

Prepared for  
TML Holdings, LCC

# Aurora Airport Rezone *Transportation Impact Study*



Prepared by



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April 10, 2019

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Subject: Aurora Airport Rezone Transportation Impact Study

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Dear Ted Millar,

DKS Associates is pleased to submit this transportation impact study for the proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport. Please feel free to call if you have any questions or comments regarding this study.

Sincerely,  
DKS Associates

A handwritten signature in blue ink that reads "Lacy Brown".

Lacy Brown, Ph.D., P.E.  
Transportation Engineer

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# 1.0 EXECUTIVE SUMMARY

This report documents a preliminary traffic assessment related to the impacts of a proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport. The planned rezone would change the zoning from an Exclusive Farm Use (EFU) to a Public, which will include airport related commercial and warehouse or hanger uses. Table 1 provides more details regarding the study area and characteristics of the proposed project.

**Table 1: Study Area and Proposed Project Characteristics**

Study Area	
Number of Study Intersections	Six
Analysis Period(s)	Weekday AM peak hour (peak hour between 7-9 AM) and PM peak hour (peak hour between 4-6 PM)
Proposed Development	
Size and Land Use	16.5 acre Airport Related Office and Hanger/Warehouse use.
Project Trips	1,251 net new average daily trips and 174 (150 in, 24 out) AM peak hour trips and 152 (18 in, 134 out) PM peak hour trips.
Vehicle Access Points	Two access points along Airport Road
Other Transportation Facilities	
Pedestrian Facilities	No existing facilities
Bicycle Facilities	Bicycle lanes along Arndt Road
Transit Facilities	Route 3 SMART Transit stops at the Airport Road/Arndt Road intersection.

The following chapters of this report document the existing conditions of the study area, including roadway classification, bicycle and pedestrian facilities, existing traffic operations, existing safety conditions, and observations made during a field visit. The report then discussed the impact the proposed rezone and site plan will impact the surrounding transportation network and provides recommendation to mitigate the impact.

The proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport is anticipated to result in the following short-term and long-term impacts:

## PROJECT IMPACTS

The proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport is anticipated to result in the following impacts:

### Trip Generation

- The reasonable worst case development scenario under existing EFU zoning is assumed to be a 5,000 square-foot farm stand/nursery (ITE LU Code 817). The reasonable worst case development scenario under proposed Public zoning is assumed to be 158,000 square feet of Warehousing (ITE LU Code 150) and 123,000 square feet of General Office Building (ITE LU Code 710). The net difference in trip generation between these two development scenarios represents the trips associated with the zone change.
- All trip generation estimates were provided by the ITE Trip Generation Manual.<sup>1</sup> The proposed zone change is expected to generate 1,251 net new average daily trips, 174 (150 in, 24 out) AM peak hour trips and 152 (18 in, 134 out) PM peak hour trips.

### Intersection Operations

- Under 2017 Existing Conditions, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.
- In the Short-term (2022) No Build scenario and the Long-term (2037) No Build scenario, the same intersections fail to meet mobility targets or operating standards.
- In the Short-term (2022) Build scenario, the OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road intersections are further degraded with the addition of the anticipated project trips.
- In the Long-term (2037) Build scenario, the Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road intersections are further degraded with the addition of the anticipated project trips.

### Mitigations

The following improvements are recommended to mitigate the impact of the proposed zone change on the transportation system.

#### **Airport Road/Arndt Road**

- Install a dedicated right turn lane on the westbound approach.
- Construct necessary traffic signal modifications.

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<sup>1</sup> *Trip Generation Manual, 10<sup>th</sup> Edition*, Institute of Transportation Engineers, 2017.

### **OR-551/Arndt Road**

- Install a dedicated left turn lane on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### **OR-551/Ehlen Road**

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications

### **Airport Road/Ehlen Road<sup>2</sup>**

- Install left-turn lanes on the southbound and eastbound approaches
- Install a right-turn lane on the westbound approach
- Signalize intersection

ODOT maintains jurisdiction of OR-551. ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

## **Proportionate Share**

The proportionate share of improvement costs attributed to the property owner is based on the percentage of traffic generated as a result of the zone change compared to existing and future background traffic volumes. In this case the property owner would generate between 1.9% and 6.4% of the traffic at the impacted intersections in the relevant peak hours. The total cost of all mitigation improvements is approximately \$16.3M, of which the property owner's proportionate share based on their traffic impact is \$475,409. This is a conservatively high estimate that includes the full cost estimate of planned projects that are larger in scope than would be required to mitigate the impact of the zone change alone.

## **Site Plan Review**

- The site plan provided shows approximately 427 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.
- There are two proposed site access points along Airport Road. It is recommended that these two access points are aligned with the two existing private driveways on east side of Airport Road to avoid off-set intersections. The property owner should coordinate with County staff and property owners at these locations.

## **Transportation Planning Rule**

- With the recommended improvements identified in this report, the impacts of the proposed zone change are adequately mitigated, which satisfies TPR requirements.

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<sup>2</sup> The scope of recommended mitigations was increased to include of the entirety of the planned City of Aurora project outlined in their Transportation System Plan (TSP).

## 2.0 EXISTING CONDITIONS

This chapter details the existing study area conditions including the proposed site development, existing bicycle and pedestrian facilities, existing transit facilities, roadway network, future planned projects, existing traffic volumes and operations, crash analysis, and field observations. Supporting details are provided in the appendix.

### STUDY AREA

The proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport, shown in Figure 1, would change the zoning from an Exclusive Farm Use (EFU) to Public, which will include airport related office and light industrial uses. There will be two access points to Airport Road. The following sections present a summary of the roadway network including the existing characteristics of the bicycle and pedestrian facilities, public transportation services, and any future planned projects in the study area.

### ROAD NETWORK

All of the roadways within the study area are rural roads because they are outside of the Aurora urban growth boundary.

The transportation characteristics of the roadways within the study area are shown in Table 2 on the following page. The table includes the functional classification, the number of travel lanes, posted speed, and the facilities for bicyclists, pedestrians, and public transit.



Figure 1: Study Area



**Table 2: Existing Study Area Roadway Characteristics**

Roadway	ODOT Functional Classification	Lanes	Posted Speed	Sidewalk	Bike Lanes	Transit Facilities
OR 551	State Road - Rural Minor Arterial	2	55 mph	No	No <sup>1</sup>	None
Arndt Road	Rural Minor Arterial	2	45 mph	No	Yes	SMART Route Stops
Airport Road	Rural Major Collector	2	35/55 mph <sup>2</sup>	No	No	None
Keil Road	Rural Minor Collector	2	35 mph	No	No	None
Ehlen Road	Rural Minor Arterial	2	35/45 mph <sup>3</sup>	No	No	None

<sup>1</sup>OR 551 has shoulders, approximately six feet, that are wide enough for bicycles.

<sup>2</sup>Airport Road is 55 mph from Arndt Road to just north of Smith Lane and 35 mph from just north of Smith Lane to Ehlen Road.

<sup>3</sup>Ehlen Road is 45 mph from OR 551 to Kahle Lane NE and 35 mph from Kahle Lane NE to just east of Airport Road NE.

The existing bicycle and pedestrian facilities near the proposed site include six foot bicycle lanes on Arndt Road from OR 551 and continuing east along Arndt Road. There is a short segment of sidewalk on each corner of the Arndt Road/Airport Road intersection. There are two transit stops that facilitate Route 3 of the South Metro Area Regional Transit (SMART), which provides service to Wilsonville and surrounding area. The functional classification specifies the purpose of the facility and is a determining factor of applicable cross-section, access spacing, and intersection performance standards.

## EXISTING TRAFFIC VOLUMES AND OPERATIONS

An analysis of the 2017 existing intersection operations was performed for the study intersections to ensure the transportation network meets Marion County's performance standards. Intersections are the focus of the analysis because they are the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity.

Intersection operations were analyzed for the AM and PM peak hours. Turning movement counts were collected on June 6th and 7th, 2017 during the AM and PM peak periods at each of the following study intersections.

- Airport Road /Arndt Road
- Airport Road /Keil Road
- Airport Road /Ehlen Road
- OR-551/Arndt Road
- OR-551/Keil Road
- OR-551/Ehlen Road

## Seasonal Adjustment Factor

The traffic count data collected in June 2017 represents a period where traffic volumes are lower than the average weekday conditions. Adjustments to ODOT facilities are required to reach the desired conditions using methodology from the ODOT Analysis Procedural Manual. To determine when the average weekday conditions occur, data is examined from Automatic Traffic Recorder (ATR) stations that record traffic highway volumes year-round. The Hubbard ATR #24-016 on OR-551 just south of Ehlen Road was deemed appropriate to utilize. The June traffic counts were adjusted to the peak month of August by a seasonal factor of 1.01. The supporting ATR data and calculation is included in the appendix. The adjusted 2017 traffic volumes are shown in Figure 2 below.

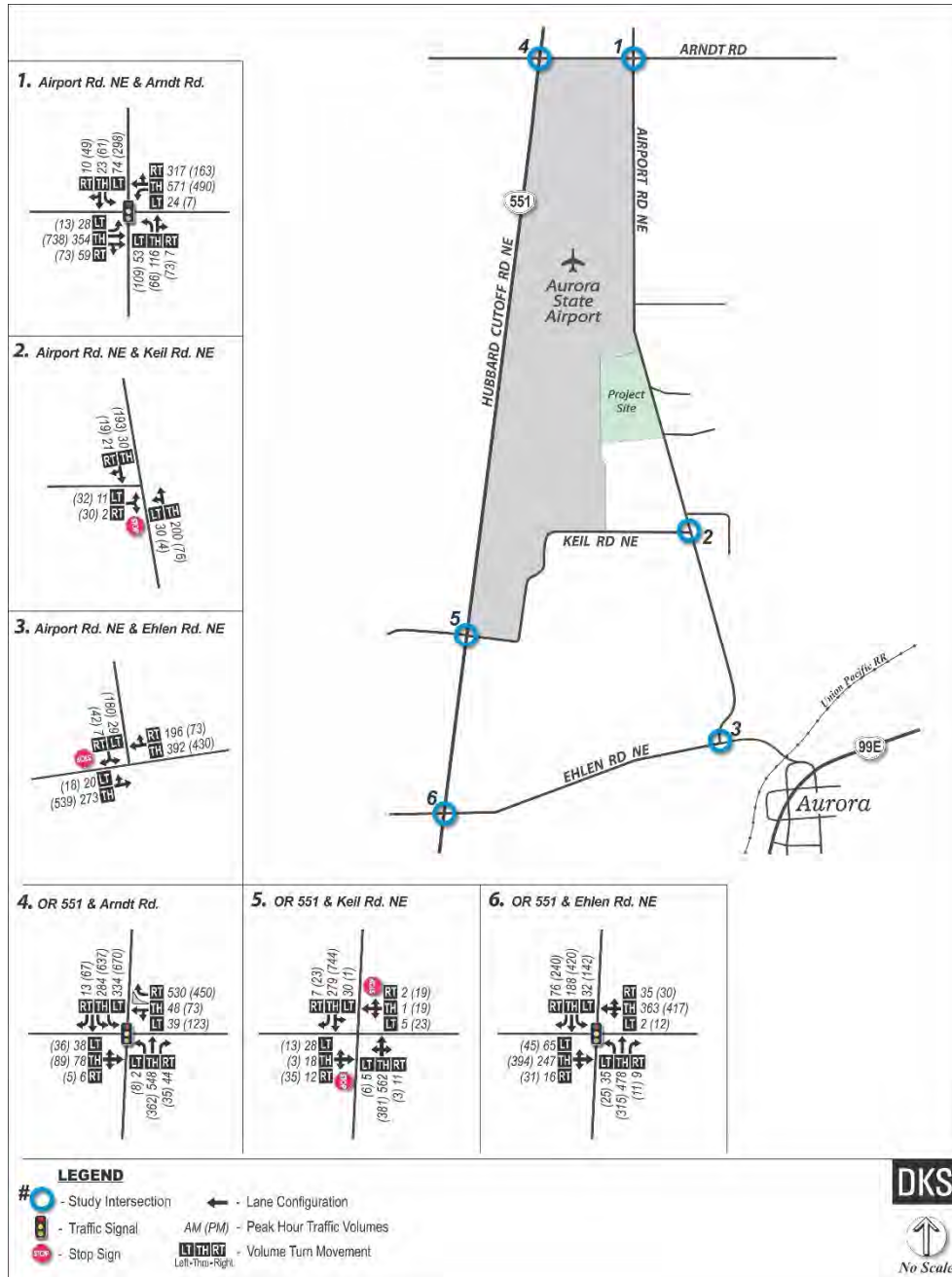


Figure 2: 2017 Existing Conditions Traffic Volumes

## Intersection Performance Measures

Level of service (LOS) ratings and volume-to-capacity (v/c) ratios are two commonly used performance measures that provide a good representation of intersection operations. In addition, they are often incorporated into agency mobility standards.

- **Level of service (LOS):** A “report card” rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- **Volume-to-capacity (v/c) ratio:** A decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 0.95, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

All study intersections under Marion County jurisdiction require that unsignalized intersections maintain a Level of Service (LOS) of E or better. Signalized intersections under Marion County jurisdiction are required to maintain a LOS of D or better (all individual movements to maintain a LOS E or better) with a v/c ratio of 0.85 or less.<sup>3</sup> Signalized intersections under ODOT jurisdiction require a 0.70 or better v/c ratio for a regional highway in a rural area.<sup>4</sup>

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<sup>3</sup> TIA Requirements Policy and Procedures - Methodologies and Analysis Parameters. Marion County. 2015.

<sup>4</sup> Oregon Highway Plan Table 5. Oregon Department of Transportation. 2015.

Existing study intersection operations were evaluated based on the Highway Capacity Manual (HCM) 2000 methodology for signalized intersections<sup>5</sup> and HCM 6th Edition for unsignalized intersections.<sup>6</sup> Table 3 lists the study intersection's existing volume to capacity (v/c) ratio, delay, and LOS. As shown, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.

**Table 3: 2017 Existing Peak Hour Study Intersection Operations**

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
<b>Signalized</b>								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	<b>0.84</b>	<b>25.8</b>	<b>C</b>	<b>0.89</b>	<b>32.8</b>	<b>C</b>
OR-551/Arndt Road	ODOT	0.70 v/c	<b>0.75</b>	<b>22.6</b>	<b>C</b>	<b>0.79</b>	<b>26.4</b>	<b>C</b>
OR-551/Ehlen Road	ODOT	0.70 v/c	<b>0.77</b>	<b>27.6</b>	<b>C</b>	<b>0.79</b>	<b>30.6</b>	<b>C</b>
<b>Two-way Stop</b>								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.11 EB	10.8	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	<b>0.88 SB</b>	<b>70.0</b>	<b>A/F</b>
OR-551/Keil Road	ODOT	0.75 v/c	0.29 EB	26.8	A/D	0.35 WB	34.0	A/D

**Signalized intersections:**

v/c = Volume-to-Capacity Ratio of Intersection  
 Delay = Average Stopped Delay per Vehicle (sec)  
 LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

**Bold/Highlighted:** Intersection fails to meet operating standards/mobility targets.

<sup>5</sup> *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000. Methodology approved by Keith Blair, ODOT Region 2 Senior Analyst, November 6, 2018.

<sup>6</sup> *Highway Capacity Manual 6th Edition*, Transportation Research Board, Washington D.C., 2016. Methodology approved by Keith Blair, ODOT Region 2 Senior Analyst, November 6, 2018.

## CRASH HISTORY

The most recent five years (2011-2015) of available crash data for the study area was obtained from the Oregon Department of Transportation (ODOT) and was used to evaluate the safety performance of the study intersections. As shown in Figure 3, there were a total of 144 collisions, 118 collisions at the study intersections and 26 collisions along the study segments. Three of the total collisions at the study intersections resulted in severe injuries and three collisions involved a bicycle and resulted in an injury. There were no fatalities at any of the study intersections.

The two primary types of collisions were rear-end (55 crashes) and turning (51 crashes) and many were attributed to failure to yield (46 crashes) or following too closely (32 crashes).

### Safety Priority Index System (SPIS)

The Safety Priority Index System (SPIS) is a ranking system developed by ODOT to identify potential safety problems on state highways. SPIS scores are developed based upon crash frequency, severity, and rate for a 0.10 mile or variable length segment along the state highway over a rolling three-year window (i.e., every year it is updated with the most recent three years).

A prioritized list of the top 15th percentile of statewide SPIS sites is created for each region, and the top 5th percentile are investigated by the five Region Traffic managers' offices. Based on crash data from 2012 to 2014 there was one Top 15th percentile SPIS location at the OR-551/Ehlen Road intersection, as shown in Figure 3.

### Collision Rate

The total number of crashes observed at an intersection is typically related to the volume of traffic traveling through said intersection. Because of this relationship, a commonly used measure to evaluate the safety performance of an intersection is the intersection crash rate, which is the number of crashes per year per million entering vehicles (MEV). ODOT has developed a list of critical crash rates which represent the expected crash rate for different types of intersections across the state. If the calculated crash rate is higher than the corresponding ODOT critical crash rate, this would indicate a potential safety concern and would warrant additional safety investigations.

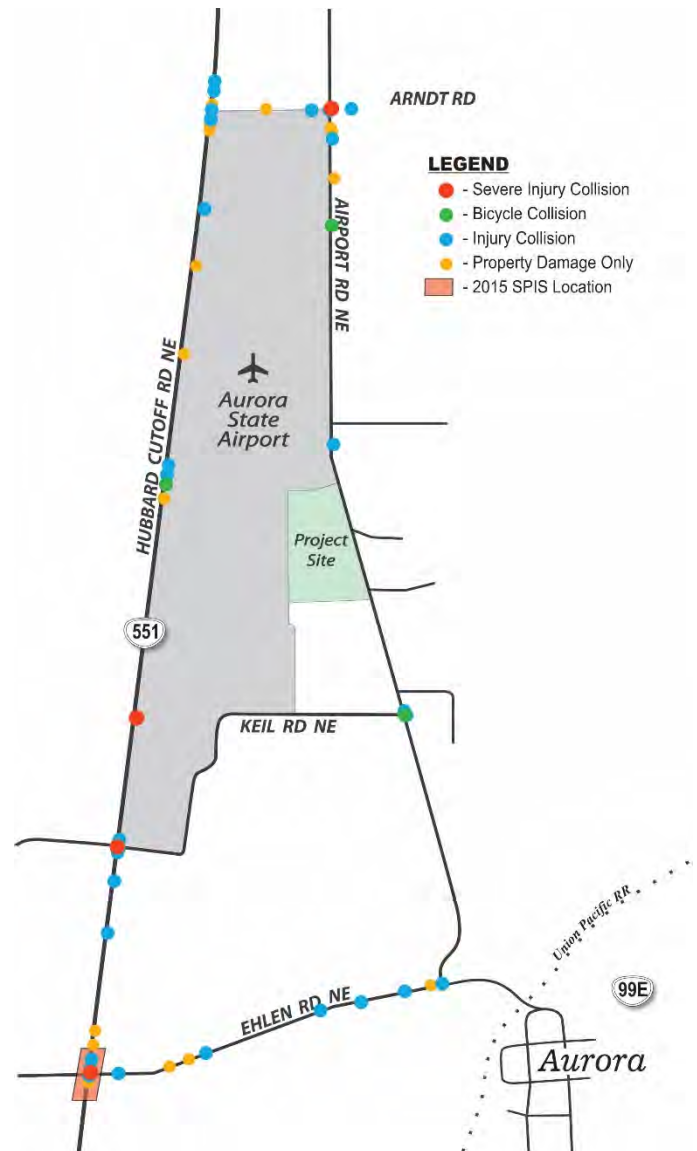


Figure 3: 2011 to 2015 Collisions

As shown in Table 4, there were no fatal crashes in the study area between 2011 and 2015. The three signalized intersections, Airport Road/Arndt Road, OR-551/Arndt Road, and OR-551/Ehlen Road, and the two-way stop controlled intersection at Airport Road/Keil Road had a high crash rate that exceeds the ODOT Critical Crash Rate. At the Airport Road/Keil Road intersection, the total number of crashes is relatively low, however the volume of traffic is also low and the overall crash rate is higher than expected.

**Table 4: Study Intersection Crashes (2011-2015)**

Intersection	Crash Frequency (by Severity)				Approximate ADT	ODOT Critical Crash Rate <sup>2</sup>	Observed Crash Rate <sup>3</sup>
	Severe	Injury	PDO <sup>1</sup>	Total			
Airport Road/Arndt Road	1	21	13	35	21,540	0.58	<b>0.89</b>
Airport Road/Keil Road	0	4	1	5	3,580	0.48	<b>0.77</b>
Airport Road/Ehlen Road	0	2	5	7	12,930	0.48	0.30
OR-551/Arndt Road	0	12	16	28	25,740	0.58	<b>0.60</b>
OR-551/Keil Road	1	10	6	17	12,800	1.08	0.73
OR-551/Ehlen Road	1	13	12	26	21,020	0.58	<b>0.68</b>

<sup>1</sup> PDO = Property damage only

<sup>2</sup> Critical crash rate according to 90th Percentile rate from ODOT APM Exhibit 4-1

<sup>3</sup> Crash rate = average annual crashes per million entering vehicles (MEV); MEV estimates based on PM peak-hour traffic count

**Bold/Highlighted:** Intersection is over the critical crash rate.

### Safety Improvements

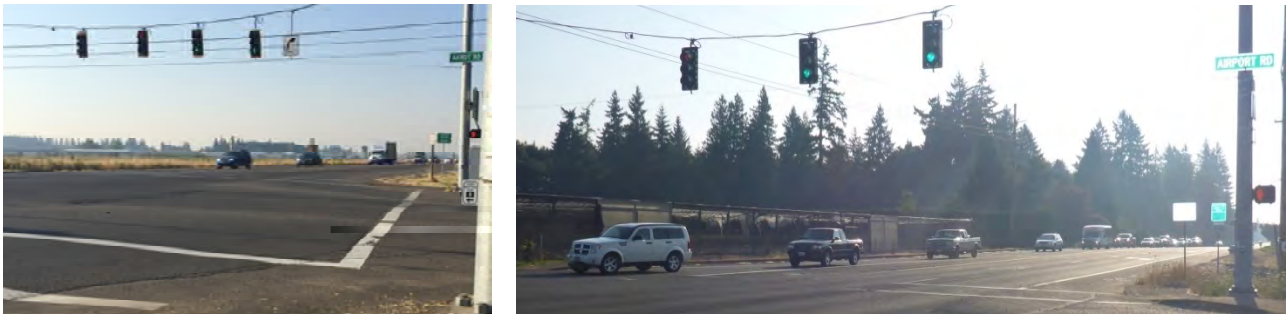
The severe injury at the Airport Road/Arndt Road intersection occurred at night when a vehicle traveling northbound collided with a southbound left turning vehicle. The severe injury at the Airport Road/Ehlen Road intersection occurred during the day when a vehicle failed to stop at the stop sign and collided with a vehicle traveling westbound. The severe injury at the OR-551/Keil Road intersection occurred during the day when a vehicle turning left from Keil Road onto OR-551 failed to yield to a motorcyclists traveling westbound through the intersection.

It is recommended that safety improvements such as improved signal visibility and advance warning signs be installed at the Airport Road/Arndt Road, OR-551/Arndt Road, and OR-551/Ehlen Road intersections. There is a planned project to install roadway departure safety countermeasures along Ehlen Road, including centerline rumble strips and profiled fog lines (see Chapter 3 for more details).

## FIELD OBSERVATIONS

DKS performed field observations at the study area intersections for the Aurora Airport project area on August 2<sup>nd</sup>, 2017 during the AM and PM peak hours. These observations were performed on a typical weekday to verify that actual intersection operations were consistent with the analysis results. Notable observations at the proposed project driveways and study intersections included:

- No sight distance issues were observed at the proposed project site driveways.
- Queues at the OR-551/Ehlen Road intersection reached up to 18 vehicles in the westbound direction in the AM peak hour and 19 vehicles in the eastbound direction in the PM peak hour.
- Eastbound and westbound permissive left turns off Ehlen Road often blocked through movements in the AM and PM peak hour.
- At the OR-551/Arndt Road intersection, the longest queue in the AM peak hour that was observed was 21 combined vehicles in the dual southbound left turn lanes in the PM peak hour.
- Queues at Airport Road/Arndt Road intersection reached 25 vehicles in the westbound direction in the AM peak hour and up to 24 vehicles in the eastbound direction in the PM peak hour.
- Study intersections and roadway segments are rural in nature; however they connect I-5 to the Canby urban area resulting in high traffic volumes.



**Northbound traffic at OR-551/Arndt Road intersection (left) and westbound traffic at Airport Road/Arndt Road intersection (right)**



**Westbound traffic at OR-551/Ehlen Road intersection**

## 3.0 SHORT-TERM (2022) PROJECT IMPACTS

The proposed development of the 16.5 acre parcel on the east edge of the Aurora State Airport requires changing the existing zoning from Exclusive Farm Use (EFU) to Public and using the space as additional warehouse or hanger space with attached offices. To evaluate the impacts of the proposed zone change per TPR requirements, the trip generation of the reasonable worst case development scenarios under existing and proposed zoning are compared.

The reasonable worst case Public zone land use assumptions would be 158,000 square feet of warehouse or hanger space and 123,000 square feet of office space.

The reasonable worst case land use assumption for an EFU zone would be a 5,000 square foot farm stand/nursery. Several farm stands and nurseries currently occupy properties zoned as EFU in the vicinity of the subject property, with building footprints up to 5,000 square feet.<sup>7</sup>

The net difference of trip generation estimates between existing and proposed zoning is used to evaluate the potential transportation impacts of the zone change. This net difference is calculated by subtracting the trips generated by the farm stand/nursery from the trips generated by the proposed warehouse or hanger space with attached offices. The estimated net new trips were then distributed and added to the roadway network to evaluate the transportation impact of the proposed zone change.

The following sections present the anticipated number of new trips associated with the proposed zone change, the distribution of trips within the study area, the future traffic volumes and operating conditions, the recommended mitigations, and a review of the preliminary site plan. Supporting information can be found in the appendix.

### TRIP GENERATION

Trip generation is the method used to estimate the number of vehicles a development adds to site driveways and the adjacent roadway network during a specified period (i.e., such as the PM peak hour). Trip generation estimates are performed using trip rates surveyed at similar land uses, as provided by the Institute of Transportation Engineers (ITE).<sup>8</sup>

Based on the ITE manual, a 5,000 SF nursery is estimated to generate 341 average daily trips, 12 (6 in, 6 out) AM peak hour trips and 34 (17 in, 17 out) PM peak hour trips.

The worst-case land use assumed for the Public zone is estimated to generate 1,592 average daily trips and 186 (156 in, 30 out) AM peak hour trips and 186 (35 in, 151 out) PM peak hour trips. The future Build scenario (proposed Public zoning minus existing EFU zone trips) is estimated to generate 1,251 net new average daily trips, 174 (150 in, 24 out) AM peak hour trips and 152 (18 in, 134 out) PM

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<sup>7</sup> Boones Ferry Berry Farms, Smith Gardens, TSW Nursery, Fir Point Farms (Clackamas County, AG zone), Oregon Nursery Sales (Clackamas County, AG zone)

<sup>8</sup> *Trip Generation Manual, 10<sup>th</sup> Edition*, Institute of Transportation Engineers, 2017.



peak hour trips. The peak hour trips were distributed and added to the roadway network for the future Build operations analysis.

Table 5 lists the AM and PM peak hour vehicle trip generation estimates, which were used for both the short-term (2022) and long-term (2037) analysis scenarios.<sup>9</sup>

**Table 5: Trip Generation Summary for Existing Zoning and Proposed Public Zone**

Land Use (ITE Code)	Trip Generation Rate <sup>a</sup>		Units	AM Peak Hour			PM Peak Hour			Daily Trips
	AM Peak	PM Peak		In	Out	Total	In	Out	Total	
<b>Existing EFU Zone</b>										
Farm Stand/Nursery (817)	2.43	6.94	5 KSF <sup>b</sup>	6	6	12	17	17	34	341
<b>Worst Case Public Zone Land Use</b>										
Warehousing (150)	0.28	0.30	158 KSF <sup>b</sup>	34	10	44	13	34	47	295
General Office Building (710)	1.15	1.13	123 KSF <sup>b</sup>	122	20	142	22	117	139	1,297
<i>New Trips from Proposed Public Zoning</i>				156	30	186	35	151	186	1,592
<b>Net New Trips for Future Build Scenarios</b>				<b>150</b>	<b>24</b>	<b>174</b>	<b>18</b>	<b>134</b>	<b>152</b>	<b>1,251</b>

<sup>a</sup> The project trip generation estimates were based on ITE equations for the proposed warehouse and office buildings. The peak hour trip generation rates for the warehouse and office buildings were then back calculated.

<sup>b</sup> KSF = 1,000 Square Feet

## TRIP DISTRIBUTION

Trip distribution provides an estimation of where project-related trips would be coming from and going to within the study area. It is given as percentages at key gateways to the study area and is used to route project trips through the study intersections. The trip distribution, estimated using the existing traffic counts, is shown in Figure 4 on the following page.

<sup>9</sup> Based on the types of approved uses for Exclusive Farm Use (EFU) Zone, Chapter 17.136 and for Public (P) Zone, Chapter 17.171 in the Marion County Code, it was determined that an existing farm stand land use and the proposed airport development would be the worst case scenario

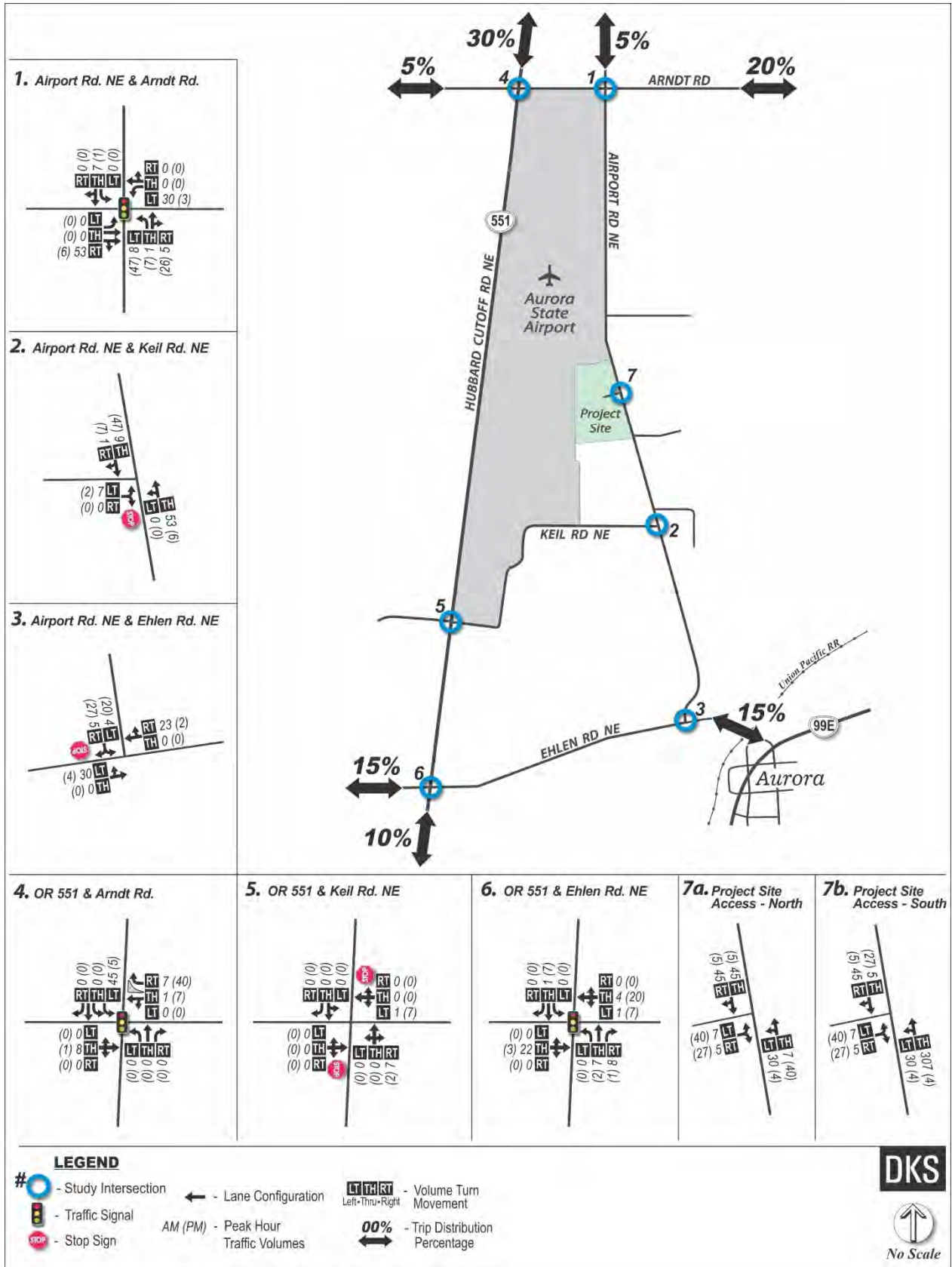


Figure 4: Project Trips and Trip Distribution

## SHORT-TERM (2022) IMPACT ANALYSIS

### Future Traffic Volumes

Future traffic volumes were estimated and used to analyze future intersection operations at the study intersection for the 2022 No Build and 2022 Build scenarios. The future traffic volumes include various combinations of three types of traffic: existing, background, and project. The background traffic includes the traffic that is expected to be added to the transportation system based on an anticipated growth rate.

A growth rate was calculated based on methodology stated in ODOT's Analysis Procedure Manual.<sup>10</sup> OR-551 is located outside of Aurora's urban growth boundary and using historical trends to estimate a growth rate was deemed applicable. Current and future traffic volumes on OR-551 near the site (mile posts 1.49 and 3.46) were gathered from ODOT's Future Volumes Table and an annual growth rate of 2.0% on OR-551 between Arndt Road and Ehlen Road was calculated. Supporting data is included in the appendix.

This growth rate was applied to the OR-551/Arndt Road and OR-551/Ehlen Road intersections, the north-south through movements at the OR-551/Keil Road intersection, and the east-west movements at the Arndt Road/Airport Road intersection. The growth rate was selectively applied to the study intersections to accurately model the expected background growth in traffic. It is anticipated that any growth on Airport Road in the future will be due to the expansion of the Aurora Airport facilities.

### Short-term (2022) Traffic Operations

The following sections present the results of the future traffic operations at each of the study intersections. All future traffic operations assumed completion of the following planned projects.

- **Marion County Local Road Roadway Departure:** Install roadway departure countermeasures along Ehlen Road to include centerline rumble strips and profiled fog lines. Construction is expected to begin in 2018 per the 2018-2021 ODOT STIP draft project list. (Project Key 19753)
- **Marion County Flashing Yellow Arrows:** Install flashing yellow arrows for all left turn movements at the Airport Road/Arndt Road intersection to allow for protective and permissive left turns. Optimized signal timing was assumed as part of this project.

ODOT's 2018-2021 STIP draft project list also includes plans to install left turn lanes on Ehlen Road at the OR-551 signalized intersection, restrict movements at Boones Ferry Road/Ehlen Road to right turns only with the installation of a concrete traffic separator, and construct a new local county road connection between OR-551 and Boones Ferry Road. (Project Key 18664). Per direction from ODOT, it was decided to not assume this project for the analysis due to the uncertainty of funding.<sup>11</sup>

Figure 5 and Figure 6 on the following pages show the expected traffic volumes for the study area for the 2022 No Build with Existing EFU Zoning and the 2022 Build with Proposed Public Zoning.

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<sup>10</sup> *Analysis Procedure Manual, Version 2*, Chapter 6: Future Year Forecasting, ODOT, Last updated November 2018.

<sup>11</sup> TIA Review Comments from ODOT, Dated January 4, 2019

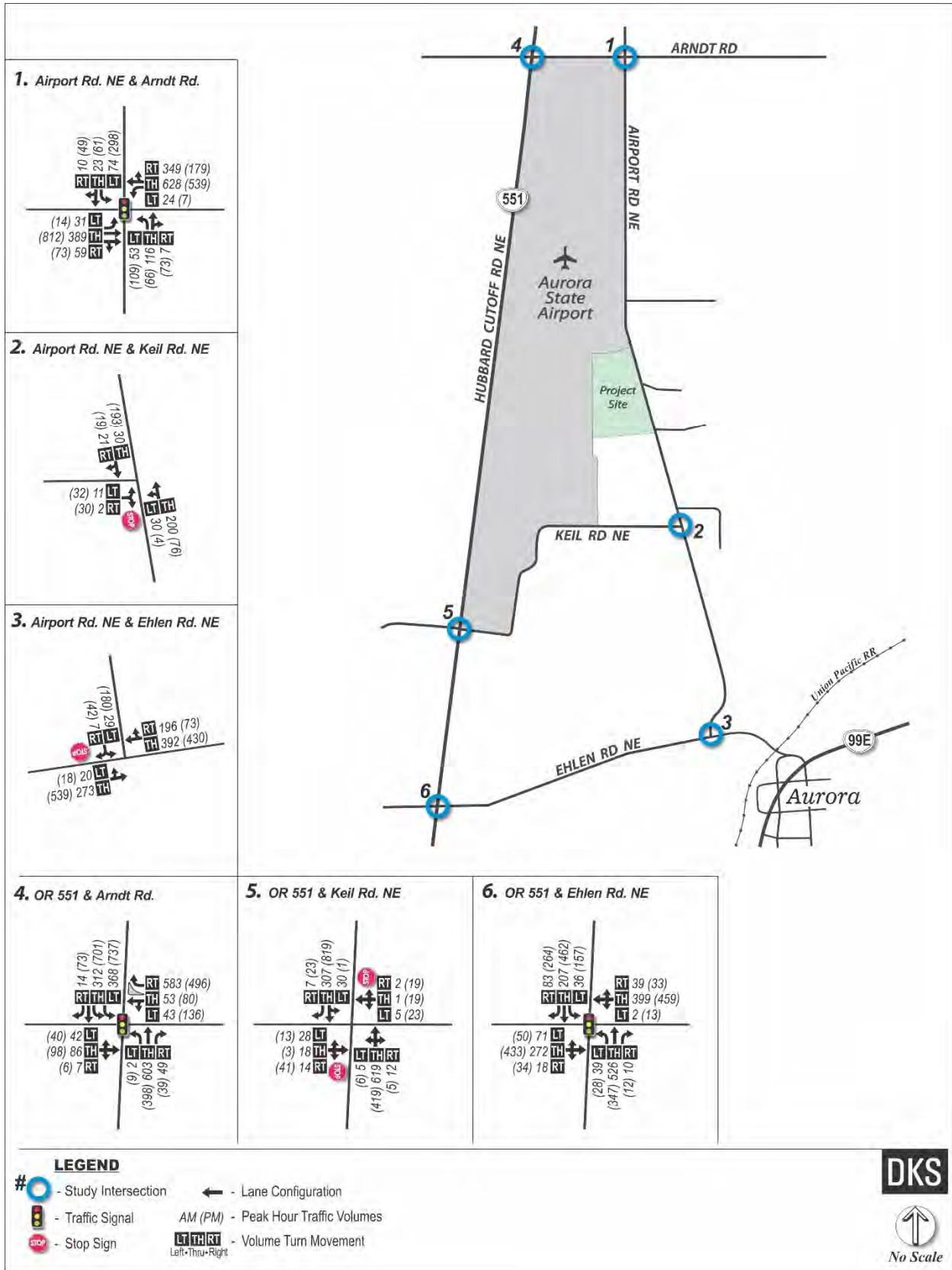


Figure 5: 2022 No Build Traffic Volumes

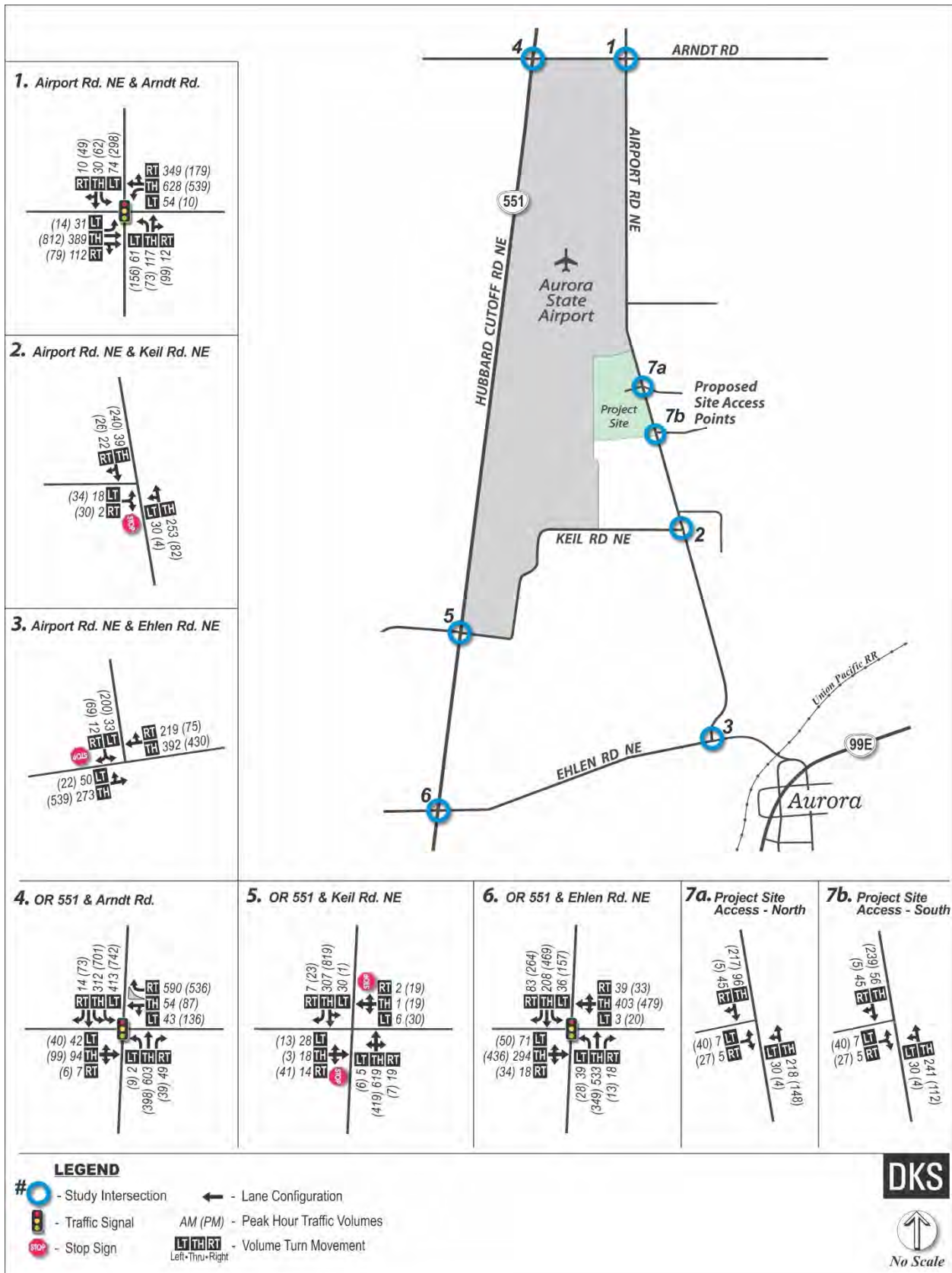


Figure 6: 2022 Build Traffic Volumes

It is anticipated that the proposed rezone and development will be completed in 2022. Table 6 lists the 2022 No Build intersection operations and Table 7 lists the study intersections' 2022 Build (assumes worst case Public zone land use) intersection operations.

**Table 6: Short-term (2022) No Build Intersection Operations**

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
<b>Signalized</b>								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	<b>0.89</b>	<b>41.7</b>	<b>D</b>	<b>1.04</b>	<b>40.9</b>	<b>D</b>
OR-551/Arndt Road	ODOT	0.70	<b>0.78</b>	<b>23.1</b>	<b>C</b>	<b>0.88</b>	<b>39.6</b>	<b>D</b>
OR-551/Ehlen Road	ODOT	0.70	<b>0.83</b>	<b>32.9</b>	<b>C</b>	<b>0.88</b>	<b>37.6</b>	<b>D</b>
<b>Two-way Stop</b>								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.10 EB	10.6	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	<b>0.88 SB</b>	<b>70.0</b>	<b>A/F</b>
OR-551/Keil Road	ODOT	0.75	0.33 EB	30.2	A/D	0.43 WB	44.1	A/E

**Signalized intersections:**

v/c = Volume-to-Capacity Ratio of Intersection  
 Delay = Average Stopped Delay per Vehicle (sec)  
 LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

**Bold/Highlighted:** Intersection fails to meet operating standards/mobility targets.

**Table 7: Short-term (2022) Build Intersection Operations**

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
<b>Signalized</b>								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	<b>0.89</b>	<b>41.3</b>	<b>D</b>	<b>1.00</b>	<b>46.5</b>	<b>D</b>
OR-551/Arndt Road	ODOT	0.70	<b>0.80</b>	<b>25.0</b>	<b>C</b>	<b>0.88</b>	<b>41.9</b>	<b>D</b>
OR-551/Ehlen Road	ODOT	0.70	<b>0.83</b>	<b>34.4</b>	<b>C</b>	<b>0.89</b>	<b>38.9</b>	<b>D</b>
<b>Two-way Stop</b>								
Airport Road/Keil Road	Marion County	LOS E	0.04 EB	11.5	A/B	0.11 EB	11.1	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.16 SB	19.0	A/C	<b>1.03 SB</b>	<b>104.9</b>	<b>A/F</b>
OR-551/Keil Road	ODOT	0.75	0.33 EB	30.5	A/D	0.50 WB	52.0	A/F

## Short-term (2022) Mitigation Strategies

As was discussed in the existing conditions section, Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road currently do not meet Marion County or ODOT mobility targets/standards. The proposed zone change will further degrade intersection operations at OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road. Per TPR requirements, the incremental impact of the zone change on the surrounding development must be mitigated. In other words, improvements are required to bring intersection operations to the same level they would be without the zone change. The following improvements are recommended to mitigate the anticipated impact of project trips at these three intersections. It should be noted that the improvements shown for the intersection of Airport Road/Ehlen Road include the full scope of a planned project listed in the City of Aurora's Transportation System Plan (TSP).<sup>12</sup> Per the request of Marion County and the City of Aurora, the full project was included as a recommended improvement even though it is much larger in scope than what is required to mitigate intersection operations to No-Build levels as required by TPR.<sup>13</sup>

### OR-551/Arndt Road

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### OR-551/Ehlen Road

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### Airport Road/Ehlen Road<sup>14</sup>

- Install left-turn lanes on the southbound and eastbound approaches.
- Install a right-turn lane on the westbound approach.
- Signalize intersection.

ODOT maintains jurisdiction of OR-551. ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

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<sup>12</sup> *City of Aurora Transportation System Plan*, City of Aurora, 2009.

<sup>13</sup> At the intersection of Airport Road/Ehlen Road, the addition of an eastbound left-turn lane and a center two-way left-turn lane on the west leg would adequately mitigate the impact of the zone change.

<sup>14</sup> The scope of recommended mitigations was increased to include of the entirety of the planned City of Aurora project outlined in their Transportation System Plan (TSP).



Table 8 below shows the operational results with the recommended mitigations and how they compare to the mitigation standard. The mitigation standard is based on the Short-term (2022) No Build operations. The recommended mitigations improve operations to a level at or better than what is expected without the zone change. Additionally, the mitigations improve traffic operations for the Airport Road/Ehlen Road intersection to Marion County’s required operating standard.

**Table 8: 2022 Mitigated Traffic Operations**

Intersection	Mitigation	Mitigation Standard <sup>1</sup>	AM Peak			Mitigation Standard <sup>1</sup>	PM Peak		
			v/c	Delay	LOS		v/c	Delay	LOS
<b>Signalized</b>									
OR-551/Arndt Road	EBLT, WBLT	0.78 v/c	0.78	20.9	C				
OR-551/Ehlen Road	EBLT, WBLT					0.88 v/c	0.85	31.5	C
Airport Road/Ehlen Road	EBLT, SBLT, WBRT, Signalization					0.88 v/c	0.60	8.9	A

**Signalized intersections:**

- v/c = Volume-to-Capacity Ratio of Intersection
- Delay = Average Stopped Delay per Vehicle (sec)
- LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

- v/c = Volume-to-Capacity Ratio of Worst Movement
- Delay = Critical Movement Approach Delay (sec)
- LOS = Level of Service of Major Street/Minor Street

<sup>1</sup>Since the intersection fails to meet current mobility targets/standards, the mitigation standard is equal to the operating condition without project trips added.



## SITE PLAN REVIEW

The site plan includes approximately 150,535 square feet of proposed warehouse or hanger space and 118,980 square feet of proposed office space. The site plan also shows a taxi-lane easement that connects to the existing taxiway and runway and approximately 427 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.

### Site Access

The access points are located at existing driveways along Airport Road, one of which is Stenbock Way NE. The spacing between the access points is approximately 575 feet and 630 feet, which meets Marion County access spacing standards for major collectors.<sup>15</sup> The access points along Airport Road are located near existing driveways that lead to properties on the east side of Airport Way. It is recommended that the proposed access points are aligned with these driveways to avoid off-set intersections. The developer should coordinate with County staff and property owners at these locations. Based on preliminary observations, there are no existing sight distance concerns at the existing driveway or study intersections.<sup>16</sup> However, prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.

Table 9 below page shows the traffic operations at the two proposed project driveways for the Short-term (2022) Build scenario. It was assumed that project trips would be evenly split between the two proposed driveways and therefore the expected operations would be similar. As shown, both the proposed driveways meet the Marion County operating standard.

**Table 9: Short-term (2022) Build Driveway Operations**

Location	Jurisdiction	Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
Airport Road/North Access Point	Marion County	LOS E	0.03 NBL	10.6	A/B	0.12 EB	11.4	A/B
Airport Road/South Access Point			0.02 NBL	10.4	A/B	0.12 EB	11.3	A/B

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement

Delay = Critical Movement Approach Delay (sec)

LOS = Level of Service of Major Street/Minor Street

**Bold/Highlighted:** Intersection fails to meet operating standards.

<sup>15</sup> *Marion County Rural Transportation System Plan, 2005*. Table 10-1. Access spacing requirements between minor intersections or private access is 300 feet on major collector roadways.

<sup>16</sup> Preliminary sight distance evaluations were completed on August 2, 2017.

### **Turn Lane Warrant Analysis**

Turn warrant analyses were performed for the proposed site access points along Airport Road using the Highway Review Board (HRB) left turn lane warrant analysis methodology for the northbound approaches and the National Cooperative Highway Research Program (NCHRP) Report 279 right turn lane warrant analysis methodology for the southbound approaches. It was assumed that the vehicles turning into the project site would be split between the two proposed access points.

Northbound left turn lanes were not warranted at the proposed site accesses under HRB methodology, however, were warranted by ODOT criteria. Right turn lanes were not warranted at either of the proposed site accesses. Since left-turn lane warrants are only met by ODOT criteria during the AM peak hour for the worst-case land use assumption, left-turn lanes are not deemed necessary at this time. All approaches would also continue to meet Marion County standards without the addition of left-turn lanes. The results and supporting documentation can be found in the appendix.

## 4.0 TRANSPORTATION PLANNING RULE ANALYSIS (2037)

Transportation system planning in Oregon is guided and enforced by Statewide Planning Goal 12: Transportation.<sup>17</sup> The Transportation Planning Rule (TPR), OAR 660-012, describes how to implement Planning Goal 12 in all communities throughout the State.<sup>18</sup> By implementing Planning Goal 12, the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile.

OAR 660-012-0060 of the TPR addresses amendments to plans and land use regulations and includes measures to be taken to ensure allowed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. This rule includes criteria for identifying significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers.

The foregoing transportation impact analysis does indicate that several facilities in the surrounding transportation network will be significantly impacted by a proposed change in zoning. Additional intersections were identified with significant impacts. For those cases, the TPR requires that measures be taken consistent with the rule.

### LONG-TERM (2037) TRAFFIC VOLUMES

As previously completed for the 2022 short-term analysis, the future traffic volumes include various combinations of three types of traffic: existing, background, and project. The background traffic includes the traffic that is expected to be added to the transportation system based on an anticipated growth rate of 2.0% per year.

This growth rate was applied to the OR-551/Arndt Road and OR-551/Ehlen Road intersections, the north-south through movements at the OR-551/Keil Road intersection, and the east-west movements at the Arndt Road/Airport Road intersection. The growth rate was selectively applied to the study intersections to accurately model the expected background growth in traffic. It is anticipated that any growth on Airport Road in the future will be due to the expansion of the Aurora Airport facilities.

All future traffic operations assumed completion of the planned projects previously discussed including the flashing yellow arrows to allow for protected and permissive left turns on the Airport Road/Arndt Road intersection.

The estimated traffic volumes were used to analyze future intersection operations at the study intersection for the 2037 No Build and 2037 Build scenarios. Figure 7 and Figure 8 on the following pages show the expected traffic volumes for the study area for the 2037 No Build with Existing EFU Zoning and 2037 Build with the Worst Case Public Zone Land Use.

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<sup>17</sup> Statewide Planning Goals: <http://www.oregon.gov/LCD/goals.shtml>

<sup>18</sup> Transportation Planning Rule: [http://arcweb.sos.state.or.us/rules/OARS\\_600/OAR\\_660/660\\_012.html](http://arcweb.sos.state.or.us/rules/OARS_600/OAR_660/660_012.html)

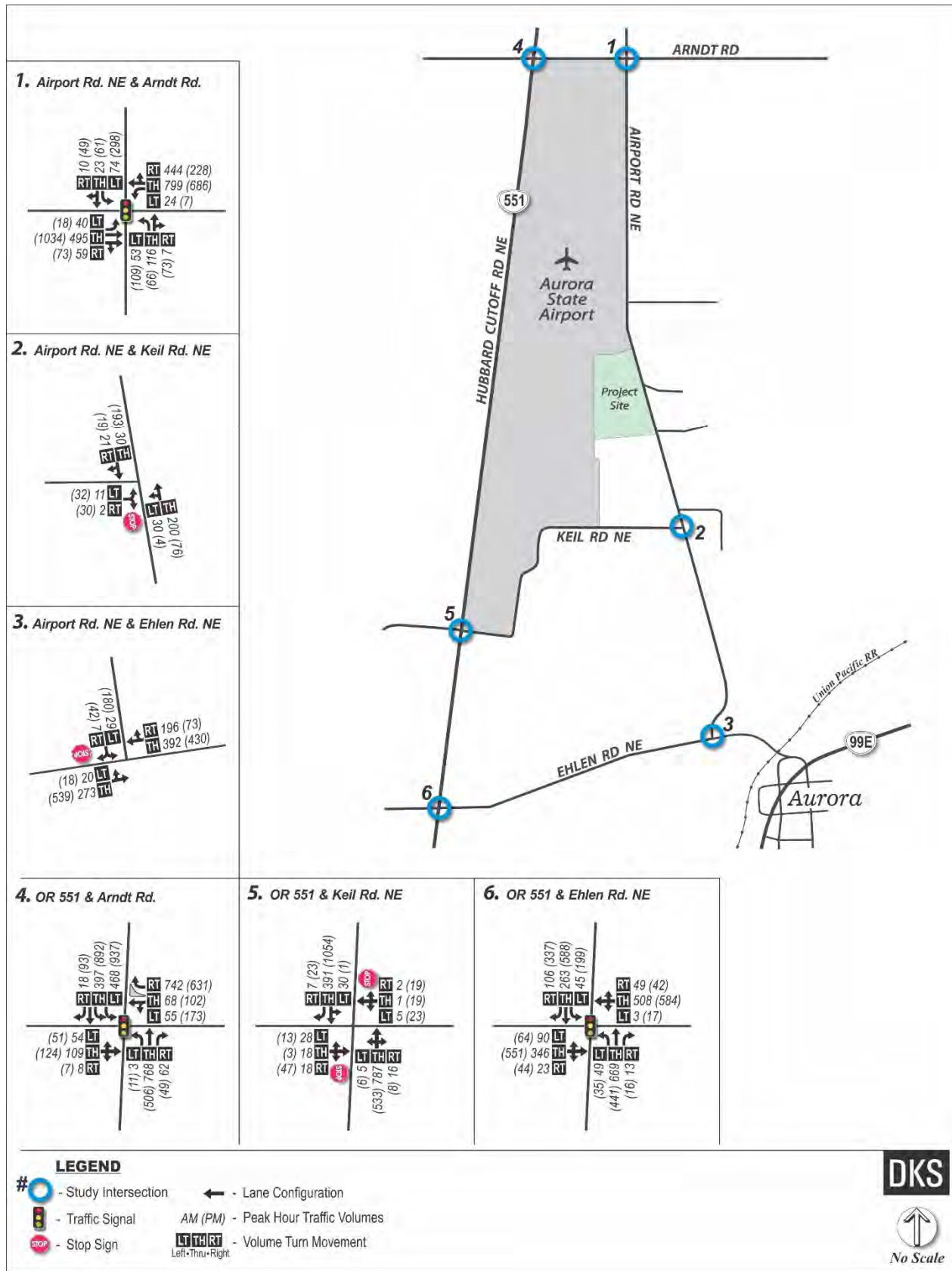


Figure 7: 2037 No Build Traffic Volumes

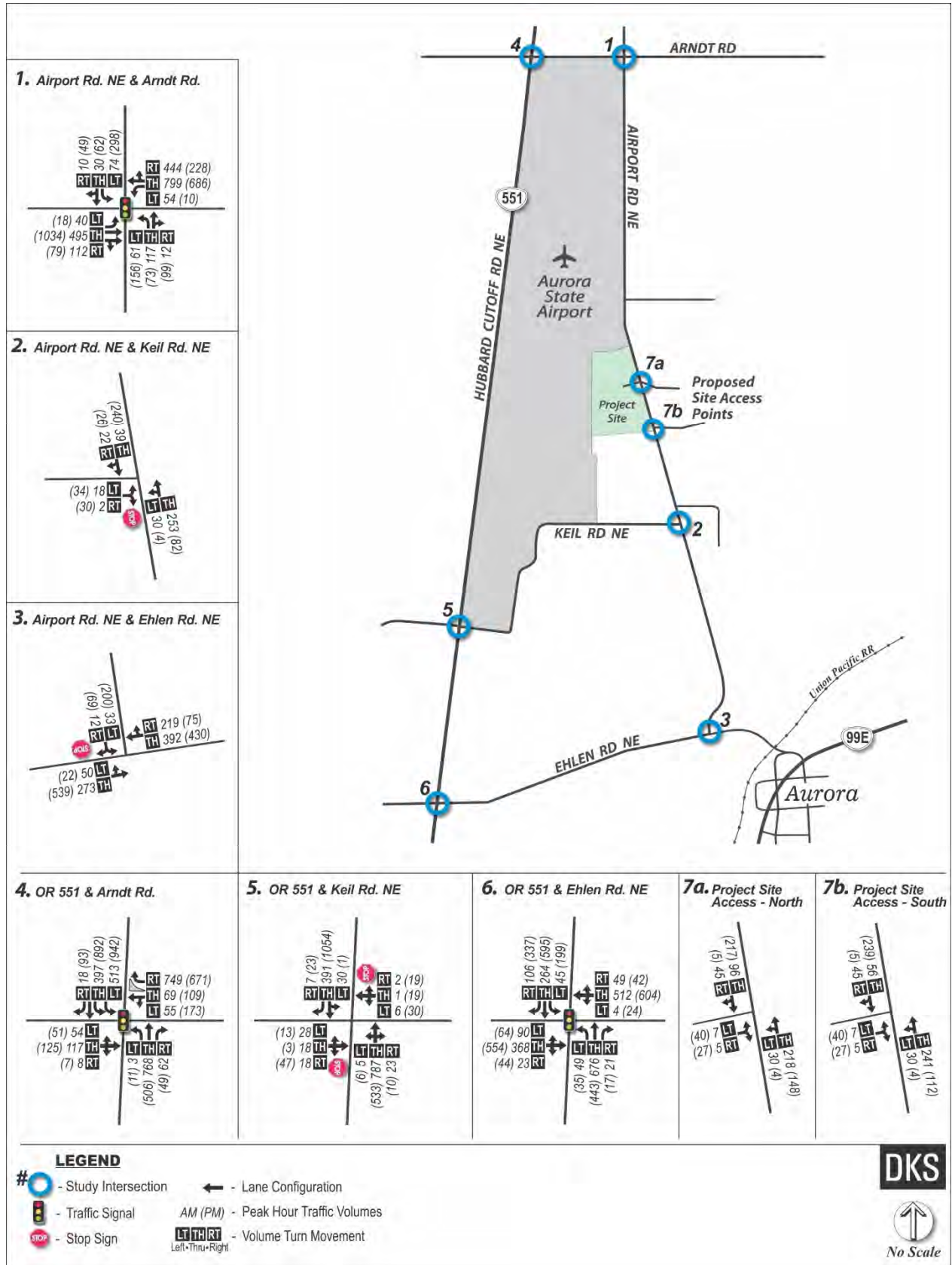


Figure 8: 2037 Build Traffic Volumes

## LONG-TERM (2037) INTERSECTION OPERATIONS

Table 10 presents the 2037 No Build (Existing EFU Zoning) intersection operations and Table 11 on the following page lists the study intersections' 2037 Build (Public Zoning) intersection operations. As shown, in both scenarios the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and the Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.

**Table 10: 2037 No Build (Existing EFU Zoning) Intersection Operations**

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
<b>Signalized</b>								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	<b>1.10</b>	<b>106.9</b>	<b>F</b>	<b>1.21</b>	<b>79.9</b>	<b>E</b>
OR-551/Arndt Road	ODOT	0.70	<b>0.89</b>	<b>32.2</b>	<b>C</b>	<b>1.06</b>	<b>79.5</b>	<b>E</b>
OR-551/Ehlen Road	ODOT	0.70	<b>0.93</b>	<b>49.7</b>	<b>D</b>	<b>1.07</b>	<b>76.6</b>	<b>E</b>
<b>Two-way Stop</b>								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.10 EB	10.5	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	<b>0.88 SB</b>	<b>70.0</b>	<b>A/F</b>
OR-551/Keil Road	ODOT	0.75	0.36 EB	35.3	A/E	0.60 WB	82.1	B/F

**Signalized intersections:**

v/c = Volume-to-Capacity Ratio of Intersection  
 Delay = Average Stopped Delay per Vehicle (sec)  
 LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

**Bold/Highlighted:** Intersection fails to meet operating standards/mobility targets.

**Table 11: 2037 Build (Worst Case Public Zone Land Use) Intersection Operations**

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	Delay	LOS	v/c	Delay	LOS
<b>Signalized</b>								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	<b>1.11</b>	<b>102.9</b>	<b>F</b>	<b>1.17</b>	<b>85.9</b>	<b>F</b>
OR-551/Arndt Road	ODOT	0.70	<b>0.92</b>	<b>35.3</b>	<b>C</b>	<b>1.07</b>	<b>80.1</b>	<b>F</b>
OR-551/Ehlen Road	ODOT	0.70	<b>0.93</b>	<b>53.1</b>	<b>D</b>	<b>1.08</b>	<b>81.4</b>	<b>F</b>
<b>Two-way Stop</b>								
Airport Road/Keil Road	Marion County	LOS E	0.04 EB	11.5	A/B	0.11 EB	11.1	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.16 SB	19.0	A/C	<b>1.03 SB</b>	<b>104.9</b>	<b>A/F</b>
OR-551/Keil Road	ODOT	0.75	0.36 EB	35.5	A/E	0.70 WB	103.5	B/F

**Signalized intersections:**

v/c = Volume-to-Capacity Ratio of Intersection  
 Delay = Average Stopped Delay per Vehicle (sec)  
 LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

**Bold/Highlighted:** Intersection fails to meet operating standards/mobility targets.

## MITIGATION STRATEGIES

As was discussed previously, the intersections of Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road currently do not meet Marion County or ODOT mobility targets/standards. Operations at the intersections of Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road will further with the addition of traffic related to the proposed zone change. The following improvements would mitigate the anticipated impact of zone change at these four intersections. It should be noted that the improvements at OR-551/Ehlen Road and Airport Road/Ehlen Road are representative of planned projects and are larger in scope than what is required to mitigate the impact of the zone change alone.

### Airport Road/Arndt Road

- Install a dedicated right turn lane on the westbound approach.
- Construct necessary traffic signal modifications.

### OR-551/Arndt Road

- Install a dedicated left turn lane on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### OR-551/Ehlen Road

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### Airport Road/Ehlen Road<sup>19</sup>

- Install left-turn lanes on the southbound and eastbound approaches.
- Install a right-turn lane on the westbound approach.
- Signalize intersection.

ODOT maintains jurisdiction of OR-551. ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

Table 12 shows the operational results with the mitigation strategies and how they compare to the mitigation standard. The mitigation standard is based on the Long-term (2037) No Build operations. For all four locations, the recommended improvements result in intersection operations that are better than if the zone change did not occur (mitigation standard). Additionally, the mitigations improve traffic operations for the Airport Road/Ehlen Road intersection to the County's operating standard. With the recommended mitigation strategies identified in this report, the proposed zone change will not significantly affect the transportation system.

**Table 12: Long-term (2037) Mitigated Traffic Operations**

Intersection	Mitigation	Mitigation Standard <sup>1</sup>	AM Peak			Mitigation Standard <sup>1</sup>	PM Peak		
			v/c	Delay	LOS		v/c	Delay	LOS
<b>Signalized</b>									
Airport Road/Arndt Road	WBRT	1.10 v/c	0.85	43.8	D				
OR-551/Arndt Road	EBLT, WBLT	0.89 v/c	0.87	28.1	C	1.06 v/c	0.90	34.4	C
OR-551/Ehlen Road	EBLT, WBLT					1.07 v/c	0.99	60.7	E
Airport Road/Ehlen Road	EBLT, TWLT					0.88 v/c	0.60	8.7	A

**Signalized intersections:**

v/c = Volume-to-Capacity Ratio of Intersection  
 Delay = Average Stopped Delay per Vehicle (sec)  
 LOS = Level of Service of Intersection

**Two-Way Stop Controlled intersections:**

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

<sup>1</sup>Since the intersection fails to meet current mobility targets/standards, the mitigation standard is equal to the operating condition without project trips added

<sup>19</sup> Scope of mitigations recommendations was increased to include all of City of Aurora Transportation System Plan (TSP) planned projects



## PROPORTIONATE SHARE EVALUATION

The identified improvements must mitigate project impacts to meet the greater of the mobility standard or the no-build condition. Because each of the four intersections fail to meet mobility standards under No-Build scenarios (without the project), and because several of the projects are larger in scope than what is required by TPR, the applicant is required to contribute their proportionate share of improvement costs. Table 13 below lists the recommended mitigations with their respective planning level cost estimates.

**Table 13: Recommended Mitigations with Cost Estimates**

Location	Mitigation	Planning Level Cost Estimate
OR-551/Arndt Road	Eastbound/Westbound Left Turn Lanes <sup>1</sup>	\$ 4,500,000
OR-551/Ehlen Road	Eastbound/Westbound Left Turn Lanes <sup>1,2</sup>	\$8,311,000
Airport Road/Ehlen Road	Signalization and Eastbound Left Turn Lane <sup>3</sup>	\$2,000,000
Airport Road/Arndt Road	Westbound Right Turn Lane <sup>1</sup>	\$ 1,500,000

<sup>1</sup>Improvement also includes any necessary traffic signal modifications

<sup>2</sup>ODOT 2018-2021 STIP: Project Key #18664. Project cost also includes a local county road connecting OR-551 and Boones Ferry Road.

<sup>3</sup>Project cost also includes a westbound right turn lane and dedicated southbound left and right turn lanes.

The recommended improvements at OR-551/Ehlen Road have been identified in the ODOT 2018-2021 STIP draft project list (Project Key #18664), and has been estimated to cost \$8,311,000. Typically, ODOT STIP projects do not require a proportionate share contribution since these are already planned projects with funding in place. However, due to the uncertainty of the project funding it was included in recommended mitigations and proportionate share contributions. It should also be noted that the full scope of this project has been included in the proportionate share calculations even though only a small portion of it impacts operations at OR-551/Ehlen Road. As a result, the proportionate share attributed to the property owner is a conservatively high estimate.

### Proportionate Share Calculations

Below is a summary of a reasonable proportionate share calculation of the project impacts that has been approved by other agencies based on the following criteria.

1. Determine for each deficiency the appropriate off-site mitigation and the cost of each mitigation measure.
2. Determine when the cause of each mitigation is triggered:
  - a. Based upon existing conditions alone
  - b. Based upon existing + future background conditions
  - c. Based upon existing + future background + proposed project trips
3. Compute proportionate share percentage as follows:
  - 3a: Take proposed project total entering volume (TEV) at the intersection being mitigated in the peak period where the deficiency occurs and divide by existing TEV
  - 3b/c: Take proposed project TEV and divide by the sum of background growth TEV + proposed project TEV

All of the recommended improvements in this study mitigate intersections that are currently failing to meet mobility targets or operating standards under existing conditions (Scenario 2a). Table 14 below shows the peak hour traffic volumes used to calculate proportionate share percentages.

**Table 14: Proportionate Share Calculations**

Location	Mitigation	Existing Volume (Peak Hour)	Project Trips (Peak Hour)	Proportionate Share (Peak Hour) <sup>1</sup>
OR-551/Arndt Road	Eastbound/Westbound Left Turn Lanes	1,964 (AM) 2,555 (PM)	61 (AM)* 53 (PM)*	<b>3.1% (AM)</b> 2.1% (PM)
OR-551/Ehlen Road	Eastbound/Westbound Left Turn Lanes	1,546 (AM) 2,082 (PM)	43 (AM) 40 (PM)*	2.8% (AM) <b>1.9% (PM)</b>
Airport Road/Ehlen Road	Signalization and Eastbound Left Turn Lane	917 (AM) 1,282 (PM)	62 (AM) 53 (PM)*	6.8% (AM) <b>4.1% (PM)</b>
Airport Road/Arndt Road	Westbound Right Turn Lane	1,636 (AM) 2,140 (PM)	104 (AM)* 90 (PM)	<b>6.4% (AM)</b> 4.2% (PM)

<sup>1</sup>Proportionate Share = (Project Trips)/(Existing Volume)

\*Peak hour in which the addition of project trips degrades intersection operations

**Bold/Highlighted** = Percentage applied for proportionate share calculations

At OR-551/Arndt Road, project trips affect operations during both AM and PM peak hours, so the higher proportionate share percentage was applied. For the other three intersections, operations are degraded during only one of the peak hours and the associated proportionate share percentage was applied.

Table 15 summarizes the applicant's proportionate share contribution based on the information and methodologies outlined above. As shown, the applicant's total proportionate share of all improvements is \$475,409.

**Table 15: Proportionate Share Costs**

Location	Mitigation	Proportionate Share Applied	Cost Estimate	Proportionate Share Contribution
OR-551/Arndt Road	Eastbound/Westbound Left Turn Lanes	3.1%	\$4,500,000	\$139,500
OR-551/Ehlen Road	Eastbound/Westbound Left Turn Lanes	1.9%	\$8,311,000	\$157,909
Airport Road/Ehlen Road	Signalization and Eastbound Left Turn Lane	4.1%	\$2,000,000	\$82,000
Airport Road/Arndt Road	Westbound Right Turn Lane	6.4%	\$1,500,000	\$96,000
<b>Total</b>			<b>\$16,311,000</b>	<b>\$475,409</b>

## 5.0 PROJECT SUMMARY

The proposed rezone and development of the 16.5 acre parcel on the east edge of the Aurora State Airport is anticipated to result in the following impacts:

### Trip Generation

- The reasonable worst case development scenario under existing EFU zoning is assumed to be a 5,000 square-foot farm stand/nursery (ITE LU Code 817). The reasonable worst case development scenario under proposed Public zoning is assumed to be 158,000 square feet of Warehousing (ITE LU Code 150) and 123,000 square feet of General Office Building (ITE LU Code 710). The net difference in trip generation between these two development scenarios represents the trips associated with the zone change.
- All trip generation estimates were provided by the ITE Trip Generation Manual.<sup>20</sup> The proposed zone change is expected to generate 1,251 net new average daily trips, 174 (150 in, 24 out) AM peak hour trips and 152 (18 in, 134 out) PM peak hour trips.

### Intersection Operations

- Under 2017 Existing Conditions, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.
- In the Short-term (2022) No Build scenario and the Long-term (2037) No Build scenario, the same intersections fail to meet mobility targets or operating standards.
- In the Short-term (2022) Build scenario, the OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road intersections are further degraded with the addition of the anticipated project trips.
- In the Long-term (2037) Build scenario, the Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road intersections are further degraded with the addition of the anticipated project trips.

### Mitigations

The following improvements are recommended to mitigate the impact of the proposed zone change on the transportation system.

#### Airport Road/Arndt Road

- Install a dedicated right turn lane on the westbound approach.
- Construct necessary traffic signal modifications.

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<sup>20</sup> *Trip Generation Manual, 10<sup>th</sup> Edition*, Institute of Transportation Engineers, 2017.

### **OR-551/Arndt Road**

- Install a dedicated left turn lane on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

### **OR-551/Ehlen Road**

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications

### **Airport Road/Ehlen Road<sup>21</sup>**

- Install left-turn lanes on the southbound and eastbound approaches
- Install a right-turn lane on the westbound approach
- Signalize intersection

ODOT maintains jurisdiction of OR-551. ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

## **Proportionate Share**

The proportionate share of improvement costs attributed to the property owner is based on the percentage of traffic generated as a result of the zone change compared to existing and future background traffic volumes. In this case the property owner would generate between 1.9% and 6.4% of the traffic at the impacted intersections in the relevant peak hours. The total cost of all mitigation improvements is approximately \$16.3M, of which the property owner's proportionate share based on their traffic impact is \$475,409. This is a conservatively high estimate that includes the full cost estimate of planned projects that are larger in scope than would be required to mitigate the impact of the zone change alone.

## **Site Plan Review**

- The site plan provided shows approximately 427 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.
- There are two proposed site access points along Airport Road. It is recommended that these two access points are aligned with the two existing private driveways on east side of Airport Road to avoid off-set intersections. The property owner should coordinate with County staff and property owners at these locations.

## **Transportation Planning Rule**

- With the recommended improvements identified in this report, the impacts of the proposed zone change are adequately mitigated, which satisfies TPR requirements.

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<sup>21</sup> The scope of recommended mitigations was increased to include of the entirety of the planned City of Aurora project outlined in their Transportation System Plan (TSP).