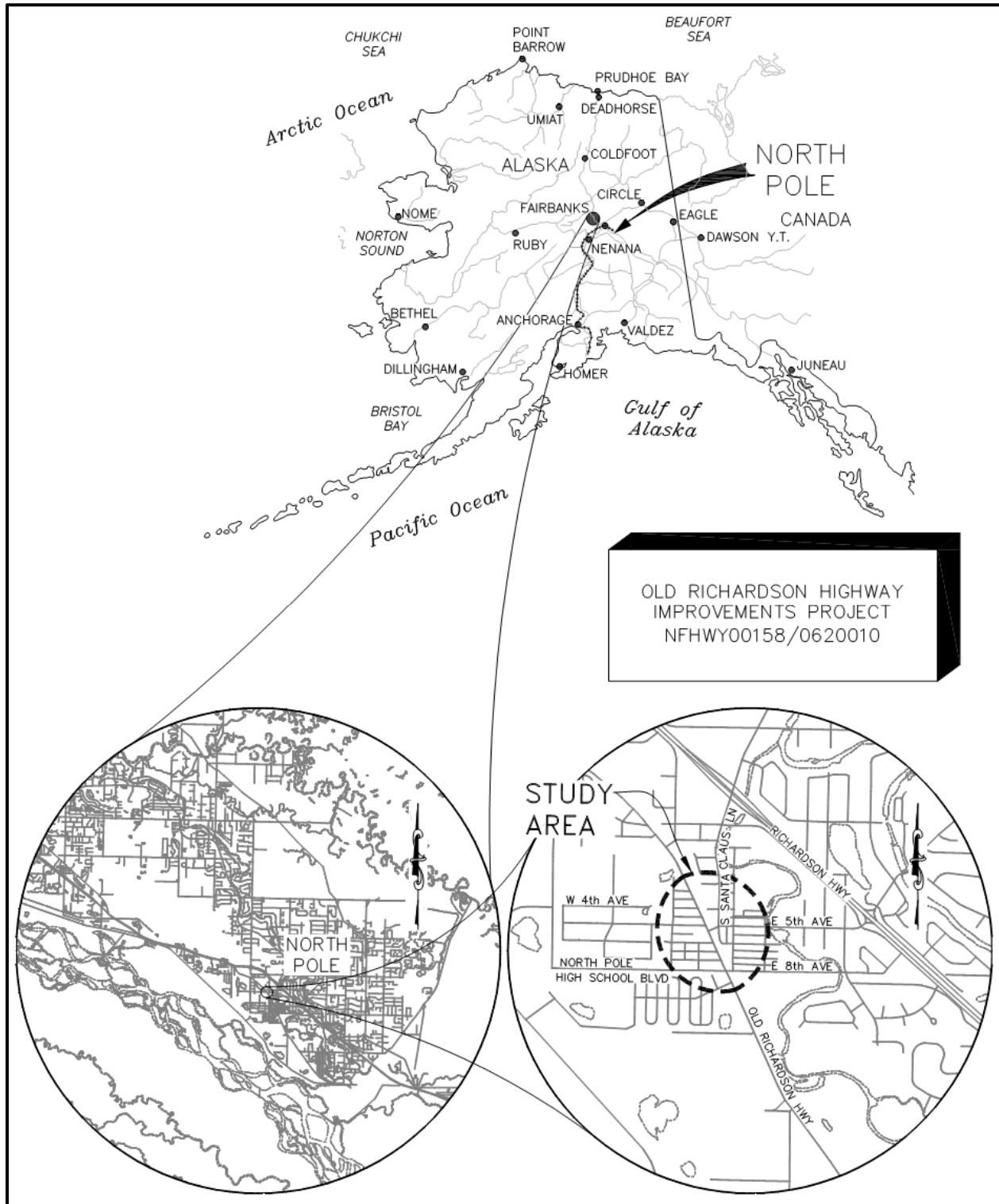


Figure 1: Project Vicinity Map



Figure 2: Railroad-Road Grade Crossing Locations

Source: Google Earth

2 Background

2.1 Past and Current Operations

The Eielson Branch of the Alaska Railroad was constructed around 1940. In the past trains carried petroleum products from the refinery in North Pole to Anchorage and Whittier using this branch. The refinery shut down in 2014 and is currently a distribution center. Petroleum products are now freighted to North Pole on this track. Empty rail cars are also transported back to Anchorage via the Eielson Branch. This line services up to 6 trains a day.

2.2 Future Operations

Various rail plans outline future uses and modifications for the Eielson Branch. These plans propose to extend the branch line from North Pole to Delta Junction, add a commuter rail from North Pole/Fairbanks to Anchorage, and/or move the branch line west outside of the City of North Pole. The line extension and service changes could result in additional freight and passenger rail travel. Relocating the branch out of the City of North Pole would eliminate these crossings, but no funding is available for this project.

2.3 Current Old Richardson Highway/ARRC Shared Right of Way

At the 5th Avenue-Old Richardson Highway and 8th Avenue-Old Richardson Highway intersections, most of the project area is within ARRC permits. At 5th Avenue, permit E5 extends from approximately the edge of pavement on the west side of Old Richardson Highway to 50 feet east of the centerline of the road. This permit also includes a 100-foot width across 5th Avenue at the intersection to the eastern edge of the ARRC right-of-way (ROW). At 8th Avenue, permits E5 and E8 extend from approximately the edge of pavement on the west side of Old Richardson Highway to 40 feet east of the centerline of the road. These permits also include an 83-foot width across 8th Avenue at the intersection to the eastern edge of the ARRC ROW.

3 Diagnostic Team Field Review and Recommendations

A DT meeting was held on August 29, 2018 in North Pole to discuss the affected crossings and make recommendations regarding crossing protection and evaluated design alternatives as they relate to the crossings. The DT met in the North Pole Branch Library for an initial briefing, and then traveled to each of the crossings to make observations and verify data.

Attendees were:

- Will Webb and Jessi Miranda with KE
- Jeff Organek and Steve Powers with DOT&PF
- Blake Adolfae and Rachel Maddy with the ARRC
- Dewayne Taylor with Fairbanks North Star Borough (FNSB) School District Transportation
- Bryce Ward (Site Visit Only) and Bill Butler with the City of North Pole

In addition, the bus lane alternative (See Section 9.4) was further discussed in October 2019 by the following team members:

- Will Webb and Jessi Miranda with KE
- John Netardus and Pamela Golden with DOT&PF
- Rachel Maddy with the ARRC
- Bill Butler with the City of North Pole

The following sections explain requirements and guidelines to be met at a railroad-highway or railroad-pathway crossing. The findings and recommendations resulting of the DT meeting and additional discussion are also presented. The meeting summary and record of additional discussion are found in Attachment A.

4 References

In performing an evaluation of a railroad-highway crossing safety and traffic operations, multiple references and resources are available as listed below:

- *Alaska Policy on Railroad/Highway Crossings* (the Policy), ADOT&PF and ARRC, September 1988
- *Railroad-Highway Grade Crossing Handbook* (the Handbook), U.S. Department of Transportation Federal Highway Administration (FHWA), August 2007
- *Alaska Traffic Manual* (ATM), DOT&PF, 2016
- *Manual on Uniform Traffic Control Devices* (MUTCD), FHWA, 2009
- Federal Railroad Administration Office of Safety Analysis (FRA) website, <https://safetydata.fra.dot.gov/OfficeofSafety>
- ADOT&PF Railroad Crossing Certification Checklist
- *A Policy on the Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2011

5 Accident Prediction Value (APV)

The computed "US DOT Accident Prediction Value" (APV) of a crossing is the product of a series of factors representing the various characteristics of the crossing including average annual daily traffic (AADT), train speeds, number of trains per day, existing crossing protection, number of main tracks, number of highway lanes, highway type (functional class), and crossing-related crash history. These factors are used to produce a collision prediction value. Section III-B-2 of *Railroad-Highway Grade Crossing Handbook* (hereafter referred to as the Handbook) provides the method for computing APVs. The calculated APV of a crossing is then compared to threshold values provided in the Policy and *Alaska Traffic Manual* (ATM). The threshold values correspond to levels of traffic control required at a crossing. Table 2 presents APV threshold values as presented in Appendix B of the Policy.

Table 2: Threshold APV

ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS APPENDIX B Changes in Level of Protection Revised September 1, 1988		
Existing traffic control device	Calculated Accident Prediction Value (APV)	Recommended Action for Improvement
Passive	0.08 to 0.12	*See note below.
	0.12 to 0.15	Flashing lights.
	0.15 to 0.23	Flashing lights or gates and flashing lights.
	0.23 to 12.4	Gates and flashing lights.
	12.4 to 18.5	Gates and flashing lights or grade separation.
	Greater than 18.5	Grade separation.
Flashing lights	0.12 to 0.18	*See note below.
	0.18 to 3.7	Gate and flashing lights.
	3.7 to 5.6	Gates and flashing lights or grade separation.
	Greater than 5.6	Grade separation.
Gates	1.32 to 1.98	*See note below.
	Greater than 1.98	Grade separation.

• NOTE - When the calculated hazard index falls within this range the decision may be to do nothing, improve the existing traffic control system, install a different type of traffic control system, or make some other improvement at the crossing.

Table 3 and Table 4 list factors that affect the collision prediction model, as well as the calculated APVs for each crossing for existing and design year AADT. AADT values for 2017 and 2040 were determined as part of the Old Richardson Intersection Improvement Traffic Analysis Report (KE, June 2018).

Table 3: 5th Avenue Crossing Existing & Future APV

Crossing ID 868461J (5th Avenue)		
Analysis Year	2017	2040
Traffic Control	Active (Flashing Lights)	Active (Flashing Lights)
AADT, vpd	2,905	4,100
Train Movements per Day	6	6
Number of Main Tracks	1	1
Average Number of Trains During Daylight	3	3
Highway Paved?	Yes	Yes
Max Timetable Speed, mph	15	15
Highway Type	Minor Collector	Minor Collector
Number of Highway Lanes	2	2
Initial Collision Prediction	0.15292	0.16930
Number of Crossing Related Crashes	0	0
Number of Analysis Years	5	5
Normalizing Constant (2010)	0.29180	0.29180
US DOT Calculated APV	0.02215	0.02356

Table 4: 8th Avenue Crossing Existing & Future APV

Crossing ID 868463X (8th Avenue)		
Analysis Year	2017	2040
Traffic Control	Passive (Cross Bucks & Stop/Yield Signs)	Passive (Cross Bucks & Stop/Yield Signs)
AADT, vpd	880	1,200
Train Movements per Day	6	6
Number of Main Tracks	1	1
Average Number of Trains During Daylight	3	3
Highway Paved?	Yes	Yes
Max Timetable Speed, mph	15	15
Highway Type	Minor Collector	Minor Collector
Number of Highway Lanes	2	2
Initial Collision Prediction	0.09080	0.10069
Number of Crossing Related Crashes	0	0
Number of Analysis Years	5	5
Normalizing Constant (2010)	0.46130	0.46130
US DOT Calculated APV	0.02458	0.02649

Comparing the calculated APVs with the Policy's threshold values, the existing traffic control is adequate for safety at the crossings and no changes are necessary.

The number of years used for this analysis is 5 based on the recommendation from the Handbook.

Note the normalizing factors used are for the year 2010. At this time, these are the most recent normalizing factors available. Normalizing factors allow the U.S. DOT collision prediction model to be calibrated with current collision trends.

6 Sight Triangle Distance

Sight distance at and approaching an at-grade railroad-highway crossing is an important factor for vehicles to safely navigate through the crossing. The required sight distances are based on the maximum potential train speed and the posted highway speed limit.

Two scenarios for sight distances must be verified for safe operations at a crossing. Both scenarios involve a train traveling toward the crossing at the maximum timetable speed for that location. In the Case I scenario, a vehicle traveling toward the crossing at the posted speed limit must be able to see the moving train far enough in advance of the crossing to have time to decide whether to stop or proceed through the crossing, and then be able to complete the chosen action. Case I sight triangles do not necessarily have to be met where the road is stop controlled or has active traffic control devices, but is desirable at all crossings.

In the Case II scenario, a vehicle stopped at the crossing must be able to see far enough down the tracks to have time to accelerate and clear the crossing before an approaching train reaches the crossing. At all existing at-grade crossings, Case II sight distance must be met, as a minimum.

Appendix A of the Policy lists the required sight distances for varying speeds and is replicated in Figure 3. These distances are based on relatively flat roadway grades and should be adjusted accordingly for grade. Both subject crossings have relatively flat roadway grades so no grade adjustment is necessary.

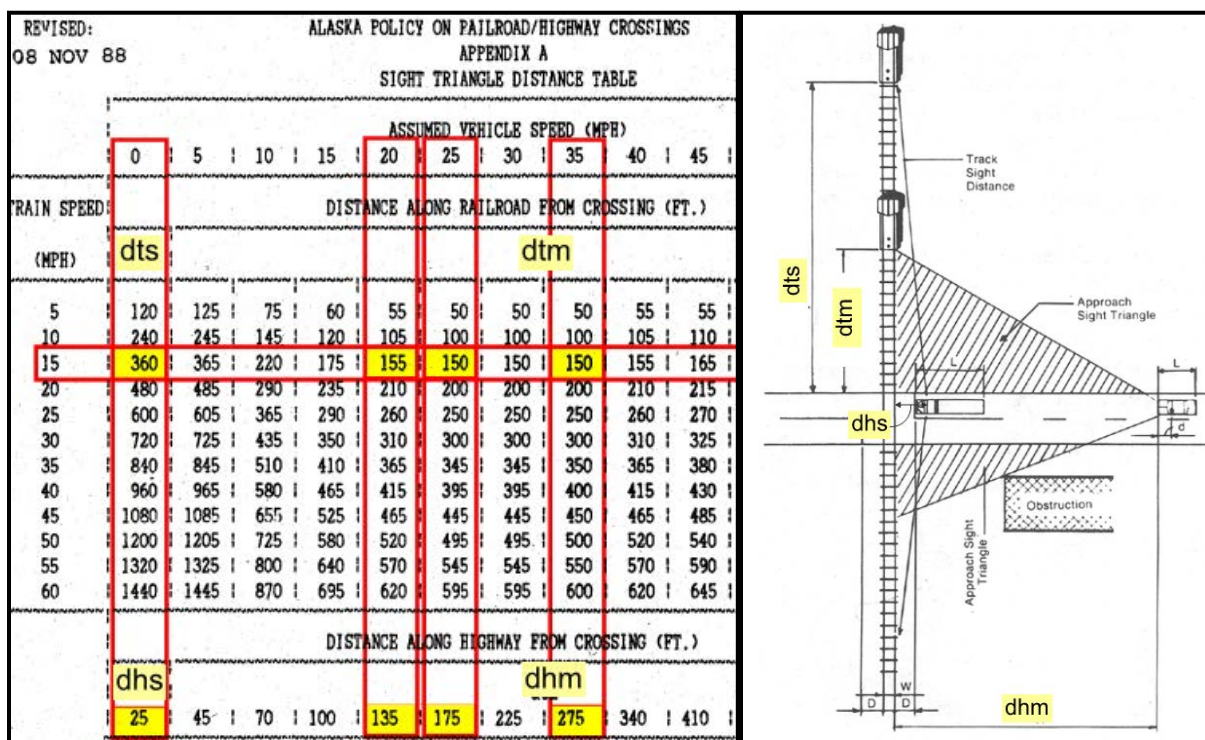


Figure 3: Sight Distance Values from the Policy

Figure 4 lays out the sight distance requirements for both cases for the 5th Avenue crossing. There is inadequate sight distance for both cases for eastbound traffic looking north along the tracks. For Case I, existing vegetation encroaches into the sight triangle. This could be remedied by removing the vegetation and underlying organic layer to prevent regrowth. For Case II, a group of utility poles, a light pole, and a signal controller box encroach into the sight triangle. These items should be relocated outside of the sight triangle.

Figure 5 illustrates the sight distance requirements for both scenarios for the 8th Avenue crossing. Case I is not met for the eastbound traffic looking north at the tracks due to vegetation encroachment. Since the eastbound traffic is stop-controlled at the crossing, Case I sight distance does not have to be met. However, Case I sight distance triangles should be met whenever possible. Removing the vegetation, include the underlaying organic layer, would resolve the issue. There is a light pole in the Case II sight triangle for the westbound traffic looking north at the tracks. This light pole is not grouped with other view encroachments and could be seen around by adjusting one's body position in the vehicle; therefore, it does not constitute an obstruction.

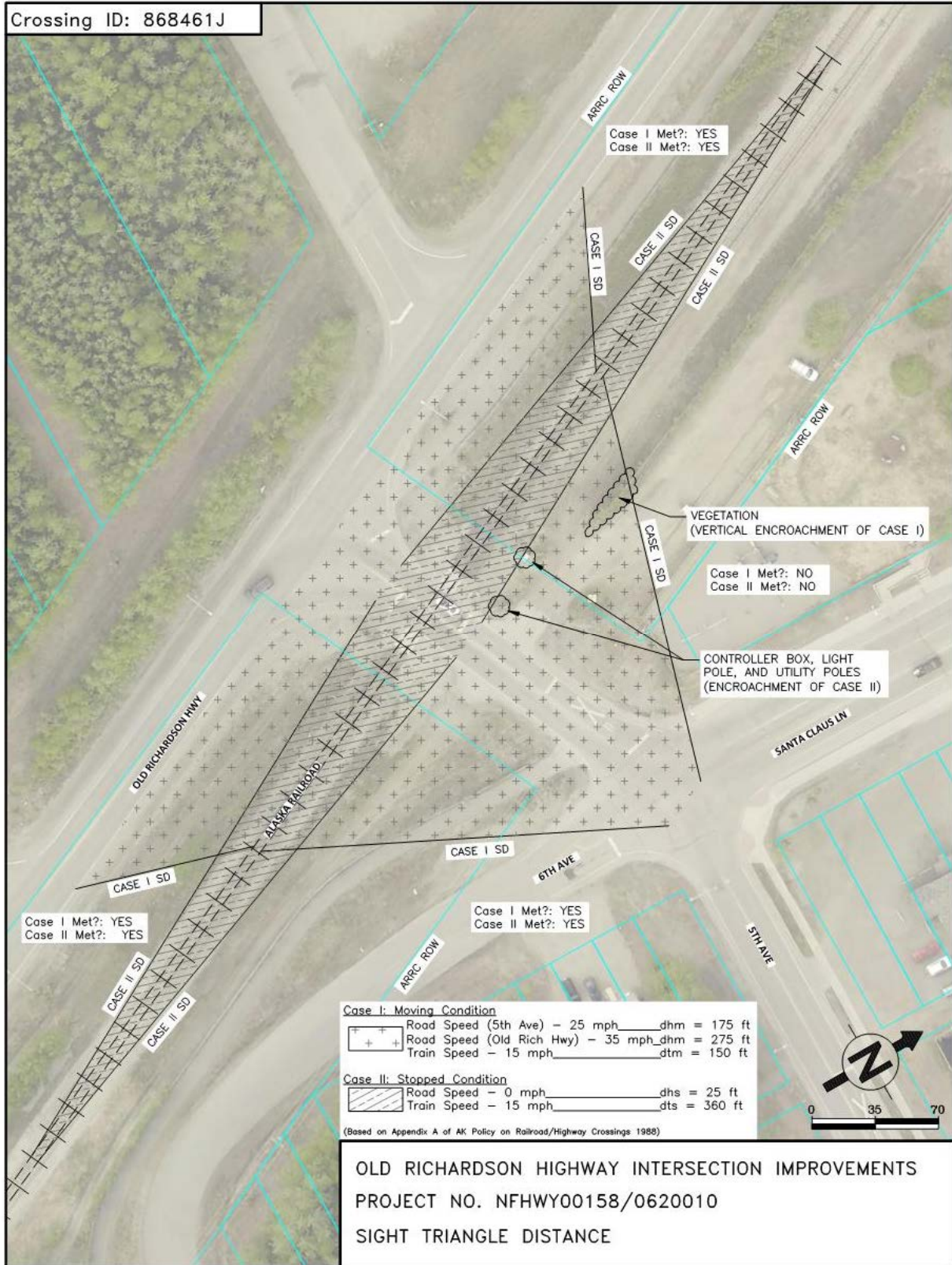


Figure 4: 5th Avenue Crossing Sight Distance Triangle

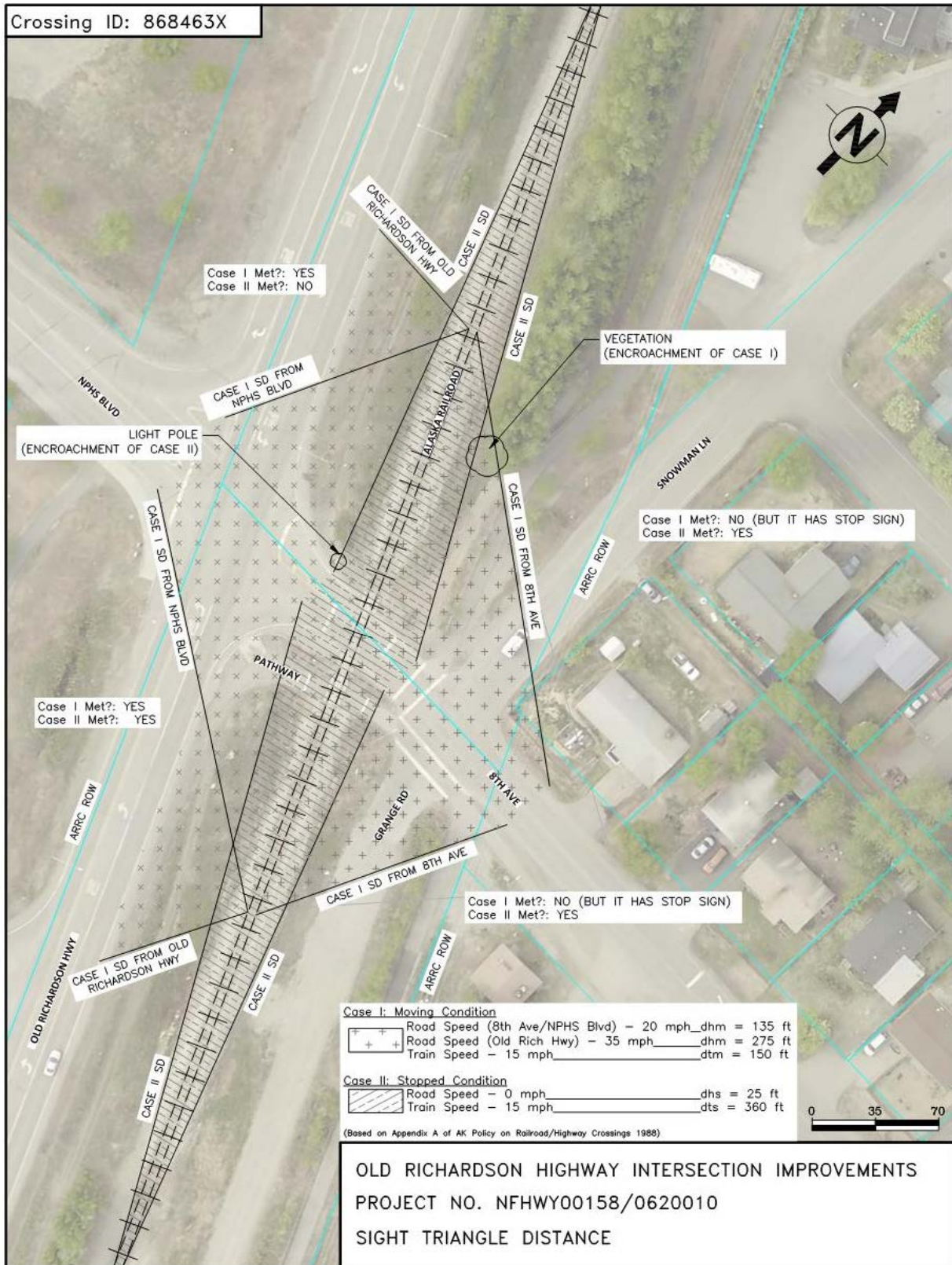


Figure 5: 8th Avenue Crossing Sight Distance Triangle

7 Traffic Control Devices

The MUTCD, as amended by the ATM, provides guidance on appropriate traffic control at railroad-highway and railroad-pathway crossings. Per Section 8B.04, the minimum traffic control at a crossing includes a crossbuck sign and a stop or yield sign. Per MUTCD, railroad-pathway crossings adjacent to railroad-highway crossing shall receive equal traffic control as the roadway. If the pathway is attached to the road, it may use the same traffic control utilized by the road. Otherwise, a separated pathway requires separate but identical traffic control as the road.

Figure 6 and Figure 7 show placement of traffic control devices per the MUTCD. Traffic control devices should meet these layouts, as appropriate. Note for roadways with posted speed limits less than 40 mph, the grade crossing pavement marking is not required per Section 8B.27 of the MUTCD.

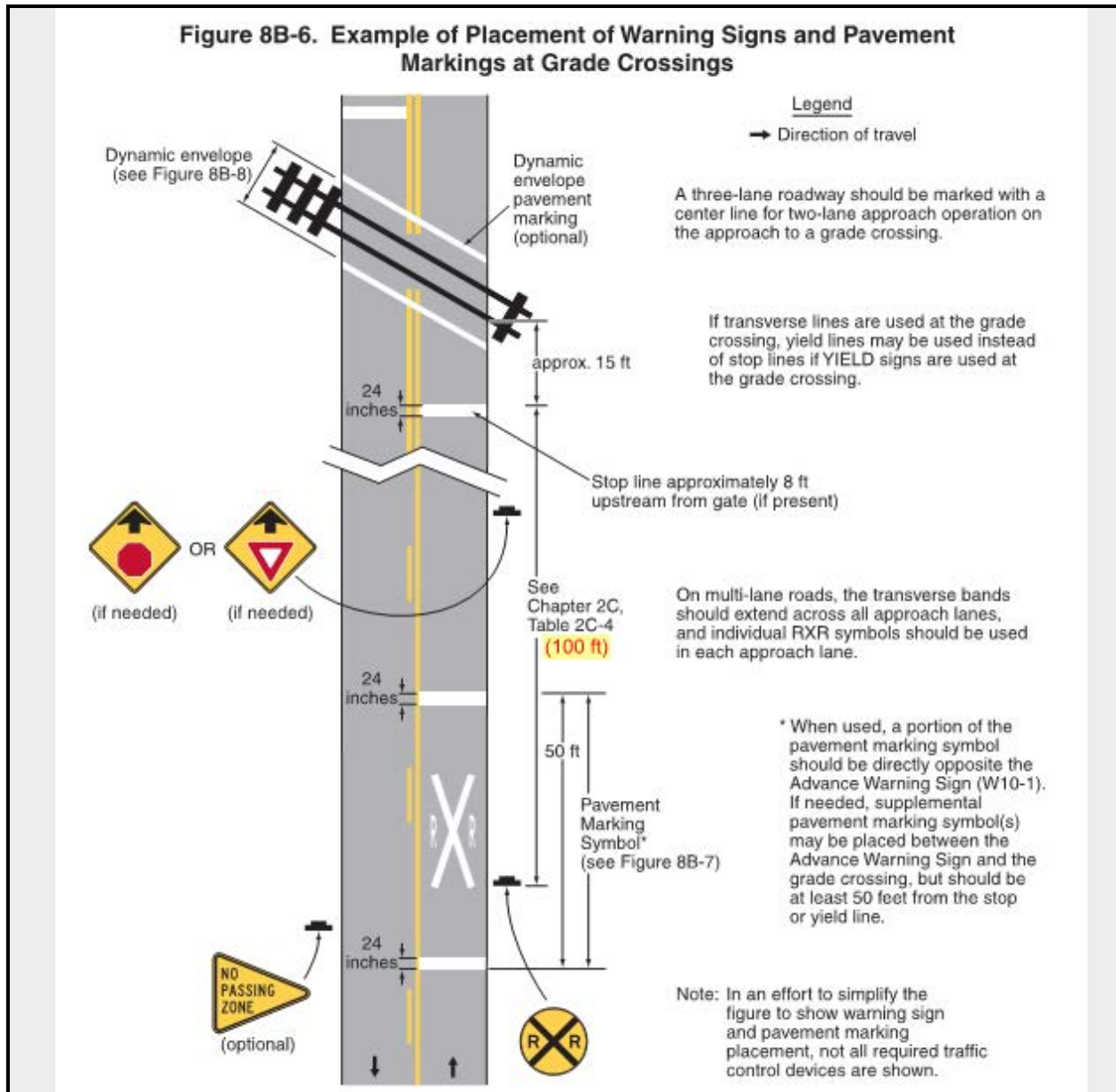


Figure 6: Railroad-Highway Crossing Signs and Pavement Markings Placement (MUTCD)

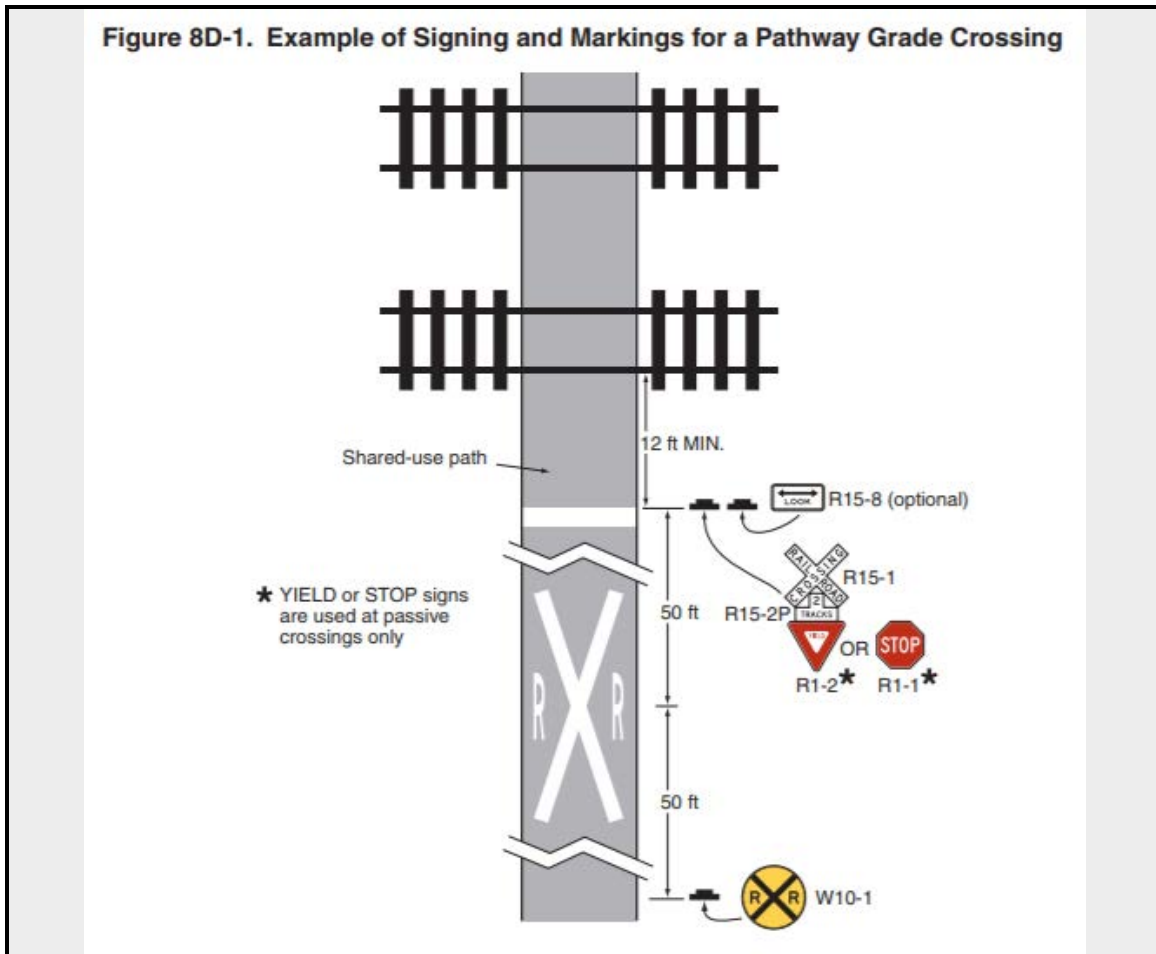


Figure 7: Railroad-Pathway Crossing Signs and Pavement Markings Placement (MUTCD)

Figure 8 represents the existing traffic control devices at the 5th Avenue crossing. The crossing contains active traffic control devices in the form of flashing lights. Per the MUTCD, the existing stop bars and signs are appropriately located. Note that the advanced warning sign for the northbound approach on the Old Richardson Highway is located short of the minimum advanced placement distance (100 feet) per Table 2C-4 of the MUTCD. However, it is positioned to capture traffic turning north from 6th Avenue, and did not pose a concern for the DT.

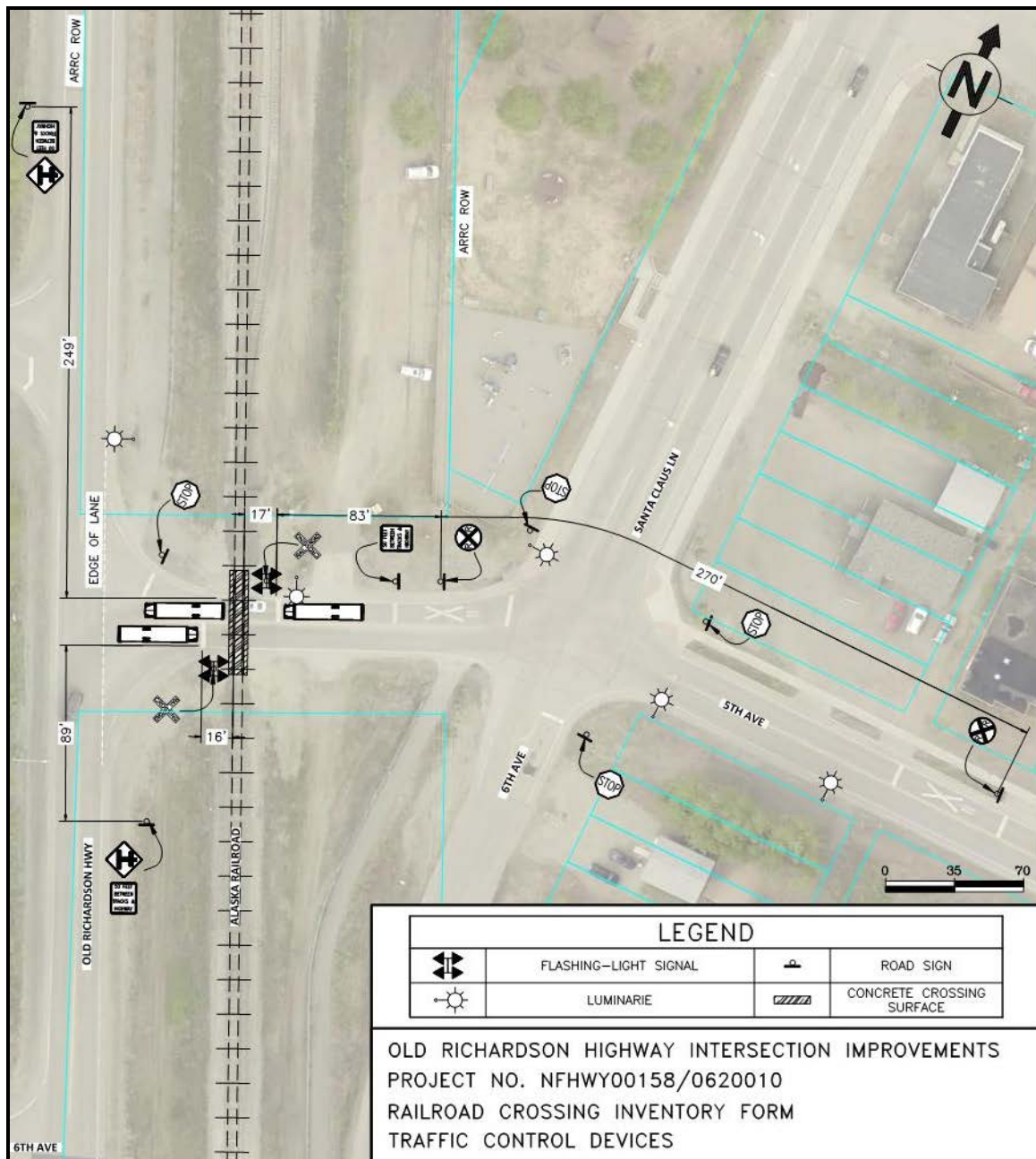


Figure 8: 5th Avenue Crossing Existing Traffic Control Devices

Figure 9 depicts the existing traffic control devices at the 8th Avenue crossing. The crossing contains passive devices in the form of railroad crossbucks and stop/yield signs. Per the MUTCD, the existing stop bars and signs are appropriately located.

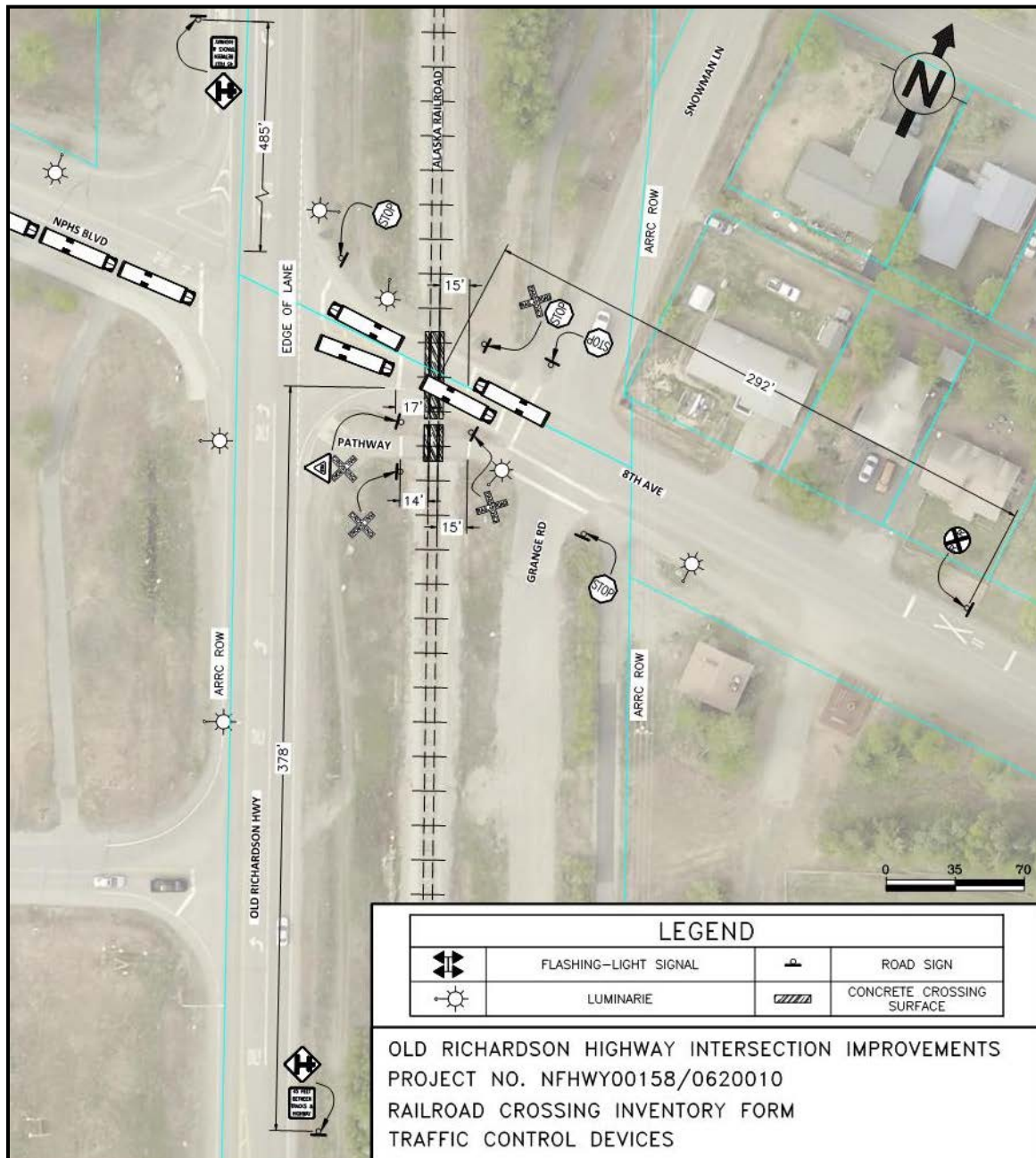


Figure 9: 8th Avenue Crossing Existing Traffic Control Devices

8 Vehicle Storage

The subject railroad-highway crossings are very close to road-road intersections. Adequate vehicle storage at the crossings is vital for safe operations. Short vehicle storage may result in collisions between trains and stopped vehicles and/or vehicles and vehicles.

The 8th Avenue crossing experiences high school bus traffic once a day. The 5th Avenue crossing also sees school bus traffic but at a smaller volume. The FNSB School District Transportation has stated that their buses are 40.5 feet long. Each bus is required to perform a safety stop at crossings. During these safety stops, and in the case of a passing train, vehicles stopped at the tracks require a minimum amount of space to avoid conflicting with through traffic on Old Richardson Highway or the nearby local streets. Because of the volume of school buses with the frequent required stops at the crossing, the school bus was chosen as the design vehicle with regard to storage at the crossings. Figure 10 depicts the required storage for safe operations at the crossings. To have adequate space for one school bus to stop at the crossing and still not hinder traffic traveling on an adjacent road parallel with the railroad, approximately 64 feet of separation between the nearest rail and the through travel lane on the roadway is needed.

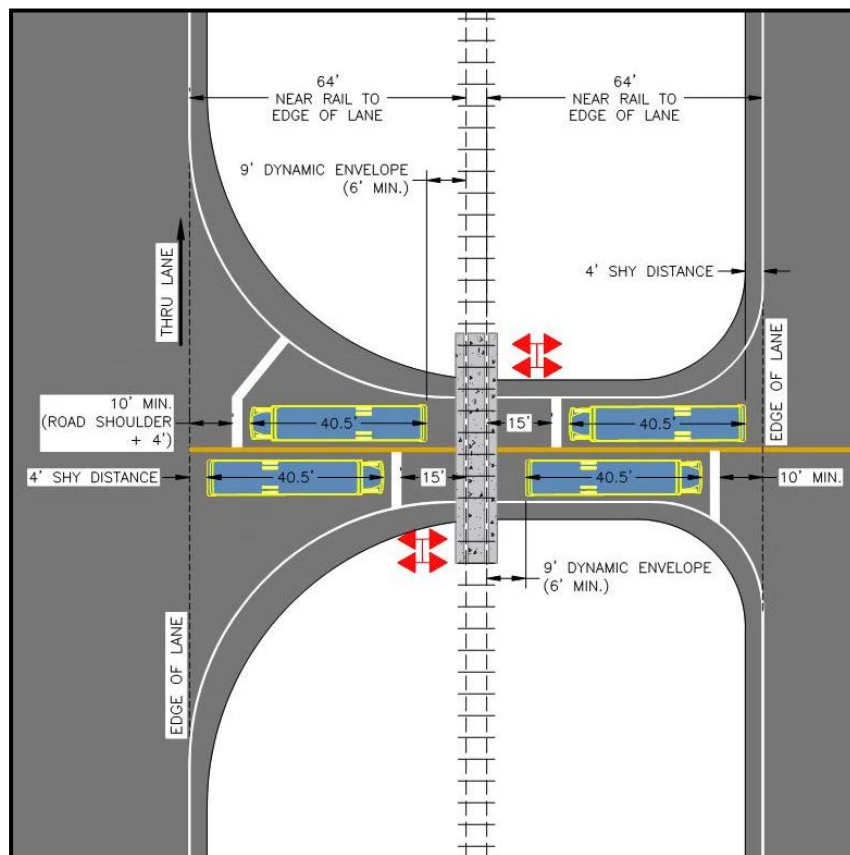


Figure 10: Minimum Vehicle Storage Requirements

Figure 11 illustrates the existing vehicle storage at the 5th Avenue crossing. This crossing has sufficient storage space for a school bus. Though, as it is currently placed, the stop bar on 5th Avenue at Old Richardson Highway prevents a westbound stopped bus from clearing the dynamic envelope of the train. However, there is enough distance to the edge of lane on Old Richardson Highway to relocate the stop bar up to 11 feet closer to the highway, thus providing more than enough space for the stopped bus to clear the dynamic envelope.

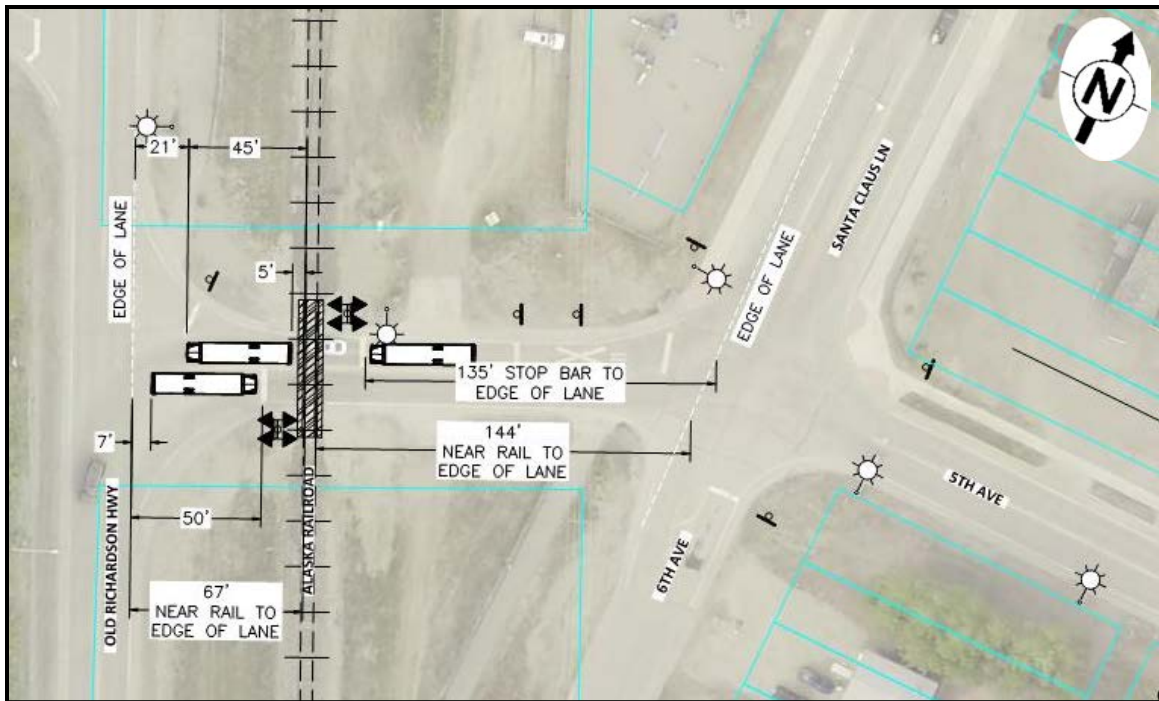


Figure 11: 5th Avenue Crossing Existing Vehicle Storage

Figure 12 depicts the existing vehicle storage at the 8th Avenue crossing. This crossing has adequate storage space for a school bus on the west side of the tracks. The 8th Avenue-Snowman Lane/Grange Road intersection on the east side of the tracks limits the space available for vehicle storage. The eastbound traffic through the crossing is not required to stop at the intersection except in the case a pedestrian is using the cross walk. In this situation, the school bus would completely block the tracks. In addition, the existing available storage for westbound vehicles on 8th Avenue before the crossing falls short from the desired distance. A stopped bus would block the cross walk and slightly encroach into the travel lane of Snowman Lane. Relocating the cross walk outside the design vehicle storage area would help alleviate this issue.

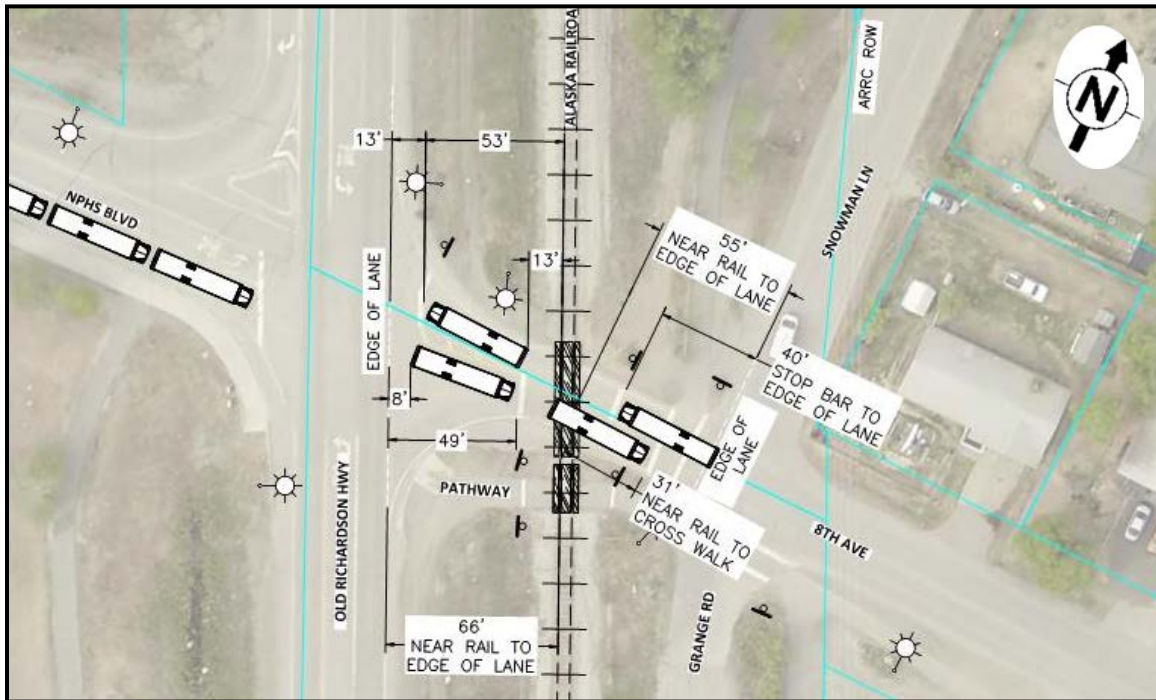


Figure 12: 8th Avenue Crossing Existing Vehicle Storage

9 Evaluated Design Alternatives

During the reconnaissance engineering phase of the design project, multiple alternatives were evaluated to address the mobility issues identified by the project. The DT reviewed these alternatives relating to safety and traffic operations with the railroad-highway crossings.

9.1 5th Avenue Crossing – Pedestrian Pathway

The design alternative for the 5th Avenue intersection involves constructing a pedestrian pathway on the north side of the crossing. This will increase the crossing width. The DT recommended to relocate the sight-encroaching light pole during the pathway construction. They also advised that the pathway crossing is required to have the same traffic control treatment as the adjacent roadway crossing. As noted earlier, one way to effectively meet this requirement is to construct an abutting sidewalk and control both the road and sidewalk by the same devices. In doing this, however, the existing flashing light signal and utility pole would require relocation, as they are currently within the footprint of an attached sidewalk. Figure 13 shows the pedestrian pathway alternative as presented at the DT meeting.

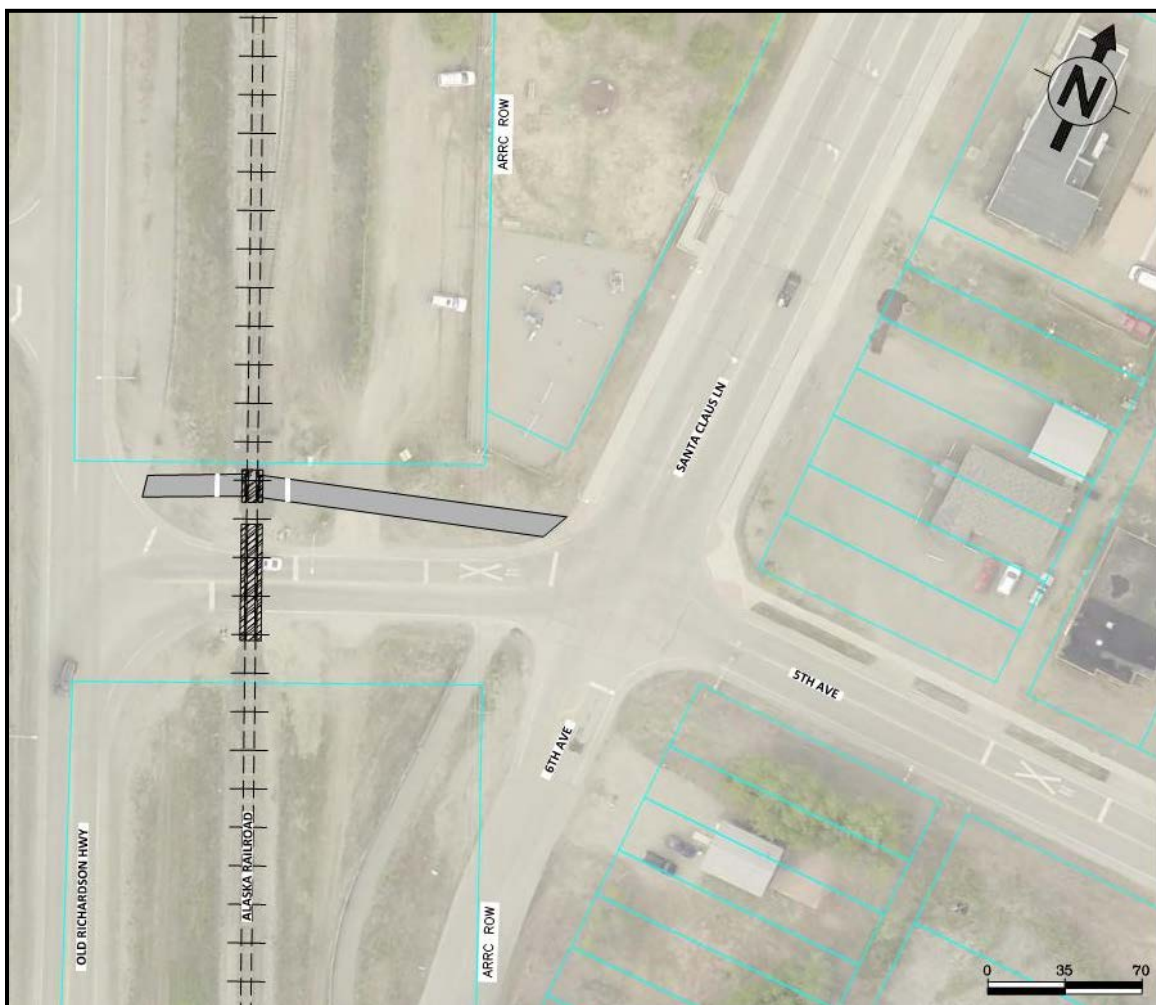


Figure 13: 5th Avenue Alternative – Pedestrian Crossing

9.2 8th Avenue Crossing – Roundabout

One design alternative for the 8th Avenue-Old Richardson Highway intersection is construction of a roundabout. Because of the proximity to the crossing, this alternative was determined to not be a viable option. The mandatory school bus safety stops, as well as stopped vehicles during the presence of a train, would result in traffic queuing into the roundabout, causing a grid-lock of all traffic at the intersection. In addition, westbound traffic queued at the roundabout would have no means to escape if it was stopped on the tracks when a train arrived. Figure 14 shows the roundabout alternative as presented during the DT meeting.

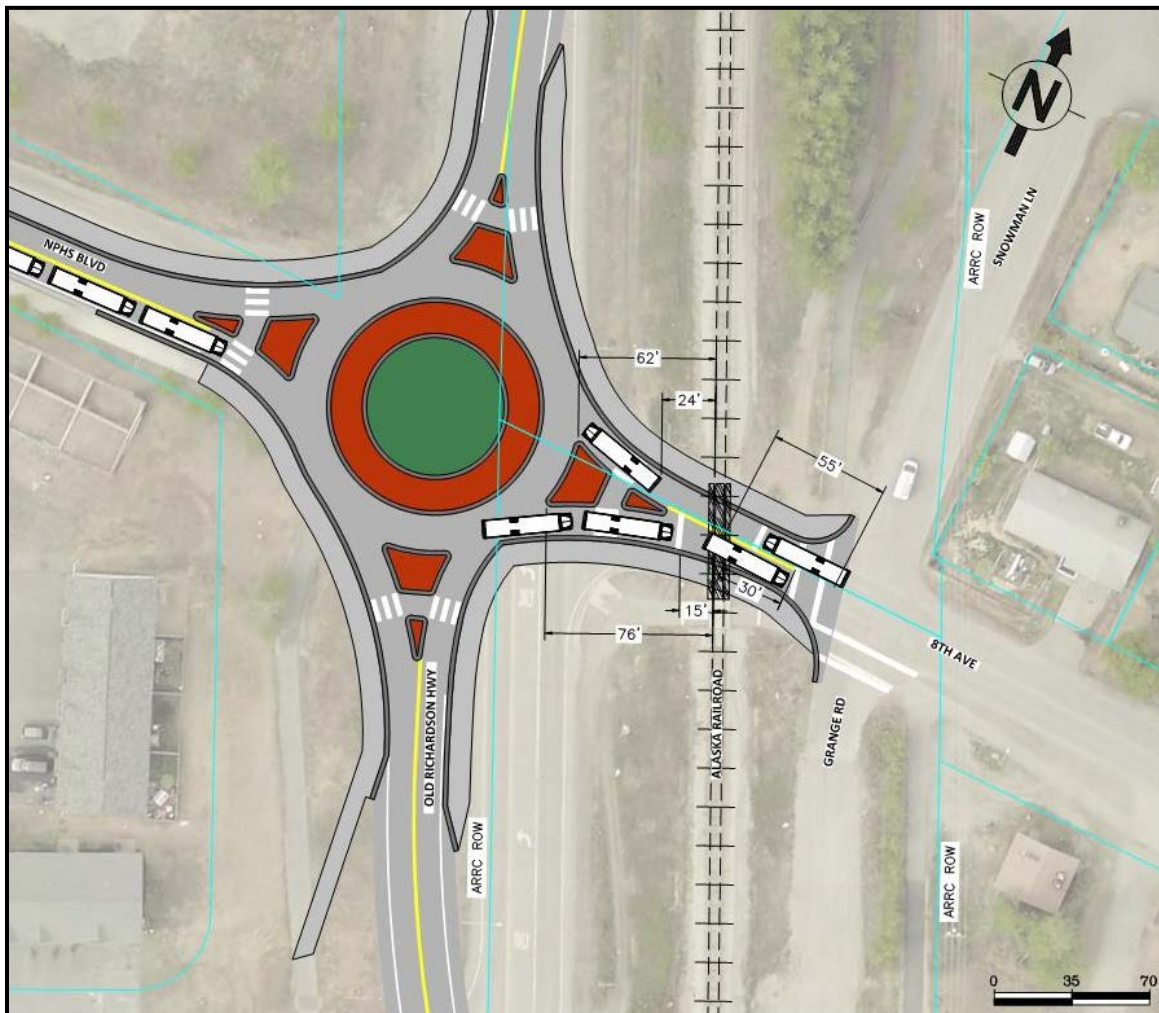


Figure 14: 8th Avenue Alternative – Roundabout

9.3 8th Avenue Crossing – Reroute Buses

A design alternative to alleviate bus queuing at the 8th Avenue-Old Richardson Highway intersection involves rerouting the current bus route between North Pole High School and North Pole Middle School. In doing this, a right-turn only lane would be constructed along Old Richardson Highway south of the crossing. This would place parallel right-turning traffic closer to the tracks, but the through traffic would remain the same distance away as existing conditions. The DT did not have concerns about this alternative. They recommend relocating the cross walk on 8th Avenue, east of the crossing, to the east side of Snowman Lane to increase the vehicle storage adjacent to the tracks. Figure 15 shows this alternative as presented during the DT meeting.

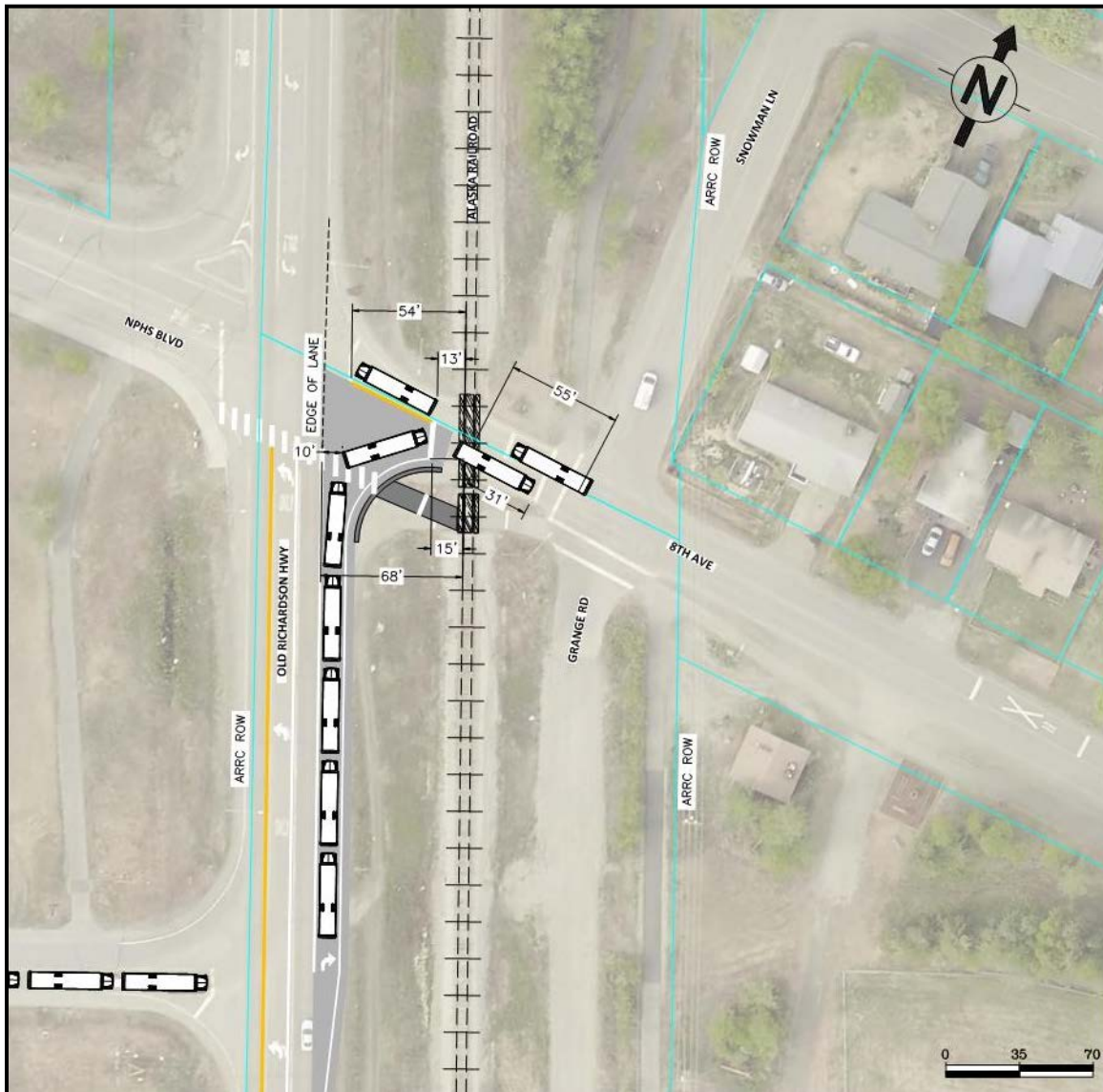


Figure 15: 8th Avenue Alternative – Reroute Buses

9.4 8th Avenue Crossing – Bus Lane

Another design alternative to improve bus queuing at the 8th Avenue-Old Richardson Highway intersection consists of constructing a bus lane from North Pole High School to North Pole Middle School. This alternative would increase the crossing width by one lane. All other components of the crossing would remain the same as the existing conditions. Multiple roadway lanes crossing a railroad track at a skewed approach with passive traffic control devices may induce conflict. Buses stopping at the crossing to perform their safety checks could block the sight distance from a vehicle in the adjacent lane to an oncoming train. Passive traffic control devices would not alert the driver of the approaching train. Skewed approaches exacerbate sight distance issues by requiring drivers to turn their head past comfortable limits for adequate line of sight. Therefore, the DT recommended performing an additional engineering analysis for installing active traffic protection (flashing lights and automatic gates) if this alternative is chosen. As with other 8th Avenue alternatives, they recommend relocating the cross walk on 8th Avenue, east of the crossing, to the east side of Snowman Lane to increase the vehicle storage adjacent to the tracks. Figure 16 shows the bus lane alternative as presented during the DT meeting.

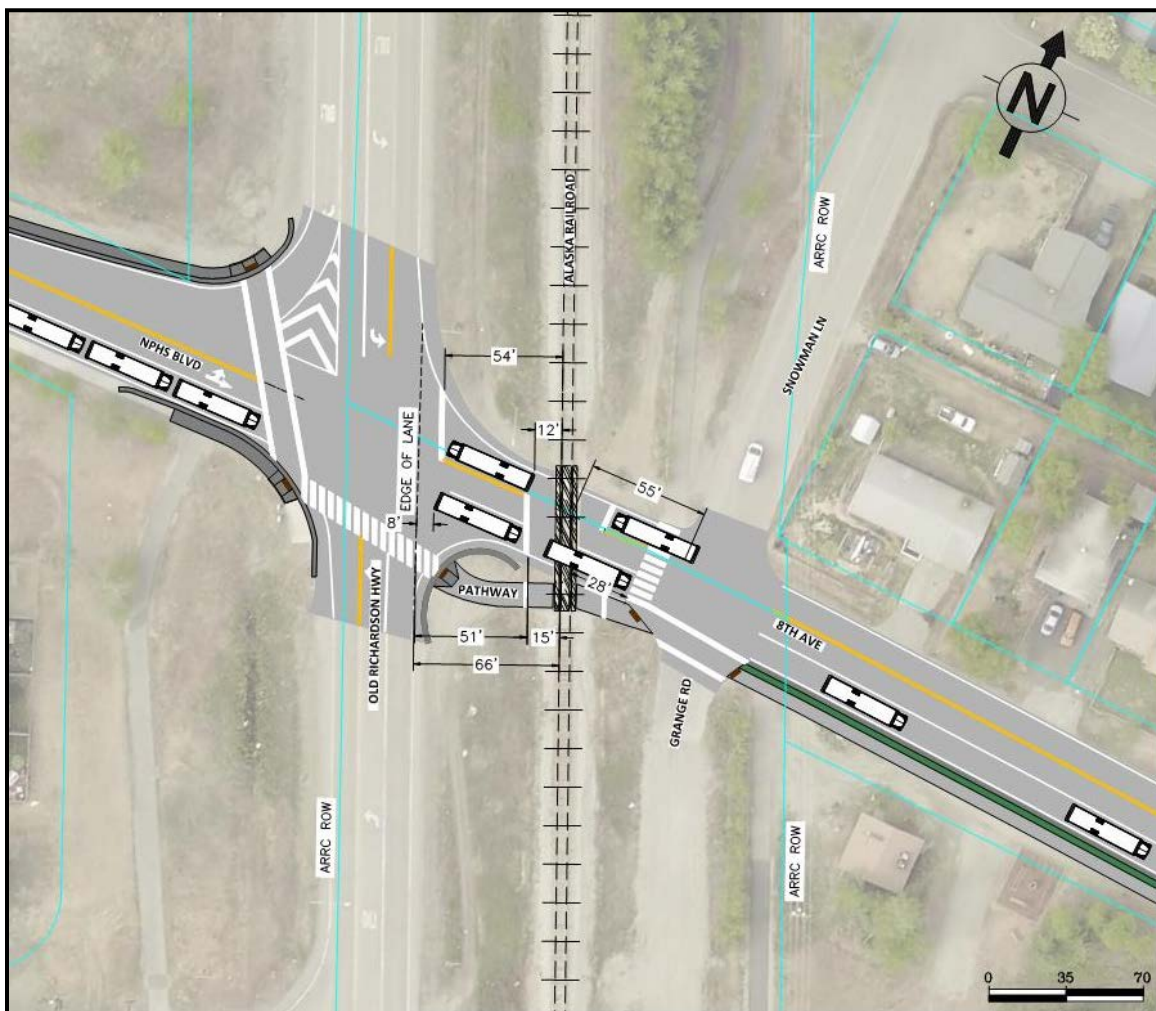


Figure 16: 8th Avenue Alternative – Bus Lane

9.5 8th Avenue Crossing – Offset Left Turn Lanes

To reduce left-angle crashes at the 8th Avenue-Old Richardson Highway intersection, reconstructing the intersection to include offset left turn lanes was presented as an alternative. With this alternative, Old Richardson Highway would be moved to the west, which would increase the vehicle storage area between the tracks and the highway. All other components of the crossing existing conditions would remain. The DT did not have concerns with this alternative. As with other 8th Avenue alternatives, they recommend relocating the cross walk on 8th Avenue, east of the crossing, to the east side of Snowman Lane to increase the vehicle storage adjacent to the tracks. Figure 17 shows the bus lane alternative as presented during the DT meeting.

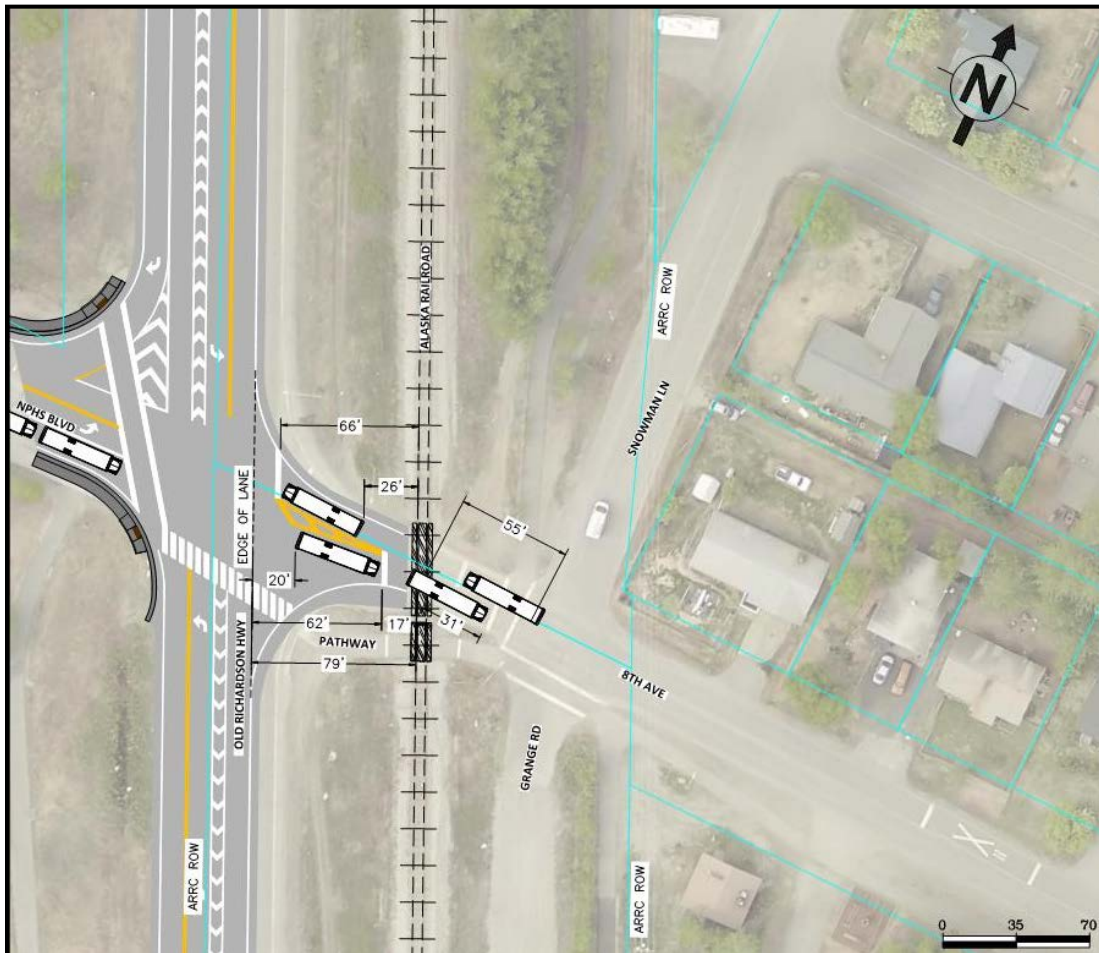


Figure 17: 8th Avenue Alternative – Offset Left Turn Lanes

9.6 Other Considerations

There are existing railroad siding tracks south of the 8th Avenue crossing and north of the 5th Avenue crossing. ARRC mentioned they could lay tracks to connect these siding tracks and use this as the mainline track. This would provide 16 more feet between Old Richardson Highway and the mainline railroad tracks; however, it would reduce the distance between the railroad tracks and the parallel local roads.

DOT&PF have confirmed a plan to relocate the existing sidewalk on the south side of NPHS Boulevard to the north side of the road. With this plan, it will make sense to also construct a pathway along the north side of 8th Avenue between Old Richardson Highway and the existing pathway along Snowman Lane. This may eliminate the need for the crosswalk that impinges on adequate vehicle storage space on the east side of the 8th Avenue crossing.

For the most functional sight distance in the project area, it is recommended to clear all vegetation between the railroad tracks and Old Richardson Highway between 5th and 8th Avenues.

10 Summary

10.1 5th Avenue Crossing

The following is a summary of the DT recommendations for the 5th Avenue railroad-highway crossing:

- Maintain the existing level of highway traffic control at the crossing.
- Relocate train signal controller box in the northeast quadrant of the crossing to be outside of the sight triangle.
- Relocate the light pole in the northeast quadrant of the crossing to be outside of the sight triangle.
- Relocate the stop bar on 5th Avenue at Old Richardson Highway to clear stopped vehicles from the dynamic envelope area of the train.
- Consider constructing an attached sidewalk instead of a separated pathway between Old Richardson Highway and Santa Claus Lane in order avoid installing additional traffic control devices for pedestrians. This would require relocating the existing flashing light signal and a utility pole.

10.2 8th Avenue Crossing

The following is a summary of the DT recommendations for the 8th Avenue railroad-highway crossing:

- Maintain the existing level of highway traffic control at the crossing.
- Construct a pathway on the northside of the crossing between Old Richardson Highway and Snowman Lane. Consider an attached sidewalk in order to avoid installing addition traffic control devices for pedestrians.
- Remove vegetation between the tracks and the pedestrian fence to provide Case II sight distance
- Relocate the existing crosswalk at the 8th Avenue-Snowman Lane/Grange Road intersection to the east side of the Snowman Lane intersection, be outside the vehicle storage area.
- If the crossing is widened for a bus only lane between North Pole High School and North Pole Middle School, evaluate the need to install active traffic control in the form of flashing lights and gates (to be determined during project development).

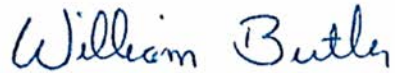
10.3 Other Recommendations

The following is a summary of other recommendations posed by the DT:

- Clear vegetation, including the organic layer, between the railroad tracks and Old Richardson Highway from 5th Avenue to 8th Avenue.

11 Diagnostic Team Report Approval

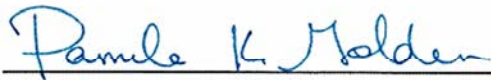
Signed:



Bill Butler, City of North Pole

10/31/2019

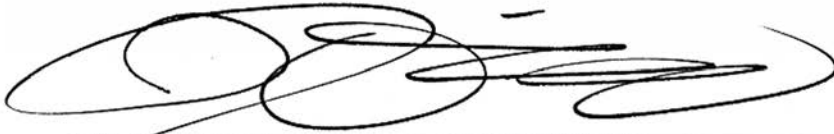
Date



Pamela Golden, Alaska Department of Transportation & Public Facilities

10/31/2019

Date



Brian Lindamood, Alaska Railroad Corporation

11/1/19

Date

Attachment A
DT Meeting Summary
Record of Additional Discussion

Project:	Old Richardson Intersection Improvements Project No. NFHWY00158 / 0620010
Meeting:	Diagnostic Team Study Meeting
Date/Time:	August 29, 2018; 1:00 p.m.
Location:	Meeting: North Pole Library Site Visit: Grade Crossings at 5 th Avenue and 8 th Avenue (North Pole)
Attendees:	Will Webb and Jessi Miranda with Kinney Engineering Jeff Organek and Steve Powers with Alaska Department of Transportation and Public Facilities Blake Adolfae and Rachel Maddy with the Alaska Railroad Corporation Dewayne Taylor with School District Transportation Bryce Ward (Site Visit Only) and Bill Butler with the City of North Pole

The Diagnostic Team (DT), as listed under Attendees, met at North Pole Branch Library to perform a DT study of the at-grade railroad-road crossings at 5th and 8th Avenues in North Pole, Alaska. An overview of the purpose and need of the design project was presented, followed by a review and discussion on the existing conditions and proposed design alternatives. Following the discussion, the team performed a site visit to the subject crossings to verify existing conditions and operations. Below is a summary of the comments from the meeting.

General Comments:

- Calculated Accident Prediction Values (APV) at the crossings indicate the existing traffic control is adequate.
- North Pole school buses are 40.5 feet long.
- Past practice was for approximately half of the buses leaving North Pole High School to use the 8th Avenue railroad crossing and half use the 5th Avenue crossing. During the site visit, the vast majority of buses were observed to use the 8th Avenue crossing.
- Each school bus performs a required stop and safety check at the crossings. During these stops, the back end adequately clears the Old Richardson Highway travel lane.
- There may be an option to connect the siding track south of the 8th Avenue crossing with the siding track north of the 5th Avenue crossing and convert the siding track to the main track. This would allow an additional 16 feet of separation between the crossing and the parallel road (Old Richardson Highway) but would reduce the distance between the tracks and the adjacent intersections to the east (Santa Claus Lane at 5th Avenue and Snowman Lane at 8th Avenue).

5th Avenue Crossing Comments:

Condition	Deficiency	On-Site Recommendation and/or Comment
Existing	Sight distance for Case I (Stopped Vehicle) not met on the north east quadrant. A controller box and multiple utility poles and a light pole hinder the stopped vehicle from seeing an approaching train.	Relocate signal controller box away from the tracks (ideally 35 feet). Relocate utility poles and light pole as feasible.
Existing	The advanced warning sign on Old Richardson Highway, south 5th Avenue, does not meet the required advanced placement distance.	This sign may have been located based on a near-by intersecting road. The intent is to capture traffic that may be turning from that road onto Old Richardson Highway and then proceeding to travel across the railroad crossing on 5th Avenue.
Alternative: Pedestrian Pathway		This intersection experiences a lot of pedestrian traffic due to the nearby highly-used park and the elementary school. Adding the pedestrian pathway connection across the railroad tracks is needed.
Alternative: Pedestrian Pathway		Pedestrian facilities at a railroad crossing are required to have the same traffic control as the adjacent road. Since flashing lights are present at the railroad-road grade crossing, flashing lights would also be required at the pathway. The most expedient way to accomplish this is to construct an abutting sidewalk, in which the road and pedestrian facility would share the traffic control.

8th Avenue Crossing Comments:

Condition	Deficiency	On-Site Recommendation and/or Comment
Existing	Case II (moving vehicle) sight distance is not met for the north east quadrant. Thick vegetation inhibits a vehicle from seeing a train at the required case II distance down the tracks.	This crossing is stop controlled, so Case II sight distance requirements do not apply. However, it is best practice to achieve both Case I and Case II sight distances if possible. Extend the existing cleared area 20 feet north, at a minimum. ARRC recommends removing vegetation within the railroad right-of-way between the crossings at 5th and 8th Avenues.
Existing	Cross walk at Snowman Lane and 8th Avenue may cause traffic to queue across the tracks. A stopped school bus design vehicle would extend over the tracks.	Relocate crosswalk to the east side of Snowman Lane and/or add a pathway connection to the north side of the crossing. ARRC is not opposed to having pathways on both sides of the road crossing.
Alternative: Roundabout		In most cases, roundabouts near railroad-road crossings are not permitted.

Project: Old Richardson Intersection Improvements
Project No. NFHWY00158 / 0620010

Participants: Will Webb and Jessi Miranda with Kinney Engineering
John Netardus and Pamela Golden with Alaska Department of Transportation and Public Facilities
Rachel Maddy with the Alaska Railroad Corporation
Bill Butler with the City of North Pole

Date/Time: October 2019

In addition to the Diagnostic Team (DT) meeting held in August 2018 at the North Pole Library, the bus lane alternative was further discussed by the listed attendees. Below is a summary of the comments from the discussion.

8th Avenue Crossing Comments:

<i>Condition</i>	<i>Deficiency</i>	<i>Recommendation and/or Comment</i>
Bus Lane	Passive traffic control for a multiple road lane crossing.	Multiple road lanes crossing a railroad track, at a skewed approach, with passive traffic control (yield signs) may induce conflict. Recommend performing an additional engineering analysis of active crossing protection if alternative is pursued.