

### **Introduction**

This traffic impact study (TIS) was performed in support of the proposed Ayrshire PUD rezoning application. The proposed development is anticipated to include a maximum of 2,100 residential dwelling units (1,470 single-family and 630 Multi-family Townhomes). Access to the proposed development is anticipated to be provided via a roadway (bridge over the CSX railroad) connecting to US 17, via existing Jersey Avenue and an additional driveway on CR 15A (Oak Ridge Avenue).

For the purpose of this traffic study, the analysis was performed under four (4) analysis phases:

- Year 2025 (Analysis Phase 01) assumed 231 single-family dwelling units with access via a roadway on Oak Ridge Avenue.
- Year 2027 (Analysis Phase 02) assumed 500 single-family dwelling units (cumulative) with access via a roadway on Oak Ridge Avenue and a four-lane bridge from the project northern entrance to US 17 across from Hall Park Road.
- Year 2030 (Analysis Phase 03) assumed 1,000 single-family dwelling units.
- Year 2035 (Analysis Phase 04) assumed 2,100 residential dwelling units (1,470 single-family and 630 Multi-family Townhomes). A third project access via existing Jersey Avenue was also assumed for this analysis phase.

**Figure 01** shows the project location. A copy of the Generalized Site Plan (GSP) provided by Dunn and Associates, Inc. is included as **Attachment A**. The methodology used in this study is consistent with the methodology discussed with the City's Planning and Zoning Director on October 29<sup>th</sup>, 2020.

### **Trip Generation**

Trip generation for the proposed project was estimated using the equation provided in the *Trip Generation Manual*, 10th Edition published by Institute of Transportation Engineers (ITE). **Table 01** summarizes the Daily, AM peak and PM peak hour trip generation for the proposed residential development under each of the development phases.

- Year 2025 (Analysis Phase 01) development is anticipated to generate 2,246 daily trips that include 169 AM peak and 227 PM peak trips.
- Year 2027 (Analysis Phase 02) development is anticipated to generate 4,574 daily trips (cumulative) that include 360 AM peak and 476 PM peak trips
- Year 2030 (Analysis Phase 03) development is anticipated to generate 8,648 daily trips (cumulative) that include 715 AM peak and 927 PM peak trips
- Year 2035 (Analysis Phase 04) development is anticipated to generate 17,049 daily trips (cumulative) that include 1,323 AM peak and 1,645 PM peak trips

### **Study Area, Existing Conditions and Data Collection**

As discussed with the City's Planning and Zoning Director and the City of Green Cove Springs traffic study guidelines, the study area includes the following intersections:

- SR 16 W at Oak Ridge Avenue
- SR 16 W / Ferris Ave. at US 17
- SR 16 E / Cooks Ln. at US 17
- Oak Ridge Avenue at Green Cove Avenue
- US 17 at Oak Ridge Avenue

- US 17 at Ayrshire Boulevard/Hall Park Road (Project Access Intersection)
- Oak Ridge Avenue at Ayrshire Boulevard (Project Access Intersection)
- Oak Ridge Avenue at Jersey Avenue (Project Access Intersection)

**Figures 02** and **03** show the existing conditions at the above stated intersections. AM peak (7:00 AM to 9:00 AM) and PM peak (4:00 PM to 6:00 PM) period turning movement counts that includes autos, heavy vehicles, bicycles and pedestrians were obtained at the above stated intersections on April 22, 2021. These counts were further adjusted by applying a season factor of 0.93 ( $0.94 \times 0.99$ ) to adjust for seasonal variations. The year 2019 season factor was used as the year 2020 season factors are anticipated to be not accurate due to the COVID 19 Pandemic. The season factors were obtained from the FDOT traffic counts online portal. **Attachment B** includes the traffic counts and season factors data. **Figure 04** includes AM peak and PM peak hour turning movements at the study intersections.

### **Future Background Traffic Volumes**

Future year traffic projections were made by applying a growth factor to existing traffic volumes. The growth factor was estimated by performing trends analysis of the historical AADT of the roadway segments within the study area. The historical AADT was obtained from the FDOT traffic counts online portal. **Table 02** summarizes the growth rate calculations. As shown in this table, majority of the roadway segments showed a negative trend. However, a minimum of 1.0% per year growth rate was applied.

- The future year 2025 traffic volumes at the study intersections were estimated by applying a growth factor of 1.04 to the year 2021 traffic volumes.
- The future year 2027 traffic volumes at the study intersection were estimated by applying a growth factor of 1.06 to the year 2021 traffic volumes.
- The future year 2030 traffic volumes at the study intersection were estimated by applying a growth factor of 1.09 to the year 2021 traffic volumes.
- The future year 2035 traffic volumes at the study intersection were estimated by applying a growth factor of 1.14 to the year 2021 traffic volumes.

**Attachment C** includes the historical AADT and Trends Analysis plots. **Figures 05, 06, 07** and **08** show year 2025, year 2027, year 2030 and year 2035 future conditions background traffic volumes at the study intersections respectively.

### **Planned and Programmed Improvements**

All of the planned and programmed improvements within the transportation study area identified from the FDOT Five (5) year work program, FDOT Long Range Plan and Clay County Capital Improvement Plan document were included in the model and the segment analysis. The following planned and programmed improvements were included in the analysis. Details of these projects are included in **Attachment D**.

- First Coast Expressway: I-10 to N. Of Argyle Forest Boulevard
- First Coast Expressway: N. of Argyle Forest Boulevard to Blanding Boulevard (SR 21)
- First Coast Expressway: Blanding Boulevard (SR 21) to North of SR 16

- First Coast Expressway: North of SR 16 to East of CR 209
- First Coast Expressway (New St. Johns River Bridge): SR 16 to CR 16A (St. Johns County) by year 2027
- First Coast Expressway (St. Johns County): CR 16A to I-95

### **Trip Distribution and Assignment**

Trip distribution for year 2025 (Analysis Phase 01) and year 2027 (Analysis Phase 02) development was determined based on existing traffic patterns (traffic entering and the exiting the City of Green Cove Springs). **Figures 09** and **10** show year 2025 and year 2027 project traffic distribution and peak hour traffic assignment at the study intersections. Following is a summary of the project traffic distribution under the year 2025 and year 2027 development conditions:

- 15% oriented to the west of SR 16 West
- 15% oriented to the south on US 17
- 35% oriented to the north on US 17
- 35% oriented to the east on SR 16E

Upon construction of the First Coast Expressway, the traffic patterns in the area are anticipated to change. Hence, trip distribution for year 2030 (Analysis Phase 03) and year 2035 (Analysis Phase 04) development conditions was obtained from the interim year 2030 model set of the Northeast Regional Planning Activity Based Model (NERPM\_AB3v1) travel demand forecasting model, provided by the North Florida Transportation Planning Organization (NFTPO). **Figures 11** and **12** show year 2030 and year 2035 project traffic distribution and peak hour traffic assignment at the study intersections. Following is a summary of the project traffic distribution percentages in the vicinity of the proposed project under year 2030 and year 2035 development conditions:

- Oak Ridge Avenue – SR 16 to Project Entrance: 6.7%
- Oak Ridge Avenue – Project Entrance to US 17: 4.32%
- US 17 – Project Entrance to First Coast Expressway: 48.63%
- US 17 – SR 16 East to Project Entrance: 40.35%

**Attachment E** includes the travel demand model plots showing the project traffic distributions (unadjusted distributions). **Attachment F** includes a figure depicting the adjusted project traffic distribution percentages in the vicinity of the proposed development.

### **Build-Out Traffic Volumes**

Build-out traffic volumes include the future background traffic volumes and the project traffic assignment under each of the year 2025, year 2027, year 2030 and year 2035 development conditions. **Figures 13, 14, 15** and **16** show the year 2025, year 2027, year 2030 and year 2035 development conditions respectively.

### **Access Intersection Turn Lanes Evaluation**

A 330-foot southbound left turn lane on Oak Ridge Avenue currently exists at Jersey Avenue. The 95<sup>th</sup> percentile queue length is anticipated to be no greater than 25 feet. Hence the existing southbound left turn lane is anticipated to be adequate. The need for southbound left turn lanes on Oak Ridge Avenue at Ayrshire Boulevard and Jersey Avenue was evaluated using the

Harmelink Curves criteria and guidance. **Figure 17** includes plots evaluating the need for southbound left turn lanes on Oak Ridge Avenue at Ayrshire Boulevard and Jersey Avenue was evaluated using the Harmelink Curves criteria and guidance. As shown in these plots, a southbound left turn lane on Oak Ridge Avenue at Ayrshire Boulevard and Jersey Avenue is anticipated to be warranted under the build-out conditions of the proposed development.

The required deceleration length for 50-mph design speed is 290-feet (including 50-foot taper) for rural roadways. A storage length of 100-feet (4 vehicles) should be provided. 390-feet (including 50-foot taper) southbound left turn lanes are recommended on Oak Ridge Avenue at Ayrshire Boulevard and Jersey Avenue.

### **Intersection Capacity Analysis**

Intersection capacity analysis of the study intersections was performed during the AM peak and PM peak periods under the existing, future background and build-out conditions using Synchro 10 software. This software uses HCM 2000/2010 procedures and methodologies in calculating LOS and delay at signalized intersections and un-signalized intersections. Existing signal timing and phasing information for the signalized study intersections were obtained from Florida Department of Transportation Traffic Operations Department. A copy of these signal timing and phasing details are included in **Attachment G**.

**Table 03** summarizes the existing conditions intersection capacity analysis Delay and LOS summary during the AM peak and PM peak conditions. As shown in this table, all the critical approaches at all the study intersections are currently operating at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is currently operating at LOS F during the PM peak hour.

**Tables 04, 05, 06** and **07** summarize the future year 2025, year 2027, year 2030 and year 2035 background traffic conditions intersection capacity analysis Delay and LOS summary during the AM peak and PM peak conditions. As summarized in these tables, all the critical approaches at the study intersections are anticipated to operate at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is anticipated to continue operating at LOS F during the PM peak hours.

**Tables 08, 09, 10** and **11** summarize the future year 2025, year 2027, year 2030 and year 2035 project build-out traffic conditions intersection capacity analysis Delay and LOS summary during the AM peak and PM peak conditions. As summarized in these tables, all the critical approaches at the study intersections are anticipated to operate at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is anticipated to continue operating at LOS F during the PM peak hours.

The US 17/Ferris Street intersection is currently operating at LOS F and will continue to operate at LOS F in the future. However, upon construction of the First Coast Expressway, traffic volumes at both SR 16 intersections on US 17 are anticipated to reduce and the Delay and LOS are anticipated to improve. Additionally, due to the change in traffic patterns, FDOT is anticipated

to re-time the traffic signals at these two intersections which will result in improved operational conditions.

A copy of the HCM worksheets under the existing, future background and build-out conditions are included as **Attachment H**.

**US 17 and Ayrshire Boulevard:** A four lane bridge connecting the proposed development and US 17 will be built by year 2027 development conditions. Upon construction, the intersection of US 17 and Ayrshire Boulevard is anticipated to require a traffic signal. Since US 17 is a FDOT roadway, the intersection is subject to FDOT's Intersection Control Evaluation (ICE) review and approval process. The ICE process is anticipated to result in either a traditional traffic signal or a Signalized R-Cut or a Signalized Median U-turn intersection control. However, for the purpose of this analysis a traditional traffic signal is assumed under the year 2027, year 2030 and year 2035 development conditions. As summarized in the above-mentioned tables, the intersection is anticipated to operate at LOS E or better under the build-out conditions of the proposed development. This intersection will be designed and constructed based on the outcome of the FDOT ICE analysis. In addition to the traffic signal, appropriate auxiliary turn lanes will be constructed on US 17 at Ayrshire Boulevard intersection.

**Oak Ridge Avenue at Ayrshire Boulevard:** Separate left and right turn lanes (Westbound) are recommended on Ayrshire Boulevard at Oak Ridge Avenue intersection. A maximum queue of 50 feet is anticipated on Ayrshire Boulevard at Oak Ridge Avenue. Hence, the westbound left turn lane on Ayrshire Boulevard at Oak Ridge Avenue need to provide for at least 100 feet storage plus 50 feet taper.

## **Summary and Conclusions**

This traffic impact study (TIS) was performed in support of the proposed Ayrshire PUD rezoning application. The proposed development is anticipated to include a maximum of 2,100 residential dwelling units (1,470 single-family and 630 Multi-family Townhomes). Access to the proposed development is anticipated to be provided via a roadway (bridge over the CSX railroad) connecting to US 17, via existing Jersey Avenue and an additional driveway on CR 15A (Oak Ridge Avenue).

For the purpose of this traffic study, the analysis was performed under four (4) analysis phases:

- Analysis Phase 01 (Year 2025) assumed 231 single-family dwelling units with access via a roadway on Oak Ridge Avenue.
  - Analysis Phase 02 (Year 2027) assumed 500 single-family dwelling units (cumulative) with access via a roadway on Oak Ridge Avenue and a four-lane bridge from the project northern entrance to US 17 across from Hall Park Road.
  - Analysis Phase 03 (Year 2030) assumed 1,000 single-family dwelling units.
  - Analysis Phase 04 (Year 2035) assumed 2,100 residential dwelling units (1,470 single-family and 630 Multi-family Townhomes). A third project access via existing Jersey Avenue was also assumed for this analysis phase.
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The future year 2025 traffic volumes at the study intersections were estimated by applying a growth factor of 1.04 to the year 2021 traffic volumes. The future year 2027 traffic volumes at the study intersection were estimated by applying a growth factor of 1.06 to the year 2021 traffic volumes. The future year 2030 traffic volumes at the study intersection were estimated by applying a growth factor of 1.09 to the year 2021 traffic volumes. The future year 2035 traffic volumes at the study intersection were estimated by applying a growth factor of 1.14 to the year 2021 traffic volumes.

Trip distribution for year 2025 (Analysis Phase 01) and year 2027 (Analysis Phase 02) development was determined based on existing traffic patterns (traffic entering and the exiting the City of Green Cove Springs). Following is a summary of the project traffic distribution under the year 2025 and year 2027 development conditions:

- 15% oriented to the west of SR 16 West
- 15% oriented to the south on US 17
- 35% oriented to the north on US 17
- 35% oriented to the east on SR 16E

Upon construction of the First Coast Expressway, the traffic patterns in the area are anticipated to change. Hence, trip distribution for year 2030 (Analysis Phase 03) and year 2035 (Analysis Phase 04) development conditions was obtained from the interim year 2030 model set of the Northeast Regional Planning Activity Based Model (NERPM\_AB3v1) travel demand forecasting model. Following is a summary of the project traffic distribution percentages in the vicinity of the proposed project under year 2030 and year 2035 development conditions:

- Oak Ridge Avenue – SR 16 to Project Entrance: 6.7%
- Oak Ridge Avenue – Project Entrance to US 17: 4.32%
- US 17 – Project Entrance to First Coast Expressway: 48.63%
- US 17 – SR 16 East to Project Entrance: 40.35%

Build-out traffic volumes include the future background traffic volumes and the project traffic assignment under each of the year 2025, year 2027, year 2030 and year 2035 development conditions.

A 330-foot southbound left turn lane on Oak Ridge Avenue currently exists at Jersey Avenue. The 95<sup>th</sup> percentile queue length is anticipated to be no greater than 25 feet. Hence the existing southbound left turn lane is anticipated to be adequate. A southbound left turn lane on Oak Ridge Avenue at Ayrshire Boulevard is anticipated to be warranted under the build-out conditions of the proposed development. The required deceleration length for 50-mph design speed is 290-feet (including 50-foot taper) for rural roadways. A storage length of 100-feet (4 vehicles) should be provided. A 390-feet (including 50-foot taper) southbound left turn lane is recommended on Oak Ridge Avenue at Ayrshire Boulevard.

All the critical approaches at all the study intersections are currently operating at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is currently operating at LOS F during the PM peak hour.

All the critical approaches at the study intersections are anticipated to operate at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is anticipated to continue operating at LOS F during the PM peak hours.

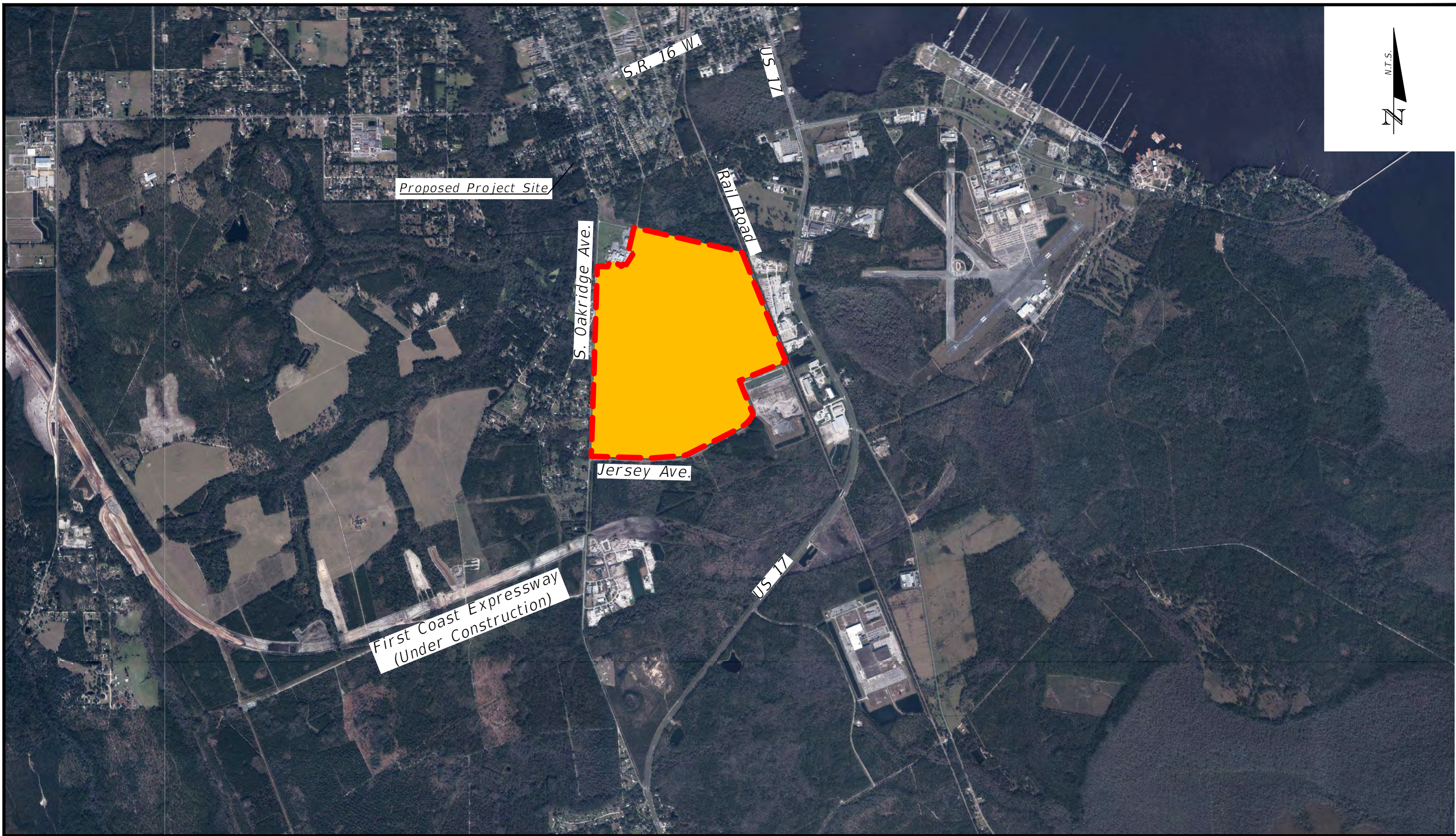
All the critical approaches at the study intersections are anticipated to operate at LOS E or better with the exception of SR 16W/Ferris Street at US 17 intersection. This intersection is anticipated to continue operating at LOS F during the PM peak hours.

The US 17/Ferris Street intersection is currently operating at LOS F and will continue to operate at LOS F in the future. However, upon construction of the First Coast Expressway, traffic volumes at both SR 16 intersections on US 17 are anticipated to reduce and the Delay and LOS are anticipated to improve. Additionally, due to the change in traffic patterns, FDOT is anticipated to re-time the traffic signals at these two intersections which will result in improved operational conditions.

A four-lane bridge connecting the proposed development and US 17 will be built by build-out conditions of the Phase 02 development. Upon construction, the intersection of US 17 and Ayrshire Boulevard is anticipated to require a traffic signal. Since US 17 is a FDOT roadway, the intersection is subject to FDOT's Intersection Control Evaluation (ICE) review and approval process. The ICE process is anticipated to result in either a traditional traffic signal or Signalized R-Cut or Signalized Median U-turns intersection control. However, for the purpose of this analysis a traditional traffic signal is assumed under the Phase 02, Phase 03 and Phase 04 development conditions.

Separate left and right turn lanes (Westbound) are recommended on Ayrshire Boulevard at Oak Ridge Avenue intersection. A maximum queue of 50 feet is anticipated on Ayrshire Boulevard at Oak Ridge Avenue. Hence, the westbound left turn lane on Ayrshire Boulevard at Oak Ridge Avenue need to provide for at least 100 feet storage plus 50 feet taper.





Proposed Project Site

S.R. 16 W.

US 17

Rail Road

S. Oakridge Ave.

Jersey Ave.

First Coast Expressway  
(Under Construction)

US 17



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Jacksonville, FL 32216  
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Figure 01 - Project Location

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S.R. 16 W. at S. Oakridge Avenue



S.R. 16 W. and Ferris Street at US 17



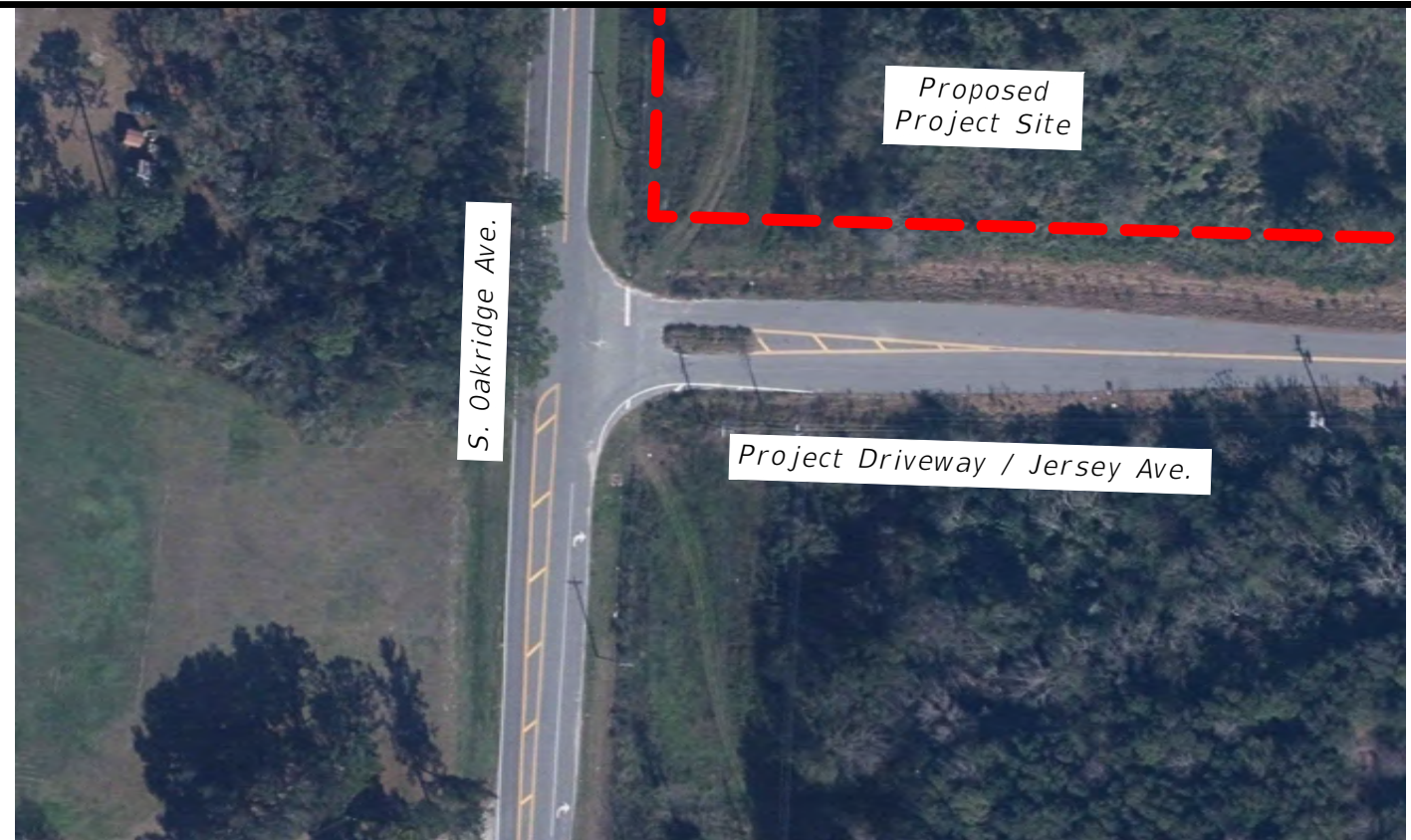
S. Oakridge Avenue at Green Cove Avenue



US 17 at Cooks Lane and S.R. 16 E. / Leonard C. Taylor Pkwy.



S. Oakridge Avenue at Project Driveway



S. Oakridge Avenue at Project Driveway / Jersey Avenue



S. Oakridge Avenue at US 17



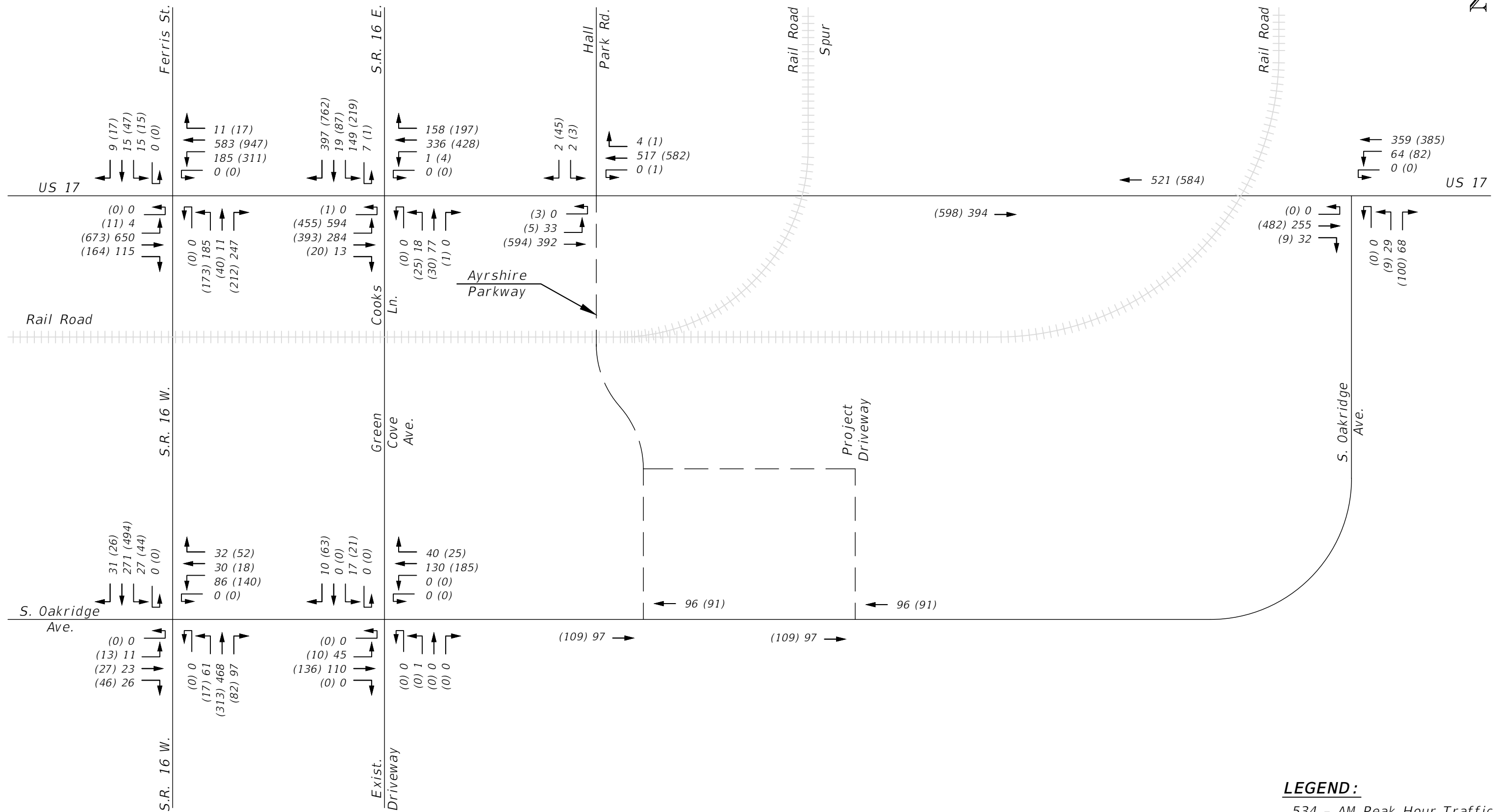
US 17 at Hall Park Road



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Figure 03 - Existing Conditions

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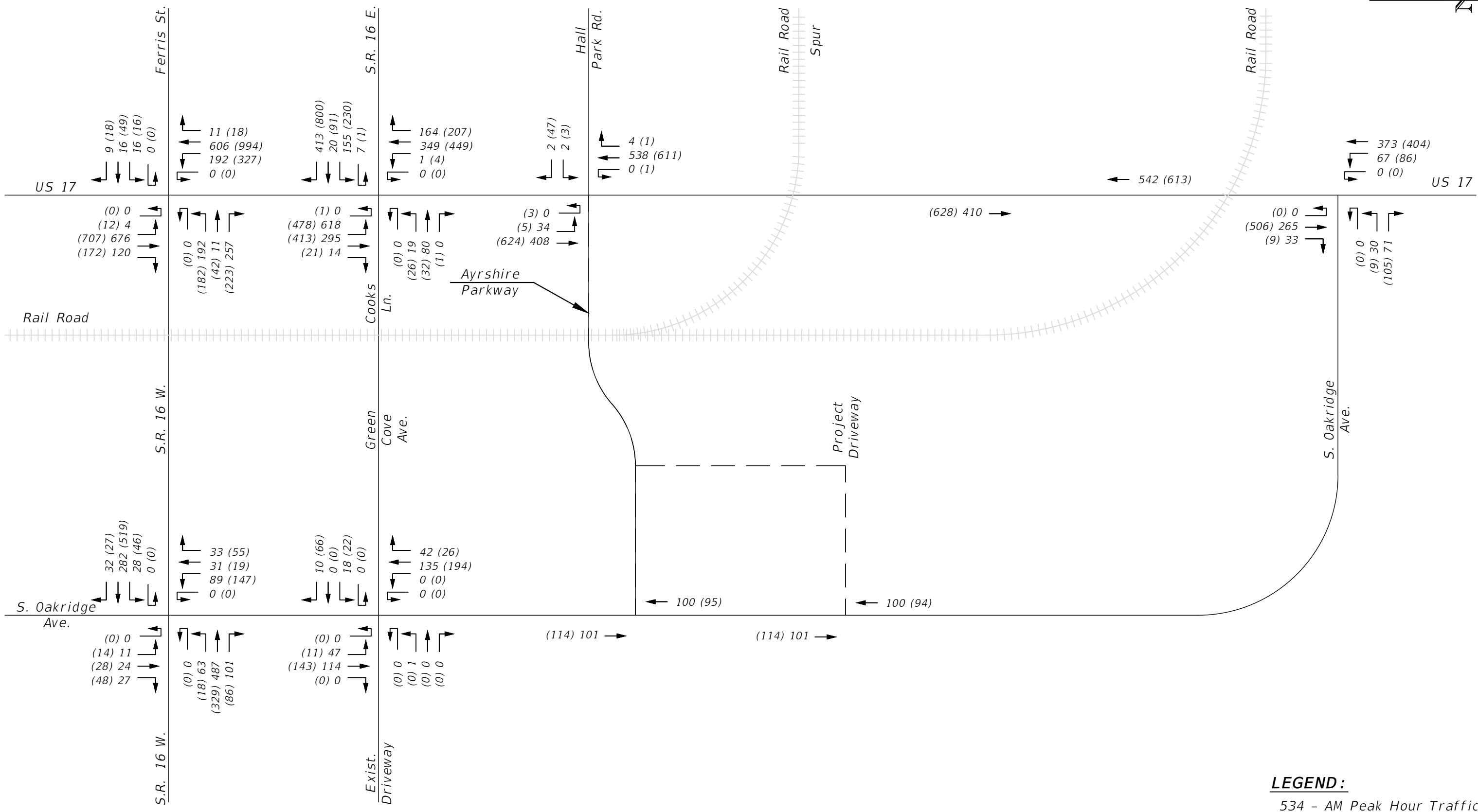
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 (923)- PM Peak Hour Traffic

Figure 04 - Year 2021 AM and PM Peak Hour Traffic Volumes



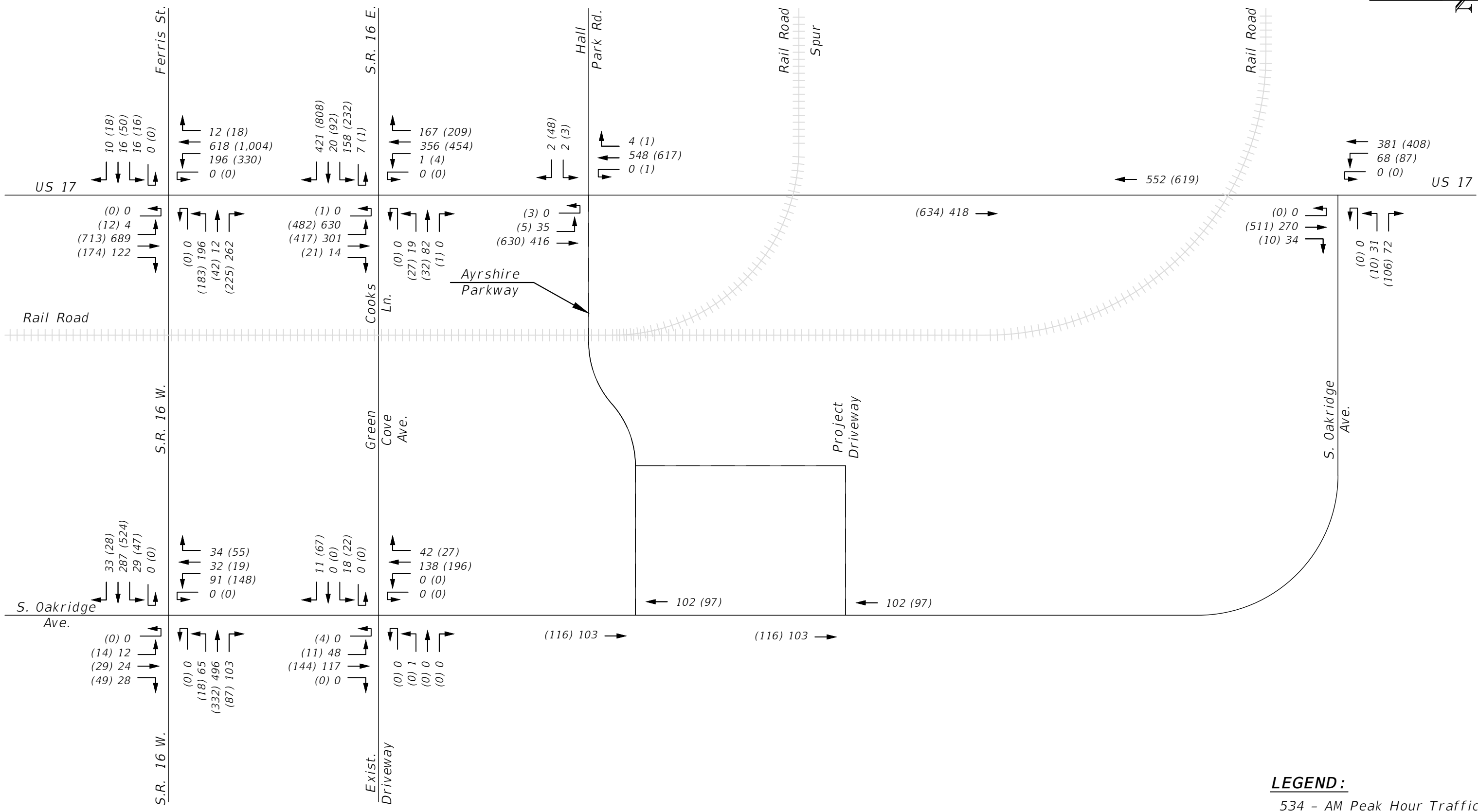
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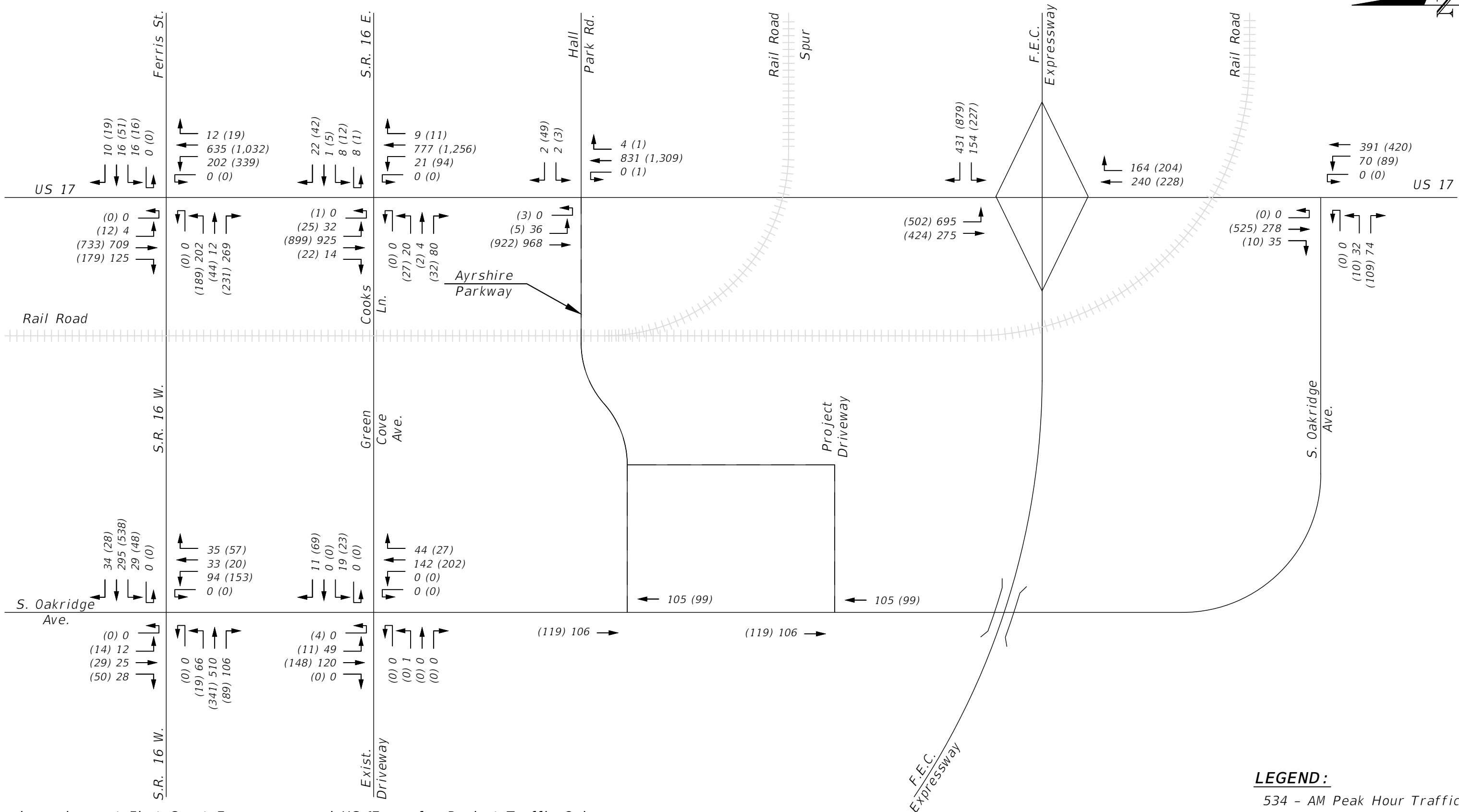
**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

Figure 05 - Year 2025 AM and PM Peak Hour (Analysis Phase 01) Background Traffic Volumes



**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

Figure 06 - Year 2027 AM and PM Peak Hour (Analysis Phase 02) Background Traffic Volumes



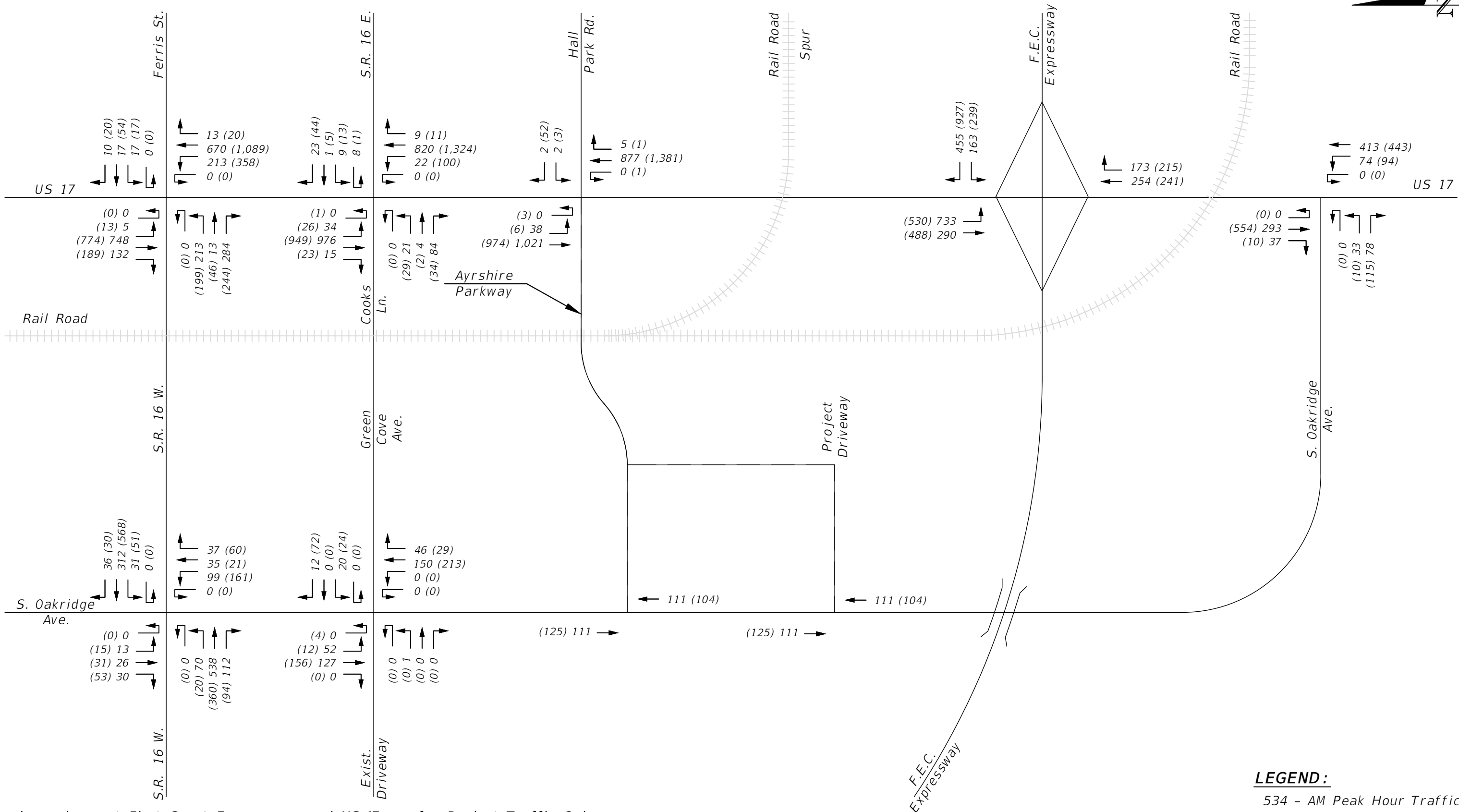
Numbers shown at First Coast Expressway and US 17 are for Project Traffic Only.

**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

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Figure 07 - Year 2030 AM and PM Peak Hour (Analysis Phase 03) Background Traffic Volumes

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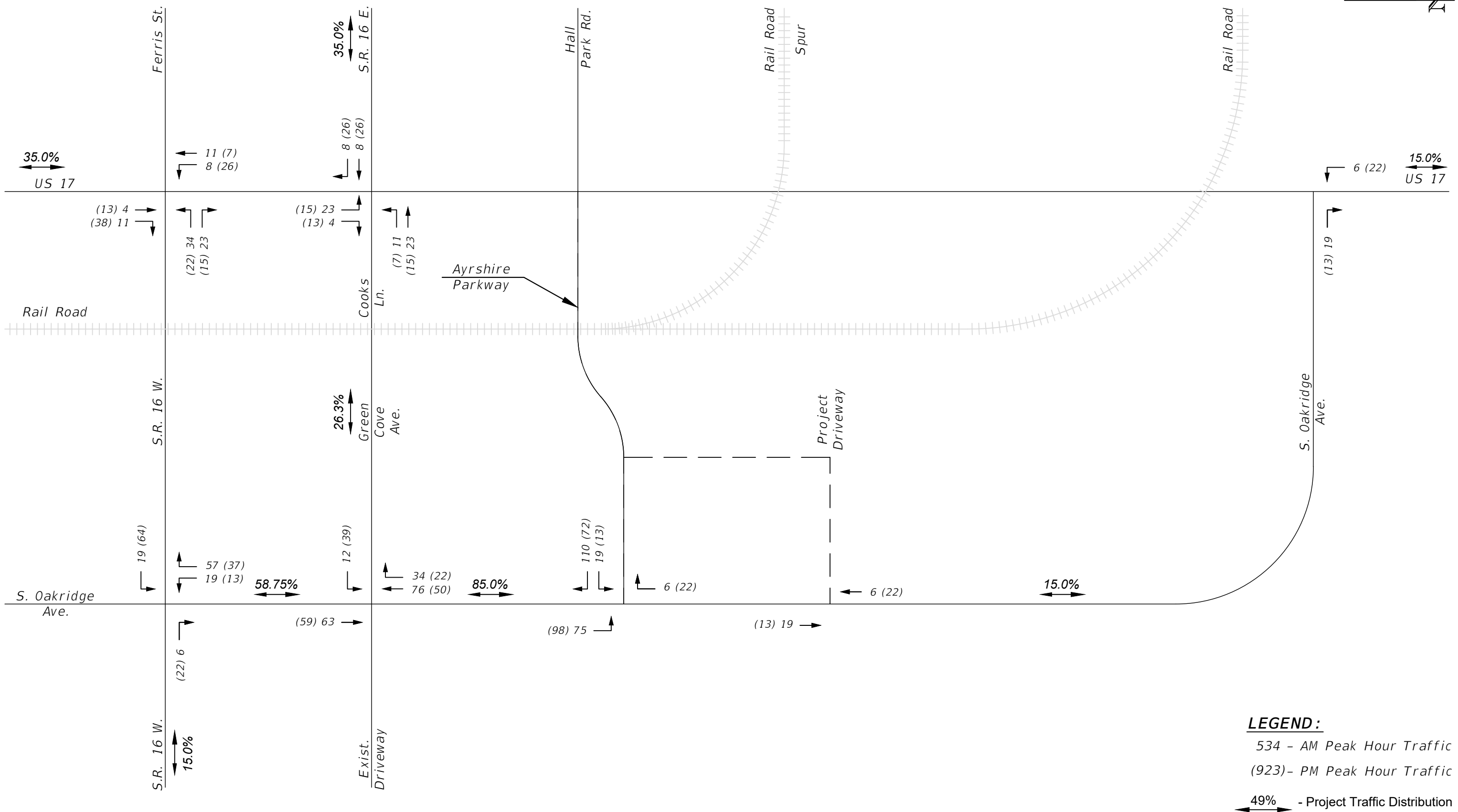
**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

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Figure 08 - Year 2035 AM and PM Peak Hour (Analysis Phase 04) Background Traffic Volumes

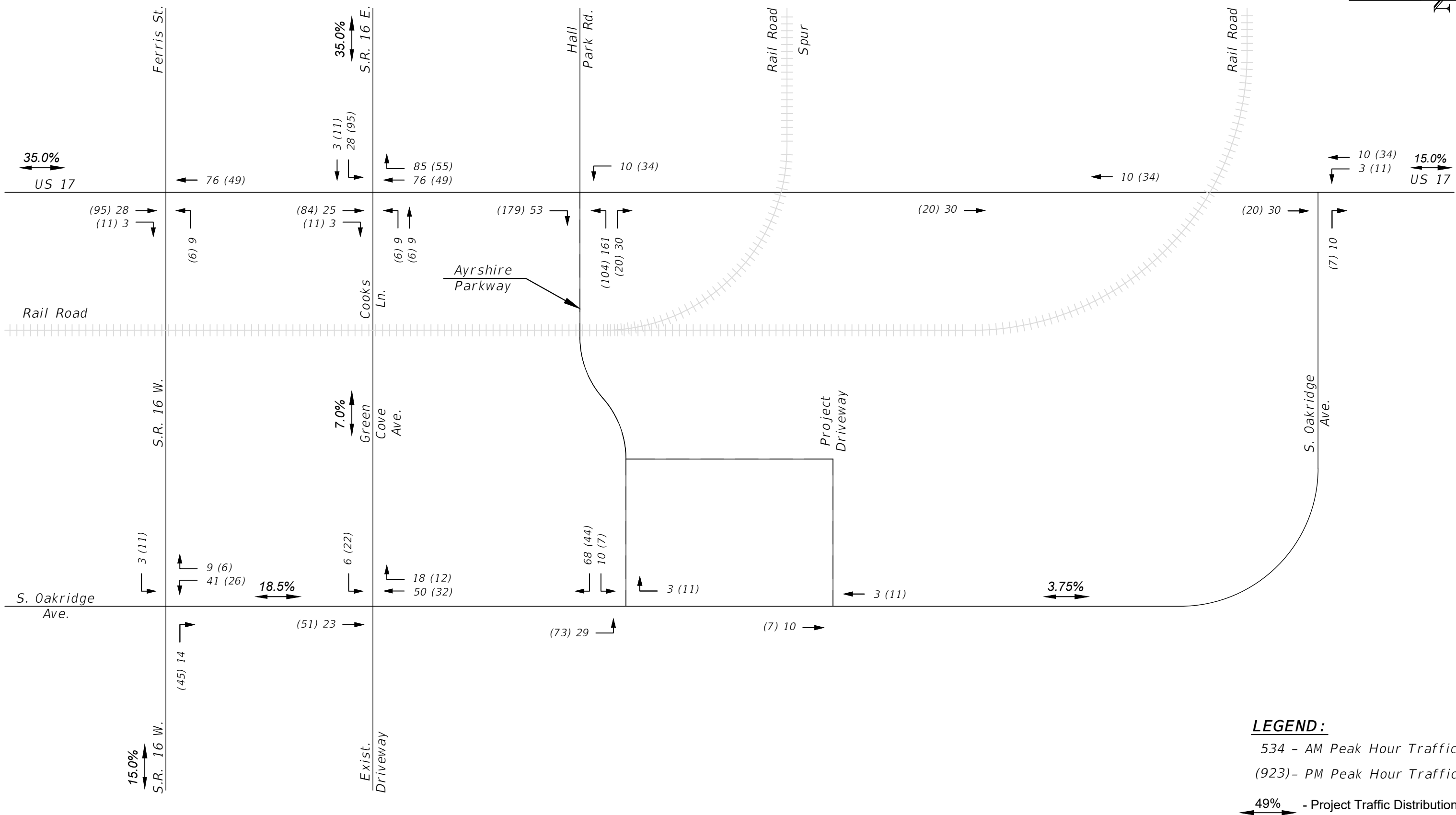
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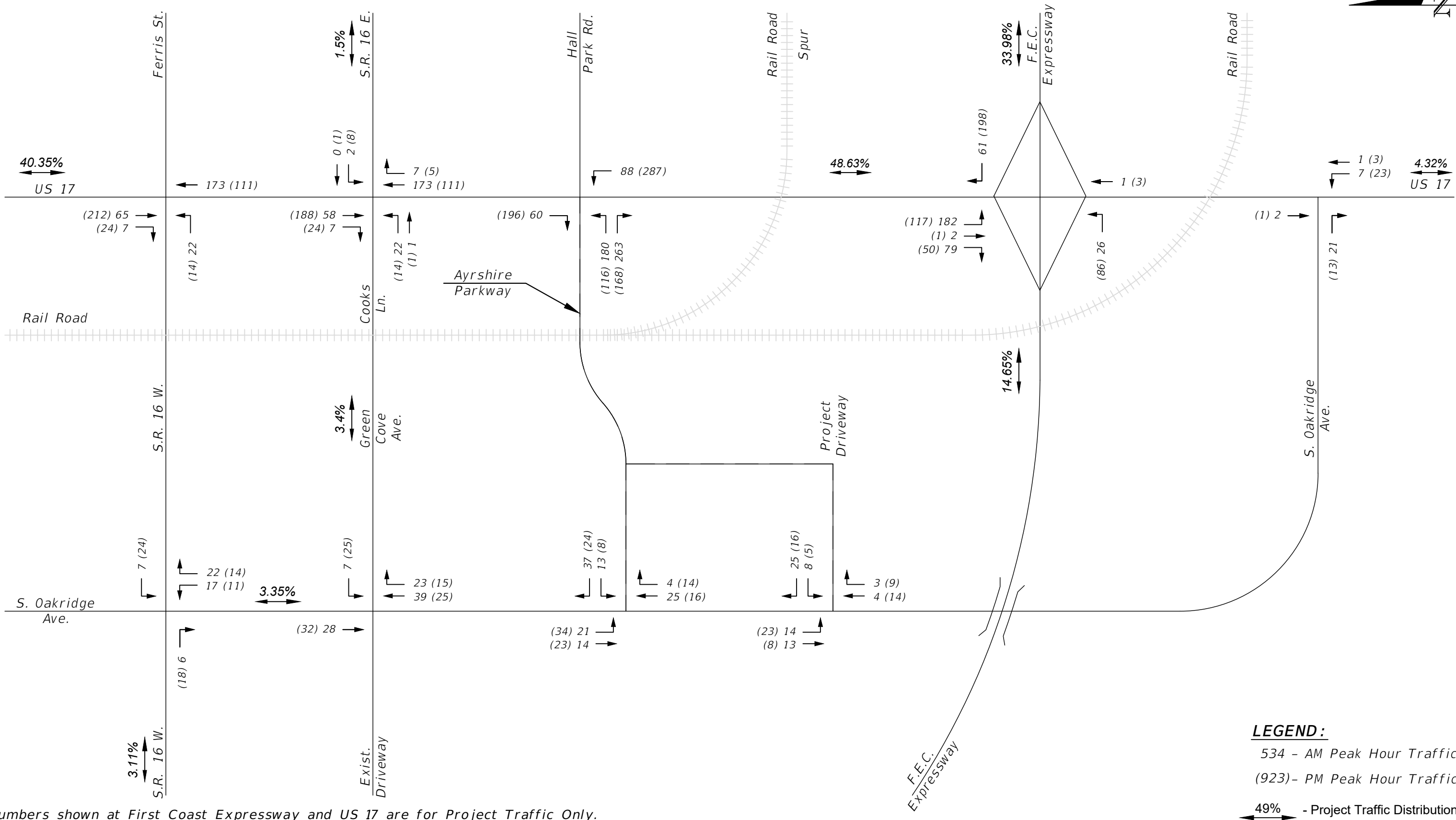
**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic  
 49% - Project Traffic Distribution

Figure 09 - Year 2025 AM and PM Peak Hour (Analysis Phase 01) Project Traffic Distribution and Assignment



**LEGEND:**  
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 (923)- PM Peak Hour Traffic  
 49% - Project Traffic Distribution

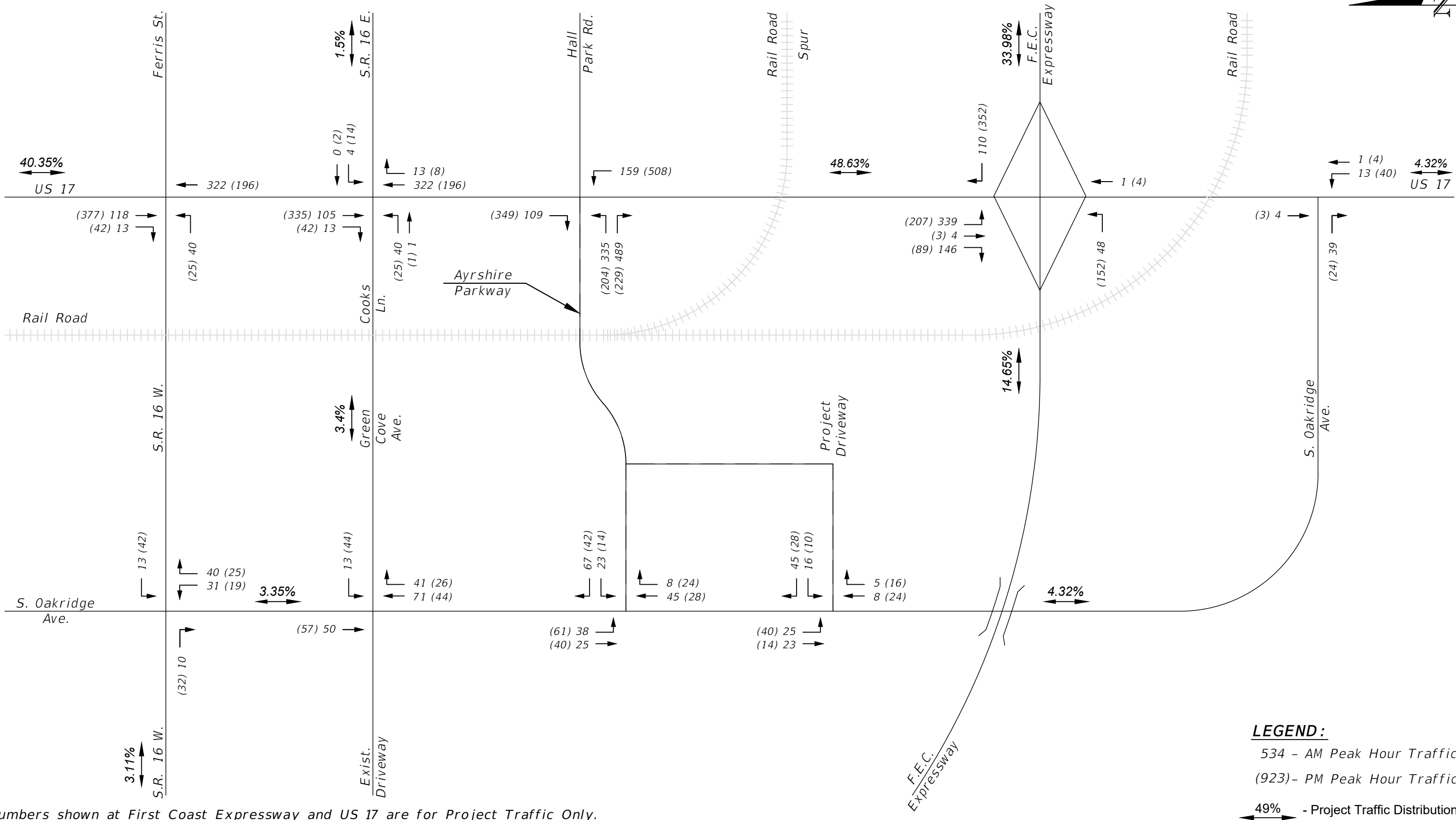
Figure 10 - Year 2027 AM and PM Peak Hour (Analysis Phase 02) Project Traffic Distribution and Assignment



Numbers shown at First Coast Expressway and US 17 are for Project Traffic Only.

**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic  
 49% - Project Traffic Distribution

Figure 11 - Year 2030 AM and PM Peak Hour (Analysis Phase 03) Project Traffic Distribution and Assignment



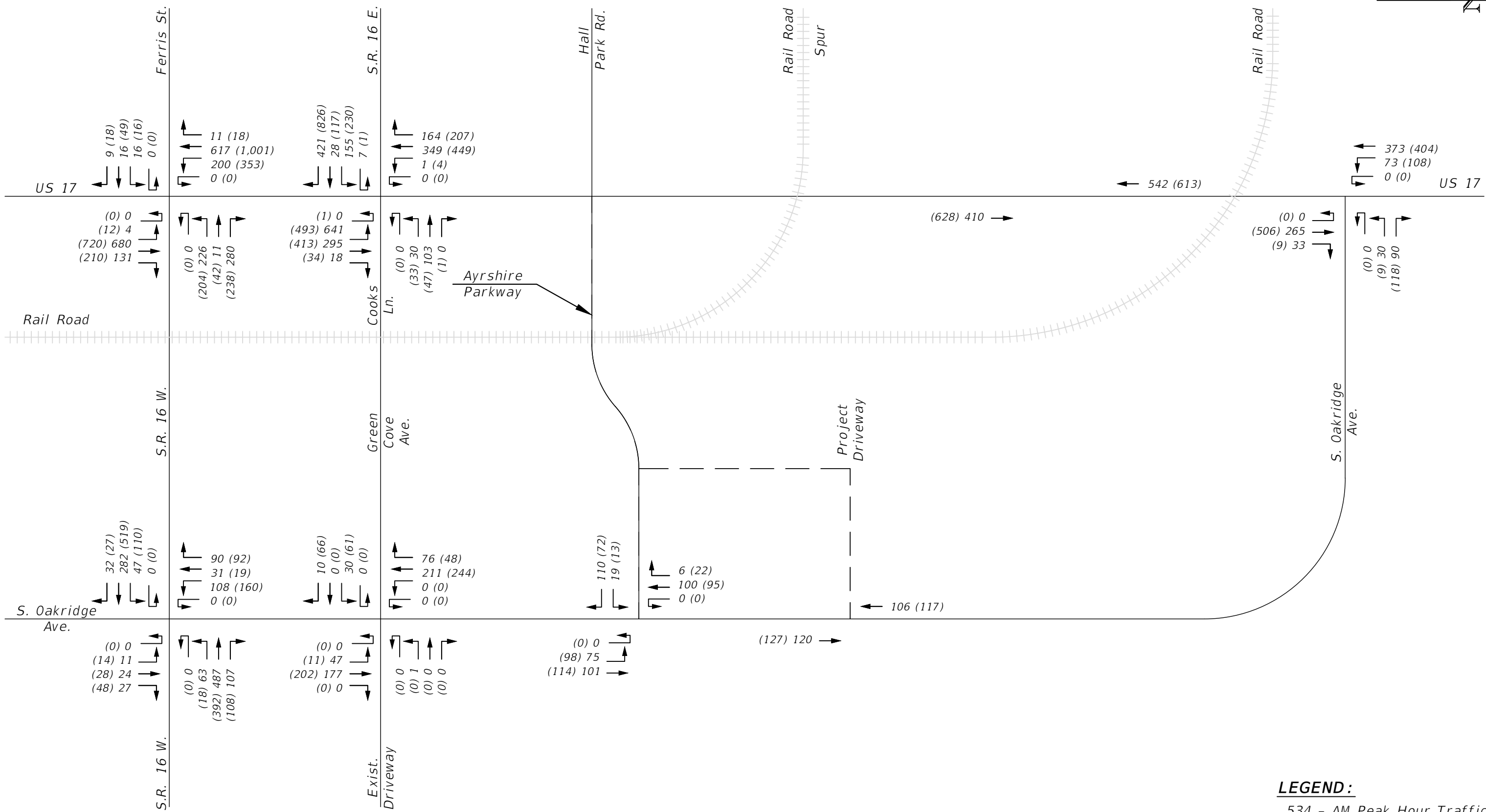
Numbers shown at First Coast Expressway and US 17 are for Project Traffic Only.

Figure 12 - Year 2035 AM and PM Peak Hour (Analysis Phase 04) Project Traffic Distribution and Assignment



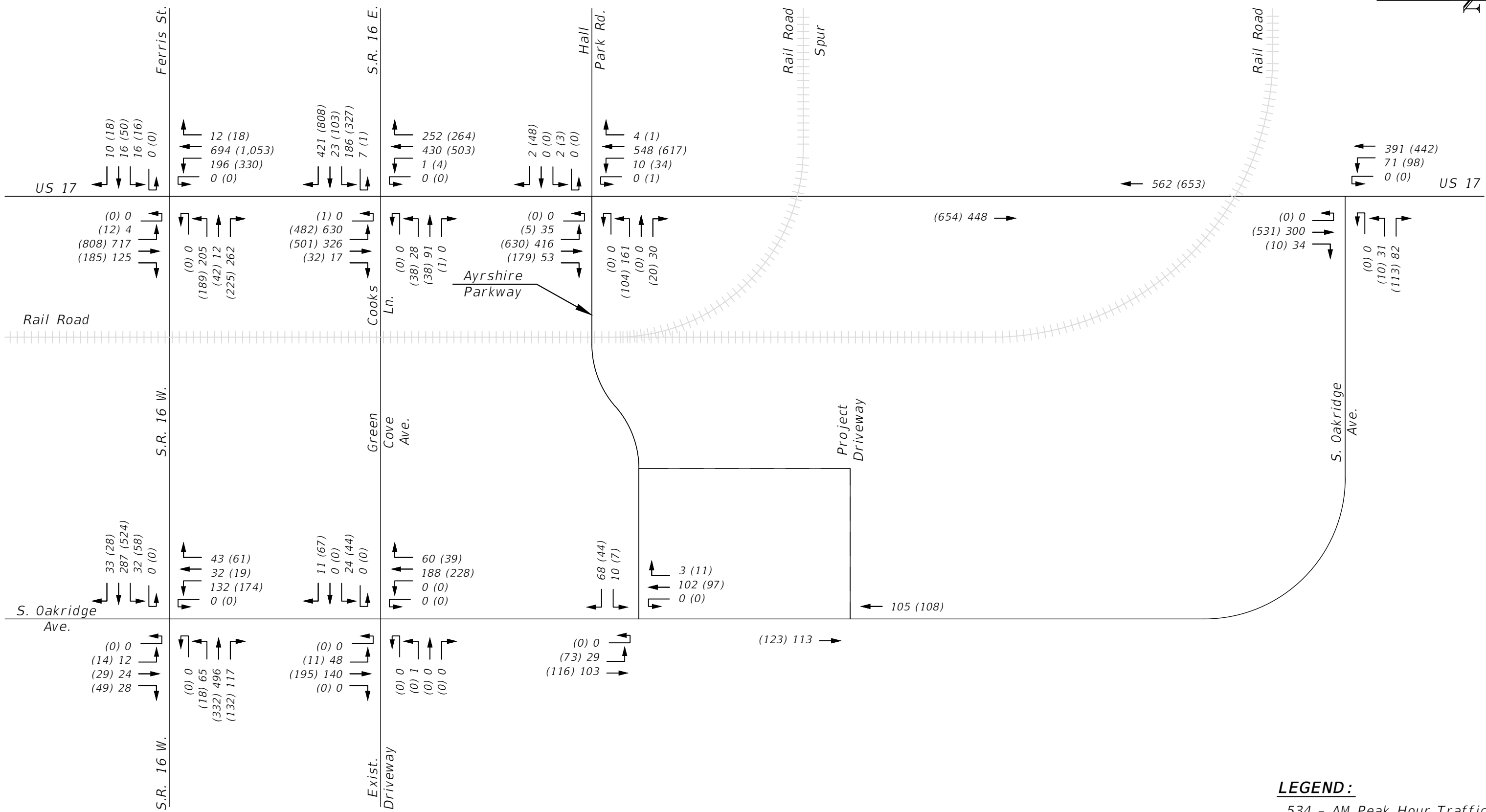
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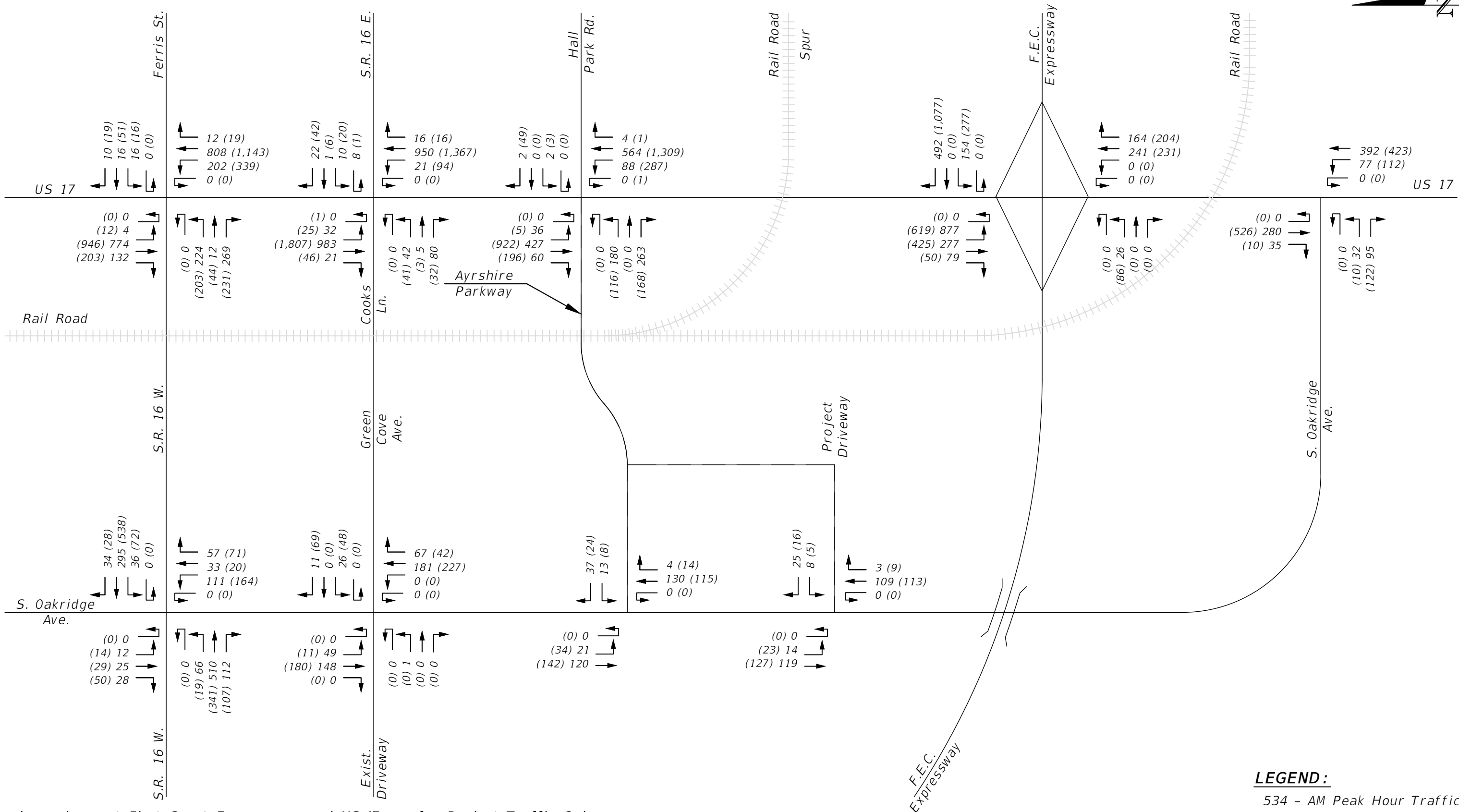
**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

Figure 13 - Year 2025 AM and PM Peak Hour (Analysis Phase 01) Build-Out Traffic Volumes



**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

Figure 14 - Year 2027 AM and PM Peak Hour (Analysis Phase 02) Build-Out Traffic Volumes



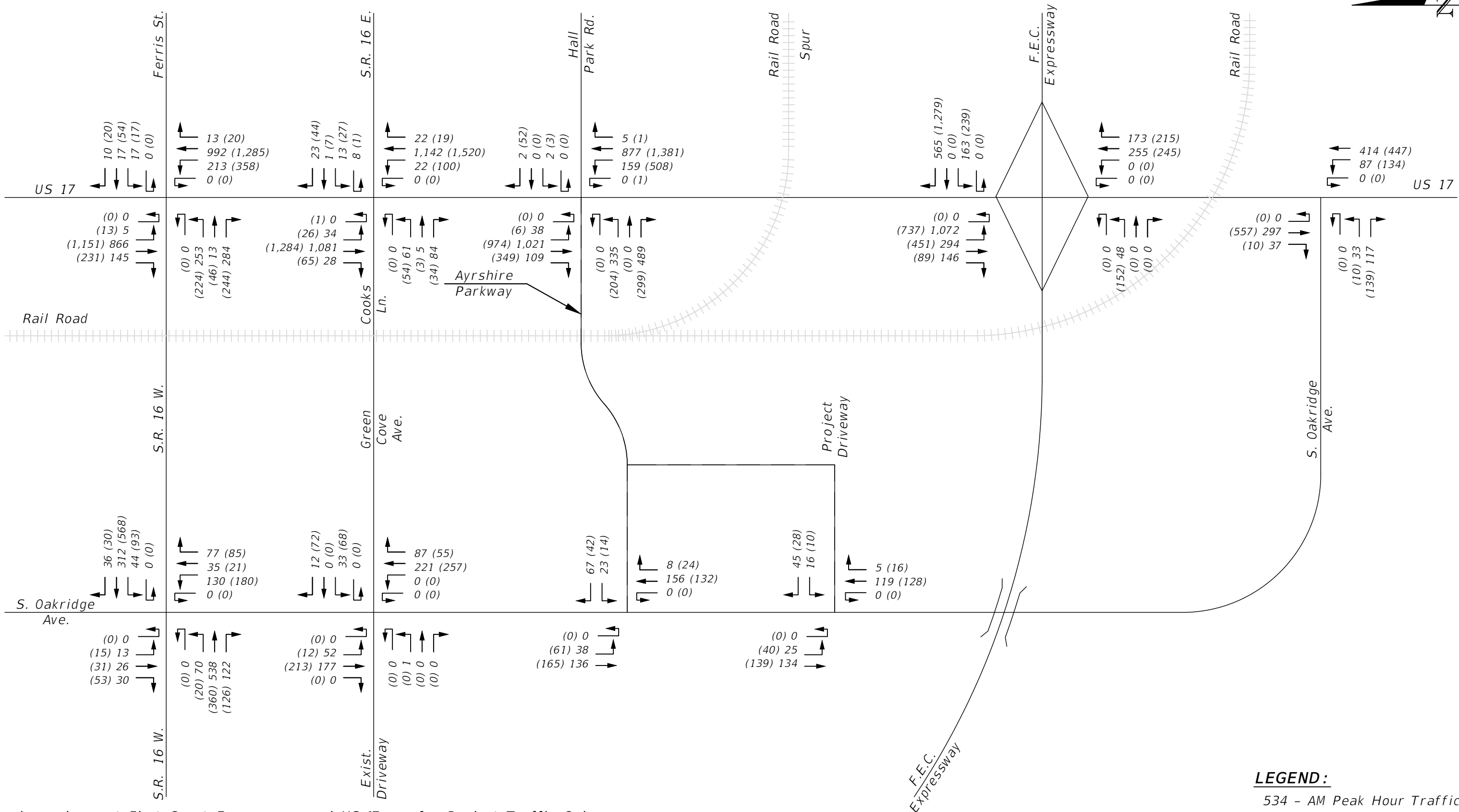
Numbers shown at First Coast Expressway and US 17 are for Project Traffic Only.

**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

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Figure 15 - Year 2030 AM and PM Peak Hour (Analysis Phase 03) Build-Out Traffic Volumes

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Numbers shown at First Coast Expressway and US 17 are for Project Traffic Only.

**LEGEND:**  
 534 - AM Peak Hour Traffic  
 (923)- PM Peak Hour Traffic

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Figure 16 - Year 2035 AM and PM Peak Hour (Analysis Phase 04) Build-Out Traffic Volumes

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**Table 01**  
**Trip Generation**  
**Ayrshire PUD, City of Green Cove Springs, FL**

ITE Land Use Code	Description	Quantity	Units	Time Period	Rate or Equation	Percent Traffic		Project Trips		
						Entering	Exiting	Total	Entering	Exiting
<b>Year 2025 (Analysis Phase 01)</b>										
210	Single Family Home Detached	231	Dwelling Units	Daily	$\ln(T) = 0.92 \ln(X) + 2.71$	50%	50%	2,246	1,123	1,123
				AM Peak	$T = 0.71(X) + 4.80$	25%	75%	169	42	127
				PM Peak	$\ln(T) = 0.96 \ln(X) + 0.20$	63%	37%	227	143	84
<b>Year 2027 (Analysis Phase 02)</b>										
210	Single Family Home Detached	500	Dwelling Units	Daily	$\ln(T) = 0.92 \ln(X) + 2.71$	50%	50%	4,571	2,286	2,285
				AM Peak	$T = 0.71(X) + 4.80$	25%	75%	360	90	270
				PM Peak	$\ln(T) = 0.96 \ln(X) + 0.20$	63%	37%	476	300	176
<b>Year 2030 (Analysis Phase 03)</b>										
210	Single Family Home Detached	1,000	Dwelling Units	Daily	$\ln(T) = 0.92 \ln(X) + 2.71$	50%	50%	8,648	4,324	4,324
				AM Peak	$T = 0.71(X) + 4.80$	25%	75%	715	179	536
				PM Peak	$\ln(T) = 0.96 \ln(X) + 0.20$	63%	37%	927	584	343
<b>Year 2035 (Analysis Phase 04)</b>										
210	Single Family Home Detached	1,470	Dwelling Units	Daily	$\ln(T) = 0.92 \ln(X) + 2.71$	50%	50%	12,327	6,164	6,163
				AM Peak	$T = 0.71(X) + 4.80$	25%	75%	1,049	262	787
				PM Peak	$\ln(T) = 0.96 \ln(X) + 0.20$	63%	37%	1,341	845	496
221	Multi-Family Residential (Low-rise)	630	Units	Daily	$T = 7.56(X) - 40.86$	50%	50%	4,722	2,361	2,361
			Units	AM Peak	$\ln(T) = 0.95 \ln(X) - 0.51$	23%	77%	274	63	211
			Units	PM Peak	$\ln(T) = 0.89 \ln(X) - 0.02$	63%	37%	304	192	112
								17,049	8,525	8,524
								1,323	325	998
								1,645	1,037	608

Source: Trip Generation Manual, 10th Edition, ITE

**Table 02**  
**Trends Growth Rate Calculations**  
**Ayrshire PUD, City of Green Cove Springs, FL**

<b>Roadway</b>	<b>AADT</b>	<b>Historic Growth Rate</b>	<b>Future Growth Rate</b>
Oak Ridge Avenue	2,200	1.19%	0.91%
SR 16 East of US 17	17,900	1.75%	1.57%
SR 16 West of Oak Ridge	14,100	6.03%	4.99%
SR 16 West of US 17	12,300	3.21%	2.76%
US 17 North of SR 16 E	19,200	-1.26%	-1.26%
US 17 North of SR 16 W	22,500	0.00%	0.00%
US 17 South of SR 16 E	15,000	3.41%	2.98%
US 17 South of SR 16W	19,400	-2.22%	-2.39%
		0.01%	0.01%

Source: Attachment C

**Table 03**  
**Existing Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	37.50	D		34.20	C	
	EB	Signal	49.40	D		27.90	C	
	WB	Signal	25.50	C		42.30	D	
	NB	Signal	30.10	C		28.60	C	
	SB	Signal	26.40	C		24.00	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	33.00	C		130.10	F	
	EB	Signal	56.40	E		37.20	D	
	WB	Signal	46.90	D		40.00	D	
	NB	Signal	21.70	C		216.40	F	
	SB	Signal	29.50	C		48.70	D	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	35.00	C		38.80	D	
	EB	Signal	46.90	D		47.20	D	
	WB	Signal	26.50	C		40.00	D	
	NB	Signal	44.60	D		48.30	D	
	SB	Signal	33.60	C		28.90	C	
US 17 at Hall Park Road	SBL	Yield	9.00	A	25	9.30	A	25
	WB	Stop	18.60	A	25	11.90	B	25
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.80	A	25	10.90	B	-
	WB	Stop	11.80	B	25	7.70	A	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.70	A	25	9.00	A	25
	EB	Stop	13.40	B	25	12.30	B	25

Source: Attachment H

**Table 04**  
**Year 2025 Background Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	40.80	D		34.70	C	
	EB	Signal	56.00	E		27.80	C	
	WB	Signal	25.70	C		43.20	D	
	NB	Signal	30.60	C		29.20	C	
	SB	Signal	26.50	C		24.10	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	33.50	C		141.90	F	
	EB	Signal	55.60	E		37.40	D	
	WB	Signal	47.70	D		40.30	D	
	NB	Signal	22.50	C		237.90	F	
	SB	Signal	30.40	C		52.10	D	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	35.40	D		40.90	D	
	EB	Signal	47.10	D		47.80	D	
	WB	Signal	27.20	C		44.40	D	
	NB	Signal	45.20	D		49.30	D	
	SB	Signal	33.90	C		29.10	C	
US 17 at Hall Park Road	SBL	Yield	9.00	A	25	9.40	A	25
	WB	Stop	18.60	C	25	12.10	B	25
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.80	A	25	7.80	A	-
	WB	Stop	12.00	B	25	11.00	B	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.70	A	25	9.10	A	25
	EB	Stop	13.40	B	25	12.50	B	25

Source: Attachment H

**Table 05**  
**Year 2027 Background Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	42.90	D		35.00	D	
	EB	Signal	60.30	E		27.80	C	
	WB	Signal	26.00	C		43.80	D	
	NB	Signal	30.90	C		29.50	C	
	SB	Signal	26.60	C		24.10	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	33.80	C		148.10	F	
	EB	Signal	55.20	E		37.40	D	
	WB	Signal	47.70	D		40.40	D	
	NB	Signal	23.00	C		249.30	F	
	SB	Signal	30.90	C		54.00	D	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	35.70	D		42.30	D	
	EB	Signal	47.30	D		48.10	D	
	WB	Signal	27.50	C		47.40	D	
	NB	Signal	45.40	D		49.80	D	
	SB	Signal	34.10	C		29.20	C	
US 17 at Hall Park Road	SBL	Yield	9.10	A	25	9.50	A	25
	WB	Stop	19.90	C	25	12.20	B	25
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.90	A	25	7.80	A	-
	WB	Stop	12.10	B	25	11.10	B	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.80	A	25	9.10	A	25
	EB	Stop	13.90	B	25	12.80	B	25

Source: Attachment H

**Table 06**  
**Year 2030 Background Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	46.40	D		35.60	D	
	EB	Signal	67.10	E		27.80	C	
	WB	Signal	26.40	C		44.80	D	
	NB	Signal	31.30	C		30.20	C	
	SB	Signal	26.60	C		24.20	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	34.50	C		158.10	F	
	EB	Signal	54.90	D		37.60	D	
	WB	Signal	47.80	D		40.50	D	
	NB	Signal	24.30	C		267.00	F	
	SB	Signal	31.70	C		57.90	E	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	29.40	C		44.30	D	
	EB	Signal	49.90	D		52.80	D	
	WB	Signal	30.70	C		29.10	C	
	NB	Signal	27.80	C		48.00	D	
	SB	Signal	28.20	C		37.80	D	
US 17 at Hall Park Road	SBL	Yield	53.50	F	25	14.20	B	25
	WB	Stop	10.70	B	25	24.40	C	50
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.90	A	25	7.80	A	-
	WB	Stop	12.30	B	25	11.20	B	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.90	A	25	9.20	A	25
	EB	Stop	14.20	B	25	12.90	B	25

Source: Attachment H

**Table 07**  
**Year 2035 Background Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	53.70	D		37.00	D	
	EB	Signal	81.70	F		28.00	C	
	WB	Signal	27.20	C		47.30	D	
	NB	Signal	31.90	C		31.50	C	
	SB	Signal	26.90	C		24.30	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	35.80	D		174.90	F	
	EB	Signal	54.00	D		37.90	D	
	WB	Signal	48.20	D		40.80	D	
	NB	Signal	26.60	C		295.70	F	
	SB	Signal	33.30	C		66.00	E	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	30.00	C		47.70	D	
	EB	Signal	50.40	D		66.20	E	
	WB	Signal	30.80	C		30.60	C	
	NB	Signal	28.50	C		48.30	D	
	SB	Signal	28.80	C		44.90	D	
US 17 at Hall Park Road	SBL	Yield	11.10	B	25	15.00	B	25
	WB	Stop	66.40	F	25	27.80	D	50
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.90	A	25	7.80	A	-
	WB	Stop	12.50	B	25	11.50	B	25
US 17 at Oak Ridge Avenue	NBL	Yield	9.00	A	25	9.30	A	25
	EB	Stop	14.70	B	50	13.20	B	25

Source: Attachment H

**Table 08**  
**Year 2025 (Analysis Phase 01) Development Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	36.20	D		35.50	D	
	EB	Signal	45.80	D		33.60	C	
	WB	Signal	23.40	C		40.80	D	
	NB	Signal	31.80	C		29.90	C	
	SB	Signal	25.10	C		23.20	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	31.60	C		133.70	F	
	EB	Signal	52.60	E		37.60	D	
	WB	Signal	45.80	D		39.40	D	
	NB	Signal	21.00	C		220.70	F	
	SB	Signal	28.30	C		64.70	E	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	34.90	C		42.00	D	
	EB	Signal	50.30	D		49.50	D	
	WB	Signal	25.40	C		48.50	D	
	NB	Signal	43.70	D		47.60	D	
	SB	Signal	34.00	C		29.40	C	
US 17 at Hall Park Road	SBL	Yield	8.80	A	25	9.50	A	25
	WB	Stop	14.30	B	-	12.00	B	25
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	8.00	A	25	7.90	A	-
	WB	Stop	12.30	B	25	13.10	B	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.50	A	25	9.20	A	25
	EB	Stop	12.00	B	25	12.20	B	25
Oak Ridge Avenue at Ayrshire Boulevard	SBL	Yield	7.6	A	25	7.7	A	25
	WBL	Stop	11.4	B	25	12.1	B	25
	WBR	Stop	9.4	A	25	9.2	A	25

Source: Attachment H



**Table 09**  
**Year 2027 (Analysis Phase 02) Development Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	37.20	D		37.10	D	
	EB	Signal	47.80	D		37.20	D	
	WB	Signal	22.90	C		42.40	D	
	NB	Signal	30.60	C		29.00	C	
	SB	Signal	25.10	C		23.20	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	32.20	C		96.70	F	
	EB	Signal	55.70	E		38.20	D	
	WB	Signal	45.70	D		46.80	D	
	NB	Signal	22.00	C		157.50	F	
	SB	Signal	29.00	C		42.40	E	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	37.30	D		45.00	D	
	EB	Signal	49.10	D		48.90	D	
	WB	Signal	27.80	C		53.30	D	
	NB	Signal	49.60	D		48.40	D	
	SB	Signal	33.40	C		32.00	C	
US 17 at Ayrshire Boulevard/Hall Park Road	Intersection	Signal	13.50	B		13.00	B	
	EB	Signal	15.00	B		16.00	B	
	WB	Signal	20.40	C		22.00	C	
	NB	Signal	14.50	B		11.90	B	
	SB	Signal	11.70	B		13.90	B	
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.90	A	25	7.90	A	-
	WB	Stop	12.00	B	25	13.10	B	25
Oak Ridge Avenue at Ayrshire Boulevard	SBL	Yield	7.5	A	25	7.7	A	25
	WBL	Stop	10.3	B	25	12.1	B	25
	WBR	Stop	9.2	A	25	9.2	A	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.70	A	25	9.20	A	25
	EB	Stop	12.40	B	25	12.20	B	25

Source: Attachment H

**Table 10**  
**Year 2030 (Analysis Phase 03) Development Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	37.60	D		35.80	D	
	EB	Signal	48.60	D		33.20	D	
	WB	Signal	22.90	C		42.40	D	
	NB	Signal	30.30	C		29.00	C	
	SB	Signal	25.10	C		23.30	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	32.90	C		173.20	F	
	EB	Signal	53.80	D		37.70	D	
	WB	Signal	45.70	D		39.60	D	
	NB	Signal	24.00	C		245.60	F	
	SB	Signal	30.70	C		145.20	F	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	30.50	D		44.50	D	
	EB	Signal	50.50	D		46.70	D	
	WB	Signal	30.60	C		29.70	C	
	NB	Signal	28.60	C		47.10	D	
	SB	Signal	29.90	C		41.80	D	
US 17 at Ayrshire Boulevard/Hall Park Road	Intersection	Signal	14.00	B		15.70	B	
	EB	Signal	23.30	C		25.40	C	
	WB	Signal	25.50	C		31.60	C	
	NB	Signal	10.90	B		15.80	B	
	SB	Signal	12.80	B		12.50	B	
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.90	A	25	7.80	A	-
	WB	Stop	12.10	B	25	12.20	B	25
Oak Ridge Avenue at Ayrshire Boulevard	SBL	Yield	7.5	A	25	7.6	A	25
	WBL	Stop	10.5	B	25	10.9	B	25
	WBR	Stop	9.2	A	25	9	A	25
Oak Ridge Avenue at Jersey Avenue	SBL	Yield	7.50	A	25	7.50	A	25
	WB	Stop	9.70	A	25	9.40	A	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.60	A	25	9.30	A	25
	EB	Stop	12.40	B	25	12.50	B	25

Source: Attachment H

**Table 11**  
**Year 2035 (Analysis Phase 04) Development Conditions - HCM Delay and LOS Summary**  
**Ayrshire PUD - Traffic Study, City of Green Cove Springs, FL**

Intersection	Approach	Signal Control	AM Peak			PM Peak		
			Delay	LOS	95%ile Queue (Feet)	Delay	LOS	95%ile Queue (Feet)
SR 16 W at Oak Ridge Avenue	Intersection	Signal	42.60	D		37.20	D	
	EB	Signal	58.20	E		35.70	D	
	WB	Signal	22.90	C		43.10	D	
	NB	Signal	32.50	C		30.70	C	
	SB	Signal	25.30	C		23.40	C	
SR 16 W / Ferris Ave. at US 17	Intersection	Signal	35.90	D		241.00	F	
	EB	Signal	51.90	D		38.20	D	
	WB	Signal	46.20	D		39.80	D	
	NB	Signal	29.40	C		305.50	F	
	SB	Signal	34.60	C		251.70	F	
SR 16 E / Cooks Ln. at US 17	Intersection	Signal	33.60	C		33.50	D	
	EB	Signal	53.00	D		64.20	E	
	WB	Signal	30.90	C		38.00	D	
	NB	Signal	33.10	C		35.40	D	
	SB	Signal	31.60	C		29.10	C	
US 17 at Ayrshire Boulevard/Hall Park Road	Intersection	Signal	31.00	C		55.70	E	
	EB	Signal	42.80	D		72.90	E	
	WB	Signal	38.40	D		65.20	E	
	NB	Signal	23.50	C		39.20	D	
	SB	Signal	29.30	C		72.30	E	
Oak Ridge Avenue at Green Cove Avenue	SBL	Yield	7.70	A	25	8.00	A	-
	WB	Stop	11.20	B	25	13.80	B	50
Oak Ridge Avenue at Ayrshire Boulevard	SBL	Yield	7.7	A	25	7.7	A	25
	WBL	Stop	11.4	B	25	12	B	25
	WBR	Stop	9.5	A	25	9.3	A	25
Oak Ridge Avenue at Jersey Avenue	SBL	Yield	7.50	A	25	7.60	A	25
	WB	Stop	9.70	A	25	9.80	A	25
US 17 at Oak Ridge Avenue	NBL	Yield	8.70	A	25	9.60	A	25
	EB	Stop	12.80	B	25	13.10	B	50

Source: Attachment H

# ***Attachment A***

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Conceptual Site Plan

(Source: Dunn and Associates, Inc.)