Washington State Department of Transportation

Hickox Road Railway Crossing Closure Traffic Impact Analysis

Mount Vernon, Washington

Prepared for the

Washington State
Department of Transportation

By

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In Association with

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WSDOT On-Call Rail Services

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Overview

The Hickox Road Railway Crossing Closure Traffic Impact Analysis provides an evaluation of the potential traffic impacts associated with the proposed closure of the existing BNSF Railway (BNSF)/Hickox Road railroad crossing in the City of Mount Vernon, Washington.

The closure of the BNSF/Hickox Road railway crossing is proposed by the Washington State Department of Transportation (WSDOT) Rail Office as part of a project to extend BNSF's Mount Vernon rail siding 3,700 feet south to accommodate rail freight and passenger service. This project is part of the Department's program to develop high-quality inter-city passenger rail service between Portland, Oregon and Vancouver, British Columbia, Canada.

The study area was defined such that the overall impact of the closure could be properly assessed. Because of the proximity to I-5, the study area was extended to assess the impact of closure at the alternative freeway interchanges. The study area is thus defined by Blackburn Road on the north, Fir Island Road on the south, Dike Road on the west, and I-5 on the east. The study area included 16 key intersections including three freeway interchanges which were analyzed as part of this study.

What is the purpose of this report?

The WSDOT Rail Office initiated this study to investigate the probable short- and long-term traffic impacts that may be caused by the closure of the BNSF/Hickox Road railway crossing.

What alternatives are available?

Two alternative scenarios were evaluated as part of the study. The two alternatives include:

- No Action—BNSF/Hickox Road railway crossing remains open; and
- With Closure—Hickox Road closed at the railway crossing.

The No Action alternative is characterized by continuation of existing trends. The With Closure alternative is characterized by a complete closure of the BNSF/Hickox Road railway crossing, with all Hickox Road traffic diverted to other roadways in the study area.

What did the study find?

Traffic Operations

Hickox Road is a low volume road serving an agricultural area of Skagit County. In 2006, the road carried a volume of 340 vehicles per day with a PM peak hour volume of 32 vehicles per hour at the railway crossing. Under the With Closure alternative, traffic will be diverted to other routes, increasing turning movement counts at various intersections in the study area by 24 vehicles per hour.

In 2026, the daily volumes within the study area will approximately double. Most of this increase occurs at the freeway interchanges. PM peak hour turning movement volumes will increase by nine vehicles per hour at the respective intersections if the BNSF/Hickox Road railway crossing is closed.

All 16 study area intersections operate at an acceptable level of service (LOS) based on City of Mount Vernon, Skagit County and WSDOT LOS standards in 2006 for both the No Action and With Closure alternatives. In 2026, the LOS at four intersections falls below the LOS standard for both the No Action and With Closure alternatives. With reconstruction and signalization of these intersections, an acceptable and relatively high LOS can be achieved.

Non-Motorized Transportation

Non-motorized transportation usage was not in evidence within the study area. Based on data collected during the PM peak hours, the volume of non-motorized traffic is negligible. As the surrounding area is predominantly agricultural, limited demand for non-motorized facilities is anticipated. However, it should be noted the studies were conducted during the winter months when non-motorized usage would be low. There may be a recreational demand during the summer that was not observed during this study. The closure of the BNSF/Hickox Road railway crossing is not anticipated to have a significant impact on pedestrian or bicycle usage in the area.

Emergency Response

Aid vehicles and police cruisers are dispatched from their present location as opposed to the station; therefore emergency services are not significantly impacted. Aid vehicles and police cruisers circulate through the area on a regular basis.

Conversations with the Skagit County Fire Marshal and Fire District Three Fire Chief indicated they are opposed to the closure. Their concern is the closure will noticeably increase fire response to the area west of the railway crossing on Hickox Road. The fire station with primary responsibility for the study area is located on the east side of I-5.

Transit

There are no anticipated impacts to transit services with the closure of the BNSF/Hickox Road railway crossing. Currently there is no transit service on Hickox Road and none is planned for the future.

The Conway School District however, indicated they would be impacted as they currently have a bus route along Hickox Road.

Truck Access

In the PM peak hour approximately nine trucks use Hickox Road. Under the With Closure alternative, the travel distance and time could be increased up to three miles and 10 minutes for truck trips generated west of the railway crossing.

What are the recommendations?

It is recommended that the BNSF/Hickox Road railway crossing be closed as part of WSDOT's project to extend the rail siding and improve Amtrak service in Western Washington.

Secondly, it is recommended that the WSDOT –Rail Office work with Skagit County Fire District Three to address the need to mitigate the anticipated impact on fire response time.

It is also recommended the Conway School District develop new routing to serve students within the study area to mitigate the anticipated impact on school bus service.

Chapter One: Introduction

What is the background of this project?

The Pacific Northwest Rail Corridor stretches 466 miles from Vancouver, British Columbia (BC), Canada, to Eugene, Oregon, via Seattle and Portland. In the early 1990s, the U.S. Department of Transportation Federal Railroad Administration designated this segment as a "high-speed" rail corridor. This designation helps the region compete for federal funds to plan and implement improved passenger and freight rail service along the corridor. The Pacific Northwest Rail Corridor is unique because it is the only high-speed rail corridor in the United States with international and interstate ties. The corridor includes approximately 134 miles in Oregon, 297 miles in Washington, and 35 miles in British Columbia.

In the late 1980s, when the Washington State Legislature funded a program to improve rail depots across the state, improving passenger rail service in this corridor became a priority. By the early 1990s, Washington State Department of Transportation (WSDOT) began developing "high-quality inter-city passenger rail service through incremental upgrading of the existing (Amtrak) service." Washington State, in partnership with the State of Oregon, Amtrak, railroads, local communities, and other stakeholders, has since pursued a logical progression of investment in infrastructure aimed at implementing fast, frequent Amtrak service. This upgraded service, called the Amtrak *Cascades*, is guided by market demand and will eventually offer true high-speed service to travelers.

The goal of these proposed rail improvements is to increase passenger train frequency to 8 trains per day by full program build out, connecting Seattle and Vancouver, BC, with a three-hour travel time . Additionally, hourly daylight service will connect Seattle to Portland in a two and a half-hour travel time.,

What is the purpose of this report?

The closure of the BNSF/Hickox Road railway crossing was proposed to support an increased passenger train frequency of 8 trains per day by full program build out. The WSDOT Rail Office initiated this study to

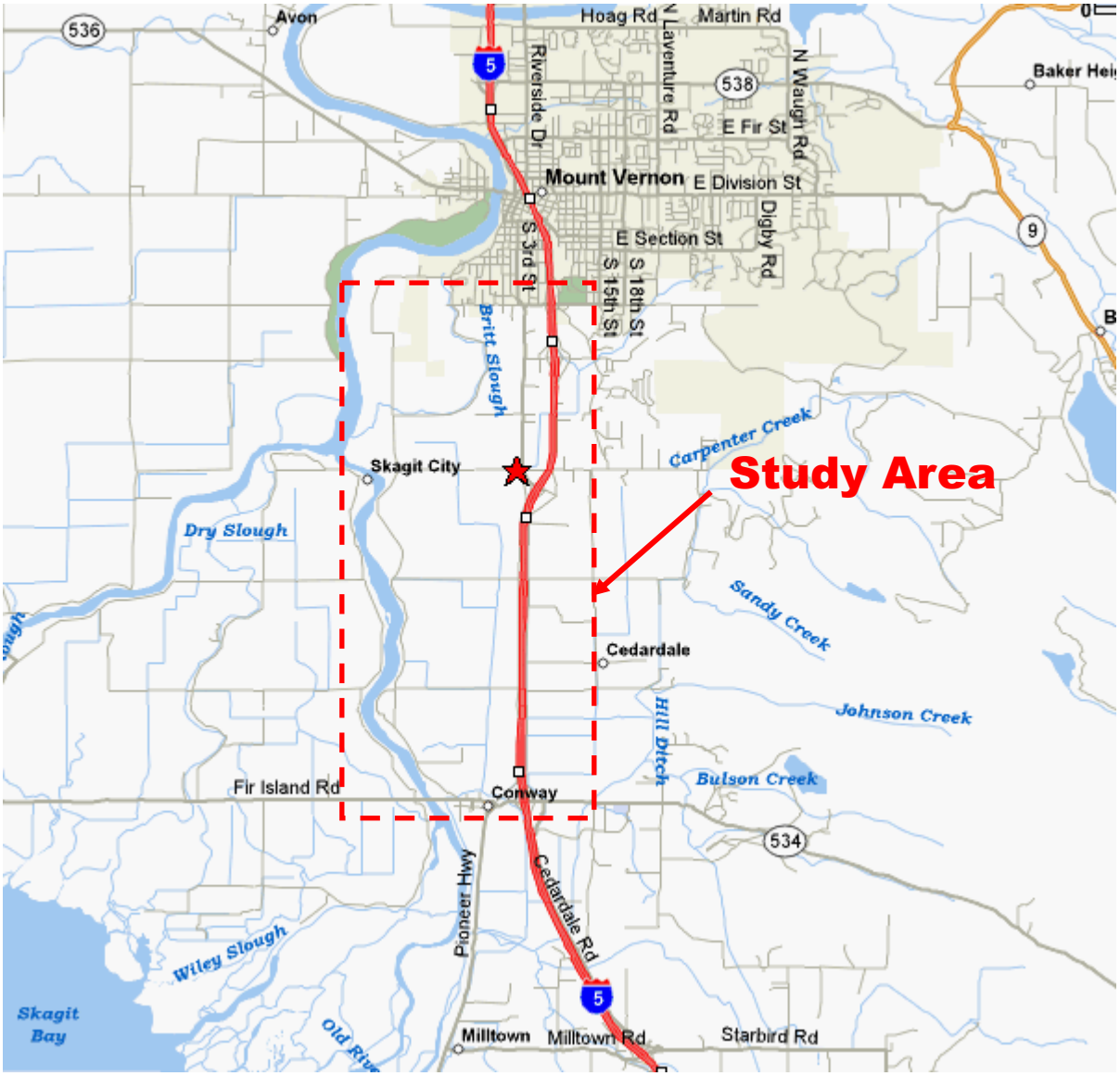
investigate the probable short-term and long-term traffic impacts created by the closure of the BNSF/Hickox Road railway crossing as part of the Mount Vernon siding extension project.

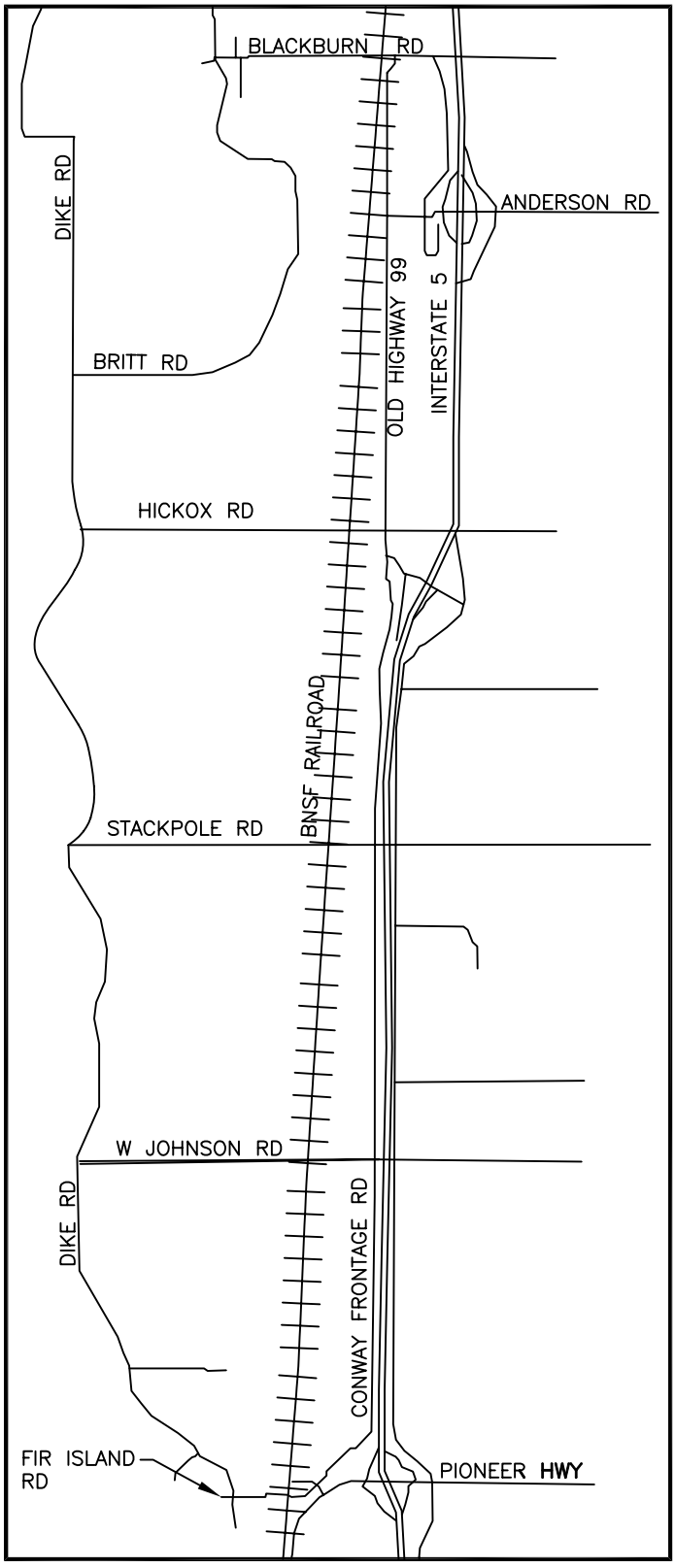
What is the study area?

The study area includes the transportation network potentially impacted by the closure of Hickox Road. The study area is located adjacent to I-5 in Skagit County, in the northwestern part of Western Washington, between Seattle, Washington and Vancouver, B.C. Canada. The study area lies within the southwest part of Skagit County in a broad delta and flood plain, both of which extend inland through the rich and fertile Skagit Valley. The majority of the study area resides in the unincorporated Town of Conway and the southwest tip of the City of Mount Vernon. The land use setting of the study area is best described as agricultural, natural resource land. To facilitate transport of goods in agricultural areas freeway and truck access is important for the viability of businesses.

A vicinity map is presented in Figure 1.1. A study area map is presented in Figure 1.2. The study area is bounded by Blackburn Road on the north, I-5 on the east, Fir Island Road on the south, and Dike Road on the west.

Figure 1.1
Vicinity Map





NOT TO SCALE

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STUDY AREA

FIGURE 1.2

HICKOX ROAD RAILWAY CROSSING CLOSURE

What are the alternative actions?

Two alternative conditions were analyzed:

1. No Action—BNSF/Hickox Road railway crossing remains open; and
2. With Closure—closing of BNSF/Hickox Road railway crossing.

The No Action alternative is characterized by an unaffected roadway capacity on Hickox Road. The With Closure alternative is characterized by a complete closure of the BNSF/Hickox Road railway crossing located approximately 550 feet west of Old Highway 99, with all BNSF/Hickox Road railway crossing traffic diverted to other roadways in the study area.

What is the scope of this report?

This report presents an analysis of traffic conditions during an average weekday PM peak. An analysis of traffic conditions during major events is not currently included in the analysis.

As a premise of this study, only future funded transportation improvement projects are included. However, according to the impacted jurisdiction, there are no highway transportation improvement projects in the study area; therefore, no highway projects are included in the traffic analysis.

For the purpose of this report 2006 is defined as the horizon year. To address federal requirements, an analysis of traffic conditions 20 years in the future with the proposed action is also presented and defined as the future year. The future year for this study is 2026.

Chapter Two: Existing Conditions

What are the existing conditions?

The existing conditions analysis provides a statement of the condition of the transportation network within the study area at the time of the writing of this report. The statement details the existing roadways, existing traffic volumes, and level of service (LOS) at the impacted intersections analyzed; and evaluates the characteristics of the existing study area access, emergency response, truck access, transit service, and non-motorized facilities.

Roadway Facilities

Roadways

The following roadways are in the study area:

Blackburn Road is a two-lane minor arterial that runs east-west from Cedardale Road to Britt Road. Traffic controls on Blackburn Road include a signal at South Second Street and a stop sign at the intersection with Britt Road as well as a stop sign on the minor intersecting streets of Cleveland Street, Gunn Road, and South Third Street. The speed limit is 25 mph.

Anderson Road is a two-lane local access road that runs east-west. Traffic control on Anderson Road includes a stop sign at Old Highway 99. The speed limit is 35 mph.

Pederson Lane is a private driveway that runs east-west from Old Highway 99 to a farm. Traffic control on Pederson Lane includes a stop sign at Old Highway 99.

Hickox Road is a two-lane minor collector that runs east-west from I-5 to Dike Road. Traffic control on Hickox Road includes stop signs at Old Highway 99 and Dike Road. The speed limit is 35 mph.

Stackpole Road is a two-lane rural local access road that runs east-west from Conway Frontage Road to Dike Road. Traffic control on Stackpole Road includes stop signs at Conway Frontage Road and Dike Road. The speed limit is 35 mph.

Peter Johnson Road is a two-lane rural local access road that runs east-west from Conway Frontage Road to Dike Road. Traffic control on

Peter Johnson Road includes stop signs at Conway Frontage Road and Dike Road. The speed limit is 35 mph.

Fir Island Road is a two-lane major collector that runs east-west from Pioneer Highway to the west where it intersects with Best Road. Traffic controls on Fir Island Road include stop signs at Conway Frontage Road and Pioneer Highway. The speed limit is 35 mph in the study area.

Old Highway 99 is a two-lane major collector that runs north-south from Blackburn Road to Hickox Road. Traffic controls on Old Highway 99 include a signal at Blackburn Road as well as stop signs on the minor intersecting streets of Anderson Road, McFarmland Lane, Pederson Lane, Jack Lane and Hickox Road. The speed limit is 35 mph.

Conway Frontage Road is a two-lane minor collector that runs north-south from Hickox Road to Fir Island Road. Traffic controls on Conway Frontage Road include a stop sign at Fir Island Road as well as stop signs on the minor intersecting streets of Stackpole Road and Peter Johnson Road. The speed limit is 50 mph.

Pioneer Highway is a two-lane major collector that runs north-south from Fir Island Road to the south where it intersects with I-5 at the SR-534 interchange at Smokey Point. Traffic control on Pioneer Highway includes a stop sign at Fir Island Road. The speed limit is 50 mph.

Dike Road is a two-lane minor collector that runs north-south from Britt Road to Fir Island Road. Traffic controls on Dike Road include stop signs at Britt Road and Fir Island Road as well as stop signs on the minor intersecting streets of Stackpole Road, Peter Johnson Road and Hickox Road. The speed limit is 40 mph.

Britt Road is a two-lane collector that runs north-south from Blackburn Road to Dike Road. At the Britt Road and Dike Road intersection, Britt Road is a minor collector; east of Dike Road it is an urban collector. Traffic controls within the study area include a stop sign at Dike Road as well as a stop sign Blackburn Road. The speed limit is 35 mph.

Intersections

Sixteen key intersections were analyzed as part of this study including:

- Pioneer Highway/I-5 Northbound Ramp
- Pioneer Highway/I-5 Southbound Ramp
- Fir Island Road/Pioneer Highway

- Fir Island Road/Conway Frontage Road
- Old Highway 99/I-5 Northbound Ramp
- Old Highway 99/I-5 Southbound Ramp
- Anderson Road/I-5 Northbound Ramp
- Anderson Road/I-5 Southbound Ramp
- Anderson Road/Old Highway 99
- Stackpole Road/Dike Road
- Hickox Road/Dike Road
- Britt Road/Dike Road
- Blackburn Road/Britt Road
- Blackburn Road/Old Highway 99
- Stackpole Road/Conway Frontage Road
- Hickox Road/Old Highway 99

What are the existing traffic operations at intersections?

This section identifies existing traffic volumes within the study area; provides an assessment of existing LOS; and a statement of existing accident patterns at key intersections.

Traffic Volumes

Traffic volumes were collected within the study area during a two-week period in January and February 2006. These traffic volumes represent average weekday conditions.

Average Weekday Daily Traffic Volumes

A six-day, 24-hour machine count was collected on Hickox Road between Dike Road and Old Highway 99 from February 3rd through the 8th, 2006. Average weekday daily traffic on Hickox Road is 340 vehicles with a 50/50 percentage split in the eastbound and westbound directions. The average weekend volume was 220 vehicles per day with the same 50/50 split by direction. Skagit County data indicated the average weekday volume on Hickox Road was 380 vehicles per day. The highest volume of the day occurred during the PM peak hour of 4:00 to 6:00. For the

purposes of determining intersection LOS, turning movement counts were collected during this time.

Peak Hour Traffic Volumes

The PM peak hour counts were collected between 4:00 PM and 6:00 PM. Since February represents a relatively low volume scenario, PM peak hour volumes were factored to achieve an annual average peak hour volume. A monthly adjustment factor of 1.09 was applied to all PM peak hour turning movement counts to achieve an annual average volume. This factor was obtained from Skagit County Public Works. The 2006 PM peak hour turning movement volumes are presented in Figure 2.1. The volumes may vary by plus or minus five percent, which is within an acceptable range.

A summary of the PM peak hour turning movement approach volumes at each intersection is presented in Table 2.1. The volumes varied from a low of 17 entering vehicles at the Stackpole Road/Dike Road intersection to a high of 1,316 entering vehicles at Fir Island Road/Pioneer Highway intersection. With the exception of Fir Island Road/Pioneer Highway and Pioneer Highway/I-5 Southbound Ramps, the PM peak hour volumes at the key intersections in the study area were very low, which is consistent with the rural nature of the area.

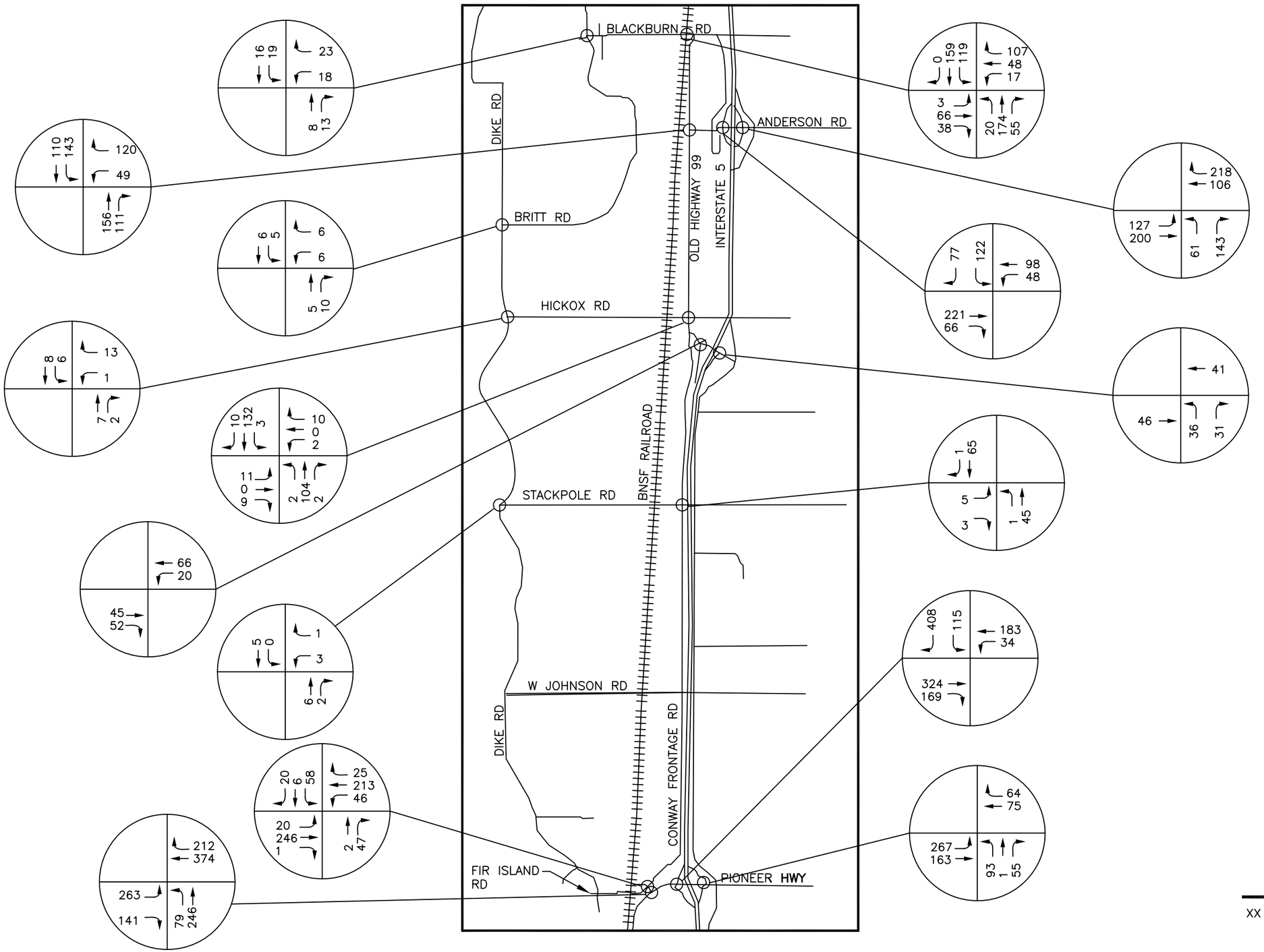
Table 2.1
2006 Peak Hour Turning Movement Volumes

Location	PM Peak Volume[1]
Pioneer Highway/I-5 Northbound Ramps	718
Pioneer Highway/I-5 Southbound Ramps	1,233
Fir Island Road/Pioneer Highway	1,316
Fir Island Road/Conway Frontage Road	684
Old Highway 99/I-5 Northbound Ramps	154
Old Highway 99/I-5 Southbound Ramps	183
Anderson Road/I-5 Northbound Ramps	856
Anderson Road/I-5 Southbound Ramps	633
Anderson Road/Old Highway 99	690
Stackpole Road/Dike Road	17
Hickox Road/Dike Road	38
Britt Road/Dike Road	40
Blackburn Road/Britt Road	96

Blackburn Road/Old Highway 99	808
Stackpole Road/Conway Frontage Road	120
Hickox Road/Old Highway 99	286
Total Intersection Approach Volumes	**7,872**

1. In vehicles per hour.

As shown in Table 2.1, the total intersection approach volume for all study area intersections is 7,872 vehicles per hour. The highest volume occurs at the Fir Island Road/Pioneer Highway intersection (1,316 vehicles per hour [vph]) and the Pioneer Highway/I-5 Southbound Ramps (1,233 vph). The lowest PM peak hour approach volume occurs at the Stackpole Road/Dike Road intersection (17 vph). The average PM peak hour approach volume is 492 vph.



LEGEND

STUDY AREA BOUNDARY

XX – PM PEAK HOUR VOLUME

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2006
PM PEAK HOUR TRAFFIC VOLUMES

FIGURE 2.1

HICKOX RAILROAD RAILWAY
CROSSING CLOSURE
TRAFFIC INPACT ANALYSIS

FILENAME: TrafficVols–Fig2.1.dwg

Level of Service (LOS)

Level of service characterizes the operating conditions on a roadway or at an intersection. Operating conditions are defined in terms of traffic performance measures related to speed, travel time, freedom to maneuver, traffic interruptions, driver comfort and convenience. These various factors are used to quantify the amount of delay associated with a given traffic flow condition. The amount of delay per vehicle is correlated with a LOS designation. The 2000 *Highway Capacity Manual* (*HCM*) describes the methodologies for calculating LOS on street segments and at signalized and unsignalized intersections.

According to the *HCM*, there are six levels of service by which the operational performance of the roadway system may be described. These levels range from LOS A, which indicates a relatively free-flowing condition, to LOS F, which indicates operational breakdown.

The LOS criteria are presented in Table 2.2.

Table 2.2
Level of Service Criteria

Level of Service	Expected Delay
A	Little/No Delay
B	Short Delays
C	Average Delays
D	Long Delays
E	Very Long Delays
F	Extreme Delays

Source: 2000 Highway Capacity Manual Special Report 209, Fourth Edition.

LOS for an intersection with stop signs on two approaches is determined by calculating the time a vehicle must wait at the stop before proceeding through the intersection. LOS is determined from the average delay per vehicle for each stop sign controlled approach. The intersection LOS is evaluated based on the movement with the highest delay. Average control delay less than or equal to 10 seconds per vehicle is defined as LOS A. For LOS F, the average control delay is greater than 50 seconds per vehicle.

LOS for an intersection with stop signs on all approaches is defined in terms of average control delay per vehicle for the intersection as a whole. The total time a vehicle waits to pass through the intersection is divided by the total volume of traffic passing through the intersection. The delay per vehicle for the entire intersection is then correlated with the LOS. Average control delay of less than or equal to 10 seconds per vehicle is defined as LOS A. For LOS F, the average control delay is greater than 50 seconds per vehicle.

LOS for signalized intersections is defined in terms of average control delay per vehicle for the intersection as a whole. The criterion for LOS A is an average control delay of less than or equal to 10 seconds per vehicle. The criterion for LOS F is an average control delay of greater than 80 seconds.

LOS for a signalized intersection is calculated in the same manner as all-way stop controlled intersections. The total time vehicles must wait to pass through the intersection divided by the total intersection approach volume yields a delay per vehicle which correlates with a value for LOS.

The City of Mount Vernon and Skagit County have defined LOS D as the standard for intersections within the city and county. Washington State Department of Transportation (WSDOT) also has defined LOS D as the standard for intersections within their right-of-way in urban areas.

For this report, LOS was calculated using Synchro 6.0, utilizing the HCM methodologies.

Current traffic signal timing plans for the signalized intersection in the study area were obtained from Mount Vernon Public Works Department.

The result of the LOS analysis for existing conditions at key intersections is shown in Table 2.3.

Table 2.3
Existing Level of Service

Location	Traffic Control	Existing[1]	LOS Standard
Pioneer Highway/I-5 Northbound Ramps	Stop Sign	A(8.9)	D
Pioneer Highway/I-5 Southbound Ramps	Stop Sign	B(10.4)	D
Fir Island Road/Pioneer Highway	Stop Sign	D(26.2)	D
Fir Island Road/Conway Frontage Road	Stop Sign	B(10.7)	D
Old Highway 99/I-5 Northbound Ramps	Stop Sign	A(7.0)	D
Old Highway 99/I-5 Southbound Ramps	Stop Sign	A(1.8)	D
Anderson Road/I-5 Northbound Ramps	Stop Sign	A(9.4)	D
Anderson Road/I-5 Southbound Ramps	Stop Sign	A(8.9)	D
Anderson Road/Old Highway 99	Stop Sign	A(9.9)	D
Stackpole Road/Dike Road	Stop Sign	A(8.6)	D
Hickox Road/Dike Road	Stop Sign	A(8.5)	D
Britt Road/Dike Road	Stop Sign	A(8.6)	D
Blackburn Road/Britt Road	Stop Sign	A(8.8)	D
Blackburn Road/Old Highway 99	Signal	A(8.0)	D
Conway Frontage Road/Stackpole Road	Stop Sign	A(9.0)	D
Hickox Road/Old Highway 99	Stop Sign	A(9.9)	D

Note: LOS for stop controlled intersection represents the approach with the highest delay. LOS for signalized intersection represents total intersection delay.

1. (xx) - seconds of delay per vehicle

As shown in Table 2.3, all analysis intersections currently operate at an acceptable and high LOS during the PM peak hour, with the exception of the Fir Island Road/Pioneer Highway intersection, which currently operates at LOS D during the PM peak hour. LOS D, however, is an acceptable LOS for the study area.

Accidents

The latest three-year accident history at the intersections analyzed was obtained from the WSDOT. The latest available three-year accident history included the period from January 1, 2003 to December 31, 2005. A summary of the three-year accident history is presented in Table 2.4.

Table 2.4
Three-Year Accident History

Intersection	Analysis Period							
	2003		2004		2005			
	INJ	PDO	INJ	PDO	INJ	PDO	Total	Acc Rate[1]
Pioneer Highway/I-5 Northbound Ramps		1				1	2	0.252
Pioneer Highway/I-5 Southbound Ramps		1	3	2			6	0.445
Old Highway 99/I-5 Northbound Ramps					1		1	0.609
Old Highway 99/I-5 Southbound Ramps							0	0.000
Anderson Road/I-5 Northbound Ramps	1		2				3	0.109
Anderson Road/I-5 Southbound Ramps			1				1	0.453

INJ – injury

PDO – property damage only

1. Accidents per million entering vehicles

As shown in Table 2.4, there have been very few accidents at the analysis intersections during the last three-year period. The Old Highway 99/I-5 Northbound Ramp intersection has experienced one accident during the latest three-year period, with an accident rate of 0.609 accidents per million entering vehicles. The Old Highway 99/I-5 Southbound Ramp intersection has no accident experience during the latest three-year period. The Pioneer Highway/I-5 Northbound Ramp intersection has experienced two accidents during the latest three-year period, with an accident rate of 0.252 accidents per million entering vehicles.

The Pioneer Highway/I-5 Southbound Ramp intersection has experienced six accidents during the latest three-year period, with an accident rate of 0.445 accidents per million entering vehicles.

The Anderson Road/I-5 Northbound Ramp intersection has experienced three accidents during the latest three-year period, with an accident rate of 0.109 accidents per million entering vehicles. The Anderson Road/I-5 Southbound Ramp intersection has experienced one accident during the latest three-year period, with an accident rate of 0.453 accidents per million entering vehicles. There have been no fatalities at intersections within the study area.

What are other access issues?

Study Area Access

The study area has four portals of access. Three of these include an interchange with I-5. Portals with I-5 interchanges include Anderson Road, Old Highway 99, and Pioneer Highway. Old Highway 99 is a partial interchange with a northbound off-ramp and a southbound on-ramp. The Anderson Road and Pioneer Highway interchanges provide full access to I-5. The fourth portal is the Blackburn Road/Old Highway 99 intersection.

From Hickox Road, traffic destined to the north on I-5 would use the Anderson Road interchange and traffic destined to the south on I-5 would use the Old Highway 99 interchange. Traffic coming to Hickox Road originating from the north on I-5 would use the Anderson Road interchange and traffic originating from the south on I-5 would use the Old Highway 99 interchange.

Emergency Response

Medical Aid

Skagit County Medic One is a countywide system that cares for all citizens and visitors. The emergency medical service (EMS) is dispatched by Skagit County Medic One from various locations throughout the county depending on location and support required. Response time from the moment of dispatch until the ambulance comes to a complete stop should not exceed 30 minutes in rural areas. The study area is considered a rural area. Currently Skagit County Medic One meets the state response time standard.

Police Department

The Skagit County Sheriff's office serves Skagit County including Mount Vernon. The Skagit County Sheriff's office is located at 600 South Third

Street in Mount Vernon. The Mount Vernon police station is located at 1805 Continental Place.

Fire Department

Emergency response for the Hickox Road study area is provided by Fire District Three, Volunteer Five Station located at 19746 East Hickox Road, which is on the east side of I-5. Fire District Three also has a fire station south of Hickox Road at 21020 Greenfield Street in Conway, but the response zone for that fire station does not include the study area. Emergency vehicles from the fire station on East Hickox Road access the study area via Hickox Road or Burkland Road depending on the location of the incident. The current estimated response time to a point midway between Old Highway 99 and Dike Road is approximately three minutes.

Trucks

The daily volume of trucks on Hickox Road is approximately 50 with a 57 percent eastbound and 43 percent westbound orientation. The PM peak hour averages approximately two two-axle six tire, and one three-axle trucks in each direction. Land use within the study area is reliant on truck access to serve the various agricultural needs allowed under current zoning.

What is current transit service?

Transit

Skagit Transit (SKAT) provides service throughout Skagit County including the study area. Route 208 North provides regularly scheduled service on Blackburn Road. There is no scheduled service on Hickox Road.

School Buses

School bus service in the area is provided by the Conway and Mount Vernon School Districts. Hickox Road is the dividing line between the Conway School District and the Mount Vernon School District. chool bus routes are determined by the location of students. Conway School District has an existing bus stop located at the Dike Road/Hickox Road intersection and the bus uses Hickox Road to reach its next destination. Mount Vernon School District does not have routes on Hickox Road.

What is the impact on non-motorized transportation?

Pedestrian and Bicycle Volumes

Pedestrian and bicycle movement counts were collected at the key intersections in the study area during the 2006 PM peak period. The volume counts verified that only a small number of non-motorized trips are generated due to the rural nature of the area. The results of the counts indicated one pedestrian and two bicycles observed at the Old Highway 99/ Hickox Road intersection.

Pedestrian and Bicycle Facilities

The existing roads have been designed to accommodate pedestrians and bicycles in selected locations. Dedicated pedestrian or bike facilities in the study area exist at the following locations:

- Anderson Road/Old Highway 99 - sidewalks on three of the four corners of the intersection;
- Blackburn Road/Old Highway 99 - sidewalks on the four corners of the intersection; and
- Blackburn Road - Old Highway 99 to Britt Road – north side has an asphalt walkway separated from traffic by an extruded curb.

There are no additional dedicated pedestrian or bicycle facilities in the study area. Some of the roadways in the study area have asphalt shoulders that can be used by pedestrians and bicyclists and are listed below:

- Anderson Road has paved shoulders from Old Highway 99 through the I-5 interchange;
- Conway Frontage Road has eight-foot-wide shoulders from Old Highway 99 to Fir Island Road;
- Old Highway 99 and Pioneer Highway/SR-534 have asphalt shoulders on the I-5 interchange and within the WSDOT right-of-way boundaries;
- Fir Island Road has asphalt shoulders within the study area; and
- Old Highway 99 from Blackburn Road to Conway Frontage Road has asphalt shoulders varying in width from four feet to eight feet.

Rail

There are several railway crossings in the study area. These crossings are discussed below.

Crossing Facilities

Blackburn Road—BNSF Railway crosses Blackburn Road at grade between Railroad Avenue and Third Street South. There is a single track approximately 200 feet west of Railroad Avenue. The crossing is controlled by a cantilever flashing-light signal with automatic gates.

BNSF Railway crosses on Blackburn Road.

Pederson Lane—BNSF Railway crosses Pederson Lane at grade west of Old Highway 99. One track crosses Pederson Lane approximately 390 feet west of Old Highway 99. The crossing is controlled by a sign without automatic gates.

Hickox Road—BNSF Railway crosses Hickox Road at grade approximately 550 feet west of Old Highway 99. The crossing is controlled by a flashing light signal with automatic gates.

Stackpole Road—BNSF Railway crosses Stackpole Road at grade approximately 1,020 feet west of Old Highway 99. The crossing is controlled by a stop sign and cross bucks.

Peter Johnson Road—BNSF Railway crosses Peter Johnson Road at grade approximately 1,110 feet west of Old Highway 99. The crossing is controlled by a stop sign and cross bucks.

Fir Island Road— BNSF Railway crosses Fir Island Road at grade between Jones Road and First Street. The track crosses Fir Island Road approximately 220 feet west of Jones Road. The crossing is controlled by a cantilever flashing light signal with automatic gates.

BNSF Railway crosses on Fir Island Road.

Train Volumes

Data on train volumes at the BNSF/Hickox Road railway crossing were provided by WSDOT. Current service schedules were obtained from Amtrak. Table 2.5 presents a summary of the existing daily train volumes crossing Hickox Road.

Table 2.5
Existing Weekday Train Volumes

Service	Daily Volume
Amtrak Cascades	4
Freight Trains	10
Total Existing Train Volume	**14**

As shown in Table 2.5, there are four daily Amtrak *Cascades*, and 10 daily freight trains for a total of 14 daily trains crossing Hickox Road.

Amtrak *Cascades* are primarily during off-peak hours. Freight trains do not have a pre-determined schedule, but operate on demand.

Accidents

The vehicle/train accident history at the BNSF/Hickox Road railway crossing was obtained from the Federal Railroad Administration (FRA). A summary of all train-vehicular accidents reported since 1975 is provided in Table 2.6.

Table 2.6
Railway Crossing Accidents

Railway Crossing	Accidents	Date of Accident
Hickox Road	1	04/05/78
Hickox Road	1	01/05/90

As shown in Table 2.6, there have been a total of two reported vehicle/train accidents at the BNSF/Hickox Road railway crossing since 1975. Two accidents in a 31-year period (0.06 accidents per year) is less than the average accident rate at railway crossings of 0.1 accidents per year.

In 1978, according to FRA, an eastbound vehicle on Hickox Road collided with a northbound freight train. The train was proceeding through the crossing and struck the vehicle. The incident occurred at dark under cloudy conditions. The motorist did not stop and four individuals in the vehicle were injured. Vehicle damage was approximately $1,900.

In 1990, an eastbound vehicle on Hickox Road collided with a northbound freight train. The train was proceeding through the crossing and was struck by the vehicle. The incident occurred at dark under cloudy conditions. The motorist did not stop and was killed. Vehicle damage was approximately $1,000.

What improvements are planned/programmed?

There are no planned or programmed highway transportation improvement projects in the vicinity of the study area. Roadway maintenance in the study area is scheduled on an annual basis.

Transit Improvement Projects

Skagit Transit (SKAT)—No improvements are scheduled for Hickox Road by SKAT. SKAT's development plan includes future extended service to Anderson Road.

Chapter Three: Horizon Year (2006) Traffic Impact Analysis

The horizon year analysis evaluates the impact of the proposed action at the time the impact of the action is realized. The proposed closure of the BNSF/Hickox Road railway crossing is anticipated in the 2006 time horizon. Therefore, for the purposes of this analysis, 2006 is assumed to be the horizon year.

The 2006 horizon year traffic impacts were analyzed for the following conditions:

1. No Action – BNSF/Hickox Road railway crossing will remain open; and
2. With Closure – closing of BNSF/Hickox Road railway crossing.

The analysis was based on the following background conditions:

- existing traffic flow conditions in the study area would remain the same; and
- there are no planned/programmed highway transportation improvements in the study area.

What is the impact on traffic operations at intersections?

The 2006 horizon year analysis presents a statement of the traffic operations within the study area for the No Action and With Closure alternatives. The analysis identifies peak hour traffic volumes, level of service (LOS), and future accident potential at the study area intersections under the No Action and With Closure alternatives.

Peak Hour Traffic Volumes

No Action

Traffic volume data for the 2006 No Action alternative is the same as the existing conditions presented in Chapter Two.

With Closure

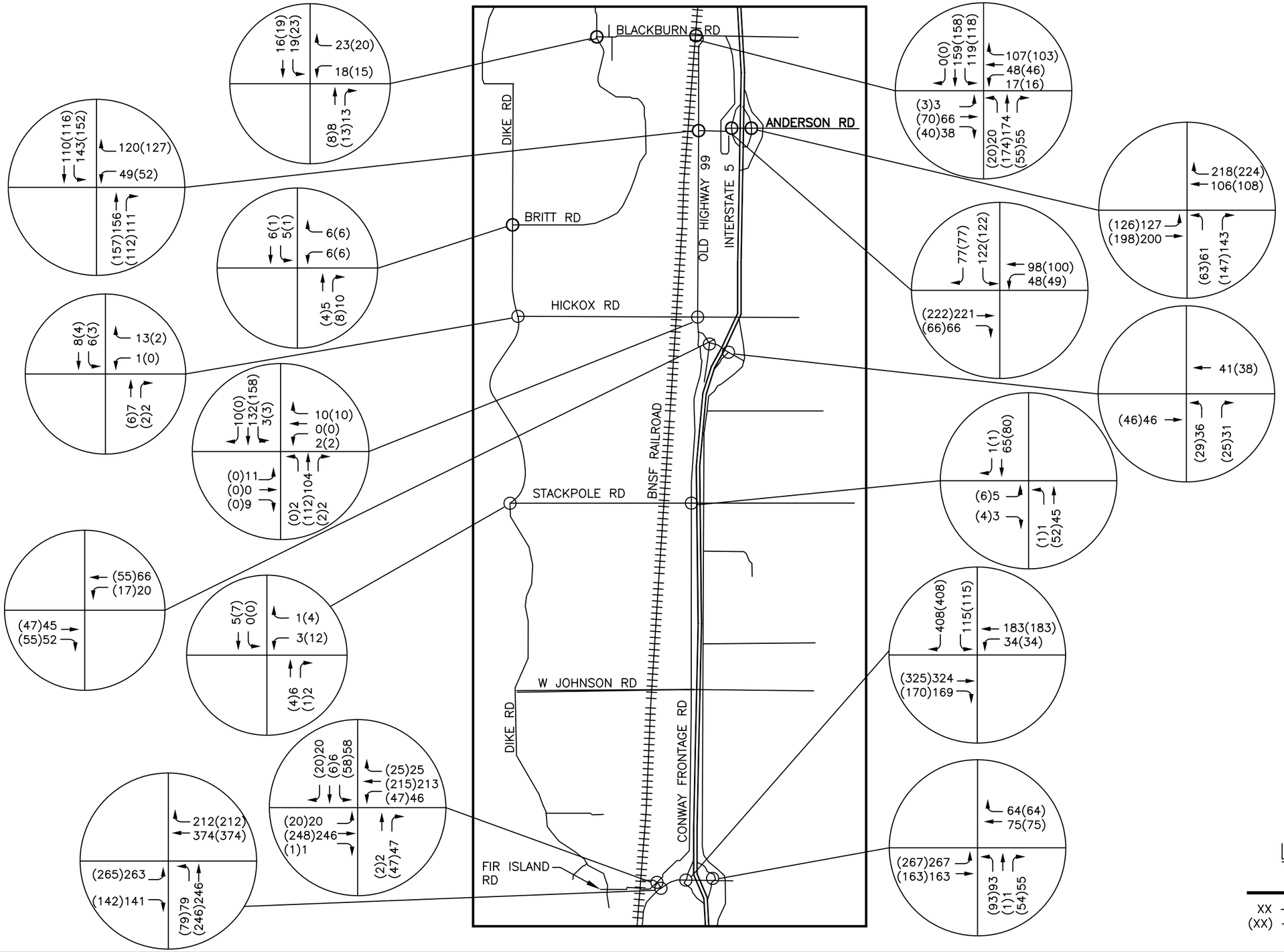
Under the With Closure alternative, existing traffic on Hickox Road will be diverted to other roadways in the study area. The City of Mount Vernon traffic assignment model was used to provide an estimate of PM peak hour traffic volume on the study area network for the With Closure alternative.

The model process involved four steps as follows:

- The first step generated a 2006 PM peak hour traffic assignment for the study area roadway network;
- the second step generated a 2006 PM peak hour traffic assignment for the study area roadway network assuming closure of the Hickox Road at the railway crossing;
- the third step subtracting the No Action PM peak hour volume for each link from the With Closure volume on the same link; and
- the fourth step factored the differential link approach volume at each study area intersection by the assignment percentage generated from the 2006 per peak hour turning movement counts.

The resultant volume was then added to the 2006 existing PM peak hour turning movement volume to obtain the 2006 With Closure assignment.

A summary of the resulting 2006 PM peak hour volumes for each alternative is presented in Figure 3.1 and Table 3.1.



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2006
PM PEAK HOUR TRAFFIC VOLUMES

FIGURE 3.1

HICKOX RAILROAD RAILWAY
CROSSING CLOSURE
TRAFFIC INPACT ANALYSIS

FILENAME: TrafficVols-Fig2.1.dwg

Table 3.1
2006 Peak Hour Turning Movement Volumes

Location	PM Peak Volume[1]		Change
	No Action	With Closure	
Pioneer Highway/I-5 Northbound Ramps	718	718	0
Pioneer Highway/I-5 Southbound Ramps	1,233	1,234	+1
Fir Island Road/Pioneer Highway	1,316	1,319	+3
Fir Island Road/Conway Frontage Road	684	690	+6
Old Highway 99/I-5 Northbound Ramps	154	139	-15
Old Highway 99/I-5 Southbound Ramps	183	174	-9
Anderson Road/I-5 Northbound Ramps	856	866	+10
Anderson Road/I-5 Southbound Ramps	633	636	+3
Anderson Road/Old Highway 99	690	716	+26
Stackpole Road/Dike Road	17	28	+19
Hickox Road/Dike Road	38	17	-21
Britt Road/Dike Road	40	26	-14
Blackburn Road/Britt Road	96	97	+1
Blackburn Road/Old Highway 99	808	803	-5
Stackpole Road/Conway Frontage Road	120	145	+25
Hickox Road/Old Highway 99	286	288	+2
Total Intersection Approach Volumes	**7,872**	**7,896**	**+24**

1. Vehicles per hour.

As shown in Table 3.1 under the No Action alternative, the total PM peak hour approach volume for the 16 study area intersections is 7,872 PM peak hour turning movements compared to 7,896 under the With Closure alternative. The difference in total volume between the two alternatives of 24 represents the additional turning movements the network will experience as a result of the closure of the railway crossing.

The additional 24 turning movements result in an increase in traffic at 10 intersections and a decrease at five intersections. There is no change at one intersection. The impact on the network occurs on Dike Road, Conway Frontage Road, and Old Highway 99.

The average 2006 total intersection approach volume for all study area intersections under the No Action alternative is 492 vehicles per hour (vph) compared to the average of 494 vph for the With Closure alternative.

The largest increase (26 vehicles) occurs at the Anderson Road/Old Highway 99 intersection and the largest decrease (21 vehicles) occurs at the Hickox Road/Dike Road intersection.

Level of Service

The LOS at the key intersections was calculated using *Synchro 6.0* and the PM peak hour turning movement volumes for the 2006 With Closure alternative. The LOS for the 2006 No Action alternative is the same as the existing condition analysis.

Table 3.2 shows the LOS for the No Action and With Closure alternatives for the PM peak hour. See Chapter Two, page 11, for more information on LOS standards.

Table 3.2
2006 Level of Service

Intersection	PM Peak		LOS Standard
	No Action[1]	With Closure[1]	
Pioneer Highway/I-5 Northbound Ramps	A(8.9)	A(8.9)	D
Pioneer Highway/I-5 Southbound Ramps	B(10.4)	B(10.4)	D
Fir Island Road/Pioneer Highway	D(26.2)	D(26.6)	D
Fir Island Road/Conway Frontage Road	B(10.7)	B(10.7)	D
Old Highway 99/I-5 Northbound Ramps	A(7.0)	A(7.0)	D
Old Highway 99/I-5 Southbound Ramps	A(1.8)	A(1.9)	D
Anderson Road/I-5 Northbound Ramps	A(9.4)	A(9.4)	D
Anderson Road/I-5 Southbound Ramps	A(8.2)	A(8.2)	D
Anderson Road/Old Highway 99	A(9.9)	B(10.1)	D
Stackpole Road/Dike Road	A(8.6)	A(8.6)	D
Hickox Road/Dike Road	A(8.5)	A(8.4)	D
Britt Road/Dike Road	A(8.6)	A(8.5)	D
Blackburn Road/Britt Road	A(8.8)	A(8.8)	D
Blackburn Road/Old Highway 99	A(8.0)	A(8.7)	D
Stackpole Road/Conway Frontage Road	A(9.0)	A(9.1)	D
Hickox Road/Old Highway 99	A(9.9)	A(9.2)	D

1. (xx) - seconds of delay per vehicle

No Action

As shown in Table 3.2, all study area intersections are estimated to operate at acceptable LOS. LOS D is an acceptable LOS.

With Closure

As shown in Table 3.2, all key intersections are estimated to operate at acceptable LOS under the With Closure alternative. LOS D is an acceptable LOS.

Accidents

No Action

Under the No Action alternative, the traffic accident rate for the study area will remain the same.

With Closure

Under the With Closure alternative, the study area traffic accident rate will remain essentially the same since the overall traffic volume for the study area is unchanged. Some intersections will experience an increase or decrease in traffic volume to accommodate the closure but these volumes are not large enough to result in the potential for measurable increased accidents.

What is the impact on access in the study area?

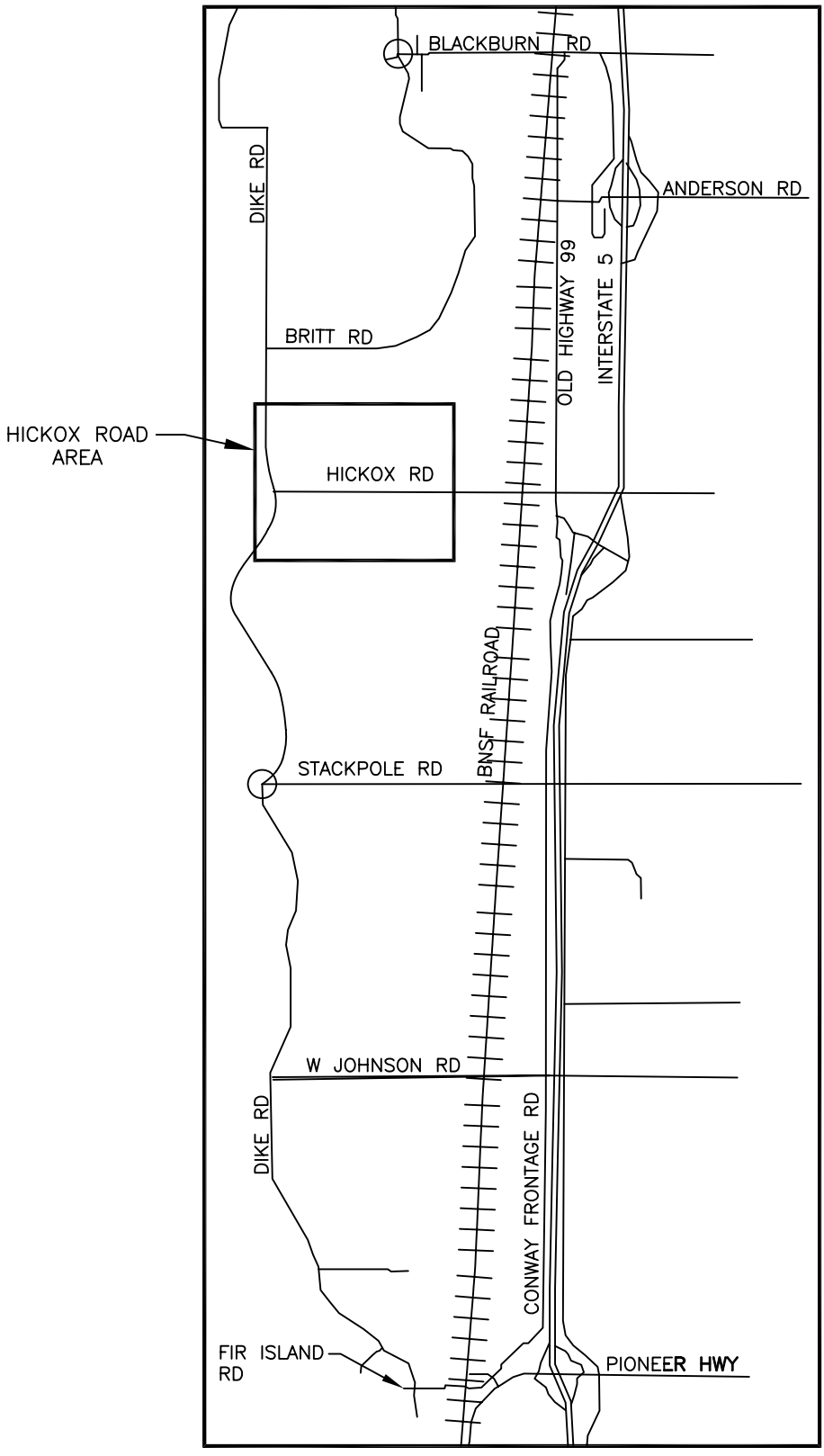
No Action

Under the No Action alternative, traffic access for the study area will not be impacted.

With Closure

Impact of the With Closure alternative is limited to a small area within the study area. The limits of the impact area were determined by identifying properties where generated trips would have to divert from their existing route to a new route through the study area, resulting in a longer trip to the four main east-west portals in the study area. The area includes Hickox Road west of the railway crossing and Dike Road within one-half mile of the Hickox Road/Dike Road intersection. This area is referred to as the "Hickox Road Area" for the remainder of the report (see Figure 3.2). For the purpose of this analysis, the Hickox Road/Dike Road intersection was used for travel time analysis.

Under the With Closure alternative, the Blackburn Road/Britt Road intersection on the north end of the study area will be the alternative route for trips to and from the north. Stackpole Road or West Johnson Road will be the alternative route for trips to and from the south. The estimated travel times to reach these areas were determined.



NOT TO SCALE

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HICKOX ROAD AREA

FIGURE 3.2

HICKOX ROAD RAILWAY CROSSING CLOSURE

Based on minimum travel time theory, traffic destined to the north on I-5 from the Hickox Road/Dike Road intersection could use Dike Road, Britt Road,

Blackburn Road, Old Highway 99 and the Anderson Road I-5 interchange northbound on-ramp. Traffic destined to the south on I-5, coming from the Hickox Road/Dike Road intersection, could use Dike Road, Stackpole Road, Conway Frontage Road and the Old Highway 99 interchange southbound on-ramp. Traffic heading north on I-5 could use the Hickox Road/I-5 interchange northbound off-ramp, Conway Frontage Road, Stackpole Road and Dike Road to access the Hickox Road/Dike Road intersection. Pioneer Highway is another alternative route. Traffic from the north on I-5 would use the Anderson Road I-5 interchange southbound off-ramp, Old Highway 99, Blackburn Road, Britt Road and Dike Road to access the Hickox Road/Dike Road intersection. Travel distance and time were calculated using these portals into the study area.

Table 3.3 shows the estimated travel times for all alternative routes originating from the Hickox Road Area to the four main east-west portals into the study area.

Table 3.3
2006 Hickox Road Travel Time Evaluation

From	To	Average Travel Time (min)	
		No Action	With Closure
Hickox Road/Dike Road	Blackburn Road/Old Highway 99	6	9
Hickox Road/Dike Road	Anderson Road/I-5	4	11
Hickox Road/Dike Road	Old Highway 99/I-5	1.5	10.5
Hickox Road/Dike Road	Pioneer Highway/I-5	4.5	7.5

As shown in Table 3.3, during the PM peak hour, the average travel time from the Hickox Road/Dike Road intersection to the adjacent I-5 access points and Old Highway 99 increases an average of five minutes.

Emergency Response

No Action

The No Action alternative in 2006 is equivalent to existing conditions. The existing and No Action alternative estimated response time to mid-Hickox Road is approximately three minutes from the fire station located on East Hickox Road, which is on the east side of I-5. The response time for the police and emergency medical service will vary depending on the origin of the vehicle dispatched. The No Action alternative will not impact emergency response time for the area.

With Closure

The With Closure alternative will have minimal impact on response time for police service and Skagit County Medic One given that the location of the dispatched vehicle varies. Fire response would come from Fire District Three's station located on East Hickox Road, which would have the largest potential increase in response time.

According to conversations with Dave Corrion, Traffic Sergeant of the Skagit County Sheriff's office, the closure of the BNSF/Hickox Road railway crossing should not have an appreciable impact on response time. However, the traffic sergeant stated that Hickox Road is a key road and is not a favorable location for a closure.

According to conversations with Lieutenant Jerry Dodd of the Mount Vernon Police Department, the BNSF/Hickox Road railway crossing is used to provide service to Dike Road. The lieutenant stated that crime in the study area is very minimal; therefore, the closure will have minimal impact on their activities.

The With Closure alternative will increase Fire District Three's response time to the Hickox Road Area and eliminate an alternative emergency response route that might be needed during catastrophic blockage of alternative routes as the BNSF/Hickox Road railway crossing is no longer available to emergency vehicles heading west.

Skagit County Fire Marshal Dan Cain stated he was in general opposed to street closures as it reduces access for emergency response. However, if Hickox Road is closed for some reason, there are viable alternate routes.

Stackpole Road is the most likely alternate path for fire vehicles as it is the closest east-west road. The travel distance and time to the Hickox Road Area along this route from the fire station east of I-5 has a potential increase of three miles and a seven minutes increase in response time. Emergency response along the two north-south roads, Conway Frontage Road and Dike Road, will not be impacted.

Truck Access

Convenient access to I-5 is essential for the trucking industry and other local businesses in the study area. There are several alternate truck routes in the vicinity. The main traffic patterns and access points for this region place more emphasis on Anderson Road and Pioneer Highway/I-5 interchanges than the Old Highway 99/I-5 interchange adjacent to Hickox Road.

No Action

Under the No Action alternative truck access will not be impacted.
The existing travel times and distances will be unaffected.

With Closure

Under the With Closure alternative, approximately 50 heavy vehicle trips per day and six heavy vehicles during PM peak hour will experience increased travel times and distances. Trucks wanting to go west of Hickox Road or trucks currently coming from the Hickox Road Area across the railway will experience up to three additional miles and will spend an additional six to nine minutes traveling at slower speeds on local roads. Truck traffic using the freeway has the option of diverting to other routes such as the Anderson Road interchange on the north, or the Pioneer Highway exit on the south.

What is the impact on transit services?

No Action

The No Action alternative is the same as the existing condition for transit service. There will be no impact to existing transit service.

There will be no impact on school bus operations.

With Closure

The closure of BNSF/Hickox Road railway crossing will not impact transit service because Hickox Road does not have service. The Skagit Transit (SKAT) service on Blackburn Road will not be impacted under the With Closure alternative because the closure has no impact on the capacity or existing LOS on Blackburn Road.

The Executive Director of SKAT, Dale O'Brien, commented that if the BNSF/Hickox Road railway crossing were closed, it will have no impact on any potential improvements or current transit service.

Conway School District bus service in the study area will be impacted with the closure as currently there is a bus stop at the Hickox Road/Dike Road intersection and Hickox Road is used as a pass through. Rerouting of the school bus will be required under the With Closure alternative.

What is the impact on non-motorized transportation?

No Action

Under the No Action alternative, the railway crossings at Blackburn Road, Hickox Road, Stackpole Road, West Johnson Road and Fir Island Road will continue operations with their existing control configurations. Pedestrians and bicyclists will continue to use the shoulders of the network streets to cross the five public railway crossings.

With Closure

The With Closure alternative will not significantly impact non-motorized traffic because the volume of non-motorized traffic in the PM peak hour observed was one pedestrian and two bicyclists. Under the With Closure alternative, the potential for train and pedestrian/bicycle accidents will be eliminated at the crossing.

The With Closure alternative may inconvenience pedestrians and bicyclists, who will be forced to use other significantly longer routes. The few pedestrians and bicyclists who use the area may experience some inconvenience under the With Closure alternative.

Chapter Four: Future Year (2026) Traffic Impact Analysis

The future year (2026) traffic impact analysis provides an assessment of the impact of the proposed action twenty years in the future including an assessment of traffic operations, access in the study area, emergency services response, transit services and non-motorized transportation in the study area.

The 2026 future year traffic impacts were analyzed for the following conditions:

1. No Action – Hickox Road railway crossing remains open; and
2. With Closure – closing of Hickox Road railway crossing

What is the impact on traffic operations at intersections?

The traffic operations analysis for the 2026 Horizon Year includes an assessment of peak hour traffic volumes at key intersections in the study area; an evaluation of level of service (LOS) at these intersections; and potential for accidents at the same intersections for the No Action and With Closure alternatives.

Peak Hour Traffic Volumes

The 2026 PM peak hour volumes were generated with the aid of the City of Mount Vernon traffic assignment model. The 2026 forecasts were developed based on land use growth projections for the study area consistent with the current City of Mount Vernon and Skagit County Comprehensive Plans.

No Action

The 2026 No Action PM peak hour turning movement volumes at the key intersections were estimated from 2026 traffic volume forecasts generated by the City of Mount Vernon traffic assignment model. The modeling process involved four steps similar to the process used for creating the 2006 With Closure assignment. The steps are as follows:

- Generate a 2006 PM peak hour assignment calibrated against 2006 PM peak hour turning movement counts;

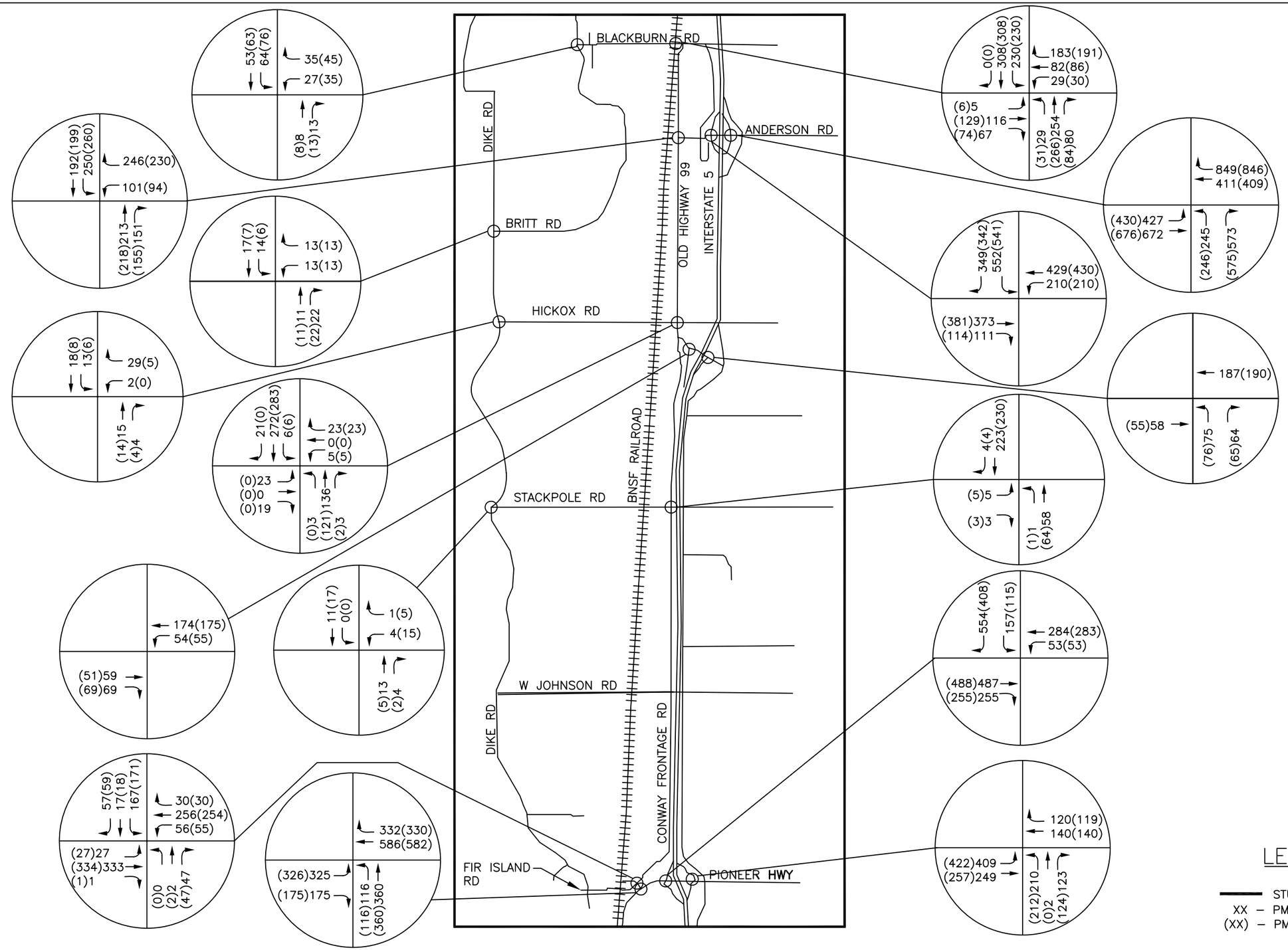
- generate a 2026 PM peak hour assignment for the No Action condition;
- subtract the 2026 PM peak hour No Action assignment from the 2006 PM peak assignment; and then
- add the intersection approach and volume difference between the 2026 No Action and 2006 existing assignment to each intersection movement based on the turning movement percentages derived from the 2006 existing ground counts to obtain the 2026 No Action PM peak hour assignment.

The results of the forecast indicate that PM peak hour volumes are expected to increase by 96 percent between 2006 and 2026.

With Closure

Under the With Closure alternative, 2026 PM peak hour traffic will be diverted to parallel east-west roadways, such as Blackburn Road to the north and Stackpole Road and West Johnson Road to the south. PM peak hour turning movement volumes for the 2026 With Closure alternative were developed through a 2026 PM peak hour model run with the closure of the Hickox Road railway crossing. The model process is the same as the 2026 No Action scenario with the exception that a 2026 With Closure model was prepared and subtracted from the 2006 existing to estimate the future impact of the proposed railway crossing closure.

The 2026 PM peak hour turning movement volumes at the key intersections for the No Action and With Closure alternatives are presented in Figure 4.1. A summary of the intersection approach volumes at the key study area intersections for the 2006 and 2026 scenarios is presented in Table 4.1.



LEGEND

STUDY AREA BOUNDARY
XX – PM PEAK NO ACTION
(XX) – PM PEAK WITH CLOSURE

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2026
PM PEAK HOUR TRAFFIC VOLUMES

FIGURE 4.1

HICKOX RAILROAD RAILWAY
CROSSING CLOSURE
TRAFFIC INPACT ANALYSIS

FILENAME: TrafficVols-Fig2.1.dwg

Table 4.1
2026 Peak Hour Turning Movement Volumes

Location	2006 PM Peak[1]		Change	2026 PM Peak[1]		Change
	No Action	With Closure		No Action	With Closure	
Pioneer Highway/I-5 Northbound Ramps	718	718	0	1,254	1,277	+23
Pioneer Highway/I-5 Southbound Ramps	1,233	1,234	+1	1,789	1,792	+3
Fir Island Road/Pioneer Highway	1,316	1,319	+3	1,894	1,889	-5
Fir Island Road/Conway Frontage Road	684	690	+6	994	998	+4
Old Highway 99/I-5 Northbound Ramps	154	139	-15	385	386	+1
Old Highway 99/I-5 Southbound Ramps	183	174	-9	356	339	-17
Anderson Road/I-5 Northbound Ramps	856	866	+10	3,177	3,183	+6
Anderson Road/I-5 Southbound Ramps	633	636	+3	2,024	2,018	-6
Anderson Road/Old Highway 99	690	716	+26	1,153	1,156	+3
Stackpole Road/Dike Road	17	28	+19	33	43	+10
Hickox Road/Dike Road	38	17	-21	81	36	-45
Britt Road/Dike Road	40	26	-14	91	72	-19
Blackburn Road/Britt Road	96	97	+1	200	239	+39
Blackburn Road/Old Highway 99	808	803	-5	1,382	1,435	+53
Stackpole Road/Conway Frontage	120	145	+25	294	307	+13
Hickox Road/Old Highway 99	286	288	+2	510	441	-69
Total Intersection Approach Volumes	**7,872**	**7,896**	**+24**	**15,617**	**15,626**	**+9**

1. Vehicles per hour.

As shown in Table 4.1, the total 2026 PM peak hour intersection approach volume is 15,617 vehicles per hour (vph) for the No Action alternative and 15,626 vph for the With Closure alternative. Comparing these volumes to the 2006 PM peak hour volumes indicate a growth of 7,745 vph in the No Action alternative and 7,729 vph in the With Closure alternative.

The highest 2026 PM peak hour approach volume occurs at the Anderson Road/I-5 Northbound Ramps for both the No Action (3,177 vph) and With Closure alternatives (3,183 vph). The lowest 2026 approach volume occurs at the Stackpole Road/Dike Road intersection for the No Action (33 vph) alternative and at the Hickox Road/Dike Road intersection for the With Closure (36 vph) alternative. The difference between the 2026 No Action and With Closure alternative is 89 vph. The average total 2026 intersection approach volume for all study area intersections is 977 vph for the No Action alternative and 976 vph for the With Closure alternative.

Level of Service

As in the 2006 analysis, the LOS of all the key intersections was evaluated using the *2000 Highway Capacity Manual* (*HCM*) procedures as implemented in *Syncro 6.0*.

Table 4.2 shows the 2026 LOS for the No Action and With Closure alternatives during the PM peak hour. The 2006 LOS for the same scenarios is shown for comparison purposes.

Table 4.2
Level of Service

Location	Traffic Control	2006		2026		LOS Standard
		Existing	With Closure	No Action	With Closure	
Pioneer Highway/I-5 Northbound Ramps	Stop Sign	A(8.9)	A(8.9)	C(15.7)	C(19.7)	D
Pioneer Highway/I-5 Southbound Ramps	Stop Sign	B(10.4)	B(10.4)	B(14.1)	B(14.1)	D
Fir Island Road/Pioneer Highway	Stop Sign	D(26.2)	D(26.6)	F(246) B(11.3)[1]	F(239) B(11.2)[1]	D
Fir Island Road/Conway Frontage Road	Stop Sign	B(10.7)	B(10.7)	F(122) B(8.2)[1]	F(126) A(8.2)[1]	D
Old Highway 99/I-5 Northbound Ramps	Stop Sign	A(7.0)	A(30)	A(4)	A(4)	D
Old Highway 99/I-5 Southbound Ramps	Stop Sign	A(1.8)	A(1.9)	A(2.1)	A(2.1)	D
Anderson Road/I-5 Northbound Ramps	Stop Sign	A(9.4)	A(9.4)	F(H) D(49.3)[1]	F(H) D(49.0)[1]	D
Anderson Road/I-5 Southbound Ramps	Stop Sign	A(8.2)	A(8.2)	F(H) C(21.8)[1]	F(H) C(21.3)[1]	D
Anderson Road/Old Highway 99	Stop Sign	A(9.9)	B(10.1)	D(29.5)	D(27.6)	D
Stackpole Road/Dike Road	Stop Sign	A(8.6)	A(8.6)	A(8.7)	A(8.7)	D
Hickox Road/Dike Road	Stop Sign	A(8.5)	A(8.4)	A(8.7)	A(8.5)	D
Britt Road/Dike Road	Stop Sign	A(8.6)	A(8.5)	A(8.9)	A(8.8)	D
Blackburn Road/Britt Road	Stop Sign	A(8.8)	A(8.8)	A(9.5)	A(9.8)	D
Blackburn Road/Old Highway 99	Signal	A(8.0)	A(8.7)	B(15.1)	B(12.2)	D
Stackpole Road/Conway Frontage Road	Stop Sign	A(9.0)	A(9.1)	B(10.0)	B(10.1)	D
Hickox Road/Old Highway 99	Stop Sign	A(9.9)	A(9.2)	B(11.9)	A(9.6)	D

1. With improvement

(xx) – seconds of delay per vehicle

(H) – delay exceeds program limits

As shown in Table 4.2, 12 of the 16 intersections are estimated to operate at an acceptable LOS in the 2026 time horizon. The remaining four intersections are estimated to operate at LOS F which is below the standard for the study area. In fact, the delay at the Anderson Road/I-5 ramp intersections under the 2026 No Action and With Closure alternatives exceeds the delay thresholds in the analysis software.

The four intersections with LOS F include:

- Fir Island Road/Pioneer Highway
- Fir Island Road/Conway Frontage Road
- Anderson Road/I-5 Northbound Ramps
- Anderson Road/I-5 Southbound Ramps

To address the deficient LOS, the following improvements were identified:

1. **Fir Island Road/Pioneer Highway**

   To provide acceptable LOS, the intersection should be signalized for both the 2026 No Action and With Closure alternatives.

   With these improvements, the intersection is estimated to operate at LOS B for both the No Action and With Closure alternatives.

2. **Fir Island Road/Conway Frontage Road**

   With signalization of this intersection under both alternatives in the 2026 time horizon, LOS A can be achieved.

3. **Anderson Road/I-5 Northbound Ramps**

   To provide an acceptable LOS, the intersection should be reconstructed to provide a northbound left turn lane and two northbound right turn lanes; a dedicated eastbound left turn lane and two through lanes; two westbound through lanes and two right turn lanes; and overall intersection signalization.

With these improvements, the intersection is estimated to operate at LOS D for both the No Action and With Closure alternatives.

4. Anderson Road/I-5 Southbound Ramps

To provide an acceptable LOS, the intersection should be reconstructed to provide one southbound left turn lane and one shared southbound left/through/right turn lane; one westbound left turn lane and a westbound through lane; one eastbound through lane and a shared through/right turn lane; and overall intersection signalization. With these improvements, the intersection is estimated to operate at LOS C for both the 2026 No Action and With Closure alternatives.

No Action

Future intersection conditions in 2026 under the No Action alternative depict LOS deficiencies at the four above identified intersections in the study area. Acceptable levels of service can be achieved through reconstruction of the intersection as noted.

With Closure

Under the 2026 With Closure alternative, LOS deficiencies will be realized at the same four intersections as in the No Action alternative.

What is the impact on access to the study area?

No Action

Under the No Action alternative for 2026, traffic circulation will utilize the existing road network. The existing travel times for these trips into and out of the study area are shown in Table 4.3. It is expected that with projected increased traffic volumes, travel times through and to the study area will dramatically increase if the transportation improvements discussed in the traffic operations sections are not constructed.

With Closure

Under the With Closure alternative, the traffic south of Hickox Road heading north will divert to the parallel east-west railway crossings. The potential impacts to the area connectivity can be measured by evaluating the travel time between the vicinity of the Hickox Road/Dike Road intersection on the east side of the railway crossing to the north, south, and west of the railway crossing at the four main portals into the study area. The Britt Road/Blackburn Road intersection on the north end of the study area will be the alternative routes for trips to and from the north end of the

study area. Stackpole Road or West Johnson Road will be the alternate route for trips and destinations from the south. The estimated travel times to reach these areas were compiled and analyzed.

Table 4.3 shows the estimated travel times for the alternative routes originating from the vicinity of the Hickox Road/Dike Road intersection to the four main east-west portals into the study area.

Table 4.3
2026 Hickox Road Travel Time Evaluation

From	To	Average Travel Time (min)	
		No Action	With Closure
Hickox Road/Dike Road	Blackburn Road/Old Highway 99	6	9
Hickox Road/Dike Road	Anderson Road/I-5	4	11
Hickox Road/Dike Road	Old Highway 99/I-5	1.5	10.5
Hickox Road/Dike Road	Pioneer Highway/I-5	4.5	7.5

As shown in Table 4.3, during the PM peak hour, the average travel times from Hickox Road to the adjacent I-5 access points and the City of Mount Vernon central business district increase an average of five minutes. Alternative traffic waiting under the With Closure alternative remains the same as the 2006 routings. It is expected, however, that without improvements the travel time will significantly increase.

Emergency Response

No Action

Under the No Action alternative, emergency response service will use current routing to service calls. The estimated response time to a mid-point on Hickox Road is approximately three minutes from the fire station located on East Hickox Road, which is east of I-5. The response time for the police and emergency medical service will vary depending on the origin of the responding vehicle.

With Closure

Under the With Closure alternative, response time for the police service and Skagit County Medic One will be minimally impacted depending on the location of the response vehicle at the time of dispatch. Requests for assistance in the vicinity of the Hickox Road/Dike Road intersection will have the largest potential increase in response time. Response time for fire services will be significant for incidents on Hickox Road and Dike Road.

The With Closure alternative will increase Fire District Three's response time to the Hickox Road/Dike Road intersection area and the Britt Road/Dike Road intersection area. Response time is increased as Hickox Road is the most direct route from the fire station located on East Hickox Road, east of I-5. By 2026 another fire station may be required in or near the study area due to anticipated growth along the Blackburn Road corridor. With the addition of another fire station, the potential response time impacts may be mitigated. The travel distance and time to the Hickox Road/Dike Road intersection will potentially have an increase of three miles and seven minutes, the same as in 2006.

The With Closure condition will also eliminate an alternative emergency response route that might be needed during catastrophic blockage of alternative routes.

Emergency response along the two north-south arterials, Conway Frontage Road and Dike Road, will not be significantly impacted under this alternative. With the closure of the Hickox Road railway crossing, Stackpole Road would be a likely alternative route for emergency vehicles.

Truck Access

Convenient access to I-5 is essential for the trucking business and other local businesses in the area. There are several alternate truck routes in the vicinity.

No Action

In 2026, truck routing will remain virtually the same as 2006 with the exception of increased travel times resulting from increased congestion.

With Closure

Under the With Closure alternative, some truck traffic may divert to other routes such as the Anderson Road/I-5 interchange on the north end of the

study area or the Pioneer Highway/I-5 interchange on the south end. Approximately 80 truck trips per day and eight during the PM peak hour will experience increased travel times and distances. With the closure, trucks destined to or from the Hickox Road/Dike Road intersection will experience an additional two to three miles of travel distance and will need to spend an additional six to nine minutes traveling at slower speeds on local roads. The 2026 travel delay time is the same as 2006 because the volumes in 2026 are not significantly greater than the 2006 volumes.

What is the impact on transit services?

No Action

Under the No Action alternative there will be no impact to service.

With Closure

Skagit Transit (SKAT) does not have any planned/programmed service scheduled on Hickox Road for 2026. The land use setting of the study area is agricultural, natural resource land; therefore, it is unlikely that the area will develop to a point where transit service would be beneficial for the area. For that reason, the closure of Hickox Road will not impact future transit service.

What is the impact on non-motorized transportation?

No Action

Under the No Action alternative, the railway crossings at Blackburn Road, Hickox Road, Stackpole Road and West Johnson Road will continue operations with their present control configurations. Pedestrians and bicyclists will continue to use the shoulders of the network streets to cross the railroad at five public crossings.

With Closure

The impact of the closure will not significantly affect non-motorized traffic because the volume is relatively small in the PM peak hour. Under the With Closure alternative, the potential for train and pedestrian/bicycle accidents will be eliminated.

The With Closure alternative may cause inconvenience to pedestrians and bicyclists, but this cannot be verified based on the minimal number of pedestrians and bicyclists observed during the course of the study.

What is the impact on planned/programmed improvements?

There are no planned or programmed highway transportation improvement projects in the vicinity of the study area. Roadway maintenance is scheduled on an annual basis.

Chapter Five: Findings

Chapter Five presents the findings of the traffic impact analysis of the proposed closure of the Hickox Road railway crossing located 550 feet west of Old Highway 99.

What is the impact on traffic operations at intersections?

- Hickox Road in 2006 is carrying 340 vehicles per day, with a PM peak hour volume of approximately 32 vehicles split between the eastbound and westbound directions (see Figure 2.1).
- All intersections are presently operating at an acceptable LOS per the study area standards. LOS D is within acceptable limits.
- There have been relatively few accidents in the study area during the latest three-year period with accidents limited to the I-5 interchanges. The highest number of accidents occurred at the Pioneer Highway/I-5 Southbound ramp (6). Even so, the accident rate was only 0.609 accidents per million entering vehicles which is significantly less than the statewide average for similar intersections.
- Under the With Closure alternative, total intersection approach volumes during the PM peak hour are estimated to increase by 24 vehicles. This results from the increased circulation through the study area intersections resulting from the closure of the Hickox Road railway crossing.
- Although there are some very minor differences in the 2006 PM peak hour intersection delay with the closure, the LOS remains within acceptable limits at all study area intersections.
- Under the With Closure alternative, the study area traffic accident rate will remain essentially the same since the overall traffic volume for the study area is unchanged. Some intersections will experience an increase or decrease in traffic volume to accommodate the closure but these volumes are not large enough to result in the potential for measurable increased accidents.
- Under both alternatives the 2026 traffic volumes in the study area are expected to approximately double over the 2006 PM peak.
- With the increased volumes in the 2026 PM peak hour, the LOS at four of the 16 intersections exceeds acceptable limits. With significant reconstruction of the intersections, the LOS can be improved to acceptable and relatively high levels.

- Under the With Closure alternative in 2026, the same four intersections experience a failed level of service. With the same improvements, an acceptable and high LOS is achieved.

What is the impact on study area access?

Study Area

- In 2006 and 2026 under the No Action alternative, the street network in the study area remains unchanged.

- In 2006 and 2026 under the With Closure alternative, traffic will be required to divert to alternative routes, increasing their average trip length by two to three miles for those properties within three-fourths of a mile of the Hickox Road/Dike Road intersection. The With Closure condition will eliminate an alternative route that might be needed during catastrophic blockage of alternative routes.

What is the impact on emergency response services?

- Fire District Three response time to the study area will increase by seven minutes and three miles. However, this appears to be within national response time standards of the National Fire Protection Association.

- Stackpole Road will be a reasonable alternative route to the study area in an emergency condition, because it is the closest east-west road to Hickox Road.

- Other emergency services response times will not be significantly impacted as they are dispatched from their present locations and have easily accessible alternative routes to the area.

- The Skagit County Fire Marshal and the Fire District Three Fire Chief are opposed to the railway crossing closure as it would reduce access for emergency response. However, according to the 2004 Fire in Washington Report, published by the Office of the State Fire Marshall, Skagit County Fire Protection District Three had only three reported incidents for all of 2004.

What is the impact on truck access?

- In 2006 Hickox Road has approximately 50 heavy vehicle trips per day and six heavy vehicles during the PM peak period. In 2026 Hickox Road is estimated to serve approximately 80 heavy vehicle trips per day and eight heavy vehicles during the PM peak period.

What is the impact on transit services?

- There are no anticipated impacts to SKAT transit services with the closure of the BNSF/Hickox Road railway crossing.
- Currently SKAT has no scheduled service on Hickox Road. Therefore, the With Closure alternative will not impact the transit services currently operating.
- There are anticipated impacts to Conway School District school bus service under the With Closure alternative.
- Currently Conway School District has a bus stop located at the Hickox Road/Dike Road intersection. Rerouting of the school bus will be required under the With Closure alternative.

What is the impact on non-motorized transportation?

- The volume of non-motorized traffic is relatively small. In the PM peak hour one pedestrian and two bicyclists were observed.
- The With Closure alternative is not expected to have a significant impact on pedestrian or bicycle traffic.

Chapter Six: Conclusions and Recommendations

Conclusions

- The With Closure alternative will not create a significant adverse impact on traffic operations at the study area intersections. Four of the 16 intersections will require upgrades to the existing traffic control systems by 2026 regardless if the crossing is closed or not.
- Response time by the police, sheriff and Skagit Medic One in general should not be impacted by the crossing closure.
- Response time by Fire District Three will be impacted by the closure due to the location of the existing fire station on Hickox Road east of I-5.
- Transit service by SKAT will not be impacted by the closure.
- Conway School District bus service will be impacted because a bus stop is located at the Hickox Road/Dike Road intersection.
- The BNSF/Hickox Road railway crossing closure should not have an impact on the safety of pedestrians and bicyclists.
- Future highway transportation improvements for the study area will not be affected by the closure.

Overall

Based on the traffic analysis it was determined the closure of the BNSF/Hickox Road railway crossing will have no significant adverse traffic-related impacts.

Recommendations

It is recommended that the Hickox Road railway crossing be closed in conjunction with the Mount Vernon siding improvement project to support improved train service on the BSNF line between Seattle and Vancouver, BC.

It is recommended that the WSDOT Rail Office work with Skagit County Fire District Three to mitigate the impact of the closure on fire service response.

It is recommended that the Conway School District develop new bus routing to serve students within the study area with the closure of the Hickox Road railway crossing.

Chapter Seven: Response to Comments Traffic Impact Analysis

What are the comments?

As part of the review process for the Hickox Road Railway Crossing Closure Traffic Impact Analysis, the document was submitted, in addition to Washington State Department of Transportation (WSDOT) Rail Office, the City of Mount Vernon Public Works Department, Skagit County Fire District Three, and the Skagit County Public Works Department.

The following is a response to the agency comments. All agencies expressed concern about the proposed closure and requested that additional alternatives be explored.

In addition to the request for added alternatives, the agencies expressed concern about the ability of large trucks and farm vehicles to maneuver through the area due to the substandard roadway geometry. To address this issue, a computer simulation of the turning radius of various vehicles was completed.

Fire protection response time was also a matter of concern. To make a clear assessment of the impacts on fire protection operations certain information is needed, such as response time logs, incident reports, etc. Some facts about the district, mileage and a response summary have been provided by Fire District Three. Additional information such as response time data logs have been repeatedly requested but not provided.

What additional alternatives are available?

Three additional alternatives were developed to meet the project objectives and at the same time maintain access to the west side of the railway along the Hickox Road Corridor. These alternatives include:

- Realign Hickox Road to the south of the proposed siding;
- Widen the existing crossing to accommodate the siding; and
- Move the proposed railroad siding to a new location south of Hickox Road.

Realignment of Hickox Road to avoid the siding would require construction of approximately 2,900 linear feet of new roadway as the new siding extends

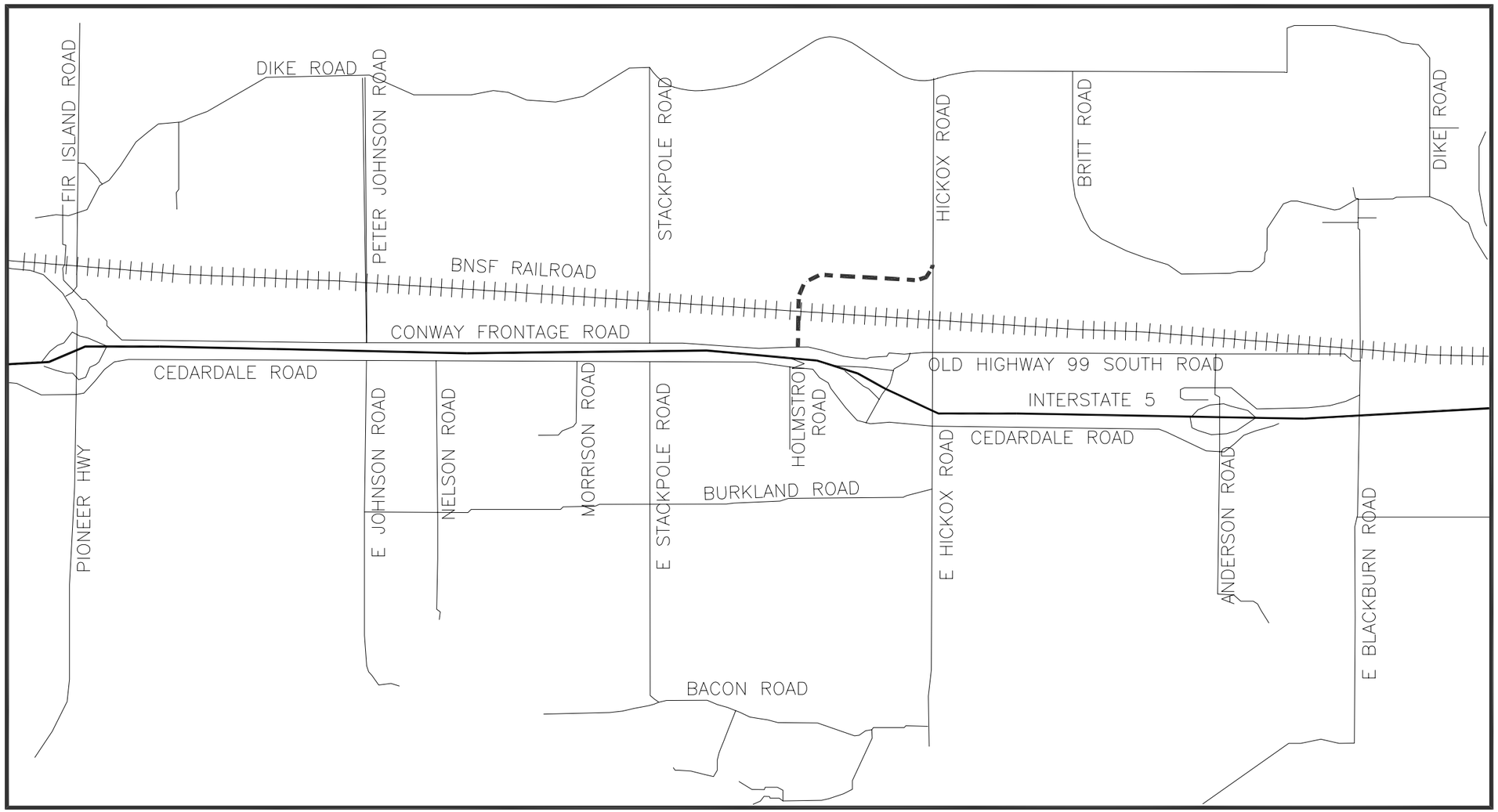
1,500 feet south of the existing Hickox Road railway crossing. The new roadway would begin approximately 700 feet west of the existing crossing turning to the south where it continues for approximately 1,500 feet before turning to the east where it crosses the railway. After crossing the railway the alignment runs approximately 900 feet in a northeasterly direction intersecting with the Conway Frontage Road approximately 1,650 feet south of the Hickox Road intersection with Old Highway 99. See Figure 7.1 and 7.2.

Widening of the existing Hickox Road railway crossing would extend the existing crossing to the east approximately 14 feet. Under this alternative, there would be no change to the existing alignment of Hickox Road.

Moving the railroad siding to a new location south of Hickox Road was suggested by all the agencies. While this concept is a legitimate alternative, it is not viable for several reasons:

- The current funding for this project is $2.4 million. The cost of moving the siding is estimated to cost three times more than the current project.
- The state already invested $1.2 million in upgrading the track at the existing Mount Vernon siding in 2005, the benefits of which would be lost.
- The environmental impacts at the alternative location are unknown.
- Even if additional funding was obtained, a new siding at that location would push the project schedule back at least two years while it is redesigned and environmental impacts assessed.

Therefore, an alternative siding location was eliminated from further consideration.



LEGEND

STUDY AREA BOUNDARY

PROPOSED HICKOX RD ALIGNMENT

NO.	REVISION	BY	APP'D	DATE

GARRY STRUTHERS ASSOCIATES, INC.
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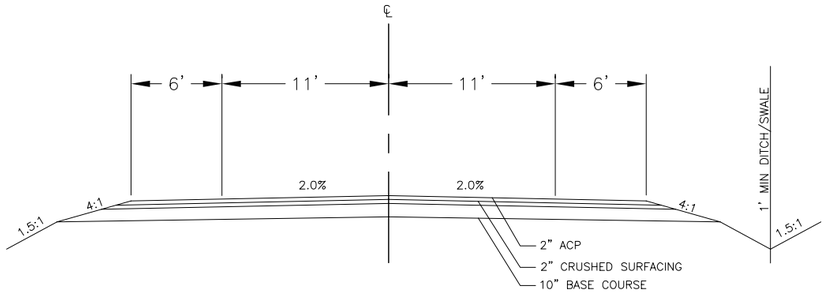
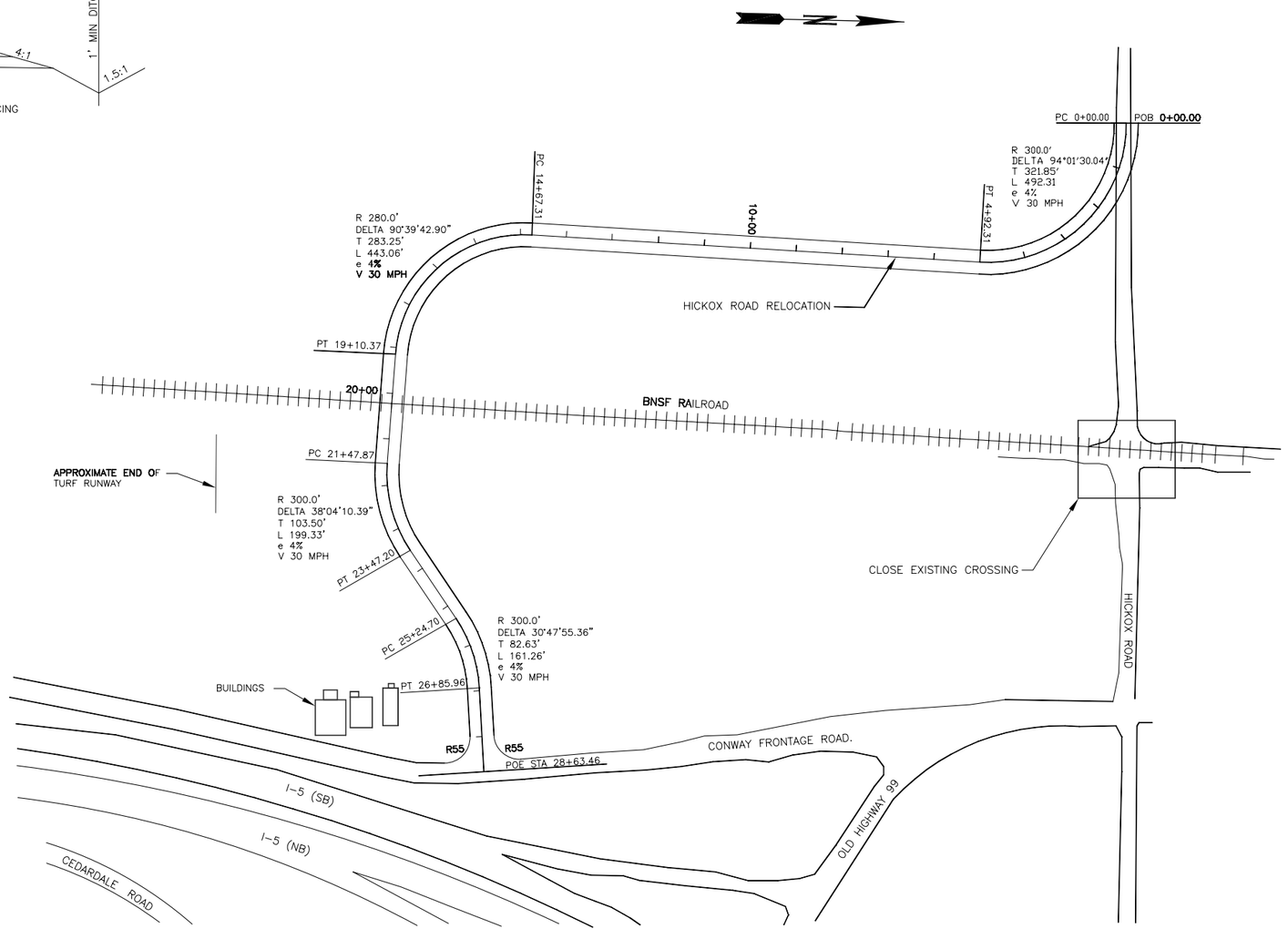
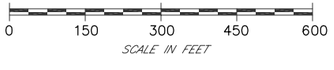
DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY CROSSING CLOSURE	DATE:
DRAWN BY:	SCALE: NTS		PROJECT NO: 000-005.0084
RECOMMENDED:	CONTRACT NO:	STUDY AREA	DRAWING NO: FIG. 7.1
APPROVED:			SHEET NO: OF



TYPICAL SECTION
NTS





NO.	REVISION	BY	APP'D	DATE

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DESIGNED:	
DRAWN BY:	
RECOMMENDED:	
APPROVED:	
CHECKED:	
SCALE:	1:250
CONTRACT NO:	

HICKOX ROAD RAILWAY CROSSING CLOSURE

TYPICAL SECTION/CROSSING RELOCATION

DATE:	07-2006
PROJECT NO:	000-005.084
DRAWING NO:	FIG. 7.2
SHEET NO:	OF

What are the options to realign Hickox Road?

What are the design assumptions for the realigned Hickox Road?

To prepare a viable design for the relocated Hickox Road, several assumptions were made. These assumptions include:

- Roadway design would be subject to Skagit County Road Design Standards (SCRDS);
- Roadway would be functionally classified as a Rural Minor Collector;
- Roadway cross section would consist of two 11-foot lanes with one lane in each direction and six-foot shoulders on both sides per SCRDS;
- Design Speed would be 30 MPH;
- Posted Speed would be 25 MPH;
- Roadway would be aligned to avoid potential environmental conflicts or conflicts with existing land uses;
- New crossing would be designed according to the Washington Utilities and Transportation and BNSF Railway (BNSF) requirements. The new railroad crossing would have state of the art detection and traffic control including gates and flashing lights.
- The cost of right of way is estimated to be $15,000 per acre.

What are the impacts of realigning Hickox Road?

Relocation of the existing Hickox Road will have an impact on the adjacent agricultural property. It will require additional public right of way through viable farmland. Relocation of the Hickox Road/Old Highway 99 intersection will cause a shift in traffic volumes through the area. However, emergency vehicle response times to properties west of the railroad would not change significantly from today. These impacts are discussed below.

Right-of-Way

To relocate Hickox Road over eight acres of right-of-way would be required. The location of the relocated Hickox Road would split two existing fields which could have an impact on the operation of the adjacent farms.

Traffic Volumes

Under the relocation alternative, it is assumed, for the purposes of this analysis, that all existing traffic currently using Hickox Road would continue to use that route even if the roadway were shifted 1,650 feet to the south. This assumption is reasonable in that there are not a lot of viable alternatives to Hickox Road in this area. However, there may be some shift in traffic patterns on the boundaries of the study area which could impact these volumes. Even so, the shifts would be minor.

With this assumption, it is estimated there would be a PM peak hour volume of 32 vehicles per hour (vph) on Hickox Road through the realigned section. PM peak hour volume at the Hickox Road/Conway Frontage Road intersection would approximate 148 vph.

In the 2026 horizon year, the PM peak hour volume on Hickox Road would approximate 66 vph. The PM peak hour volume at the Hickox Road/Conway Frontage Road intersection would approximate 350 vph.

The Hickox Road realignment PM peak hour volume of traffic through the Hickox Road/Conway Frontage Road is expected to remain about the same as the No Action alternative for both the 2006 and 2026 scenarios.

Traffic patterns will change to some degree as traffic generated along Hickox Road destined to and from the south will no longer be required to pass through the Old Highway 99/Conway Frontage Road intersection. Traffic bound to and from the north will now be required to pass through the Old Highway 99/Conway Frontage Road intersection. Traffic destined to and from I-5 will now become right and left turns through this intersection. Right turns are destined to I-5 southbound and left turns are coming from I-5 northbound.

Level of Service (LOS)

In the 2006 time horizon, the Hickox Road/Conway Frontage Road is estimated to operate at LOS A and LOS B in 2026. Other intersections impacted by the proposed realignment, i.e. Hickox Road/Old Highway 99 and the Old Highway 99/Conway Frontage Road, are currently operating at LOS A and would continue to operate at that level under the realignment alternative.

Accidents

Under the realignment alternative, the study area accident rate will remain essentially the same. Two intersections will experience a reorientation of turning movements generated by the realignment, but the volumes are not significant enough to create a measurable increase in the potential for accidents.

Emergency Response

Under the realignment alternative, response time for police and emergency medical services will vary depending on the location of the response vehicle at the time of dispatch. Minimal impact is expected.

Currently the response time from Volunteer Fire District's Three Fire Station located at 19746 East Hickox Road is approximately three minutes. With the realignment of Hickox Road, the response time will increase by approximately one minute. Travel distance will increase approximately 2,100 feet.

Environmental Impacts

Realignment of Hickox Road could have environment impacts. These impacts were not analyzed in this report. Wetlands are located north and south of the Hickox Road/Old Highway 99 intersection. This area is part of the Skagit River flood plain and it is highly possible there may be wetland impacts that would need to be mitigated. Costs for wetland mitigation have not been determined, and could be significant.

What is the cost of realigning Hickox Road?

The cost of realigning Hickox Road is estimated to be $1.7 million to construct. A summary of the cost estimate is attached in Appendix C.

What are the options to widen the existing Hickox Road/BNSF Railway Crossing?

What are the design assumptions for widening the existing Hickox Road railway crossing?

Under this alternative, the existing Hickox Road/BNSF railway crossing would be widened by 14 feet to the east to accommodate the existing siding track.
Following is a list of some of the assumptions and constraints associated with the Widen Existing Railway Crossing alternative. This alternative is subject to Skagit County, WSDOT, and BNSF design criteria.

- Design consistent with WSDOT Two Track Cross Section;
- Existing Approach Grades impact the design; and
- Siding track will be added east of the existing main line track.

What are the impacts of widening the existing Hickox Road/BNSF railway crossing?

Under this alternative the existing railway crossing would be widened. After hearing the communities' concerns, it was requested that WSDOT furnish data about the additional project costs of keeping Hickox Road/BNSF railway crossing open, and widening the crossing. The implications of the Widen Existing Railway Crossing alternative and the alterations that would be essential to accommodate the change are examined below.

The purpose of widening Hickox Road/BNSF railway crossing is to maintain access and minimize community impacts

Effects of Trains on Railway Crossings

The activation of gates at railway crossings limits the vehicular volume, or capacity, at the crossings. The effective capacities at railway crossings can be measured by the percent of time that a crossing does not have gate activations. Every second the crossing is closed for the passage of a train reduces the amount of the roadway capacity. In future years the effective roadway capacities at railway crossing are largely determined by increases in train volume, length and increased clearance time for multiple-track layouts.

According to Washington Administrative Code (WAC) 480-62-220, a public grade crossing must not be blocked for more than ten consecutive minutes. It also indicates that a blocked grade crossing must be cleared immediately upon the engineer becoming aware that the crossing is being approached by law enforcement or other emergency services vehicles with its emergency lights flashing or that such a vehicle is stopped with its emergency lights flashing at the crossing blocked by the train.

This siding is being extended to allow freight and passenger trains to meet and pass each other. Trains may be held in the siding for up to an hour or more, depending on railway network conditions, blocking Hickox Road. This would be in violation of the WAC. WSDOT and the BNSF Railway do not want to create a situation where trains have the potential to violate the WAC. Therefore, while it is technically feasible to widen the crossing and relocate the flashing lights and gates, WSDOT and BNSF Railway do not believe it is prudent.

Traffic Volumes

Under the Widen Existing Crossing alternative, traffic volumes will not be impacted. Turning movements may increase from motorists trying to avoid train blockages. Although turning movements may increase slightly the total volume of trips will not be impacted.

LOS

Under the Widen Existing Crossing alternative, turning movements will not be impacted therefore neither will the LOS. Hickox Road/Old Highway 99 operates at LOS A and will continue to operate at that LOS.

Access

The Widen Existing Crossing alternative would have minimal impact on access to the study area. Travel time would increase due to the increase in

crossing blockage time. Travel distance could increase if motorist turn around and use another crossing.

Emergency Response

Under the Widen Existing Crossing alternative, the crossing would be available for emergency vehicles when trains were not blocking. According to WAC 480-62-220, when an emergency vehicle approaches the tracks with lights flashing the train would have to move. Clearance time for the train to clear the tracks would depend on the train length and when the train crew became aware of the emergency vehicle. It is extremely unlikely that a train crew with its locomotives at the north end of the siding in the vicinity of Blackburn Road would see the emergency vehicles 7,500 feet south at the Hickox Road crossing.

The potential for emergency vehicles to be delayed by trains will increase as the train blockage time increases. Emergency response time may increase seeing as the responder would be unaware of the crossing closure until arrival. Knowing Hickox Road railway crossing was not a crossing option would allow the responder the opportunity time to plan an alternative route without back tracking.

Truck Access

Under the Widen Existing Crossing alternative, truck access would remain virtually the same apart from the potential for increase in delay due to crossing gate closure.

Pedestrian/Bicycle/School Bus Traffic

Pedestrians and bicyclists are generally not familiar with the principles of traffic control. They may consider the signals malfunctioned due to the longer clearance time and may run the gate to avoid the potentially long delay caused by the trains. The Widen Existing Crossing alternative would increase gate closure time; therefore the likelihood of the gate being run would increase, which decreases safety. Under the Widen Existing Crossing alternative, the potential hazards to pedestrians and bicyclists increases.

Cost Estimate

The Widen Existing Railway Crossing alternative is estimated to cost $175,000 to construct. A summary of the cost estimate is attached in Appendix C.

What are the options for truck turning movements?

During a field review, it was determined that several intersections may not provide acceptable turning radii for trucks, and large scale farm equipment.

In some locations with the closure of the Hickox Road/BNSF railway crossing, vehicles will be required to use these intersections. Critical locations include Hickox Road/Dike Road and Stackpole Road/Dike Road intersections.

As county roads, Hickox Road, Stackpole Road and Dike Road are subject to the Skagit County Roads Standards Manual. Figure C-3 from the Skagit County Roads Standards Manual shows the standard access for county roads. Dike Road and Hickox Road are classified as rural minor collectors, whereas Stackpole Road is classified as a rural local access. According to Figure C-3 from the Skagit County Roads Standards Manual for access a collector road should have a radius of 40 feet and a local road should have a minimum 25 foot radii. Currently, at the Hickox Road/Dike Road intersection the radii is 36 and at the Stackpole Road/Dike Road intersection the radius is 36. A turning movement study was completed for these two intersections and graphically illustrated in Appendix D. To more readily accommodate large trucks and farm vehicles at these locations, the radius should be increased. Larger turning radiuses would allow the trucks to stay on the right side of the center line of the roadway during the turning maneuver.

What are the fire protection impacts?

Fire District Three questioned the fire response time estimates used in the analysis and provided additional information for consideration. However, there were several inconsistencies in the data provided by the District which limited its usefulness.

Fire District Three staff indicated that both the Conway station and the Cedardale station units are dispatched to all calls within the district. During 2005, the staff indicated the majority of their calls come from the northwest area of the district adjacent to the Mount Vernon City Limits. Under this situation , the response time from the Cedardale station to the northwest area of the district is approximately 6 minutes based on a distance of 3.2 miles at the posted speed of 35 mph with additional time for negotiating the stop sign controlled intersections. Conversely, the estimated travel time from the Conway station is approximately 6.6 minutes based on a distance of 4.4 miles at the posted speed of 40 mph, or 0.6 minutes longer than the response time from the Cedardale station.

Under the With Closure alternative, units from the Cedardale station will be required to use alternative routes such as Stackpole Road to the south or Blackburn Road to the north. The estimated travel times from the Cedardale station to the northwest area of the district via Stackpole Road is nine minutes whereas for Blackburn Road it is also nine minutes, or an increase of three minutes over the Hickox Road route. The end result is that the Conway station would become the initial response unit to this portion of the district.

Since the response time from the Conway station is unchanged under the With Closure alternative, the overall increase in response time for the first responding unit would be only 0.6 minutes.

The National Fire Protection Agency (NFPA) has adopted national response time standards. Many fire station and districts have adopted the standards. According to NFPA standards, rural area fire stations should respond with six people in 14 minutes, 80 percent of the time. Suburban area fire stations should respond with 10 people in 10 minutes, 80 percent of the time. The population density varies throughout Fire District Three due to the proximity to the City of Mount Vernon such that the response time standards for the district standard lie between the rural and suburban classification. Therefore, under the more stringent standard, Fire District Three should respond with 10 people in 10 minutes, 80 percent of the time which is greater than the response time anticipated under the With Closure alternative.

In addition, Fire District Three also has a mutual aid agreement with the City of Mount Vernon Fire Department which should assist in providing an acceptable response time during critical events within the district.

After further discussions with district staff and evaluation of Fire District Three's response time summary, it was determined the With Closure alternative should not have a significant adverse impact on the district's ability to respond to emergency calls in a timely manner and within nationally recognized standards.

What are the conclusions?

The primary comment received from agencies responding to the report was that an inadequate number of alternatives were evaluated. Therefore, three additional alternatives were assessed. Several agencies also expressed concern about large truck/farm vehicle access as well as fire protection response time. Upon reviewing and analyzing the comments and information, several conclusions were made:

- The Realign Hickox Road to the south of the proposed siding alternative is not cost-effective for the existing low volume and the low projected future volumes of traffic;
- The Widen Existing Hickox Road railway crossing to accommodate two tracks alternative would result in crossing blockages in violation of state regulation WAC 480-62-220;
- Moving the railroad siding to a new location south of Hickox Road alternative is not viable primarily due to funding and schedule; and

- Existing turning radii at the Stackpole Road/Dike Road and Hickox Road/Dike Road intersections are not adequate to accommodate the radii required by large trucks and farm vehicles.

Overall

- The transportation system (which includes the roads, rails, etc.) would experience a net positive impact from the closure of the Hickox Road/BNSF railway crossing, given that the overall transportation circulation and capacity of the area could increase. The positive impacts on the rail system offset and exceed the potential negative roadway impacts.

What are the recommendations?

It is recommended that the Hickox Road railway crossing be closed in conjunction with the Mount Vernon siding improvement project to support improved train service on the BSNF Railway line between Seattle and Vancouver, BC.

To improve turning radii for large trucks and farm vehicles, the Stackpole Road/Dike Road and Hickox Road/Dike Road intersections should be improved.

Appendix A
Traffic Volumes Summary

Hickox Road Railway Crossing Closure Study

Intersection: Pioneer Highway/I-5 Northbound Ramps
PM Peak Hour: 4:30 PM - 5:30 PM
Date Collected: 3-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	269	1.09	0.91	267	0.62		1	267		142	409		155	422		
EBT	164	1.09	0.91	163	0.38	1	0	163	229	87	249	250	95	257	0.92	4.4%
EBRT	0	1.09	0.91	0	0.00		0	0		0	0		0	0		
WBLT	0	1.09	0.91	0	0.00		0	0		0	0		0	0		
WBT	76	1.09	0.91	75	0.54	0	0	75	120	65	140	119	64	140	0.86	0.0%
WBRT	65	1.09	0.91	64	0.46		0	64		55	120		55	119		
NBLT	94	1.09	0.91	93	0.63		-1	93		117	210		119	212		
NBT	1	1.09	0.91	1	0.01	-1	0	1	187	1	2	190	1	2	0.85	2.0%
NBRT	55	1.09	0.91	55	0.37		0	54		69	123		70	124		
SBLT	0	1.09	0.91	0	0		0	0		0	0		0	0		
SBT	0	1.09	0.91	0	0	0	0	0	0	0	0	0	0	0	0.23	0.0%
SBRT	0	1.09	0.91	0	0		0	0		0	0		0	0		
	724			718			0	718			1254			1277		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Pioneer Highway/I-5 Southbound Ramps
PM Peak Hour: 4:30 PM - 5:30 PM
Date Collected: 16-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
EBT	323	1.09	0.92	324	0.66	1	1	325	249	163	487	250	164	488	0.90	5.3%
EBRT	169	1.09	0.92	169	0.34		0	170		86	255		85.87	255		
WBLT	34	1.09	0.92	34	0.16		0	34		19	53		19	53		
WBT	182	1.09	0.92	183	0.84	0	0	183	120	101	284	119	100	283	0.87	5.1%
WBRT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
NBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
NBT	0	1.09	0.92	0	0.00	-1	0	0		0	0	190	0	0	N/A	N/A
NBRT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
SBLT	115	1.09	0.92	115	0.22		0	115		41	157		42	157		
SBT	0	1.09	0.92	0	0.00	0	0	0	187	0	0	190	0	0	0.90	3.4%
SBRT	407	1.09	0.92	408	0.78		0	408		146	554		148	556		
	1230			1233			1	1234			1789			1792		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Fir Island Road/Pioneer Highway
PM Peak Hour: 4:30 PM - 5:30 PM
Date Collected: 31-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	257	1.09	0.94	263	0.65		2	265		62	325		62	326		
EBT	0	1.09	0.94	0	0.00	3	0	0	95	0	0	96	0	0	0.89	2.8%
EBRT	138	1.09	0.94	141	0.35		1	142		33	175		34	175		
WBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBT	365	1.09	0.94	374	0.64	0	0	374	332	212	586	326	208	582	0.91	2.8%
WBRT	207	1.09	0.94	212	0.36		0	212		120	332		118	330		
NBLT	77	1.09	0.94	79	0.24		0	79		37	116		37	116		
NBT	240	1.09	0.94	246	0.76	0	0	246	151	114	360	151	114	360	0.85	2.0%
NBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
SBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
	1284			1316			3	1319			1894			1889		

Hickox Road Railway Crossing Closure Study

Intersection: Fir Island Road/Conway Frontage Road
PM Peak Hour: 4:00 PM - 5:00 PM
Date Collected: 1-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	20	1.09	0.92	20	0.08		0	20		7	27		7	27		
EBT	245	1.09	0.92	246	0.92	3	3	248	95	88	333	96	88	334	0.75	3.8%
EBRT	1	1.09	0.92	1	0.00		0	1		0	1		0.3609	1		
WBLT	46	1.09	0.92	46	0.16		0	47		9	56		9	55		
WBT	212	1.09	0.92	213	0.75	3	2	215	58	43	256	55	41	254	0.82	3.2%
WBRT	25	1.09	0.92	25	0.09		0	25		5	30		5	30		
NBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
NBT	2	1.09	0.92	2	0.04	0	0	2	0	0	2	0	0	2	0.71	0.0%
NBRT	47	1.09	0.92	47	0.96		0	47		0	47		0	47		
SBLT	58	1.09	0.92	58	0.69		0	58		108	167		113	171		
SBT	6	1.09	0.92	6	0.07	0	0	6	157	11	17	163	12	18	0.85	1.2%
SBRT	20	1.09	0.92	20	0.24		0	20		37	57		39	59		
	682			684			6	690			994			998		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Old Highway 99/I-5 Northbound Ramp
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 7-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
EBT	45	1.09	0.94	46	1.00	0	0	46	12	12	58	9	9	55	0.70	0.0%
EBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBT	40	1.09	0.94	41	1.00	-3	-3	38	146	146	187	149	149	190	0.93	20.0%
WBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
NBLT	35	1.09	0.94	36	0.54		-6	29		39	75		40	76		
NBT	0	1.09	0.94	0	0.00	-12	0	0	73	0	0	74	0	0	0.72	23.1%
NBRT	30	1.09	0.94	31	0.46		-6	25		34	64		34	65		
SBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
SBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
	150			154			-15	139			385			386		

Hickox Road Railway Crossing Closure Study

Intersection: Old Highway 99/I-5 Southbound Ramp
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 7-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
EBT	44	1.09	0.94	45	0.46	5	2	47	31	14	59	13	6	51	0.76	8.4%
EBRT	51	1.09	0.94	52	0.54		3	55		17	69		7.0	59		
WBLT	20	1.09	0.94	20	0.24		-3	17		34	54		34	55		
WBT	64	1.09	0.94	66	0.76	-14	-11	55	142	108	174	143	109	175	0.70	15.5%
WBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
NBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
NBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
NBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
SBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
	179			183			-9	174			356			339		

Hickox Road Railway Crossing Closure Study

Intersection: Anderson Road/I-5 Northbound Ramp
PM Peak Hour: 4:00 PM - 5:00 PM
Date Collected: 2-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	124	1.09	0.94	127	0.39		-1	126		300	427		303	430		
EBT	195	1.09	0.94	200	0.61	-3	-2	198	772	472	672	779	476	676	0.72	10.7%
EBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBT	103	1.09	0.94	106	0.33	8	3	108	936	305	411	932	304	409	0.83	6.0%
WBRT	213	1.09	0.94	218	0.67		5	224		631	849		628	846		
NBLT	60	1.09	0.94	61	0.30		2	63		184	245		185	246		
NBT	0	1.09	0.94	0	0.00	5	0	0	613	0	0	616	0	0	0.83	5.0%
NBRT	140	1.09	0.94	143	0.70		4	147		429	573		431	575		
SBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
SBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
	835			856			10	866			3177			3183		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Anderson Road/I-5 Southbound Ramp
PM Peak Hour: 4:30 PM - 5:30 PM
Date Collected: 30-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
EBT	211	1.09	0.96	221	0.77	1	1	222	198	152	373	208	160	381	0.70	2.9%
EBRT	63	1.09	0.96	66	0.23		0	66		46	111		47.825	114		
WBLT	46	1.09	0.96	48	0.33		0.9857	49		162	210		162	210		
WBT	94	1.09	0.96	98	0.67	3	2	100	492	330	429	494	332	430	0.82	1.8%
WBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
NBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
NBT	0	1.09	0.96	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
NBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
SBLT	117	1.09	0.96	122	0.61		-1	122		429	552		418	541		
SBT	0	1.09	0.96	0	0.00	-1	0	0	701	0	0	683	0	0	0.86	8.4%
SBRT	74	1.09	0.96	77	0.39		0	77		272	349		265	342		
	605			633			3	636			2024			2018		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Anderson Road/Old Highway 99
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 30-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
EBT	0	1.09	0.96	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
EBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
WBLT	47	1.09	0.96	49	0.29		3	52		51	101		45	94		
WBT	0	1.09	0.96	0	0.00	9	0	0	177	0	0	154	0	0	0.75	12.3%
WBRT	115	1.09	0.96	120	0.71		6	127		126	246		109	230		
NBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
NBT	149	1.09	0.96	156	0.58	2	1	157	97	57	213	106	62	218	0.50	7.5%
NBRT	106	1.09	0.96	111	0.42		1	112		40	151		44	155		
SBLT	137	1.09	0.96	143	0.57		8	152		107	250		117	260		
SBT	105	1.09	0.96	110	0.43	15	7	116	189	82	192	206	89	199	0.81	3.7%
SBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
	659			690			26	716			1153			1156		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Stackpole Road/Dike Road
PM Peak Hour: 4:00 PM - 5:00 PM
Date Collected: 25-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
EBT	0	1.09	0.92	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
EBRT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
WBLT	3	1.09	0.92	3	0.75		9	12		1	4		12	15		
WBT	0	1.09	0.92	0	0.00	12	0	0	1	0	0	16	0	0	0.33	0.0%
WBRT	1	1.09	0.92	1	0.25		3	4		0	1		4	5		
NBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
NBT	6	1.09	0.92	6	0.75	-3	-2	4	9	7	13	-2	-2	5	0.67	0.0%
NBRT	2	1.09	0.92	2	0.25		-1	1		2	4		-1	2		
SBLT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
SBT	5	1.09	0.92	5	1.00	2	2	7	6	6	11	12	12	17	0.42	0.0%
SBRT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
	17			17			11	28			33			43		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Hickox Road/Dike Road
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 31-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
EBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
EBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBLT	1	1.09	0.94	1	0.07		-1	0		0	2		0	0		
WBT	0	1.09	0.94	0	0.00	-12	0	0	0	0	0	0	0	0	0.58	0.0%
WBRT	13	1.09	0.94	13	0.93		-11	2		0	29		0	5		
NBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
NBT	7	1.09	0.94	7	0.78	-1	-1	6	0	0	15	0	0	14	0.45	0.0%
NBRT	2	1.09	0.94	2	0.22		0	2		0	4		0	4		
SBLT	6	1.09	0.94	6	0.43		-3	3		0	13		0	6		
SBT	8	1.09	0.94	8	0.57	-8	-5	4	0	0	18	0	0	8	0.70	14.3%
SBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
	37			38			-21	17			81			36		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Britt Road/Dike Road
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 30-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
EBT	0	1.09	0.96	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
EBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
WBLT	6	1.09	0.96	6	0.50		0	6		7	13		7	13		
WBT	0	1.09	0.96	0	0.00	0	0	0	14	0	0	13	0	0	0.60	0.0%
WBRT	6	1.09	0.96	6	0.50		0	6		7	13		7	13		
NBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
NBT	5	1.09	0.96	5	0.33	-4	-1	4	17	6	11	17	6	11	0.63	0.0%
NBRT	10	1.09	0.96	10	0.67		-3	8		11	22		11	22		
SBLT	5	1.09	0.96	5	0.45		-5	1		9	14		1	6		
SBT	6	1.09	0.96	6	0.55	-10	-5	1	20	11	17	2	1	7	0.69	8.3%
SBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
	38			40			-14	26			91			72		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Blackburn Road/Britt Road
PM Peak Hour: 4:00 PM - 5:00 PM
Date Collected: 30-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
EBT	0	1.09	0.96	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
EBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
WBLT	17	1.09	0.96	18	0.44		-2.615	15		10	27		17	35		
WBT	0	1.09	0.96	0	0.00	-6	0	0	22	0	0	39	0	0	0.61	7.7%
WBRT	22	1.09	0.96	23	0.56		-3.385	20		12	35		22	45		
NBLT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
NBT	8	1.09	0.96	8	0.40	0	0	8	0	0	8	0	0	8	0.71	0.0%
NBRT	12	1.09	0.96	13	0.60		0	13		0	13		0	13		
SBLT	18	1.09	0.96	19	0.55		4	23		45	64		57	76		
SBT	15	1.09	0.96	16	0.45	7	3	19	82	37	53	104	47	63	0.83	6.1%
SBRT	0	1.09	0.96	0	0.00		0	0		0	0		0	0		
	92			96			1	97			200			239		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Blackburn Road/Old Highway 99
PM Peak Hour: 4:30 PM - 5:30 PM
Date Collected: 15-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	3	1.09	0.92	3	0.03		0	3		2	5		3	6		
EBT	66	1.09	0.92	66	0.62	6	4	70	80	49	116	102	63	129	0.86	9.3%
EBRT	38	1.09	0.92	38	0.36		2	40		28	67		36.224	74		
WBLT	17	1.09	0.92	17	0.10		-0.692	16		12	29		13	30		
WBT	48	1.09	0.92	48	0.28	-7	-1.953	46	121	34	82	135	38	86	0.76	5.2%
WBRT	107	1.09	0.92	107	0.62		-4.355	103		75	183		84	191		
NBLT	20	1.09	0.92	20	0.08		0	20		9	29		11	31		
NBT	174	1.09	0.92	174	0.70	-1	-1	174	114	80	254	131	92	266	0.75	4.4%
NBRT	55	1.09	0.92	55	0.22		0	55		25	80		29	84		
SBLT	119	1.09	0.92	119	0.43		-1	118		111	230		111	230		
SBT	159	1.09	0.92	159	0.57	-3	-2	158	259	148	308	259	148	308	0.83	1.1%
SBRT	0	1.09	0.92	0	0.00		0	0		0	0		0	0		
	806			808			-5	803			1382			1435		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Stackpole Road/Conway Frontage Road
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 31-Jan-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	5	1.09	0.94	5	0.63		1	6		0	5		0	5		
EBT	0	1.09	0.94	0	0.00	2	0	0	0	0	0	0	0	0	0.40	0.0%
EBRT	3	1.09	0.94	3	0.38		1	4		0	3		0	3		
WBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
WBT	0	1.09	0.94	0	0.00	0	0	0	0	0	0	0	0	0	N/A	N/A
WBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
NBLT	1	1.09	0.94	1	0.02		0	1		0	1		0	1		
NBT	44	1.09	0.94	45	0.98	7	7	52	13	13	58	19	19	64	0.87	0.0%
NBRT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBLT	0	1.09	0.94	0	0.00		0	0		0	0		0	0		
SBT	63	1.09	0.94	65	0.98	16	16	80	161	158	223	168	165	230	0.80	0.0%
SBRT	1	1.09	0.94	1	0.02		0	1		3	4		3	4		
	117			120			25	145			294			307		

3/29/2006 2:40 PM

Hickox Road Railway Crossing Closure Study

Intersection: Hickox Road/Old Highway 99
PM Peak Hour: 4:15 PM - 5:15 PM
Date Collected: 15-Feb-06

	2006 Existing	Monthly Adjustment	Day of the Week Adjustment	2006 No Action PM Peak	Intersection Approach Percentage	Approach Volume Difference	2006 PM Peak W/Closure Volume Difference	2006 PM Peak W/Closure	Approach Volume Difference	2026 PM Peak Volume Difference	2026 No Action PM Peak	Approach Volume Difference	2026 PM Peak W/Closure Volume Difference	2026 PM Peak W/Closure	Peak Hour Factor	Trucks and Buses
EBLT	11	1.09	0.92	11	0.55		-11	0		12	23		-11	0		
EBT	0	1.09	0.92	0	0.00	-20	0	0	22	0	0	-20	0	0	0.58	0.0%
EBRT	9	1.09	0.92	9	0.45		-9	0		10	19		-9	0		
WBLT	2	1.09	0.92	2	0.17		0	2		3	5		3	5		
WBT	0	1.09	0.92	0	0.00	0	0	0	16	0	0	16	0	0	0.47	N/A
WBRT	10	1.09	0.92	10	0.83		0	10		13	23		13	23		
NBLT	2	1.09	0.92	2	0.02		-2	0		1	3		-2	0		
NBT	104	1.09	0.92	104	0.96	6	8	112	33	32	136	15	17	121	0.87	0.0%
NBRT	2	1.09	0.92	2	0.02		0	2		1	3		0	2		
SBLT	3	1.09	0.92	3	0.02		0	3		3	6		3	6		
SBT	132	1.09	0.92	132	0.91	16	26	158	153	139	272	154	151	283	0.80	0.0%
SBRT	10	1.09	0.92	10	0.07		-10	0		11	21		-10	0		
	285			286			2	288			510			441		

Appendix B
Level of Service

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	267	163	0	0	75	64	93	1	55	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	297	181	0	0	83	71	103	1	61	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	154			181			858	929	181	889	858	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	79			100			56	99	93	100	100	100
cM capacity (veh/h)	1426			1394			232	212	861	205	233	976

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	297	181	83	71	166
Volume Left	297	0	0	0	103
Volume Right	0	0	0	71	61
cSH	1426	1700	1700	1700	1093
Volume to Capacity	0.21	0.11	0.05	0.04	0.15
Queue Length (ft)	20	0	0	0	13
Control Delay (s)	8.2	0.0	0.0	0.0	8.9
Lane LOS	A				A
Approach Delay (s)	5.1		0.0		8.9
Approach LOS					A

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	324	169	34	183	0	0	0	0	115	0	408
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	0	352	184	37	199	0	0	0	0	125	0	443
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
vC, conflicting volume	199			536			847	625	352	625	809	199
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	68	100	47
cM capacity (veh/h)	1373			1032			130	387	691	386	303	842

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	352	184	37	199	568
Volume Left	0	0	37	0	125
Volume Right	0	184	0	0	443
cSH	1700	1700	1032	1700	1229
Volume to Capacity	0.21	0.11	0.04	0.12	0.46
Queue Length (ft)	0	0	3	0	63
Control Delay (s)	0.0	0.0	8.6	0.0	10.4
Lane LOS			A		B
Approach Delay (s)	0.0		1.4		10.4
Approach LOS					B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	374	212	263	141	79	246
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (veh/h)	420	238	296	158	89	276
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type	None					
Median storage veh)						
vC, conflicting volume	838	89	365			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	75	75			
cM capacity (veh/h)	253	969	1193			

Direction, Lane #	SE 1	NE 1	NE 2	SW 1	SW 2
Volume Total	658	296	158	89	276
Volume Left	420	296	0	0	0
Volume Right	238	0	0	0	276
cSH	429	1193	1700	1700	1700
Volume to Capacity	1.54	0.25	0.09	0.05	0.16
Queue Length (ft)	891	24	0	0	0
Control Delay (s)	276.4	9.0	0.0	0.0	0.0
Lane LOS	F	A			
Approach Delay (s)	276.4	5.9		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	125.0		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	246	1	46	213	25	0	2	47	58	6	20
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (veh/h)	25	308	1	58	266	31	0	2	59	72	8	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												2
Median type								None			None	
Median storage veh)												
vC, conflicting volume	298			309			756	771	308	814	756	282
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			100	99	92	72	98	97
cM capacity (veh/h)	1264			1252			293	309	732	258	316	757

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	25	309	58	298	61	105
Volume Left	25	0	58	0	0	72
Volume Right	0	1	0	31	59	25
cSH	1264	1700	1252	1700	693	1020
Volume to Capacity	0.02	0.18	0.05	0.18	0.09	0.10
Queue Length (ft)	2	0	4	0	7	9
Control Delay (s)	7.9	0.0	8.0	0.0	10.7	8.9
Lane LOS	A		A		B	A
Approach Delay (s)	0.6		1.3		10.7	8.9
Approach LOS					B	A

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	4%	
Volume (veh/h)	46	0	0	41	36	31
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (veh/h)	60	0	0	53	47	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type					None	
Median storage veh)						
vC, conflicting volume			60		113	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	96
cM capacity (veh/h)			1544		883	1006

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	60	53	87
Volume Left	0	0	47
Volume Right	0	0	40
cSH	1700	1700	1889
Volume to Capacity	0.04	0.03	0.05
Queue Length (ft)	0	0	4
Control Delay (s)	0.0	0.0	7.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	7.0
Approach LOS			A

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	0%	
Volume (veh/h)	45	52	20	66	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	54	63	24	80	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
vC, conflicting volume			117		213	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1472		762	973

Direction, Lane #	EB 1	WB 1
Volume Total	117	104
Volume Left	0	24
Volume Right	63	0
cSH	1700	1472
Volume to Capacity	0.07	0.02
Queue Length (ft)	0	1
Control Delay (s)	0.0	1.8
Lane LOS		A
Approach Delay (s)	0.0	1.8
Approach LOS		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	10.3%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	127	200	0	0	106	218	61	0	143	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (veh/h)	163	256	0	0	136	279	78	0	183	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									24			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	415			256			718	997	256	810	718	136
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			74	100	77	100	100	100
cM capacity (veh/h)	1144			1308			306	209	782	204	304	913

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	419	136	279	262
Volume Left	163	0	0	78
Volume Right	0	0	279	183
cSH	1144	1700	1700	1088
Volume to Capacity	0.14	0.08	0.16	0.24
Queue Length (ft)	12	0	0	24
Control Delay (s)	4.3	0.0	0.0	9.4
Lane LOS	A			A
Approach Delay (s)	4.3	0.0		9.4
Approach LOS				A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			0%			4%	
Volume (veh/h)	0	221	66	48	98	0	0	0	0	122	0	77
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	0	266	80	58	118	0	0	0	0	147	0	93
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												12
Median type								None			None	
Median storage veh)												
vC, conflicting volume	118			346			586	540	306	540	580	118
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	66	100	90
cM capacity (veh/h)	1470			1213			366	427	734	436	405	934

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	346	176	240
Volume Left	0	58	147
Volume Right	80	0	93
cSH	1700	1213	1369
Volume to Capacity	0.20	0.05	0.18
Queue Length (ft)	0	4	16
Control Delay (s)	0.0	2.9	8.2
Lane LOS		A	A
Approach Delay (s)	0.0	2.9	8.2
Approach LOS			A

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	49	120	156	111	143	110
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (veh/h)	71	174	226	161	207	159
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)		40				
Median type	None					
Median storage veh)						
vC, conflicting volume	884	311			389	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	76			82	
cM capacity (veh/h)	259	727			1168	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	245	387	207	159
Volume Left	71	0	207	0
Volume Right	174	161	0	0
cSH	986	1700	1168	1700
Volume to Capacity	0.25	0.23	0.18	0.09
Queue Length (ft)	25	0	16	0
Control Delay (s)	9.9	0.0	8.7	0.0
Lane LOS	A		A	
Approach Delay (s)	9.9	0.0	4.9	
Approach LOS	A			

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A

Movement	WBL	WBR	NBR	NBR2	SWL
Lane Configurations					
Sign Control	Stop		Free		Free
Grade	2%		0%		0%
Volume (veh/h)	3	1	6	2	5
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (veh/h)	4	1	8	3	7
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None				
Median storage veh)					
vC, conflicting volume	17	10			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
tC, single (s)	6.4	6.2			
tC, 2 stage (s)					
tF (s)	3.5	3.3			
p0 queue free %	100	100			
cM capacity (veh/h)	1001	1072			

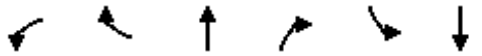
Direction, Lane #	WB 1	NB 1	SW 1
Volume Total	6	11	7
Volume Left	4	0	0
Volume Right	1	3	0
cSH	1018	1700	1608
Volume to Capacity	0.01	0.01	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	13	7	2	6	8
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (veh/h)	2	21	11	3	10	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	45	13			15	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	959	1067			1603	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	15	23
Volume Left	2	0	10
Volume Right	21	3	0
cSH	1059	1700	1603
Volume to Capacity	0.02	0.01	0.01
Queue Length (ft)	2	0	0
Control Delay (s)	8.5	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	3.1
Approach LOS	A		

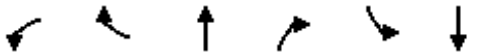
Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	6	5	10	5	6
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (veh/h)	8	8	7	14	7	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	36	14			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	973	1066			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	21	15
Volume Left	8	0	7
Volume Right	8	14	0
cSH	1017	1700	1595
Volume to Capacity	0.02	0.01	0.00
Queue Length (ft)	1	0	0
Control Delay (s)	8.6	0.0	3.3
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	3.3
Approach LOS	A		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A



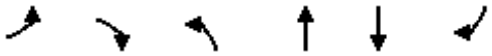
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	1%		0%			0%
Volume (veh/h)	18	23	8	13	19	16
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (veh/h)	21	27	9	15	22	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	81	17			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	909	1062			1590	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	25	41
Volume Left	21	0	22
Volume Right	27	15	0
cSH	989	1700	1590
Volume to Capacity	0.05	0.01	0.01
Queue Length (ft)	4	0	1
Control Delay (s)	8.8	0.0	4.0
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	4.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
Grade (%)		2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.92		1.00	0.96		1.00	1.00	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1565			1501		1564	1588		1564	1646	
Flt Permitted		0.99			0.96		0.64	1.00		0.60	1.00	
Satd. Flow (perm)		1554			1454		1059	1588		985	1646	
Volume (vph)	3	66	38	17	48	107	20	174	55	119	159	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	3	75	43	19	55	122	23	198	62	135	181	0
Lane Group Flow (vph)	0	121	0	0	196	0	23	260	0	135	181	0
Bus Blockages (#/hr)	2	2	2	2	2	2	2	2	2	2	2	2
Turn Type	Perm			Perm			Perm			custom		
Protected Phases		4			8			2				
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)		9.6			9.6		22.0	22.0		22.0	22.0	
Effective Green, g (s)		9.6			9.6		22.0	22.0		22.0	22.0	
Actuated g/C Ratio		0.24			0.24		0.56	0.56		0.56	0.56	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		377			352		588	882		547	914	
v/s Ratio Prot								c0.16				
v/s Ratio Perm		0.08			c0.13		0.02			0.14	0.11	
v/c Ratio		0.32			0.56		0.04	0.29		0.25	0.20	
Uniform Delay, d1		12.3			13.1		4.0	4.7		4.5	4.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			1.9		0.0	0.2		0.2	0.1	
Delay (s)		12.8			15.0		4.0	4.9		4.8	4.5	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		12.8			15.0			4.8			4.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	3	1	45	65	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (veh/h)	5	3	1	48	69	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	120	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	875	993	1530			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	9	49	70
Volume Left	5	1	0
Volume Right	3	0	1
cSH	916	1530	1700
Volume to Capacity	0.01	0.00	0.04
Queue Length (ft)	1	0	0
Control Delay (s)	9.0	0.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	0	9	2	0	10	2	104	2	3	132	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (veh/h)	12	0	9	2	0	11	2	109	2	3	139	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
vC, conflicting volume	276	266	144	275	271	111	149			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	100	100	99	100			100		
cM capacity (veh/h)	667	637	903	669	634	943	1432			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	21	13	114	153
Volume Left	12	2	2	3
Volume Right	9	11	2	11
cSH	756	883	1432	1478
Volume to Capacity	0.03	0.01	0.00	0.00
Queue Length (ft)	2	1	0	0
Control Delay (s)	9.9	9.1	0.2	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.9	9.1	0.2	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	18.4%	ICU Level of Service	A	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	267	163	0	0	75	64	93	1	54	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	297	181	0	0	83	71	103	1	60	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	154			181			858	929	181	888	858	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	79			100			56	99	93	100	100	100
cM capacity (veh/h)	1426			1394			232	212	861	206	233	976

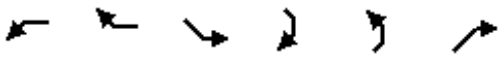
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	297	181	83	71	164
Volume Left	297	0	0	0	103
Volume Right	0	0	0	71	60
cSH	1426	1700	1700	1700	1093
Volume to Capacity	0.21	0.11	0.05	0.04	0.15
Queue Length (ft)	20	0	0	0	13
Control Delay (s)	8.2	0.0	0.0	0.0	8.9
Lane LOS	A				A
Approach Delay (s)	5.1		0.0		8.9
Approach LOS					A

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	325	170	34	183	0	0	0	0	115	0	408
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	0	353	185	37	199	0	0	0	0	125	0	443
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
vC, conflicting volume	199			538			848	626	353	626	811	199
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	68	100	47
cM capacity (veh/h)	1373			1030			130	386	690	386	302	842

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	353	185	37	199	568
Volume Left	0	0	37	0	125
Volume Right	0	185	0	0	443
cSH	1700	1700	1030	1700	1228
Volume to Capacity	0.21	0.11	0.04	0.12	0.46
Queue Length (ft)	0	0	3	0	63
Control Delay (s)	0.0	0.0	8.6	0.0	10.4
Lane LOS			A		B
Approach Delay (s)	0.0		1.4		10.4
Approach LOS					B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A



Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Sign Control	Free		Stop		Free	
Grade	0%		0%		0%	
Volume (veh/h)	374	212	265	142	79	246
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (veh/h)	420	238	298	160	89	276
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)				4		
Median type			None			
Median storage veh)						
vC, conflicting volume			874	420	658	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			6.4	6.2	4.1	
tC, 2 stage (s)						
tF (s)			3.5	3.3	2.2	
p0 queue free %			0	75	90	
cM capacity (veh/h)			290	633	929	

Direction, Lane #	WB 1	WB 2	SE 1	NE 1	NE 2
Volume Total	420	238	457	89	276
Volume Left	0	0	298	89	0
Volume Right	0	238	160	0	0
cSH	1700	1700	609	929	1700
Volume to Capacity	0.25	0.14	0.75	0.10	0.16
Queue Length (ft)	0	0	167	8	0
Control Delay (s)	0.0	0.0	26.6	9.3	0.0
Lane LOS			D	A	
Approach Delay (s)	0.0		26.6	2.3	
Approach LOS			D		

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	20	248	1	47	215	25	0	2	47	58	6	20
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (veh/h)	25	310	1	59	269	31	0	2	59	72	8	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												2
Median type								None			None	
Median storage veh)												
vC, conflicting volume	300			311			763	778	311	822	763	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			100	99	92	71	98	97
cM capacity (veh/h)	1261			1249			289	306	730	254	312	755

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	25	311	59	300	61	105
Volume Left	25	0	59	0	0	72
Volume Right	0	1	0	31	59	25
cSH	1261	1700	1249	1700	690	1014
Volume to Capacity	0.02	0.18	0.05	0.18	0.09	0.10
Queue Length (ft)	2	0	4	0	7	9
Control Delay (s)	7.9	0.0	8.0	0.0	10.7	9.0
Lane LOS	A		A		B	A
Approach Delay (s)	0.6		1.3		10.7	9.0
Approach LOS					B	A

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	4%	
Volume (veh/h)	46	0	0	38	29	25
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (veh/h)	60	0	0	49	38	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type					None	
Median storage veh)						
vC, conflicting volume			60		109	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	97
cM capacity (veh/h)			1544		888	1006

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	60	49	70
Volume Left	0	0	38
Volume Right	0	0	32
cSH	1700	1700	1894
Volume to Capacity	0.04	0.03	0.04
Queue Length (ft)	0	0	3
Control Delay (s)	0.0	0.0	7.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	7.0
Approach LOS			A

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	0%	
Volume (veh/h)	47	55	17	55	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	57	66	20	66	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
vC, conflicting volume			123		197	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1464		781	968

Direction, Lane #	EB 1	WB 1
Volume Total	123	87
Volume Left	0	20
Volume Right	66	0
cSH	1700	1464
Volume to Capacity	0.07	0.01
Queue Length (ft)	0	1
Control Delay (s)	0.0	1.9
Lane LOS		A
Approach Delay (s)	0.0	1.9
Approach LOS		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		10.4%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	126	198	0	0	108	224	63	0	147	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (veh/h)	162	254	0	0	138	287	81	0	188	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	426			254			715	1003	254	810	715	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			74	100	76	100	100	100
cM capacity (veh/h)	1134			1311			307	207	785	202	305	910

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	415	138	287	269
Volume Left	162	0	0	81
Volume Right	0	0	287	188
cSH	1134	1700	1700	1092
Volume to Capacity	0.14	0.08	0.17	0.25
Queue Length (ft)	12	0	0	24
Control Delay (s)	4.3	0.0	0.0	9.4
Lane LOS	A			A
Approach Delay (s)	4.3	0.0		9.4
Approach LOS				A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			0%			4%	
Volume (veh/h)	0	222	66	49	100	0	0	0	0	122	0	77
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	0	267	80	59	120	0	0	0	0	147	0	93
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												12
Median type								None			None	
Median storage veh)												
vC, conflicting volume	120			347			592	546	307	546	586	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	100	66	100	90
cM capacity (veh/h)	1467			1212			362	424	733	431	402	931

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	347	180	240
Volume Left	0	59	147
Volume Right	80	0	93
cSH	1700	1212	1362
Volume to Capacity	0.20	0.05	0.18
Queue Length (ft)	0	4	16
Control Delay (s)	0.0	3.0	8.2
Lane LOS		A	A
Approach Delay (s)	0.0	3.0	8.2
Approach LOS			A

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	52	127	157	112	152	116
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (veh/h)	75	184	228	162	220	168
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)		12				
Median type	None					
Median storage veh)						
vC, conflicting volume	921	313			392	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	75			81	
cM capacity (veh/h)	243	725			1165	

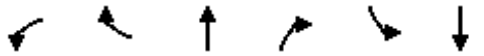
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	259	390	220	168
Volume Left	75	0	220	0
Volume Right	184	162	0	0
cSH	968	1700	1165	1700
Volume to Capacity	0.27	0.23	0.19	0.10
Queue Length (ft)	27	0	17	0
Control Delay (s)	10.1	0.0	8.8	0.0
Lane LOS	B		A	
Approach Delay (s)	10.1	0.0	5.0	
Approach LOS	B			

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A

Movement	WBL	WBR	NBR	NBR2	SWL
Lane Configurations					
Sign Control	Stop		Free		Free
Grade	2%		0%		0%
Volume (veh/h)	12	4	4	1	7
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (veh/h)	17	6	6	1	10
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None				
Median storage veh)					
vC, conflicting volume	16	6			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
tC, single (s)	6.4	6.2			
tC, 2 stage (s)					
tF (s)	3.5	3.3			
p0 queue free %	98	99			
cM capacity (veh/h)	1002	1076			

Direction, Lane #	WB 1	NB 1	SW 1
Volume Total	23	7	10
Volume Left	17	0	0
Volume Right	6	1	0
cSH	1020	1700	1614
Volume to Capacity	0.02	0.00	0.00
Queue Length (ft)	2	0	0
Control Delay (s)	8.6	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.6	0.0	0.0
Approach LOS	A		

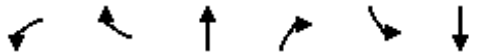
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	2	6	2	3	4
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (veh/h)	0	3	10	3	5	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	27	11			13	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	985	1070			1606	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	13	11
Volume Left	0	0	5
Volume Right	3	3	0
cSH	1070	1700	1606
Volume to Capacity	0.00	0.01	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	8.4	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	3.1
Approach LOS	A		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	6	6	4	8	1	1
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (veh/h)	8	8	5	11	1	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	15	11			16	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	1003	1070			1601	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	16	3
Volume Left	8	0	1
Volume Right	8	11	0
cSH	1035	1700	1601
Volume to Capacity	0.02	0.01	0.00
Queue Length (ft)	1	0	0
Control Delay (s)	8.5	0.0	3.6
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	3.6
Approach LOS	A		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

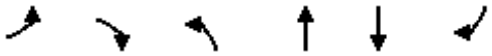
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	1%		0%			0%
Volume (veh/h)	15	20	8	13	23	19
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (veh/h)	18	24	9	15	27	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	94	17			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			98	
cM capacity (veh/h)	891	1062			1590	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	41	25	49
Volume Left	18	0	27
Volume Right	24	15	0
cSH	981	1700	1590
Volume to Capacity	0.04	0.01	0.02
Queue Length (ft)	3	0	1
Control Delay (s)	8.8	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
Grade (%)		2%			2%			2%			2%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.90		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1564	1558		1564	1475		1564	1588		1564	1646	
Flt Permitted	0.65	1.00		0.68	1.00		0.64	1.00		0.60	1.00	
Satd. Flow (perm)	1071	1558		1114	1475		1060	1588		985	1646	
Volume (vph)	3	70	40	16	46	103	20	174	55	118	158	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	3	80	45	18	52	117	23	198	62	134	180	0
Lane Group Flow (vph)	3	125	0	18	169	0	23	260	0	134	180	0
Bus Blockages (#/hr)	2	2	2	2	2	2	2	2	2	2	2	2
Turn Type	Perm			Perm			Perm			custom		
Protected Phases		4			8			2				
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)	7.8	7.8		7.8	7.8		26.6	26.6		26.6	26.6	
Effective Green, g (s)	7.8	7.8		7.8	7.8		26.6	26.6		26.6	26.6	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	287		205	271		665	996		618	1033	
v/s Ratio Prot		0.08			c0.11			c0.16				
v/s Ratio Perm	0.00			0.02			0.02			0.14	0.11	
v/c Ratio	0.02	0.44		0.09	0.62		0.03	0.26		0.22	0.17	
Uniform Delay, d1	14.2	15.3		14.3	15.9		3.0	3.5		3.4	3.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	1.1		0.2	4.4		0.0	0.1		0.2	0.1	
Delay (s)	14.2	16.4		14.5	20.4		3.0	3.7		3.6	3.4	
Level of Service	B	B		B	C		A	A		A	A	
Approach Delay (s)		16.4			19.8			3.6			3.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	4	1	52	80	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (veh/h)	6	4	1	55	85	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	143	86	86			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	849	973	1510			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	56	86
Volume Left	6	1	0
Volume Right	4	0	1
cSH	895	1510	1700
Volume to Capacity	0.01	0.00	0.05
Queue Length (ft)	1	0	0
Control Delay (s)	9.1	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	2	0	10	0	112	2	3	158	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (veh/h)	0	0	0	2	0	11	0	118	2	3	166	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
vC, conflicting volume	302	293	166	292	292	119	166			120		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			100		
cM capacity (veh/h)	642	617	878	660	618	933	1412			1468		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	13	120	169
Volume Left	0	2	0	3
Volume Right	0	11	2	0
cSH	1700	873	1412	1468
Volume to Capacity	0.00	0.01	0.00	0.00
Queue Length (ft)	0	1	0	0
Control Delay (s)	0.0	9.2	0.0	0.2
Lane LOS	A	A		A
Approach Delay (s)	0.0	9.2	0.0	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	19.2%	ICU Level of Service	A	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	409	249	0	0	140	120	210	0	123	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	454	277	0	0	156	133	233	0	137	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	289			277			1341	1474	277	1409	1341	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	64			100			0	100	82	100	100	100
cM capacity (veh/h)	1273			1286			93	81	762	69	98	890

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	454	277	156	133	370
Volume Left	454	0	0	0	233
Volume Right	0	0	0	133	137
cSH	1273	1700	1700	1700	700
Volume to Capacity	0.36	0.16	0.09	0.08	0.53
Queue Length (ft)	41	0	0	0	78
Control Delay (s)	9.4	0.0	0.0	0.0	15.7
Lane LOS	A				C
Approach Delay (s)	5.8		0.0		15.7
Approach LOS					C

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	56.3%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	487	255	53	284	0	0	0	0	157	0	554
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	0	529	277	58	309	0	0	0	0	171	0	602
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
vC, conflicting volume	309			807			1254	953	529	953	1230	309
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			100	100	100	24	100	18
cM capacity (veh/h)	1252			818			25	241	549	226	165	731

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	529	277	58	309	773
Volume Left	0	0	58	0	171
Volume Right	0	277	0	0	602
cSH	1700	1700	818	1700	957
Volume to Capacity	0.31	0.16	0.07	0.18	0.81
Queue Length (ft)	0	0	6	0	226
Control Delay (s)	0.0	0.0	9.7	0.0	22.4
Lane LOS			A		C
Approach Delay (s)	0.0		1.5		22.4
Approach LOS					C

Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	325	175	116	360	586	332
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (veh/h)	365	197	130	404	658	373
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		40				
Median type	None					
Median storage veh)						
vC, conflicting volume	1324	658	1031			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	58	81			
cM capacity (veh/h)	139	464	674			

Direction, Lane #	SE 1	NE 1	NE 2	SW 1	SW 2
Volume Total	562	130	404	658	373
Volume Left	365	130	0	0	0
Volume Right	197	0	0	0	373
cSH	386	674	1700	1700	1700
Volume to Capacity	1.46	0.19	0.24	0.39	0.22
Queue Length (ft)	730	18	0	0	0
Control Delay (s)	246.0	11.6	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	246.0	2.8		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	65.6		
Intersection Capacity Utilization	72.1%	ICU Level of Service	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	27	333	1	56	256	30	0	2	47	167	17	57
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (veh/h)	34	416	1	70	320	38	0	2	59	209	21	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	358			418			1026	982	417	1022	964	339
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			94			100	99	91	0	91	90
cM capacity (veh/h)	1201			1142			166	227	636	180	233	704

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1	SW 2
Volume Total	34	418	70	358	61	209	92
Volume Left	34	0	70	0	0	209	0
Volume Right	0	1	0	38	59	0	71
cSH	1201	1700	1142	1700	592	180	481
Volume to Capacity	0.03	0.25	0.06	0.21	0.10	1.16	0.19
Queue Length (ft)	2	0	5	0	9	271	18
Control Delay (s)	8.1	0.0	8.4	0.0	11.8	169.6	14.3
Lane LOS	A		A		B	F	B
Approach Delay (s)	0.6		1.4		11.8	121.9	
Approach LOS					B	F	

Intersection Summary				
Average Delay	30.9			
Intersection Capacity Utilization	54.1%	ICU Level of Service	A	

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	4%	
Volume (veh/h)	58	0	0	187	75	64
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (veh/h)	75	0	0	243	97	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type					None	
Median storage veh)						
vC, conflicting volume			75		318	75
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		86	92
cM capacity (veh/h)			1524		675	986

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	75	243	181
Volume Left	0	0	97
Volume Right	0	0	83
cSH	1700	1700	1661
Volume to Capacity	0.04	0.14	0.11
Queue Length (ft)	0	0	9
Control Delay (s)	0.0	0.0	7.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	7.4
Approach LOS			A

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	0%	
Volume (veh/h)	59	69	54	174	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	71	83	65	210	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
vC, conflicting volume			154		452	113
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			1426		539	940

Direction, Lane #	EB 1	WB 1
Volume Total	154	275
Volume Left	0	65
Volume Right	83	0
cSH	1700	1426
Volume to Capacity	0.09	0.05
Queue Length (ft)	0	4
Control Delay (s)	0.0	2.1
Lane LOS		A
Approach Delay (s)	0.0	2.1
Approach LOS		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	427	672	0	0	411	849	245	0	573	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (veh/h)	547	862	0	0	527	1088	314	0	735	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									20			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	1615			862			3028	3572	862	3395	3028	1071
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	0			100			0	0	0	0	0	100
cM capacity (veh/h)	403			780			0	0	355	0	0	268

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1409	1615	1049
Volume Left	547	0	314
Volume Right	0	1088	735
cSH	403	1700	8
Volume to Capacity	1.36	0.95	129.13
Queue Length (ft)	648	0	Err
Control Delay (s)	331.0	0.0	Err
Lane LOS	F		F
Approach Delay (s)	331.0	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	2689.0		
Intersection Capacity Utilization	197.6%	ICU Level of Service	H

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			0%			4%	
Volume (veh/h)	0	373	111	210	429	0	0	0	0	552	0	349
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	0	449	134	253	517	0	0	0	0	665	0	420
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	517			583			1960	1539	516	1539	1606	517
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			74			100	100	100	0	100	25
cM capacity (veh/h)	1049			991			9	86	559	75	78	558

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	583	770	443	642
Volume Left	0	253	443	222
Volume Right	134	0	0	420
cSH	1700	991	75	174
Volume to Capacity	0.34	0.26	5.88	3.69
Queue Length (ft)	0	25	Err	Err
Control Delay (s)	0.0	5.7	Err	Err
Lane LOS		A	F	F
Approach Delay (s)	0.0	5.7	Err	
Approach LOS			F	

Intersection Summary			
Average Delay	4452.9		
Intersection Capacity Utilization	114.3%	ICU Level of Service	G

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	101	246	213	151	250	192
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (veh/h)	146	357	309	219	362	278
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)		12				
Median type	None					
Median storage veh)						
vC, conflicting volume	1425	422			530	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	43			65	
cM capacity (veh/h)	97	629			1036	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	503	528	362	278
Volume Left	146	0	362	0
Volume Right	357	219	0	0
cSH	629	1700	1036	1700
Volume to Capacity	0.80	0.31	0.35	0.16
Queue Length (ft)	198	0	40	0
Control Delay (s)	29.5	0.0	10.3	0.0
Lane LOS	D		B	
Approach Delay (s)	29.5	0.0	5.8	
Approach LOS	D			

Intersection Summary			
Average Delay	11.1		
Intersection Capacity Utilization	68.2%	ICU Level of Service	B

Movement	WBL	WBR	NBR	NBR2	SWL
Lane Configurations					
Sign Control	Stop		Free		Free
Grade	2%		0%		0%
Volume (veh/h)	4	1	13	4	11
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (veh/h)	6	1	18	6	15
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None				
Median storage veh)					
vC, conflicting volume	37	21			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
tC, single (s)	6.4	6.2			
tC, 2 stage (s)					
tF (s)	3.5	3.3			
p0 queue free %	99	100			
cM capacity (veh/h)	976	1056			

Direction, Lane #	WB 1	NB 1	SW 1
Volume Total	7	24	15
Volume Left	6	0	0
Volume Right	1	6	0
cSH	991	1700	1591
Volume to Capacity	0.01	0.01	0.00
Queue Length (ft)	1	0	0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	29	15	4	13	18
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (veh/h)	3	47	24	6	21	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	98	27			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	889	1048			1582	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	50	31	50
Volume Left	3	0	21
Volume Right	47	6	0
cSH	1036	1700	1582
Volume to Capacity	0.05	0.02	0.01
Queue Length (ft)	4	0	1
Control Delay (s)	8.7	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	3.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	13	11	22	14	17
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (veh/h)	18	18	15	30	19	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	92	30			45	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	897	1044			1563	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	45	42
Volume Left	18	0	19
Volume Right	18	30	0
cSH	965	1700	1563
Volume to Capacity	0.04	0.03	0.01
Queue Length (ft)	3	0	1
Control Delay (s)	8.9	0.0	3.4
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	3.4
Approach LOS	A		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

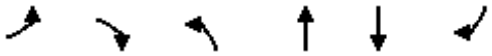
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	1%		0%			0%
Volume (veh/h)	27	35	8	13	64	53
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (veh/h)	32	41	9	15	75	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	230	17			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	96			95	
cM capacity (veh/h)	722	1062			1590	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	25	138
Volume Left	32	0	75
Volume Right	41	15	0
cSH	881	1700	1590
Volume to Capacity	0.08	0.01	0.05
Queue Length (ft)	7	0	4
Control Delay (s)	9.5	0.0	4.2
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	4.2
Approach LOS	A		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
Grade (%)		2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.92		1.00	0.96		1.00	1.00	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1565			1501		1564	1587		1564	1646	
Flt Permitted		0.99			0.96		0.54	1.00		0.51	1.00	
Satd. Flow (perm)		1553			1446		887	1587		845	1646	
Volume (vph)	5	116	67	29	82	183	29	254	80	230	308	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	6	132	76	33	93	208	33	289	91	261	350	0
Lane Group Flow (vph)	0	214	0	0	334	0	33	380	0	261	350	0
Bus Blockages (#/hr)	2	2	2	2	2	2	2	2	2	2	2	2
Turn Type	Perm			Perm			Perm			custom		
Protected Phases		4			8			2				
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)		10.8			10.8		24.1	24.1		24.1	24.1	
Effective Green, g (s)		10.8			10.8		24.1	24.1		24.1	24.1	
Actuated g/C Ratio		0.25			0.25		0.56	0.56		0.56	0.56	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		391			364		498	892		475	925	
v/s Ratio Prot								0.24				
v/s Ratio Perm		0.14			c0.23		0.04			c0.31	0.21	
v/c Ratio		0.55			0.92		0.07	0.43		0.55	0.38	
Uniform Delay, d1		13.9			15.6		4.3	5.4		6.0	5.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6			27.2		0.1	0.3		1.3	0.3	
Delay (s)		15.5			42.8		4.3	5.7		7.3	5.5	
Level of Service		B			D		A	A		A	A	
Approach Delay (s)		15.5			42.8			5.6			6.2	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	42.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	D
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	3	1	58	223	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (veh/h)	5	3	1	62	237	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	303	239	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	688	800	1325			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	9	63	241
Volume Left	5	1	0
Volume Right	3	0	4
cSH	726	1325	1700
Volume to Capacity	0.01	0.00	0.14
Queue Length (ft)	1	0	0
Control Delay (s)	10.0	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	0	19	5	0	23	3	136	3	6	272	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (veh/h)	24	0	20	5	0	24	3	143	3	6	286	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
vC, conflicting volume	485	463	297	481	472	145	308			146		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	97	99	100	97	100			100		
cM capacity (veh/h)	476	493	742	479	487	903	1252			1436		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	29	149	315
Volume Left	24	5	3	6
Volume Right	20	24	3	22
cSH	568	780	1252	1436
Volume to Capacity	0.08	0.04	0.00	0.00
Queue Length (ft)	6	3	0	0
Control Delay (s)	11.9	9.8	0.2	0.2
Lane LOS	B	A	A	A
Approach Delay (s)	11.9	9.8	0.2	0.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			4%			0%	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.95	0.88	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3364	3468			3539	2787	1734		2731			
Flt Permitted	0.31	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1087	3468			3539	2787	1734		2731			
Volume (vph)	427	672	0	0	411	849	245	0	573	0	0	0
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	547	862	0	0	527	1088	314	0	735	0	0	0
Lane Group Flow (vph)	547	862	0	0	527	1088	314	0	735	0	0	0
Turn Type	pm+pt					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	34.7	34.7			19.2	19.2	18.2		18.2			
Effective Green, g (s)	34.7	34.7			19.2	19.2	18.2		18.2			
Actuated g/C Ratio	0.57	0.57			0.32	0.32	0.30		0.30			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	1049	1976			1116	879	518		816			
v/s Ratio Prot	c0.10	0.25			0.15							
v/s Ratio Perm	0.20					0.39	0.18		0.27			
v/c Ratio	0.52	0.44			0.47	1.24	0.61		0.90			
Uniform Delay, d1	7.4	7.5			16.8	20.8	18.3		20.5			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.5	0.2			0.3	116.8	2.0		13.0			
Delay (s)	7.9	7.7			17.1	137.6	20.3		33.5			
Level of Service	A	A			B	F	C		C			
Approach Delay (s)		7.8			98.3			29.5			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM Average Control Delay	49.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			4%	
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	1.00					0.95	0.95	
Frt		0.97		1.00	1.00					1.00	0.89	
Flt Protected		1.00		0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3349		1770	1863					1648	1526	
Flt Permitted		1.00		0.24	1.00					0.95	0.99	
Satd. Flow (perm)		3349		445	1863					1648	1526	
Volume (vph)	0	373	111	210	429	0	0	0	0	552	0	349
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	449	134	253	517	0	0	0	0	665	0	420
Lane Group Flow (vph)	0	583	0	253	517	0	0	0	0	501	584	0
Turn Type				pm+pt						Perm		
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		13.5		22.5	22.5					21.1	21.1	
Effective Green, g (s)		13.5		22.5	22.5					21.1	21.1	
Actuated g/C Ratio		0.26		0.44	0.44					0.41	0.41	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		876		322	812					674	624	
v/s Ratio Prot		0.17		c0.08	0.28							
v/s Ratio Perm				c0.27						0.30	0.38	
v/c Ratio		0.67		0.79	0.64					0.74	0.94	
Uniform Delay, d1		17.0		10.4	11.4					13.0	14.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.9		11.9	1.6					4.4	21.4	
Delay (s)		19.0		22.3	13.0					17.4	36.1	
Level of Service		B		C	B					B	D	
Approach Delay (s)		19.0			16.1			0.0			27.4	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C

c Critical Lane Group

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.95	1.00	0.26	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	487	1863	1863	1583
Volume (vph)	325	175	116	360	586	332
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	365	197	130	404	658	373
Lane Group Flow (vph)	365	197	130	404	658	373
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	12.1	12.1	15.3	15.3	15.3	15.3
Effective Green, g (s)	12.1	12.1	15.3	15.3	15.3	15.3
Actuated g/C Ratio	0.34	0.34	0.43	0.43	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	605	541	210	805	805	684
v/s Ratio Prot	c0.21			0.22	c0.35	
v/s Ratio Perm		0.12	0.27			0.24
v/c Ratio	0.60	0.36	0.62	0.50	0.82	0.55
Uniform Delay, d1	9.7	8.8	7.8	7.3	8.8	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	5.3	0.5	6.5	0.9
Delay (s)	11.4	9.2	13.1	7.8	15.3	8.4
Level of Service	B	A	B	A	B	A
Approach Delay (s)	10.6			9.1	12.8	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	1862		1770	1833			1620		1770	1647	
Flt Permitted	0.53	1.00		0.47	1.00			1.00		0.72	1.00	
Satd. Flow (perm)	978	1862		881	1833			1620		1336	1647	
Volume (vph)	27	333	1	56	256	30	0	2	47	167	17	57
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	34	416	1	70	320	38	0	2	59	209	21	71
Lane Group Flow (vph)	34	417	0	70	358	0	0	61	0	209	92	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	22.2	22.2		22.2	22.2			11.7		11.7	11.7	
Effective Green, g (s)	22.2	22.2		22.2	22.2			11.7		11.7	11.7	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	518	987		467	971			452		373	460	
v/s Ratio Prot		c0.22			0.20			0.04			0.06	
v/s Ratio Perm	0.03			0.08						c0.16		
v/c Ratio	0.07	0.42		0.15	0.37			0.13		0.56	0.20	
Uniform Delay, d1	4.8	6.0		5.0	5.8			11.3		12.9	11.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.2			0.1		1.9	0.2	
Delay (s)	4.9	6.3		5.2	6.0			11.4		14.8	11.7	
Level of Service	A	A		A	A			B		B	B	
Approach Delay (s)		6.2			5.9			11.4			13.9	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	422	257	0	0	140	119	212	0	124	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (veh/h)	469	286	0	0	156	132	236	0	138	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									40			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	288			286			1379	1511	286	1448	1379	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	63			100			0	100	82	100	100	100
cM capacity (veh/h)	1274			1277			87	76	753	64	91	890

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	469	286	156	132	373
Volume Left	469	0	0	0	236
Volume Right	0	0	0	132	138
cSH	1274	1700	1700	1700	611
Volume to Capacity	0.37	0.17	0.09	0.08	0.61
Queue Length (ft)	43	0	0	0	103
Control Delay (s)	9.5	0.0	0.0	0.0	19.7
Lane LOS	A				C
Approach Delay (s)	5.9		0.0		19.7
Approach LOS					C

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	57.2%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	488	255	53	283	0	0	0	0	115	0	408
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (veh/h)	0	530	277	58	308	0	0	0	0	125	0	443
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
vC, conflicting volume	308			808			1175	953	530	953	1230	308
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			100	100	100	45	100	39
cM capacity (veh/h)	1253			818			63	241	549	226	165	732

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	530	277	58	308	568
Volume Left	0	0	58	0	125
Volume Right	0	277	0	0	443
cSH	1700	1700	818	1700	958
Volume to Capacity	0.31	0.16	0.07	0.18	0.59
Queue Length (ft)	0	0	6	0	101
Control Delay (s)	0.0	0.0	9.7	0.0	14.1
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		14.1
Approach LOS					B

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	50.3%	ICU Level of Service		A

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	326	175	116	360	582	330
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (veh/h)	366	197	130	404	654	371
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		40				
Median type	None					
Median storage veh)						
vC, conflicting volume	1319	654	1025			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	58	81			
cM capacity (veh/h)	140	467	678			

Direction, Lane #	SE 1	NE 1	NE 2	SW 1	SW 2
Volume Total	563	130	404	654	371
Volume Left	366	130	0	0	0
Volume Right	197	0	0	0	371
cSH	391	678	1700	1700	1700
Volume to Capacity	1.44	0.19	0.24	0.38	0.22
Queue Length (ft)	721	18	0	0	0
Control Delay (s)	239.0	11.6	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	239.0	2.8		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	64.1		
Intersection Capacity Utilization	71.9%	ICU Level of Service	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	27	334	1	55	254	30	0	2	47	171	18	59
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (veh/h)	34	418	1	69	318	38	0	2	59	214	22	74
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	355			419			1026	978	418	1019	960	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			94			100	99	91	0	90	90
cM capacity (veh/h)	1204			1140			165	229	635	181	234	706

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1	SW 2
Volume Total	34	419	69	355	61	214	96
Volume Left	34	0	69	0	0	214	0
Volume Right	0	1	0	38	59	0	74
cSH	1204	1700	1140	1700	592	181	480
Volume to Capacity	0.03	0.25	0.06	0.21	0.10	1.18	0.20
Queue Length (ft)	2	0	5	0	9	281	19
Control Delay (s)	8.1	0.0	8.4	0.0	11.8	176.0	14.4
Lane LOS	A		A		B	F	B
Approach Delay (s)	0.6		1.4		11.8	125.8	
Approach LOS					B	F	

Intersection Summary				
Average Delay	32.5			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A	

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	4%	
Volume (veh/h)	55	0	0	190	76	65
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (veh/h)	71	0	0	247	99	84
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type					None	
Median storage veh)						
vC, conflicting volume			71		318	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		85	91
cM capacity (veh/h)			1529		675	991

Direction, Lane #	EB 1	WB 1	NE 1
Volume Total	71	247	183
Volume Left	0	0	99
Volume Right	0	0	84
cSH	1700	1700	1665
Volume to Capacity	0.04	0.15	0.11
Queue Length (ft)	0	0	9
Control Delay (s)	0.0	0.0	7.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	7.4
Approach LOS			A

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	4%			0%	0%	
Volume (veh/h)	51	59	55	175	0	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	61	71	66	211	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
vC, conflicting volume			133		440	97
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			1452		548	959

Direction, Lane #	EB 1	WB 1
Volume Total	133	277
Volume Left	0	66
Volume Right	71	0
cSH	1700	1452
Volume to Capacity	0.08	0.05
Queue Length (ft)	0	4
Control Delay (s)	0.0	2.1
Lane LOS		A
Approach Delay (s)	0.0	2.1
Approach LOS		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			4%			0%	
Volume (veh/h)	430	676	0	0	409	846	246	0	575	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (veh/h)	551	867	0	0	524	1085	315	0	737	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									20			
Median type								None			None	
Median storage veh)												
vC, conflicting volume	1609			867			3036	3578	867	3404	3036	1067
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	0			100			0	0	0	0	0	100
cM capacity (veh/h)	406			777			0	0	352	0	0	270

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1418	1609	1053
Volume Left	551	0	315
Volume Right	0	1085	737
cSH	406	1700	8
Volume to Capacity	1.36	0.95	131.09
Queue Length (ft)	653	0	Err
Control Delay (s)	333.4	0.0	Err
Lane LOS	F		F
Approach Delay (s)	333.4	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	2695.8		
Intersection Capacity Utilization	197.8%	ICU Level of Service	H

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		4%			0%			0%			4%	
Volume (veh/h)	0	381	114	210	430	0	0	0	0	541	0	342
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (veh/h)	0	459	137	253	518	0	0	0	0	652	0	412
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
vC, conflicting volume	518			596			1964	1552	528	1552	1620	518
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			74			100	100	100	0	100	26
cM capacity (veh/h)	1048			980			10	84	551	74	76	557

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	596	771	435	629
Volume Left	0	253	435	217
Volume Right	137	0	0	412
cSH	1700	980	74	171
Volume to Capacity	0.35	0.26	5.90	3.69
Queue Length (ft)	0	26	Err	Err
Control Delay (s)	0.0	5.7	Err	Err
Lane LOS		A	F	F
Approach Delay (s)	0.0	5.7	9999.0	
Approach LOS			F	

Intersection Summary			
Average Delay	4377.0		
Intersection Capacity Utilization	114.4%	ICU Level of Service	G

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	94	230	218	155	260	199
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (veh/h)	136	333	316	225	377	288
Pedestrians	2		2			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)		12				
Median type	None					
Median storage veh)						
vC, conflicting volume	1474	432			543	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	46			63	
cM capacity (veh/h)	88	621			1024	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	470	541	377	288
Volume Left	136	0	377	0
Volume Right	333	225	0	0
cSH	612	1700	1024	1700
Volume to Capacity	0.77	0.32	0.37	0.17
Queue Length (ft)	177	0	43	0
Control Delay (s)	27.6	0.0	10.5	0.0
Lane LOS	D		B	
Approach Delay (s)	27.6	0.0	6.0	
Approach LOS	D			

Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	69.2%	ICU Level of Service	B

Movement	WBL	WBR	NBR	NBR2	SWL
Lane Configurations					
Sign Control	Stop		Free		Free
Grade	2%		0%		0%
Volume (veh/h)	15	5	5	2	17
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (veh/h)	21	7	7	3	24
Pedestrians					
Lane Width (ft)					
Walking Speed (ft/s)					
Percent Blockage					
Right turn flare (veh)					
Median type	None				
Median storage veh)					
vC, conflicting volume	32	8			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
tC, single (s)	6.4	6.2			
tC, 2 stage (s)					
tF (s)	3.5	3.3			
p0 queue free %	98	99			
cM capacity (veh/h)	981	1073			

Direction, Lane #	WB 1	NB 1	SW 1
Volume Total	28	10	24
Volume Left	21	0	0
Volume Right	7	3	0
cSH	1003	1700	1610
Volume to Capacity	0.03	0.01	0.00
Queue Length (ft)	2	0	0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	5	14	4	6	8
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Hourly flow rate (veh/h)	0	8	23	6	10	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	58	26			29	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	943	1050			1584	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	29	23
Volume Left	0	0	10
Volume Right	8	6	0
cSH	1050	1700	1584
Volume to Capacity	0.01	0.02	0.01
Queue Length (ft)	1	0	0
Control Delay (s)	8.5	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	3.1
Approach LOS	A		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	13	13	11	22	6	7
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (veh/h)	18	18	15	30	8	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	56	30			45	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	946	1044			1563	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	36	45	18
Volume Left	18	0	8
Volume Right	18	30	0
cSH	993	1700	1563
Volume to Capacity	0.04	0.03	0.01
Queue Length (ft)	3	0	0
Control Delay (s)	8.8	0.0	3.4
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	3.4
Approach LOS	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A

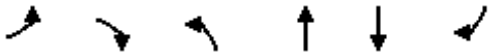
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	1%		0%			0%
Volume (veh/h)	35	45	8	13	76	63
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (veh/h)	41	53	9	15	89	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	270	17			25	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	95			94	
cM capacity (veh/h)	679	1062			1590	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	94	25	164
Volume Left	41	0	89
Volume Right	53	15	0
cSH	852	1700	1590
Volume to Capacity	0.11	0.01	0.06
Queue Length (ft)	9	0	4
Control Delay (s)	9.8	0.0	4.2
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	4.2
Approach LOS	A		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
Grade (%)		2%			2%			2%			2%	
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.92		1.00	0.96		1.00	1.00	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1566			1501		1564	1587		1564	1646	
Flt Permitted		0.99			0.95		0.52	1.00		0.48	1.00	
Satd. Flow (perm)		1548			1436		860	1587		789	1646	
Volume (vph)	6	129	74	30	86	191	31	266	84	230	308	0
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	7	147	84	34	98	217	35	302	95	261	350	0
Lane Group Flow (vph)	0	238	0	0	349	0	35	397	0	261	350	0
Bus Blockages (#/hr)	2	2	2	2	2	2	2	2	2	2	2	2
Turn Type	Perm			Perm			Perm			custom		
Protected Phases		4			8			2				
Permitted Phases	4			8			2			6	6	
Actuated Green, G (s)		13.4			13.4		22.3	22.3		22.3	22.3	
Effective Green, g (s)		13.4			13.4		22.3	22.3		22.3	22.3	
Actuated g/C Ratio		0.31			0.31		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		475			440		439	810		403	840	
v/s Ratio Prot								0.25				
v/s Ratio Perm		0.15			c0.24		0.04			c0.33	0.21	
v/c Ratio		0.50			0.79		0.08	0.49		0.65	0.42	
Uniform Delay, d1		12.4			13.9		5.5	7.0		7.8	6.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			9.5		0.1	0.5		3.6	0.3	
Delay (s)		13.2			23.4		5.5	7.5		11.4	7.0	
Level of Service		B			C		A	A		B	A	
Approach Delay (s)		13.2			23.4			7.3			8.9	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	5	3	1	64	230	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (veh/h)	5	3	1	68	245	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
vC, conflicting volume	317	247	249			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	676	792	1317			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	9	69	249
Volume Left	5	1	0
Volume Right	3	0	4
cSH	715	1317	1700
Volume to Capacity	0.01	0.00	0.15
Queue Length (ft)	1	0	0
Control Delay (s)	10.1	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.1	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	5	0	23	0	121	2	6	283	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (veh/h)	0	0	0	5	0	24	0	127	2	6	298	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
vC, conflicting volume	463	440	298	439	439	128	298			129		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	97	100			100		
cM capacity (veh/h)	494	509	742	526	510	922	1263			1456		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	29	129	304
Volume Left	0	5	0	6
Volume Right	0	24	2	0
cSH	1700	813	1263	1456
Volume to Capacity	0.00	0.04	0.00	0.00
Queue Length (ft)	0	3	0	0
Control Delay (s)	0.0	9.6	0.0	0.2
Lane LOS	A	A		A
Approach Delay (s)	0.0	9.6	0.0	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	27.5%	ICU Level of Service	A	

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.95	1.00	0.26	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	490	1863	1863	1583
Volume (vph)	326	175	116	360	582	330
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	366	197	130	404	654	371
Lane Group Flow (vph)	366	197	130	404	654	371
Turn Type		Perm	Perm			Perm
Protected Phases	6			4	8	
Permitted Phases		6	4			8
Actuated Green, G (s)	12.1	12.1	15.2	15.2	15.2	15.2
Effective Green, g (s)	12.1	12.1	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.34	0.34	0.43	0.43	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	607	543	211	802	802	682
v/s Ratio Prot	c0.21			0.22	c0.35	
v/s Ratio Perm		0.12	0.27			0.23
v/c Ratio	0.60	0.36	0.62	0.50	0.82	0.54
Uniform Delay, d1	9.6	8.7	7.8	7.3	8.8	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	5.3	0.5	6.4	0.9
Delay (s)	11.3	9.1	13.1	7.8	15.2	8.4
Level of Service	B	A	B	A	B	A
Approach Delay (s)	10.5			9.1	12.7	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	35.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	1862		1770	1833			1620		1770	1647	
Flt Permitted	0.53	1.00		0.47	1.00			1.00		0.72	1.00	
Satd. Flow (perm)	984	1862		879	1833			1620		1336	1647	
Volume (vph)	27	334	1	55	254	30	0	2	47	171	18	59
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	34	418	1	69	318	38	0	2	59	214	22	74
Lane Group Flow (vph)	34	419	0	69	356	0	0	61	0	214	96	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	21.5	21.5		21.5	21.5			11.4		11.4	11.4	
Effective Green, g (s)	21.5	21.5		21.5	21.5			11.4		11.4	11.4	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	517	979		462	964			452		372	459	
v/s Ratio Prot		c0.23			0.19			0.04			0.06	
v/s Ratio Perm	0.03			0.08						c0.16		
v/c Ratio	0.07	0.43		0.15	0.37			0.13		0.58	0.21	
Uniform Delay, d1	4.8	5.9		5.0	5.7			11.1		12.7	11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.2	0.2			0.1		2.2	0.2	
Delay (s)	4.8	6.2		5.1	5.9			11.2		14.8	11.5	
Level of Service	A	A		A	A			B		B	B	
Approach Delay (s)		6.1			5.8			11.2			13.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			4%			0%	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.95	0.88	1.00		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3364	3468			3539	2787	1734		2731			
Flt Permitted	0.31	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1093	3468			3539	2787	1734		2731			
Volume (vph)	430	676	0	0	409	846	246	0	575	0	0	0
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	551	867	0	0	524	1085	315	0	737	0	0	0
Lane Group Flow (vph)	551	867	0	0	524	1085	315	0	737	0	0	0
Turn Type	pm+pt					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases	4					8	2		2			
Actuated Green, G (s)	34.7	34.7			19.2	19.2	18.3		18.3			
Effective Green, g (s)	34.7	34.7			19.2	19.2	18.3		18.3			
Actuated g/C Ratio	0.57	0.57			0.31	0.31	0.30		0.30			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	1050	1973			1114	877	520		819			
v/s Ratio Prot	c0.10	0.25			0.15							
v/s Ratio Perm	0.20					0.39	0.18		0.27			
v/c Ratio	0.52	0.44			0.47	1.24	0.61		0.90			
Uniform Delay, d1	7.5	7.6			16.8	20.9	18.3		20.5			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.5	0.2			0.3	116.5	2.0		12.7			
Delay (s)	8.0	7.7			17.1	137.4	20.3		33.2			
Level of Service	A	A			B	F	C		C			
Approach Delay (s)		7.8			98.3			29.3			0.0	
Approach LOS		A			F			C			A	

Intersection Summary			
HCM Average Control Delay	49.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			0%			4%	
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	1.00					0.95	0.95	
Frt		0.97		1.00	1.00					1.00	0.89	
Flt Protected		1.00		0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3349		1770	1863					1648	1526	
Flt Permitted		1.00		0.23	1.00					0.95	0.99	
Satd. Flow (perm)		3349		434	1863					1648	1526	
Volume (vph)	0	381	114	210	430	0	0	0	0	541	0	342
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	459	137	253	518	0	0	0	0	652	0	412
Lane Group Flow (vph)	0	596	0	253	518	0	0	0	0	490	574	0
Turn Type				pm+pt						Perm		
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		13.7		22.7	22.7					21.1	21.1	
Effective Green, g (s)		13.7		22.7	22.7					21.1	21.1	
Actuated g/C Ratio		0.26		0.44	0.44					0.41	0.41	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		886		319	816					671	622	
v/s Ratio Prot		0.18		c0.08	0.28							
v/s Ratio Perm				c0.27						0.30	0.38	
v/c Ratio		0.67		0.79	0.63					0.73	0.92	
Uniform Delay, d1		17.0		10.5	11.3					12.9	14.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		2.0		12.7	1.6					4.1	19.4	
Delay (s)		19.1		23.1	12.9					17.0	33.9	
Level of Service		B		C	B					B	C	
Approach Delay (s)		19.1			16.3			0.0			26.2	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C

c Critical Lane Group

Appendix C
Cost Estimates

MT VERNON SIDING - WIDENING EXISTING CROSSING
PRELIMINARY COST ESTIMATE

PROVIDED BY: GARRY STRUTHERS ASSOCIATES, INC.

PROVIDED DATE: SEPTEMBER 2006

ITEM NO.	ITEM DESCRIPTIONS	QUANTITY	UNIT	UNIT COST	TOTAL
SITE WORK - HICKOX ROAD RELOCATE					
	RELOCATE SIGNS	1	L.S.	$500.00	$500.00
	RELOCATE CROSSING SIGNALS/COMMUNICATIONS/ELECTRICAL	1	L.S.	$50,000.00	$50,000.00
0405	COMMON BORROW INCL. HAUL	200	C.Y.	$15.00	$3,000.00
5100	CRUSHED SURFACING BASE COURSE	470	TON	$25.00	$11,750.00
5767	ASPHALT	35	TON	$150.00	$5,250.00
	TRAFFIC CONTROL DEVICES AT R/R CROSSING	1	L.S.	$20,000.00	$20,000.00
	GRADE CROSSING - CONCRETE	32	T.F.	$950.00	$30,400.00
				SUB-TOTAL	$120,900.00
				CONTINGENCIES (20%)	$24,180.00
				TOTAL	$145,080.00

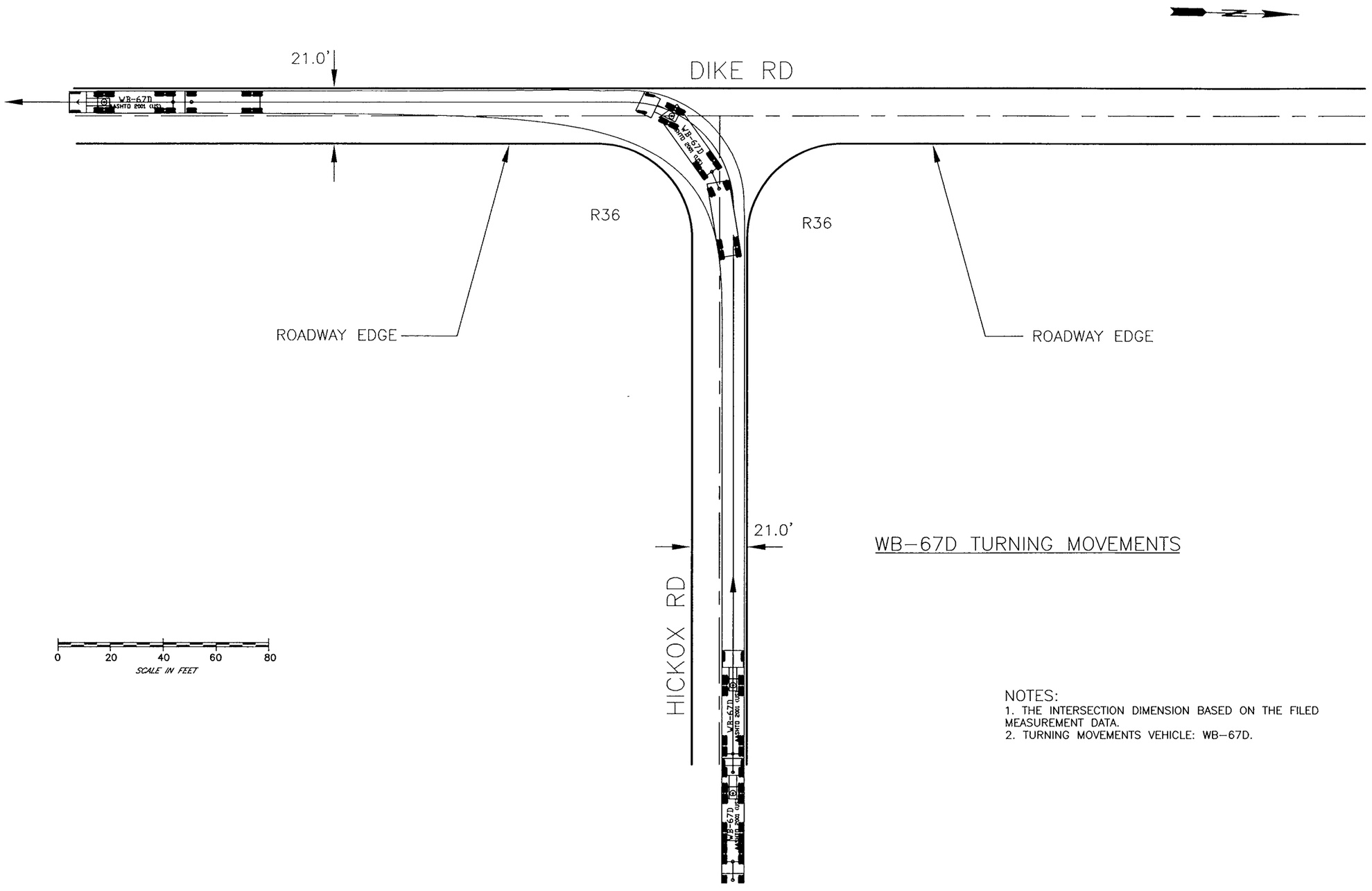
MT VERNON SIDING - RELOCATE HICKOX ROAD
PRELIMINARY COST ESTIMATE

PROVIDED BY: GARRY STRUTHERS ASSOCIATES, INC.

PROVIDED DATE: DECEMBER 2006

ITEM NO.	ITEM DESCRIPTIONS	QUANTITY	UNIT	UNIT COST	TOTAL
LAND					
	ROW ACQUISITION	8.7	ACRE	$10,000.00	$87,000.00
SITE WORK - HICKOX ROAD RELOCATE					
0025	CLEARING AND GRUBBING	6.7	ACRE	$7,000.00	$46,900.00
0310	ROADWAY EXCAVATION INCL. HAUL (TOP SOIL)	8685	C.Y.	$10.00	$86,850.00
0405	COMMON BORROW INCL. HAUL	38400	C.Y.	$15.00	$576,000.00
3010	ROAD CULVERTS	120	L.F.	$75.00	$9,000.00
5100	CRUSHED SURFACING BASE COURSE	9300	TON	$25.00	$232,500.00
5767	ASPHALT	1500	TON	$150.00	$225,000.00
6418	SEEDING	1	ACRE	$2,000.00	$2,000.00
6890	SIGNAGE	1	L.S.	$3,000.00	$3,000.00
6806	PAVEMENT MARKING	1	L.S.	$6,000.00	$6,000.00
6912	CROSSING SIGNALS WITH GATES/COMMUNICATIONS/ELECTRICAL	1	L.S.	$150,000.00	$150,000.00
	GRADE CROSSING - CONCRETE	32	L.F.	$950.00	$30,400.00
	GUARD RAILS	500	L.F.	$25.00	$12,500.00
	ENVIRONMENTAL MITIGATION/REMEDIATION	1	L.S.	$50,000.00	$50,000.00
	INSTALL BARRICADES	1	L.S.	$1,000.00	$1,000.00
	TRAFFIC CONTROL DEVICES AT R/R CROSSING	1	L.S.	$20,000.00	$20,000.00
	TESC	1	L.S.	$18,000.00	$18,000.00
				SUB-TOTAL	$1,469,150.00
				CONTINGENCIES (20%)	$293,830.00
				TOTAL	$1,762,980.00

Appendix D
Turning Movement Study: Hickox Road & Dike Road/ Stackpole Road & Dike Road



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

NO.	REVISION	BY	APP'D	DATE

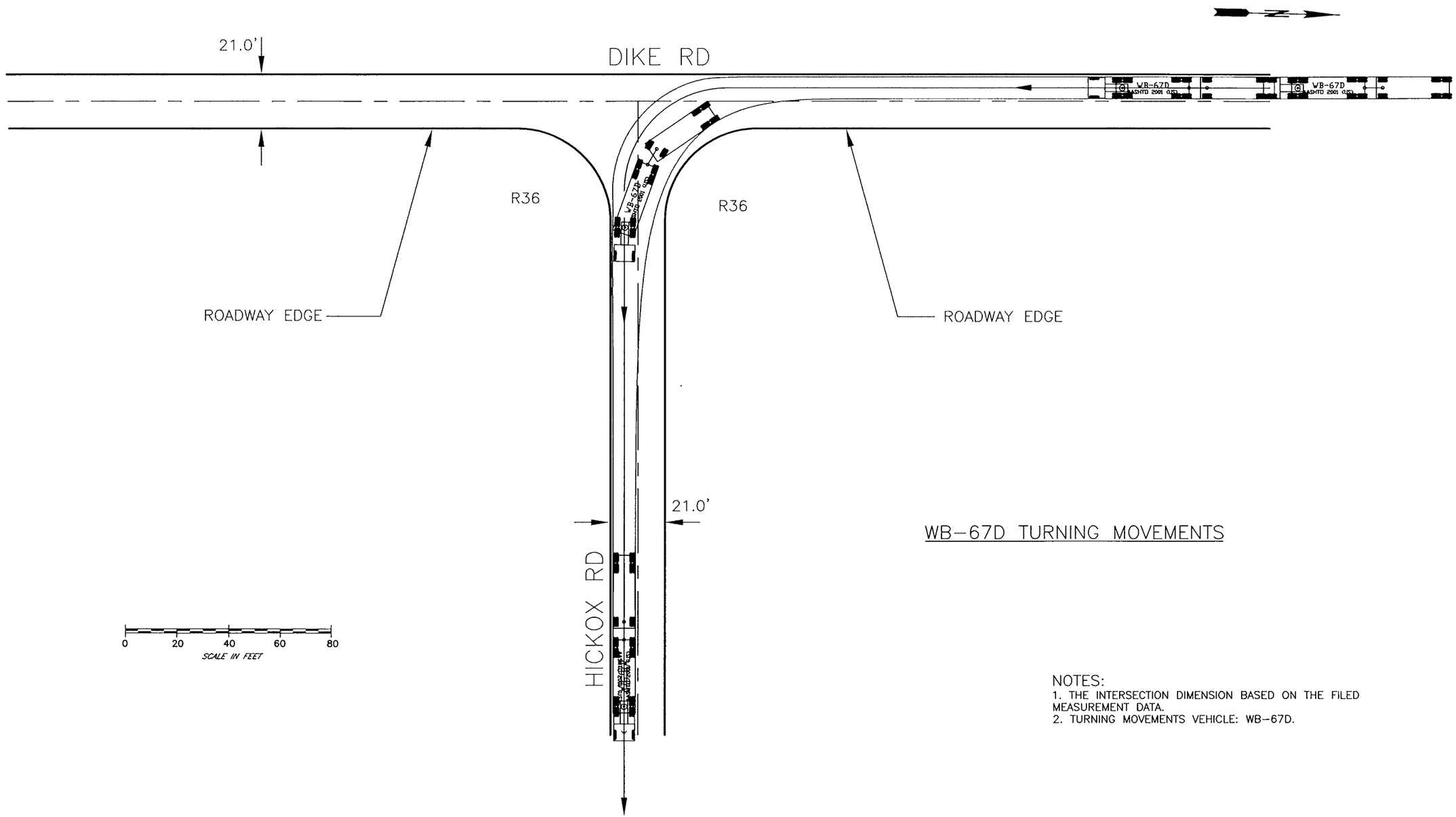
GARRY STRUTHERS ASSOCIATES, INC.
3150 Richards Road, Suite 200 Bellevue, WA 98005-4446
Phone: (425) 519-0300 Fax: (425) 519-0309
E-mail: gsa@gsassoc-inc.com http://www.gsassoc-inc.com

DESIGNED:	CHECKED:
DRAWN BY:	SCALE:
RECOMMENDED:	CONTRACT NO:
APPROVED:	

HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

NO.	REVISION	BY	APP'D	DATE

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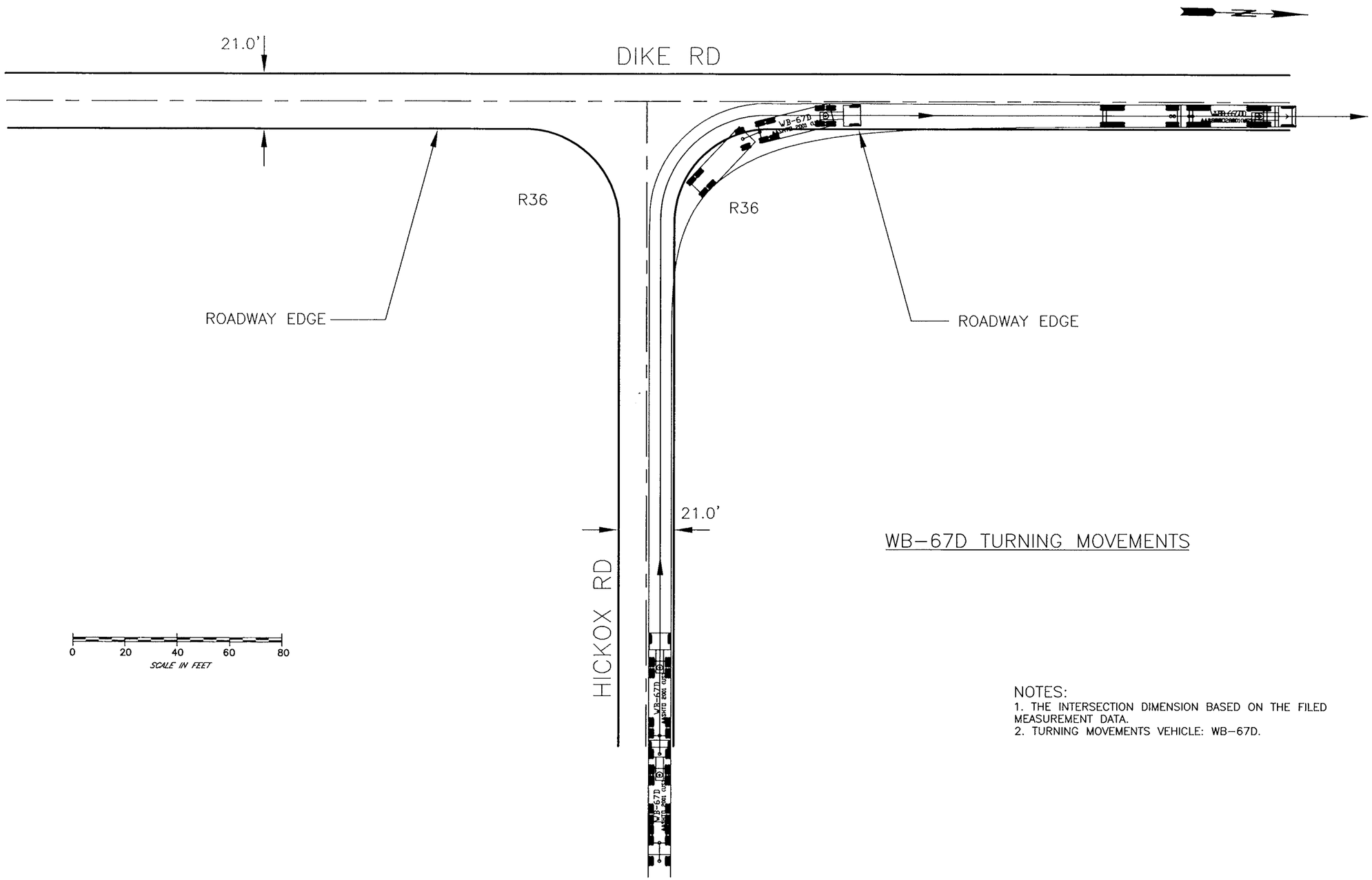
CONTRACT NO:	

HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

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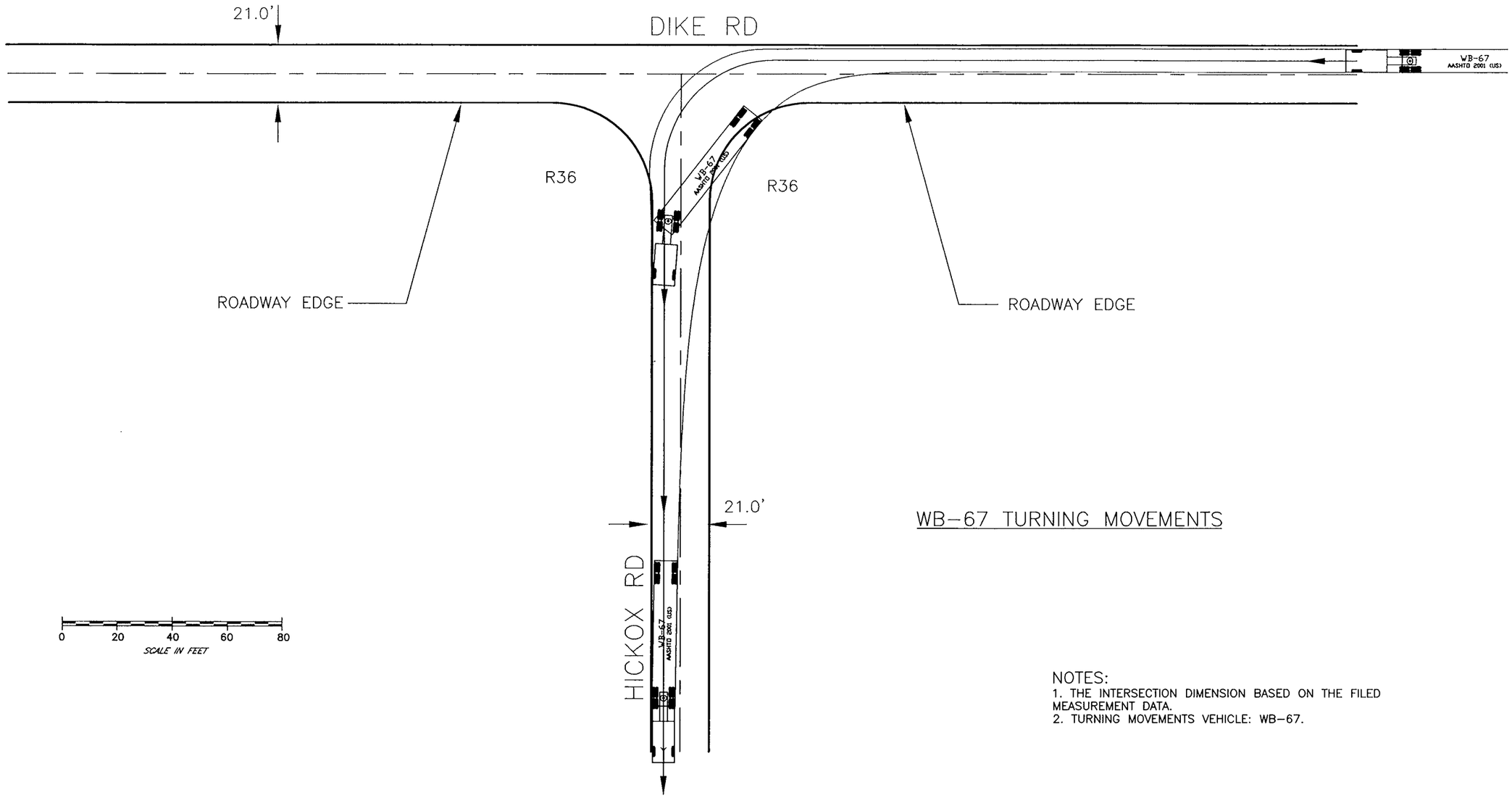
HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



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SCALE IN FEET

WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

NO.	REVISION	BY	APP'D	DATE

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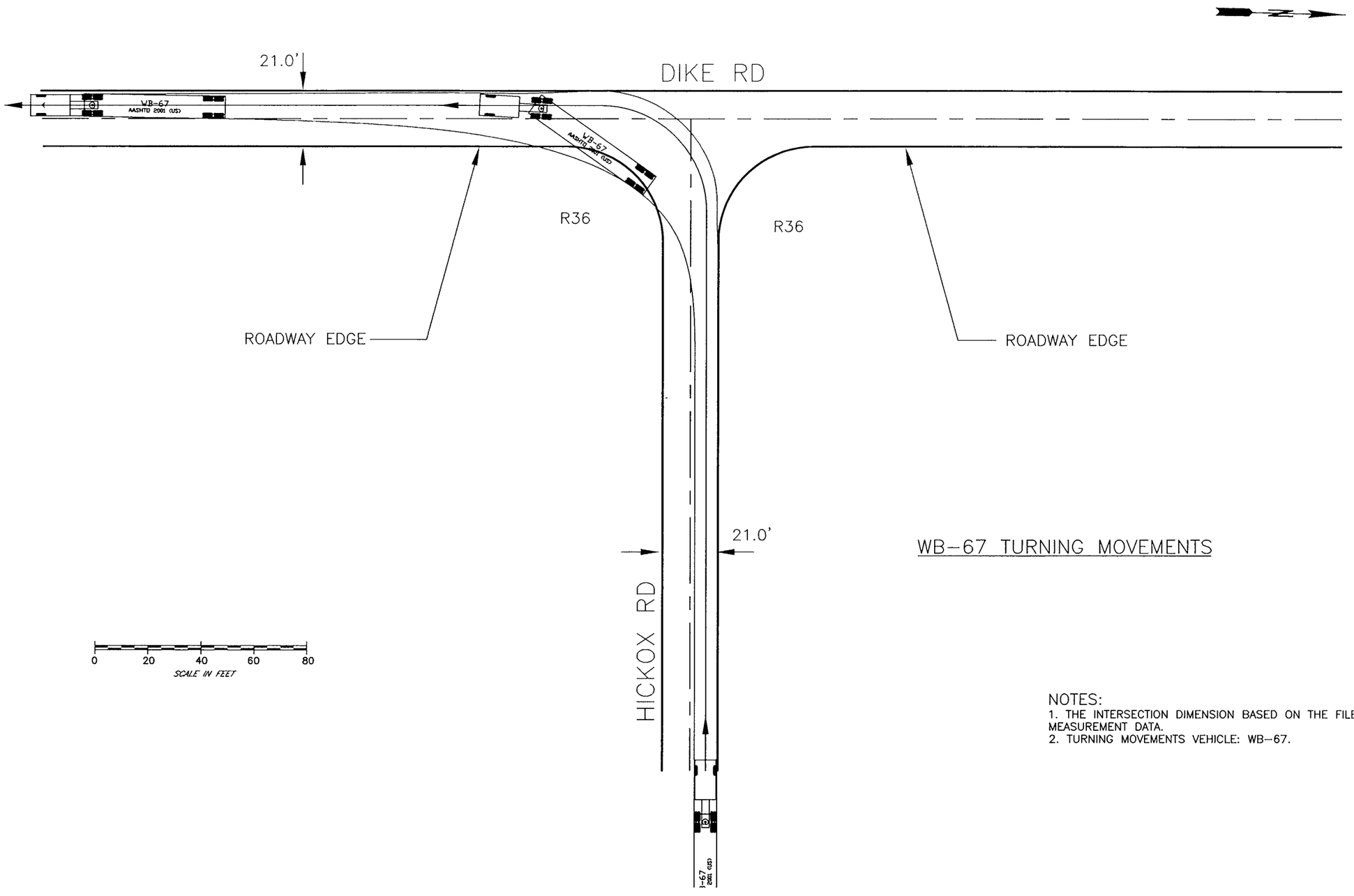
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:		TURNING MOVEMENTS STUDY	DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:		SHEET NO: OF



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SCALE IN FEET

WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

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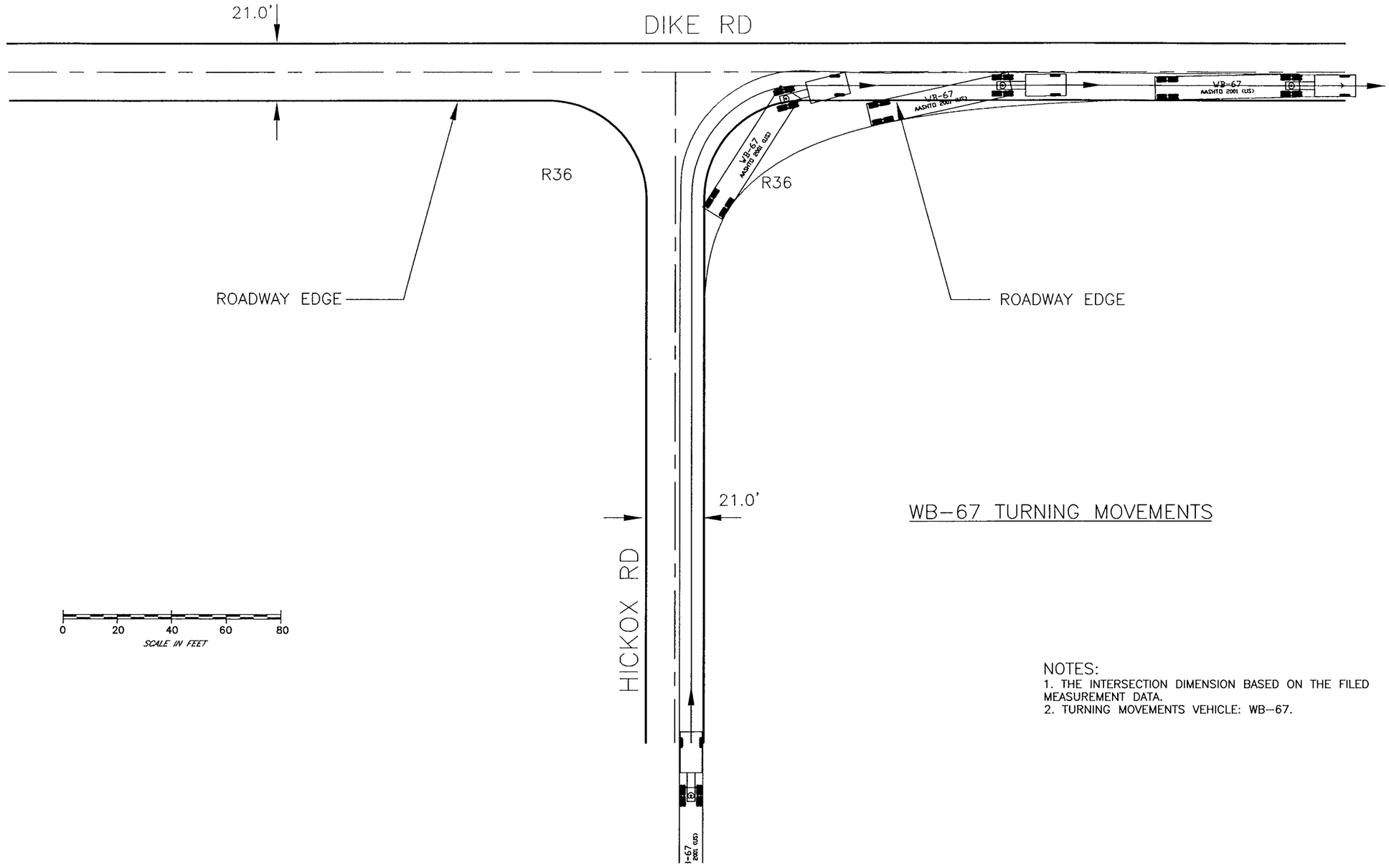
HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

NO.	REVISION	BY	APP'D	DATE

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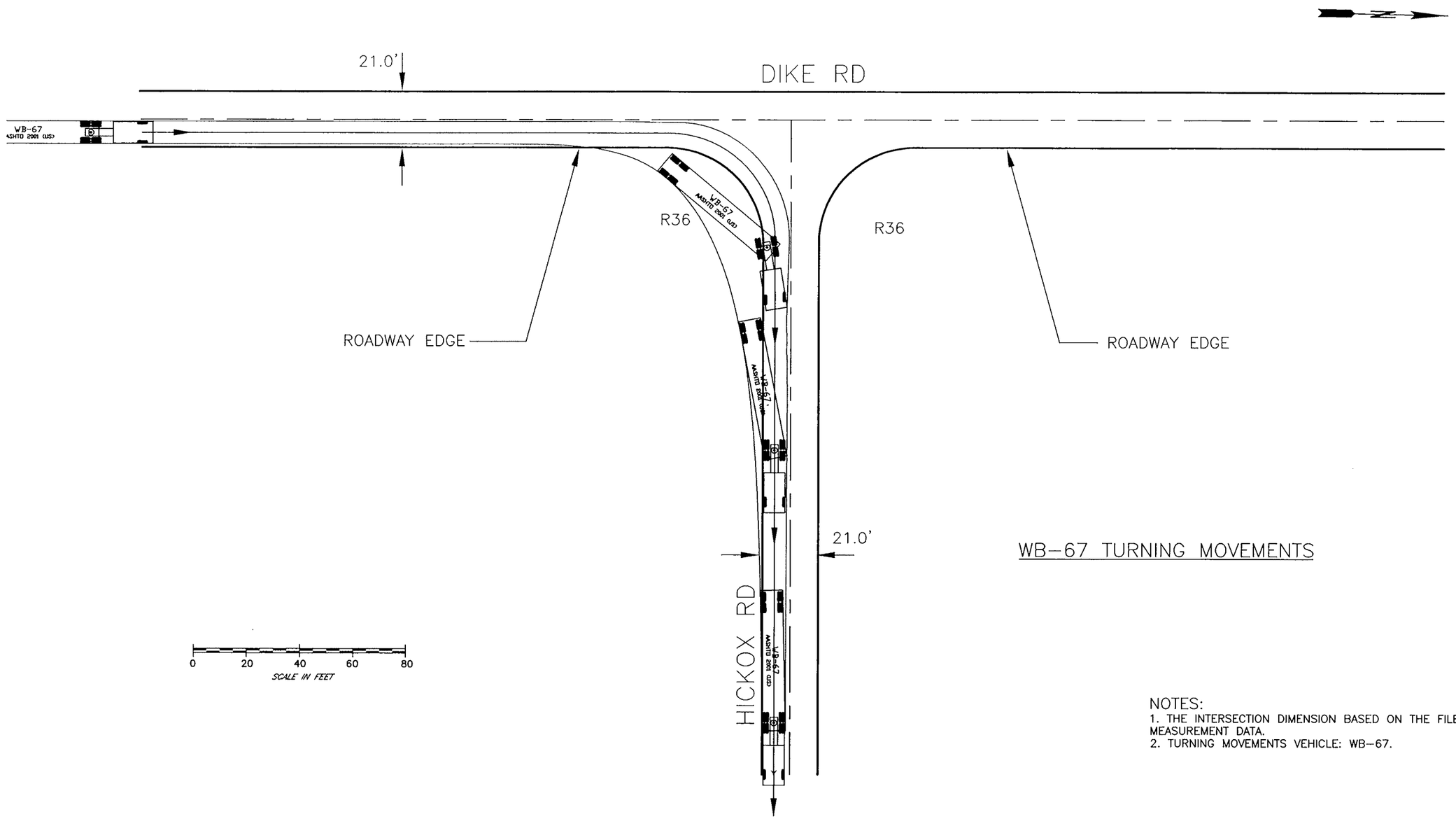
SCALE:	
CONTRACT NO:	

HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

NO.	REVISION	BY	APP'D	DATE

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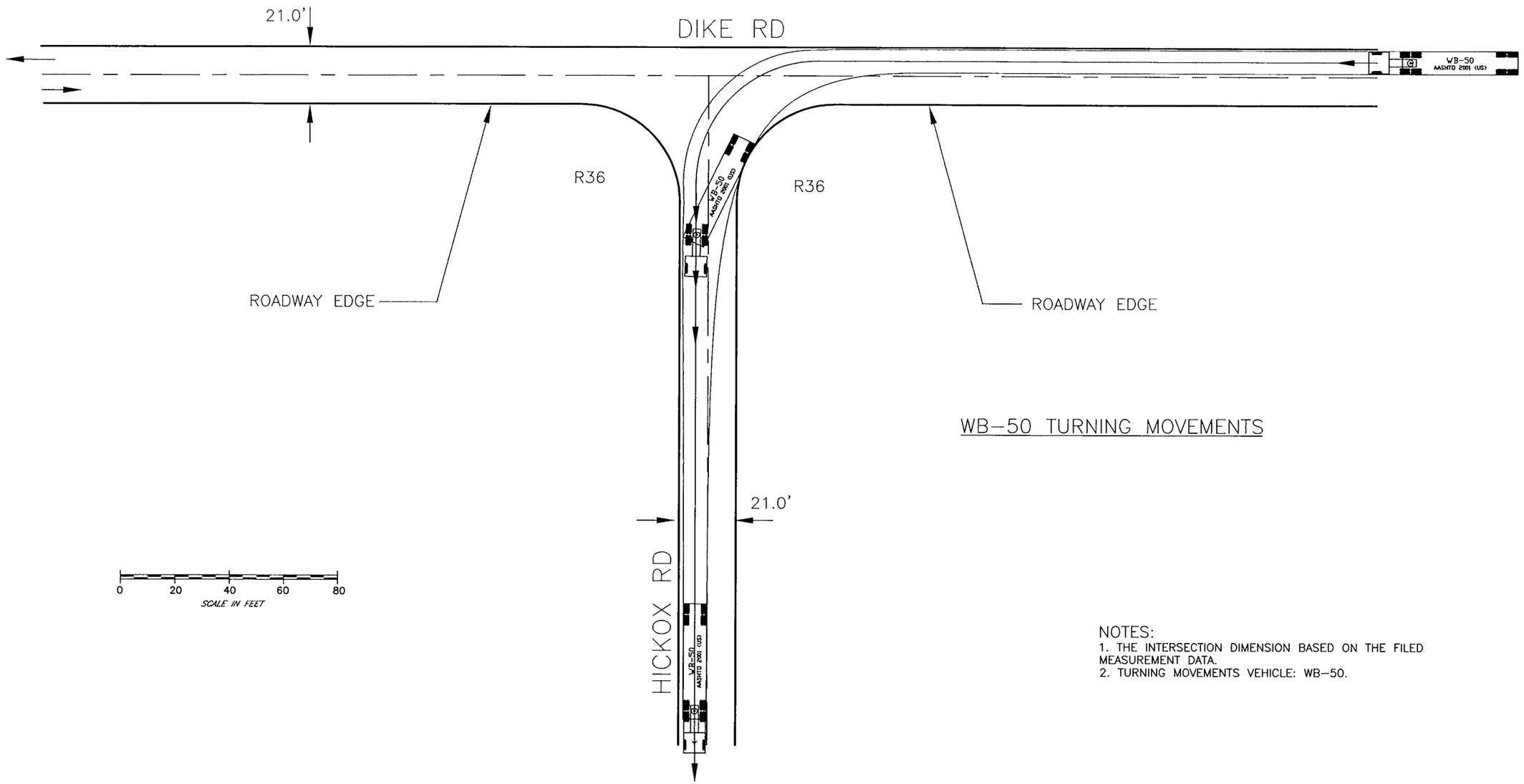
CHECKED:	
SCALE:	
CONTRACT NO:	

HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

GARRY STRUTHERS ASSOCIATES, INC.
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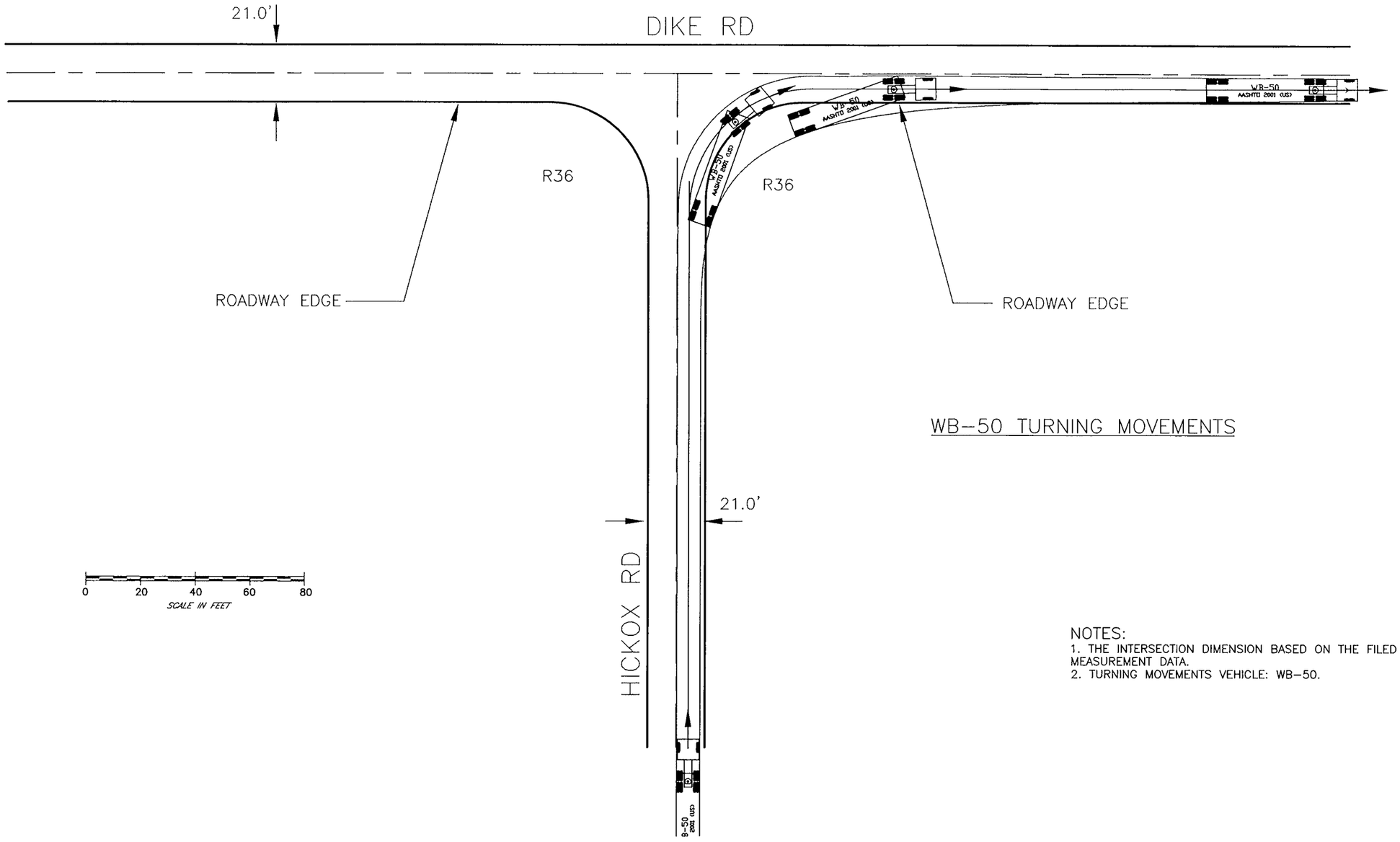
Phone: (425) 519-0300 Fax: (425) 519-0309
E-mail: gsa@gsassoc-inc.com http://www.gsassoc-inc.com

DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY HICKOX ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:			DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:	TURNING MOVEMENTS STUDY	SHEET NO: OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

GARRY STRUTHERS ASSOCIATES, INC.
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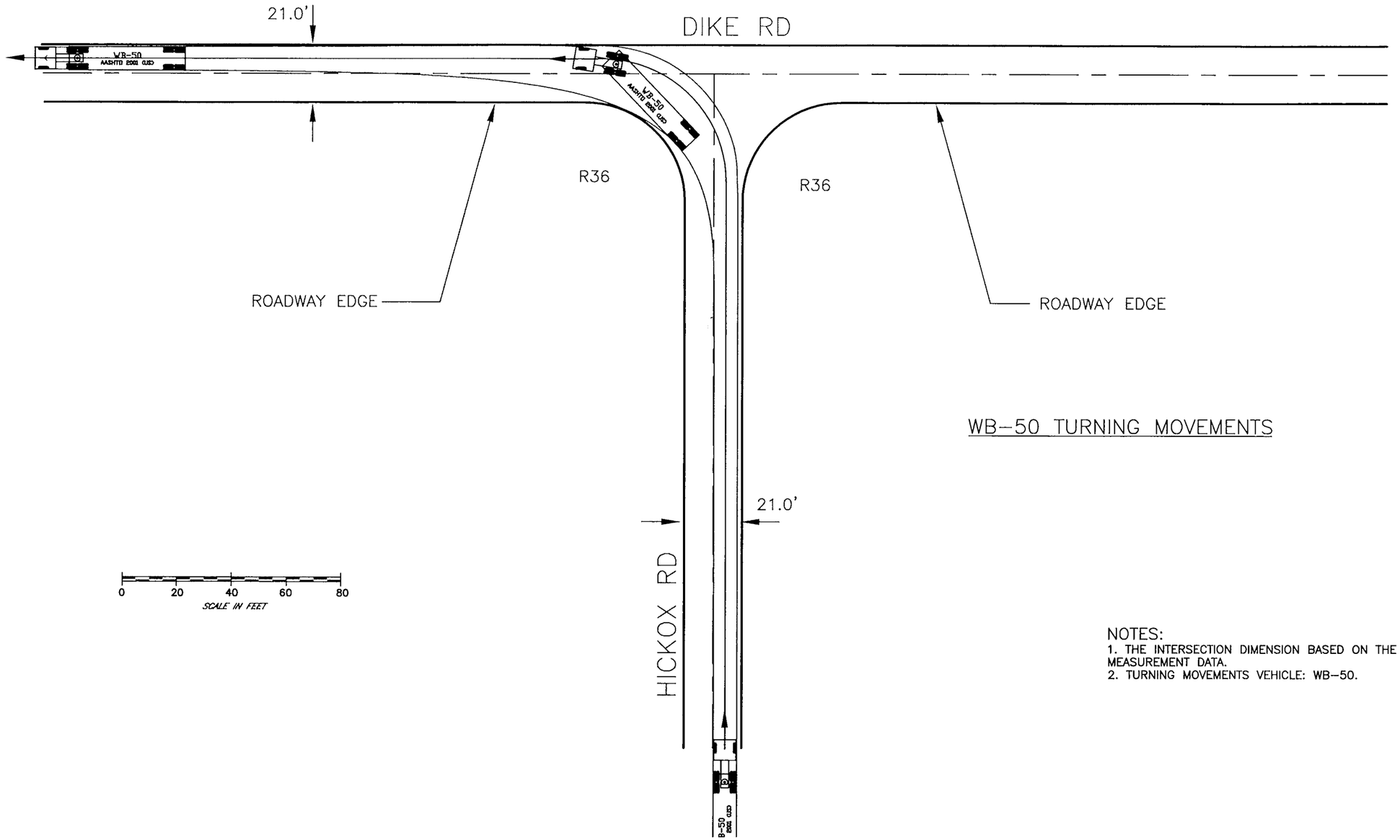
E-mail: gsa@gsassoc-inc.com http://www.gsassoc-inc.com

DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY HICKOX ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:			DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:	TURNING MOVEMENTS STUDY	SHEET NO: OF



0 20 40 60 80

SCALE IN FEET

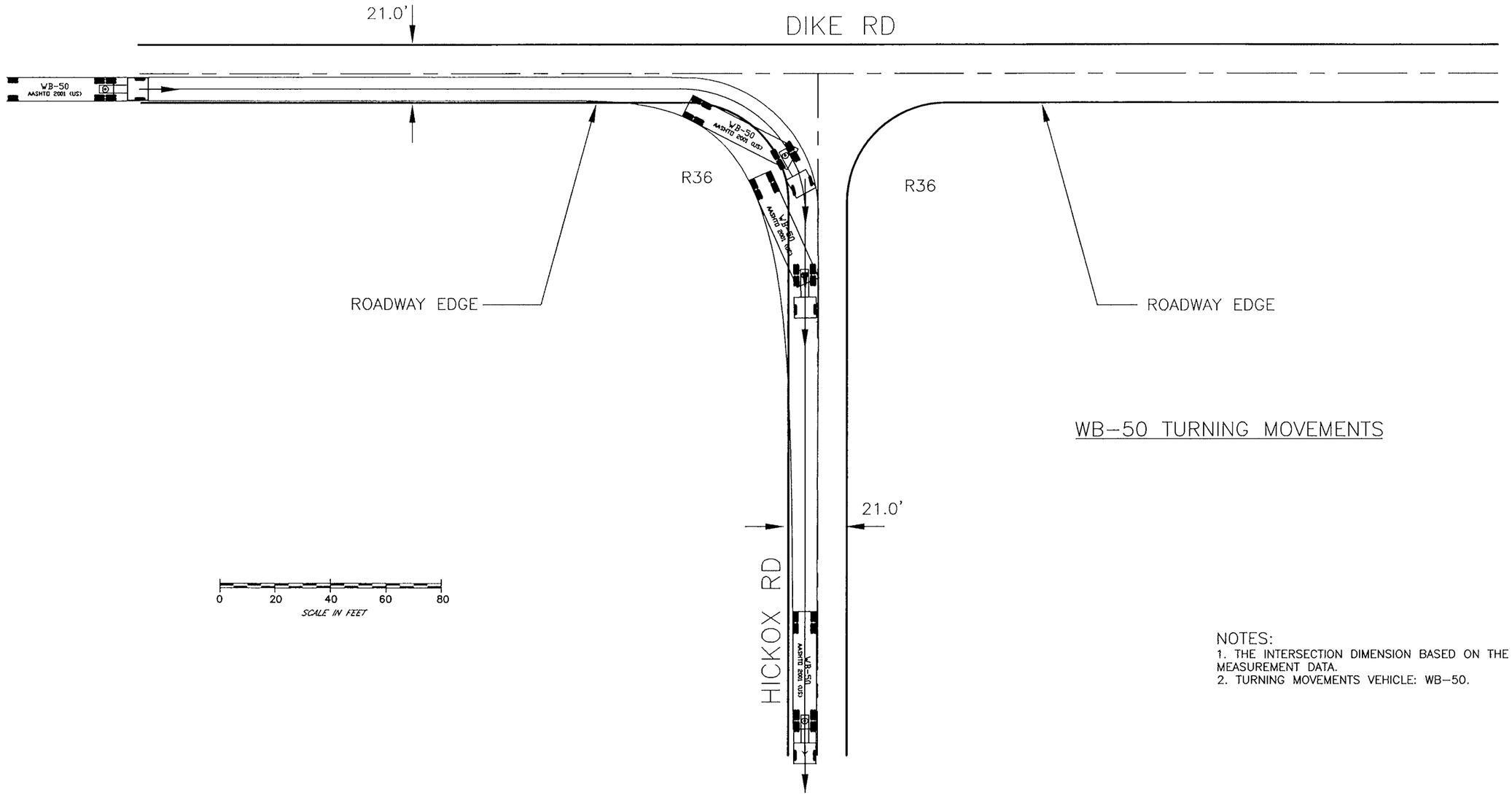
WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

GARRY STRUTHERS ASSOCIATES, INC.
3150 Richards Road, Suite 200 Bellevue, WA 98005-4446
Phone: (425) 519-0300 Fax: (425) 519-0309
E-mail: gsa@gsassoc-inc.com http://www.gsassoc-inc.com

DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY HICKOX ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:		TURNING MOVEMENTS STUDY	DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:		SHEET NO: OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

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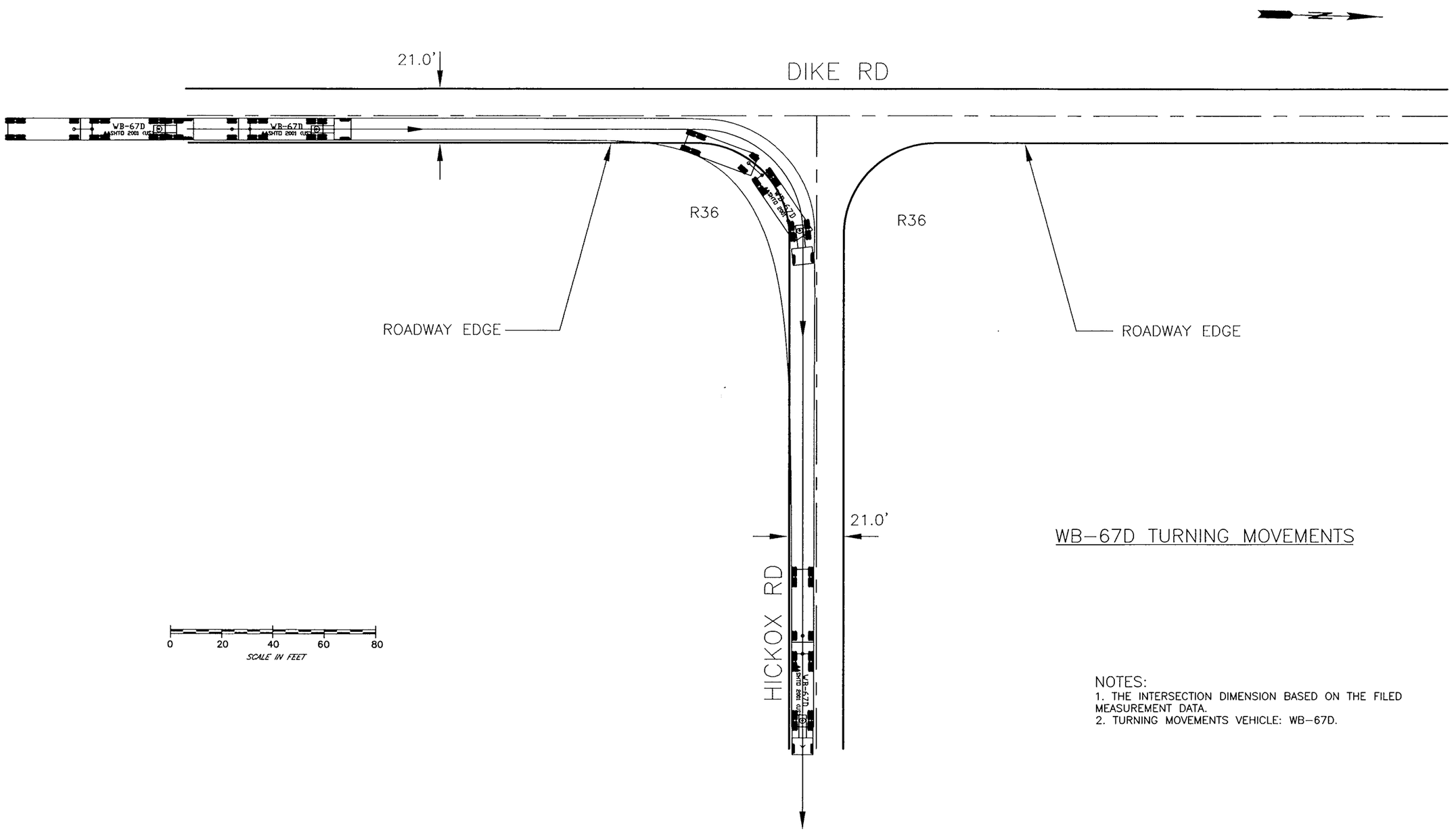
DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY HICKOX ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:	CONTRACT NO:	TURNING MOVEMENTS STUDY	DRAWING NO: FIG. XX
APPROVED:			SHEET NO: OF



WB–67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB–67D.

NO.	REVISION	BY	APP'D	DATE

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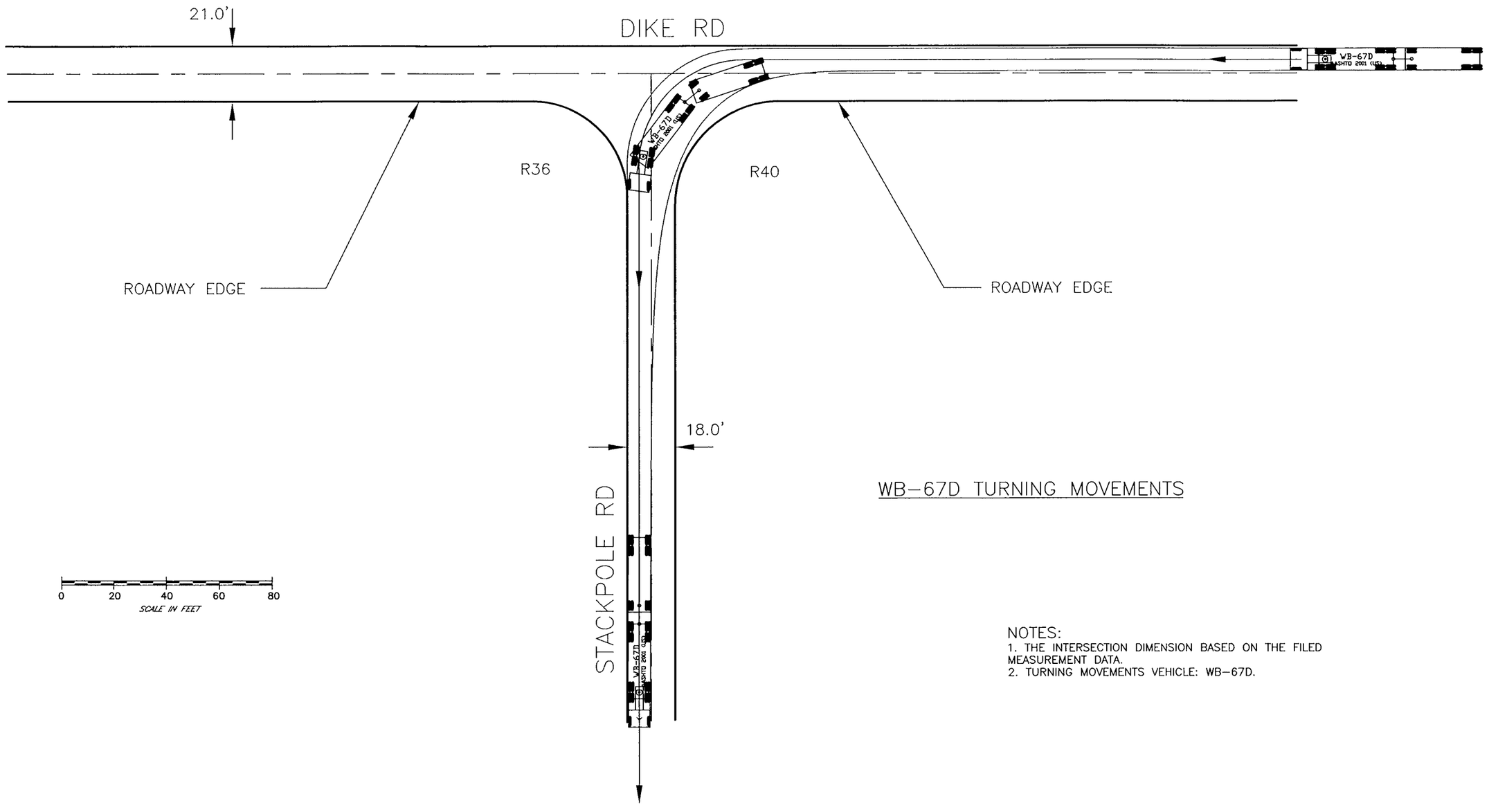
CONTRACT NO:	

HIKOX ROAD RAILWAY
HICKOX ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

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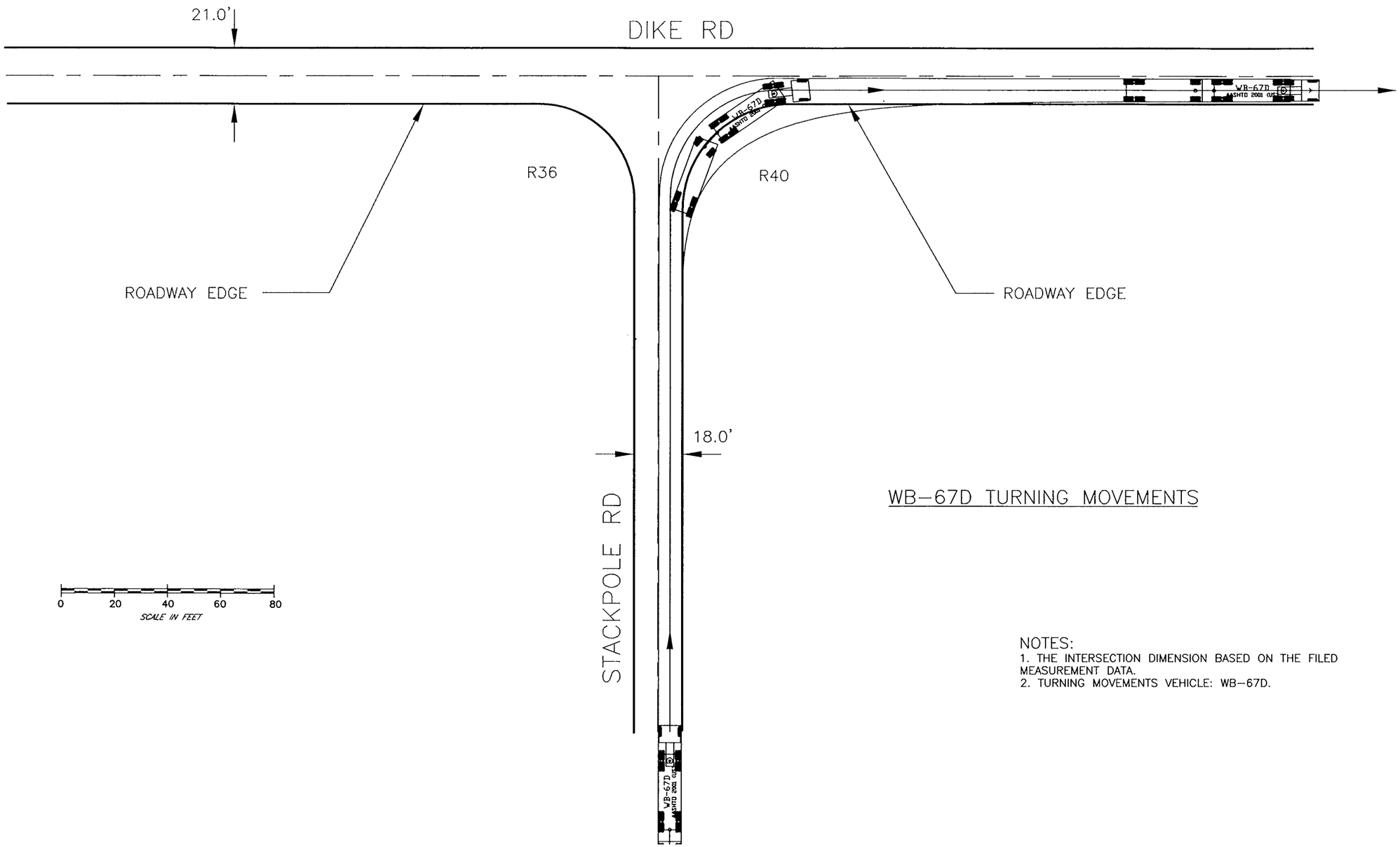
SCALE:	
CONTRACT NO:	

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

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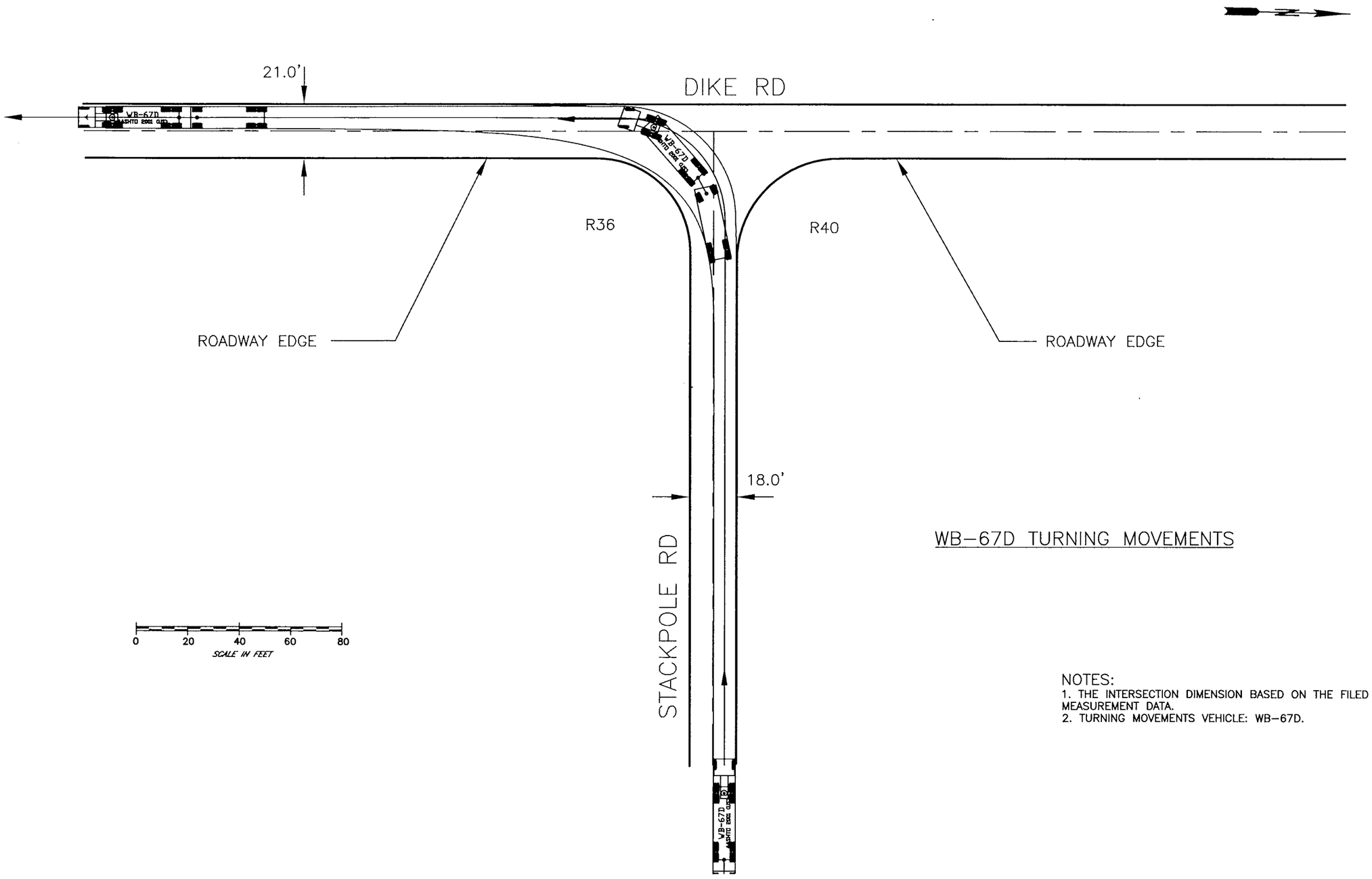
HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



0 20 40 60 80

SCALE IN FEET

WB–67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB–67D.

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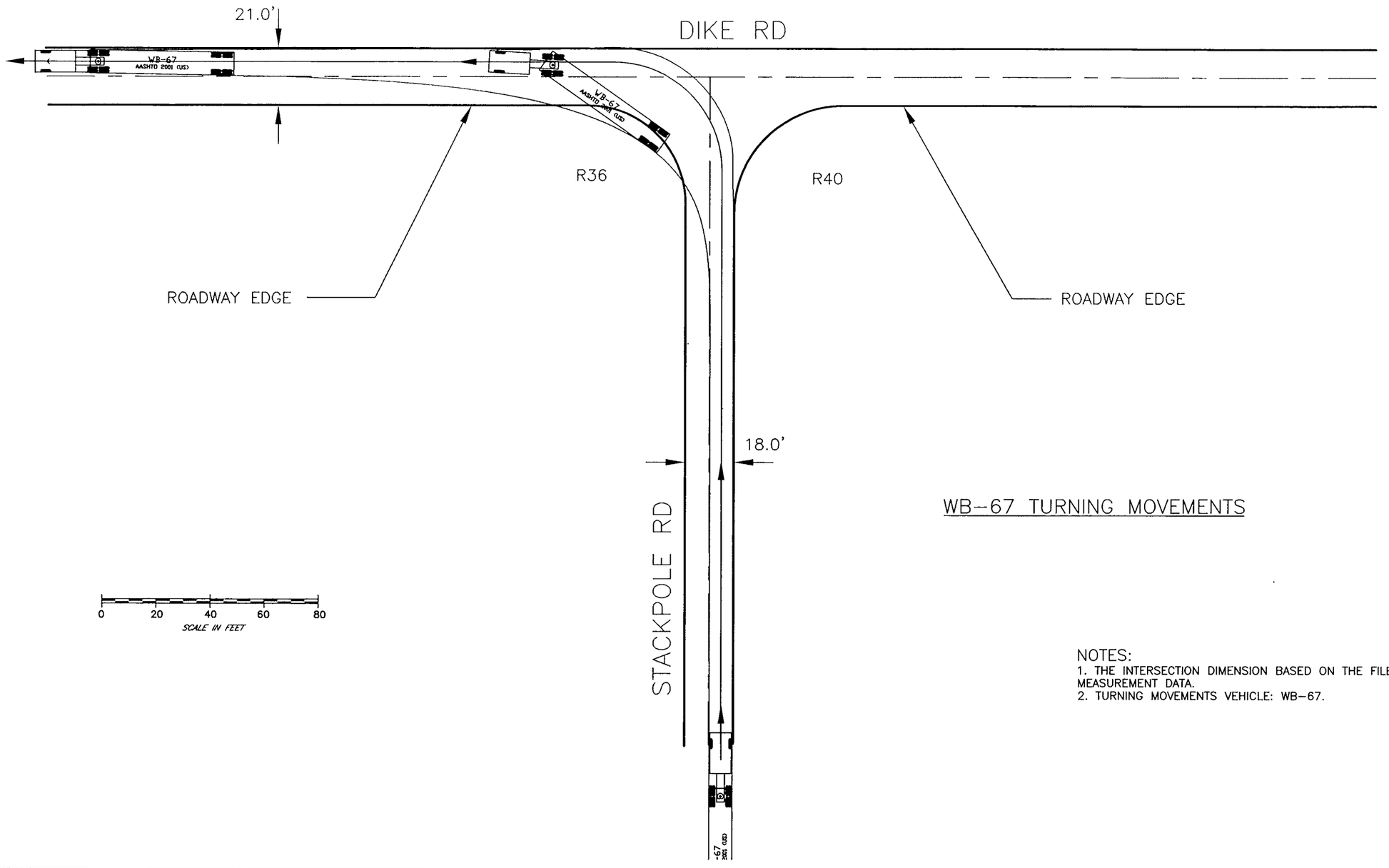
CONTRACT NO:	

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000–005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



0 20 40 60 80

SCALE IN FEET

WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

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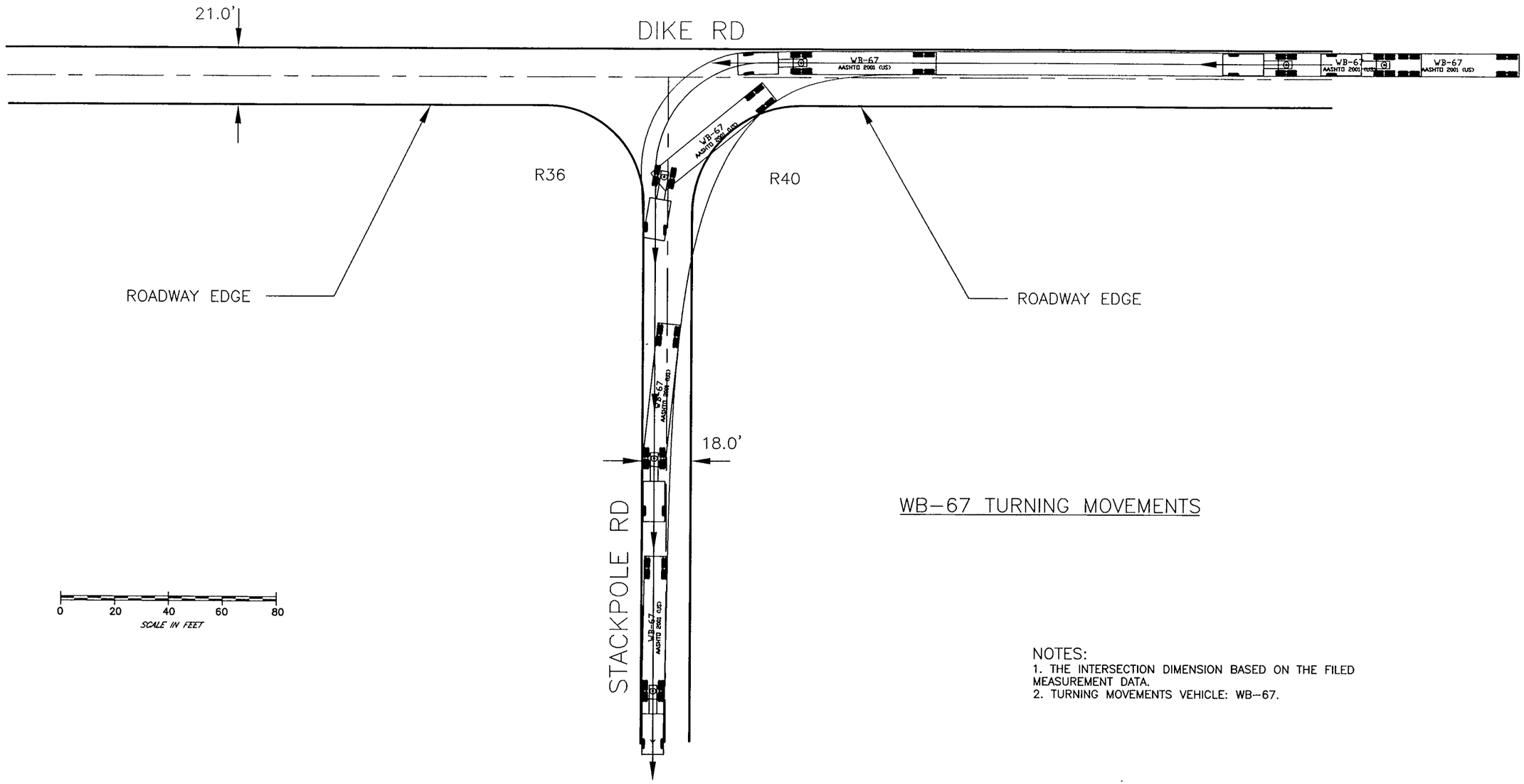
HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB--67.

NO.	REVISION	BY	APP'D	DATE

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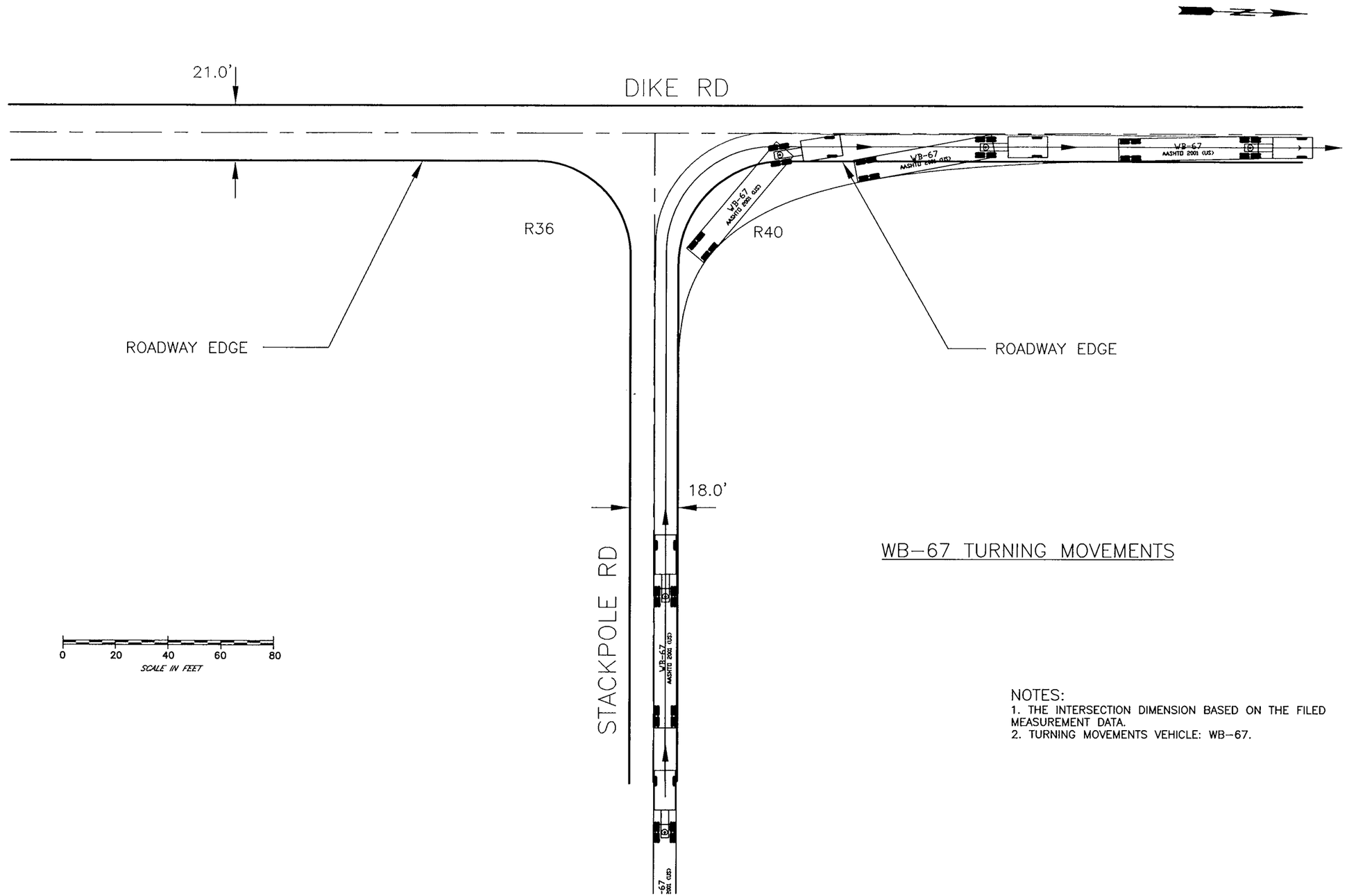
HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB–67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB–67.

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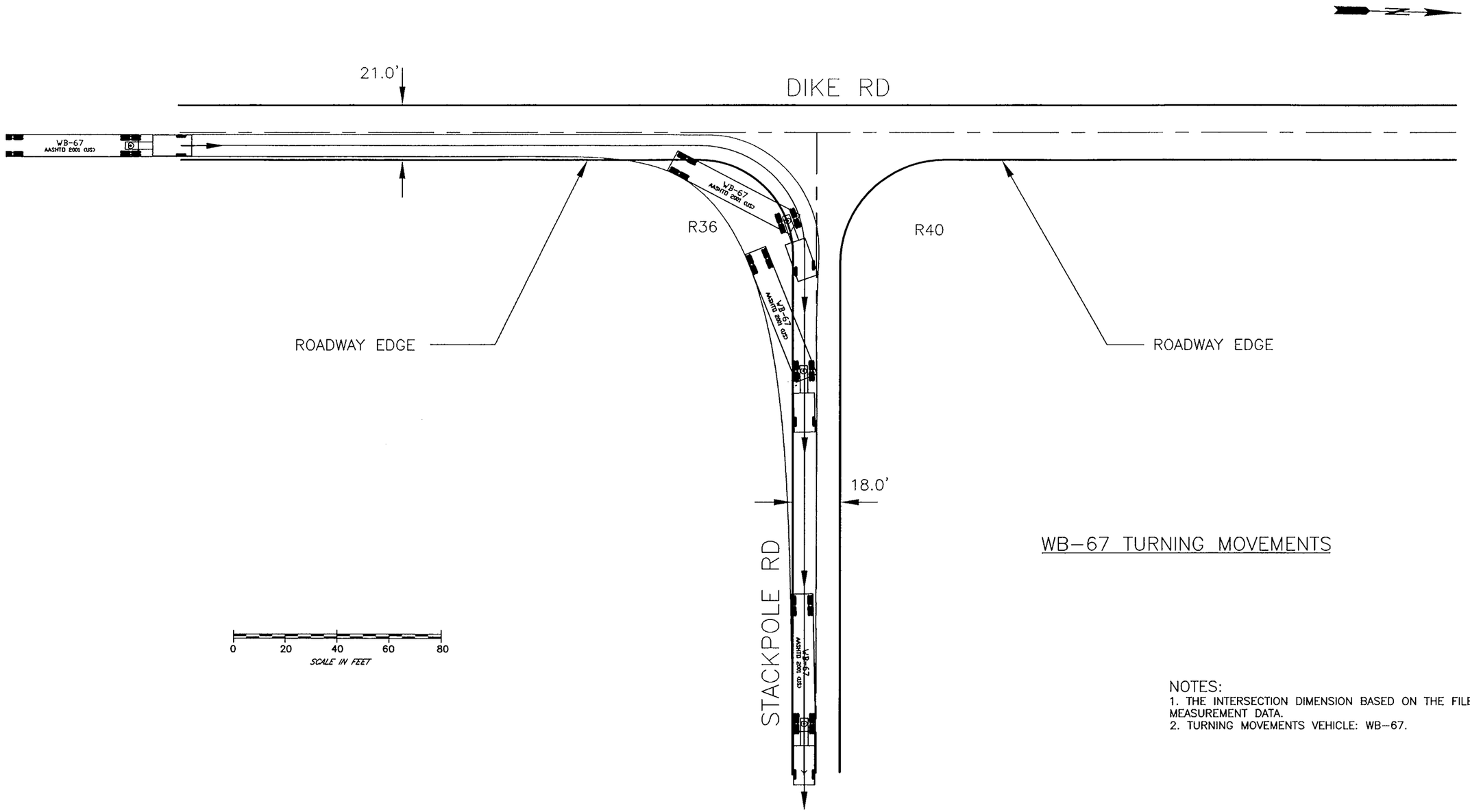
APPROVED:	CONTRACT NO:

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67.

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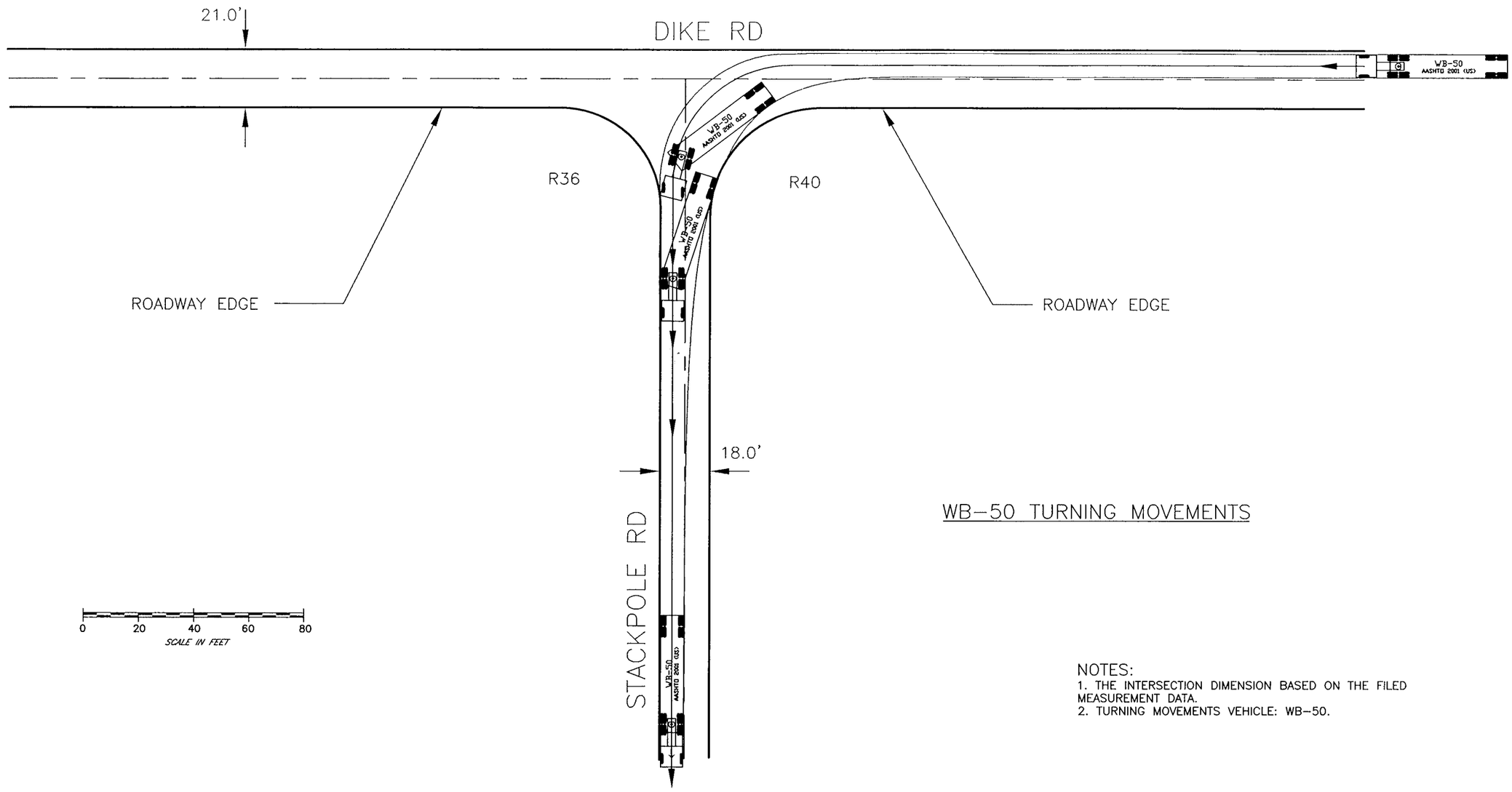
APPROVED:	CONTRACT NO:

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

GARRY STRUTHERS ASSOCIATES, INC.
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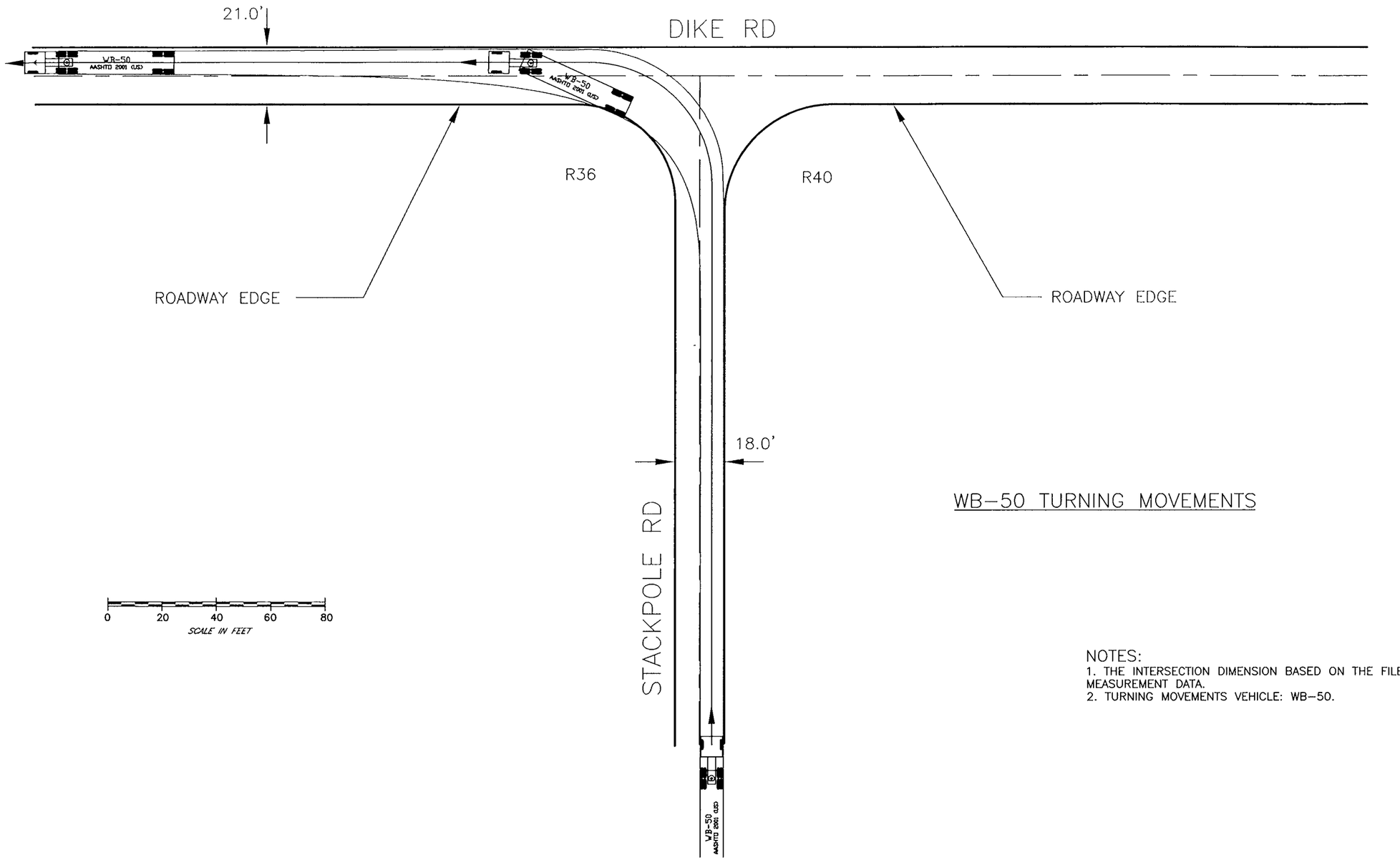
DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY STACKPOLE ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:		TURNING MOVEMENTS STUDY	DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:		SHEET NO: OF



0 20 40 60 80

SCALE IN FEET

WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

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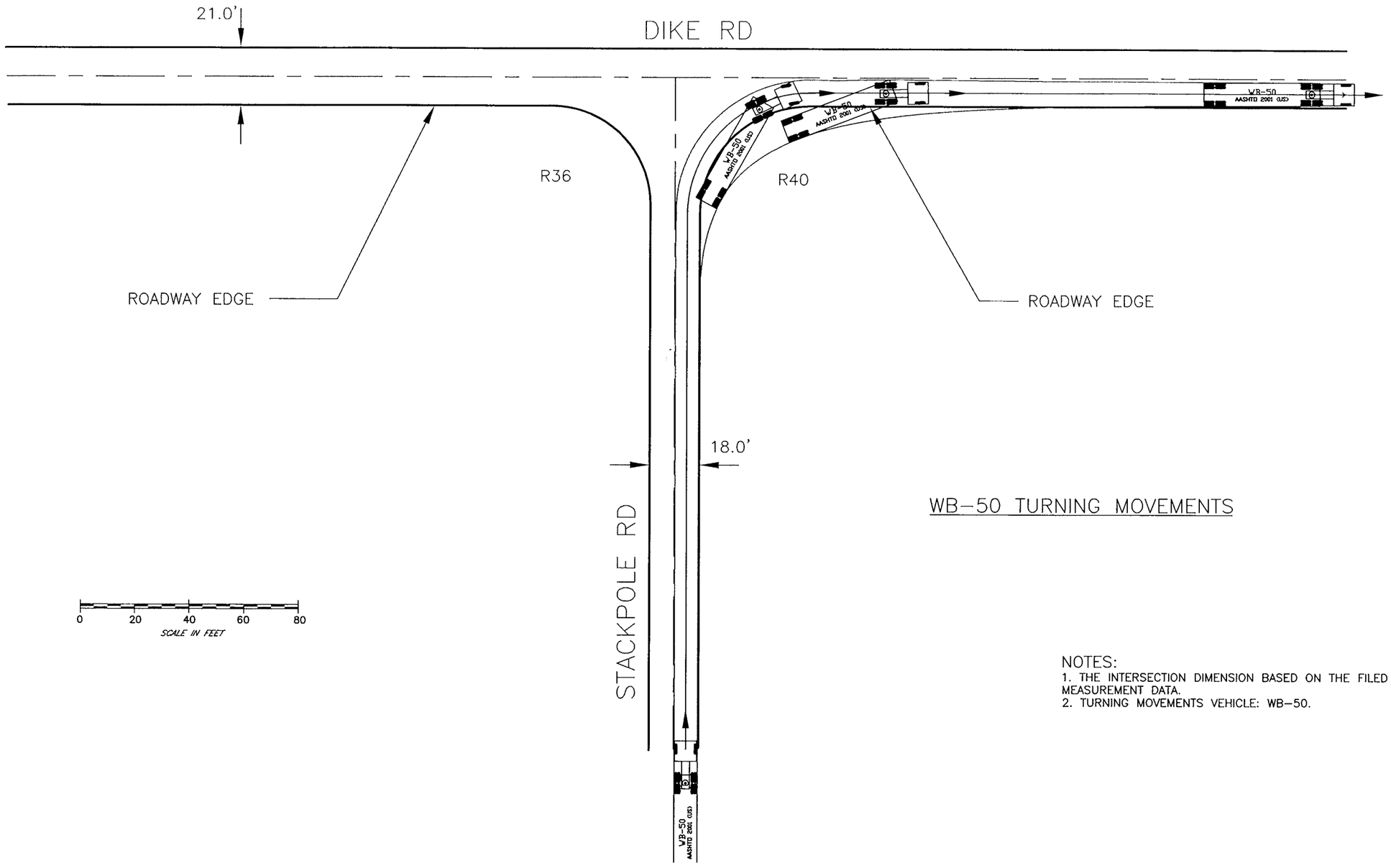
DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY STACKPOLE ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:			DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:	TURNING MOVEMENTS STUDY	SHEET NO: OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

NO.	REVISION	BY	APP'D	DATE

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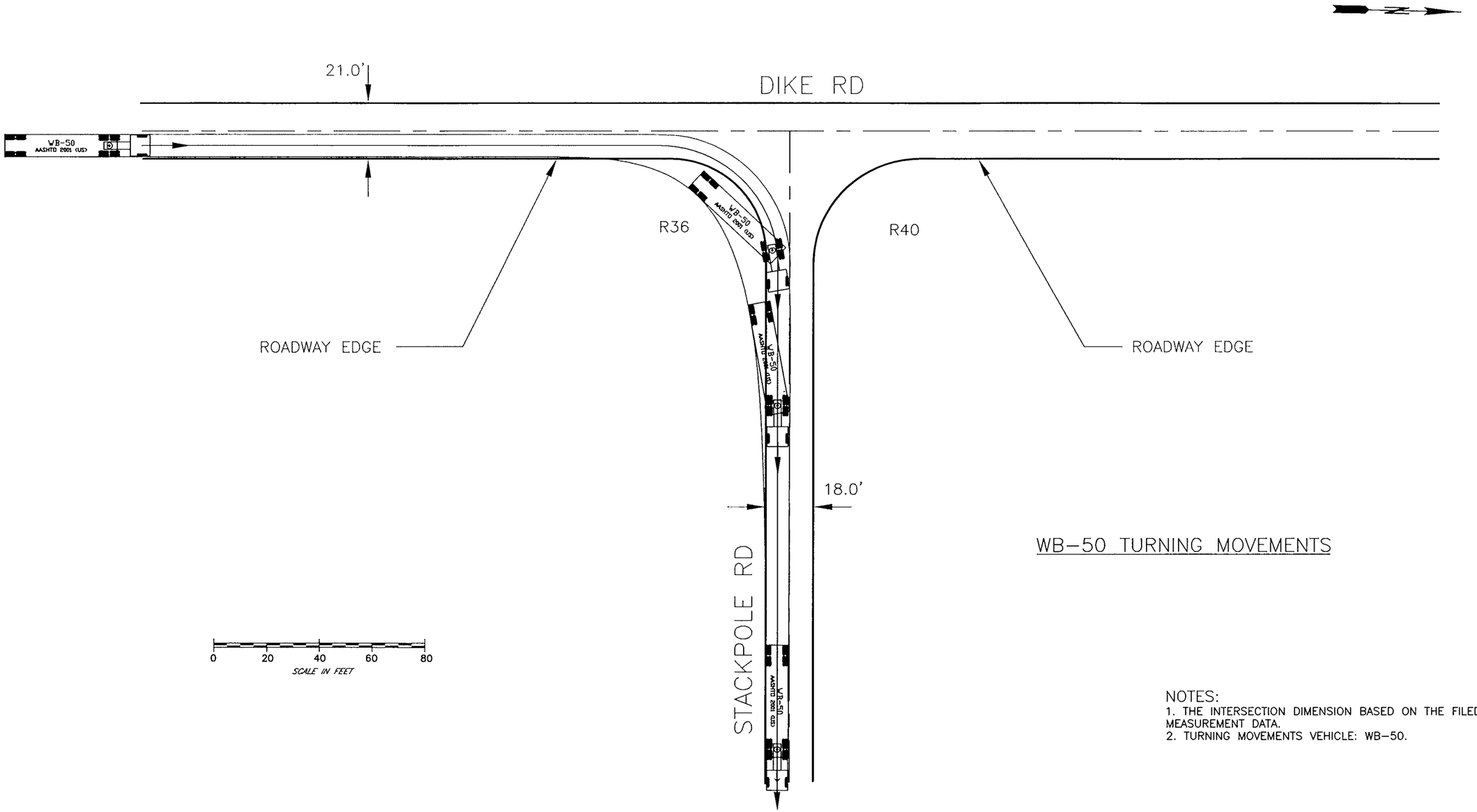
DESIGNED:	CHECKED:	HIKOX ROAD RAILWAY STACKPOLE ROAD & DIKE ROAD	DATE:
DRAWN BY:	SCALE:		PROJECT NO: 000-005.0084
RECOMMENDED:			DRAWING NO: FIG. XX
APPROVED:	CONTRACT NO:	TURNING MOVEMENTS STUDY	SHEET NO: OF



WB-50 TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-50.

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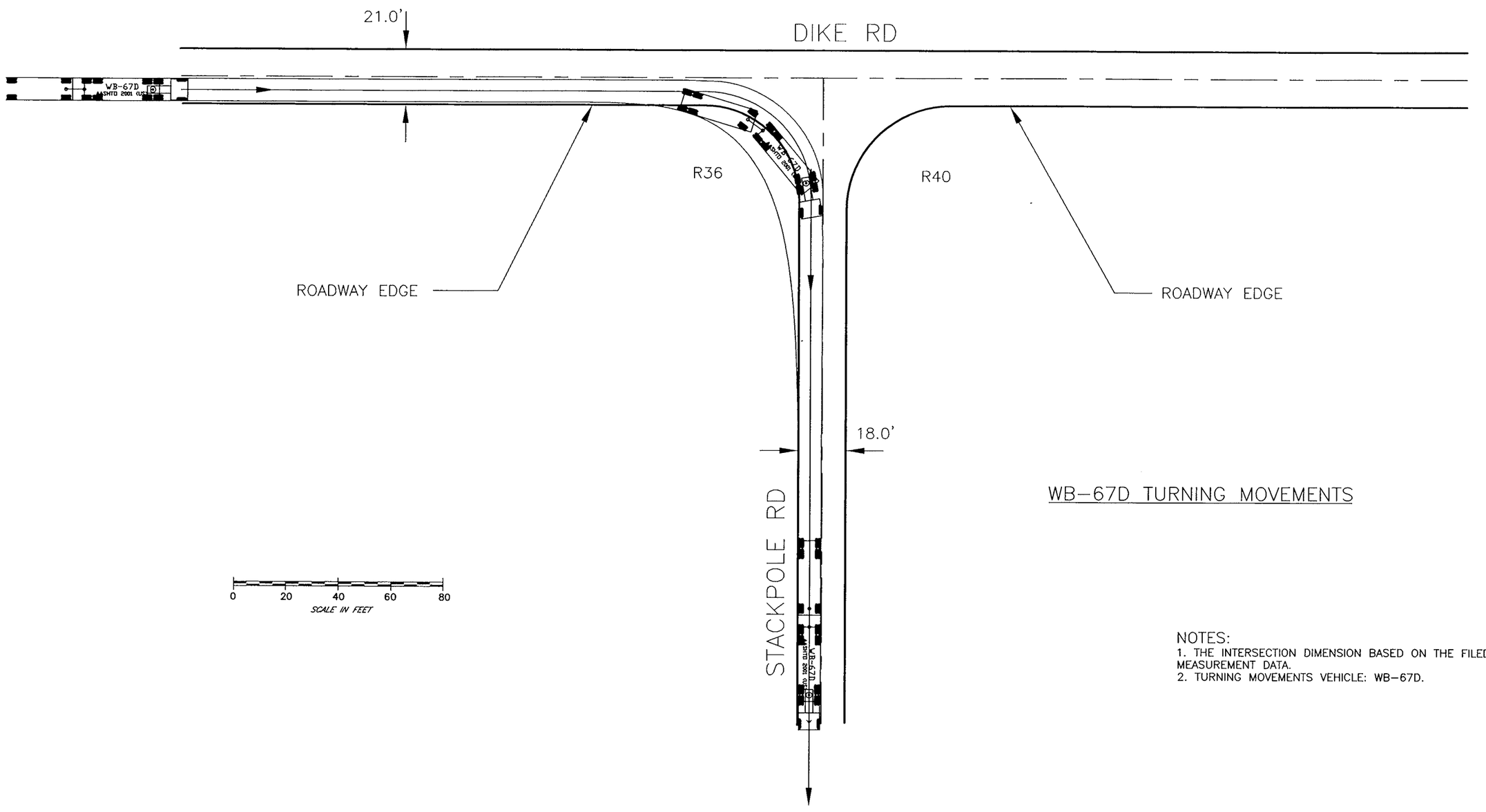
CONTRACT NO:	

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF



WB-67D TURNING MOVEMENTS

NOTES:
1. THE INTERSECTION DIMENSION BASED ON THE FILED MEASUREMENT DATA.
2. TURNING MOVEMENTS VEHICLE: WB-67D.

NO.	REVISION	BY	APP'D	DATE

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CONTRACT NO:	

HIKOX ROAD RAILWAY
STACKPOLE ROAD & DIKE ROAD

TURNING MOVEMENTS STUDY

DATE:	
PROJECT NO:	000-005.0084
DRAWING NO:	FIG. XX
SHEET NO:	OF