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MEMORANDUM

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Subject: Route 28 and Dulles Toll Road/Dulles Greenway Study
Traffic Volume Forecasts for 2045 Build Alternatives

Introduction

This memorandum summarizes the development of balanced traffic volumes for year 2045 Build Alternatives for the Route 28 and Dulles Toll Road/Dulles Greenway Interchange Study. This follows a set of volume forecasts for the 2045 No-Build scenario, which were delivered to VDOT on August 23rd, 2019, and subsequently approved for use in traffic simulation analysis. The following sections document the various improvements included in each Alternative and a discussion of how these improvements impact traffic forecasts. For each Alternative, the balanced 2045 Build freeway mainline and ramp volumes are provided as well as the corresponding balanced arterial turning movement volumes at study intersections.

Forecasting Methodology

The traffic forecasting and volume balancing methodology is consistent with the methodology previously described to develop 2025 and 2045 No-Build forecasts. 2045 Build forecasts are developed using 2045 No-Build as a baseline.

Traffic volumes were forecasted using the outputs from the MWCOG travel demand model. The Existing Conditions (2018) model scenario was calibrated and approved by VDOT in a memorandum dated April 9th, 2019. Relevant edits to the model network and scripts documented in that memorandum were carried forward to a 2045 No-Build model scenario, which also includes a series of background network improvements. The 2045 No-Build model scenario was modified to create various 2045 Build Alternative scenarios. Outputs from these models were used to estimate growth on study area roadway links using *NCHRP 765* industry-standard practices. Post-processed traffic volumes for the 2045 Build Alternative scenarios were developed starting from the from the 2045 No-Build balanced volumes, which were provided to VDOT in a memorandum dated August 23rd, 2019 and are provided again as an attachment to this memorandum for reference. Note that for trips on

facilities leading into or out of Dulles Airport, volumes have been held constant between No-Build and Build conditions. These Dulles Airport-associated volumes were grown from Existing Conditions using a constant 1.5 percent linear growth rate based upon discussions with VDOT and MWAA.

The *NCHRP 765* iterative-directional method was used to convert forecasted link volumes into forecasted turning movement volumes for arterial intersections. Build Alternative arterial turning movement volumes were again developed starting from No-Build volumes, consistent with freeway volumes.

Volumes were balanced along the freeways and arterials in a manner consistent with No-Build forecasts.

Land Use Assumptions

No changes to underlying land use are assumed between 2045 No-Build and Build conditions.

The MWCOG Round 9.1 land use projections were assumed for the traffic forecasting. The one exception is the Fairfax County Innovation Center Transit Station Area Land Units L-1 and L-2. Fairfax County requested that the study assume the optional office development (total of 4.2 million square feet of development, primarily office) that was recently adopted through a Comprehensive Plan Amendment. The land use in this zone in Fairfax County (TAZ #1705) was updated to incorporate these changes in the MWCOG model for the year 2045. This land use is consistent between No-Build and Build conditions.

Future Build Alternatives Forecasting Summary

The following sections summarize the future Build traffic volumes for each Alternative. For each Alternative, a concept diagram of improvements is provided as an attachment. Major improvements and changes to infrastructure or traffic operations/policy are summarized in this memorandum, and a summary of changes in volumes as compared to No-Build conditions is also provided for each Alternative.

BUILD ALTERNATIVE 1

Build Alternative 1 is focused on maximizing existing infrastructure/minimizing infrastructure impacts while also implementing policy changes. Additional detail for the tolling/policy assumptions are provided in the Appendix.

Summary of Build Alternative 1 Improvements

Table 1 provides an overview of improvements featured in Build Alternative 1, with any improvements shown as underlined that are anticipated to affect demand or requiring a reassignment of volumes.

Table 1. Build Alternative 1 Improvements

Study Area Location	Improvements
Tolling/Policy	• (1a) ~~Maintain HOV-2 along the DTR.~~ Item removed based on discussions with MWAA and their pending study to evaluate HOV along the DTR. Note that HOV-2+ will be maintained for the 2025 forecasts. • (1b) Restructure Dulles Greenway tolls to distance-based tolls so that only end-to-end trips will pay full fare. • (1c) Restructure DTR tolls to time-of-day fixed pricing, with higher tolls in the both directions. For the 2025 forecasts, the higher tolls will only be in the peak directions (eastbound in the AM peak and westbound in the AM peak). • (1d) Add ITS/DMS for traffic monitoring and management.
Route 28/Route 267 interchange	• (1e) The southbound Route 28 to eastbound DTR loop ramp is kept in the same location but widened from one lane to two lanes. • (1f) Ramp braiding is added along the eastbound DIAAH outer lanes between the on-ramp from southbound Route 28 (the ramp noted above) and the off-ramp to northbound Route 28. • (1g) The ramp carrying traffic from eastbound/westbound Route 267 to southbound Route 28 will fly over a new southbound Route 28 C-D road (1j) and tie into southbound Route 28 along the right side, separating out this on-ramp traffic from the southbound Route 28 to eastbound Route 267 off-ramp traffic. • (1h) The ramp from westbound DTR to northbound Route 28 will be widened to two lanes, with ramp braiding added along northbound Route 28 between the off-ramp to Innovation Avenue and the on-ramp from westbound DTR.
Route 28 mainline	• (1j) Implement southbound Route 28 C-D road from Innovation Avenue through the Route 267 interchange.
Sterling Boulevard interchange	• None
Route 606 interchange	• (1k) Convert to partial cloverleaf; remove westbound to southbound loop and eastbound to northbound loop
Innovation Avenue interchange	• (1l) Provide connection from westbound Innovation Avenue to westbound Dulles Greenway via signalized intersection. • (1m) Modify southbound Route 28 off-ramp to Innovation Avenue; tie into signalized intersection with connection to Dulles Greenway and Innovation Avenue (1l) • (1n) Modify westbound Innovation Avenue to southbound Route 28 loop ramp; tie into southbound Route 28 C-D road

Study Area Location	Improvements
Frying Pan Road interchange	• (1o) Implement barrier-separated on-ramp from Frying Pan Road to southbound Route 28 (safety improvement) • (1p) Extend acceleration lane to southbound Route 28 across bridge
Route 267 mainline	• (1q) Extend eastbound DTR 5th through lane from Centreville Road off-ramp to Fairfax County Parkway • (1r) Extend westbound HOV lane past left exit to DIAAH • (1s) Close eastbound DIAAH slip ramps east and west of Centreville Road
Centreville Road interchange	• None

Summary of Build Alternative 1 Forecast Volumes

- At the west end of Route 267 (Dulles Greenway), volumes increase substantially as compared to the No-Build condition due to the distance-based tolling policy along the Dulles Greenway, which incentivizes short-distance trips in eastern Loudoun County. At the daily level, volumes increase by approximately 7,600 vpd eastbound (23 percent) and by approximately 8,200 vpd westbound (24 percent). Much of this increase is observed to be in the off-peak hours, in which volumes in the No-Build (and Existing) conditions are fairly low due to the fixed toll rates at the Greenway main toll plaza. During the peak hours, the increases in volume are still observed, but at a less significant extent. In the eastbound direction during the AM peak, volumes increase by 650 vph (13 percent), and in the westbound direction during the PM peak, volumes increase by 610 vph (10 percent). This can likely be attributed to the higher peak period toll rates along the Dulles Toll Road and the observation that the Dulles Greenway is approaching capacity in the peak direction during the peak hour.
- At the east end of Route 267 (DTR), daily volume increases as compared to No-Build are much less significant than at the west end: only approximately 1,000 vpd (1 percent) in each direction. During the AM peak hour in the eastbound direction, an increase of approximately 600 vph (8 percent) is observed given the updated Dulles Greenway tolling policy and the widening between Centreville Road and FCP; however, during the PM peak hour in the eastbound direction, volumes decrease by more than 500 vph (11 percent) due to the bi-directional peak period increases in tolls on the DTR. During the PM peak hour in the westbound direction, volumes are essentially consistent with No-Build given upstream capacity constraints in the Reston/Herndon areas and the lack of a corresponding westbound widening in the study area; during the AM peak hour in the westbound direction, a reduction of 250 vph (6 percent) is observed due to the bi-directional peak period DTR toll increases.
- The increases in volume at the west end of Route 267 correspond to decreases in volume at the north end of Route 28, with significant decreases in volume observed on the ramps from

southbound Route 28 to eastbound Route 267 (5,700 vpd, or 22 percent) and from westbound Route 267 to northbound Route 28 (5,000 vpd, or 17 percent). Along Route 28, decreases in volume are observed on ramps that serve as bypasses to the Dulles Greenway:

- Eastbound Route 606 to southbound Route 28: 3,800 vpd decrease (33 percent)
- Northbound Route 28 to westbound Route 606: 2,100 vpd decrease (19 percent)
- Eastbound Sterling Boulevard to southbound Route 28: 3,200 vpd decrease (33 percent)
- Northbound Route 28 to westbound Sterling Boulevard: 4,100 vpd decrease (43 percent)

- At the north end of Route 28 in the study area, volumes decrease in the northbound direction by approximately 1,700 vpd (2 percent decrease) and in the PM peak hour by approximately 100 vph (2 percent). In the southbound direction, volumes decrease by approximately 1,100 vpd (1 percent) and in the AM peak hour by approximately 100 vph (1 percent).
- Increases in volume are observed along Frying Pan Road due to increases in the movements from northbound Route 28 to eastbound Frying Pan Road (700 vpd, or 6 percent) and from westbound Frying Pan Road to southbound Route 28 (800 vpd, or 7 percent). The increases in these movements are slightly offset by decreases in volume to and from the north along Route 28. These changes are likely attributable to the peak period toll increases along the DTR, incentivizing some trips to divert to the local street network.
- Volumes at the DTR ramps to and from Centreville Road in both directions decrease as compared to No-Build conditions. More significant decreases are observed along the west-facing ramps, as these represent trips that would pay the increased peak-period toll along the DTR to travel through one interchange.

BUILD ALTERNATIVE 2

Build Alternative 2 is focused on addressing critical infrastructure issues, featuring more infrastructure build-out than Alternative 1.

Summary of Build Alternative 2 Improvements

Table 2 provides an overview of improvements featured in Build Alternative 2, with any improvements shown as underlined that are anticipated to affect demand or requiring a reassignment of volumes.

Table 2. Build Alternative 2 Improvements

Study Area Location	Improvements
Tolling/Policy	• (2a) Add ITS/DMS for traffic monitoring and management.
Route 28/Route 267 interchange	• <u>(2b) Implement flyover ramp from southbound Route 28 to eastbound DTR and westbound DIAAH; remove (1) existing southbound Route 28 to eastbound DTR loop ramp and (2) existing access from southbound Route 28 to westbound DIAAH.</u> • <u>(2c) The ramp from westbound DTR to northbound Route 28 will be widened to two lanes, with ramp braiding added along northbound</u>

Study Area Location	Improvements
	Route 28 between the off-ramp to Innovation Avenue and the on-ramp from westbound DTR. • (2d) Remove eastbound DIAAH toll plaza and implement all electronic tolling on Route 28 ramps.
Route 28 mainline	• (2e) Add ramp braiding along southbound Route 28 between Route 606 and Innovation Avenue ramps. This braiding eliminates the movement from eastbound Route 606 to Innovation Avenue via Route 28.
Sterling Boulevard interchange	• None
Route 606 interchange	• (2f) Convert to diverging diamond interchange (DDI)
Innovation Avenue interchange	• (2g) Provide connection from westbound Innovation Avenue to westbound Dulles Greenway via signalized intersection. • (2h) Modify southbound Route 28 off-ramp to Innovation Avenue; tie into signalized intersection with connection to Dulles Greenway and Innovation Avenue (2g) • (2i) ~~Replace existing Innovation Avenue to southbound Route 28 loop ramp with new access to new flyover ramp (to southbound Route 28 to eastbound DTR/westbound DIAAH)~~ Upon further concept refinement, the loop ramp will be maintained to minimize impacts and costs.
Frying Pan Road interchange	• (2j) Expand trumpet interchange by increasing design speed.
Route 267 mainline	• (2k) Extend eastbound DTR 5th through lane from Centreville Road off-ramp to Fairfax County Parkway • (2l) Extend westbound HOV lane past left exit to DIAAH • (2m) Close eastbound DIAAH slip ramps east and west of Centreville Road • (2n) Close slip ramp from westbound DTR to DIAAH
Centreville Road interchange	• (2o) Implement single point urban interchange (SPUI) and widen Centreville Road to 6 lanes. • (2p) Provide ramp from Centreville Road to westbound DIAAH within the SPUI.

Summary of Build Alternative 2 Forecast Volumes

- At the west end of Route 267 (Dulles Greenway), eastbound volumes remain generally consistent with No-Build; volumes in the westbound direction increase between 2 and 3 percent due to new the on-ramp from Innovation Avenue and southbound Route 28.

- At the east end of Route 267 (DTR), eastbound volumes increase by approximately 9 percent (approximately 6,400 vpd and 640 vph during the AM peak hour) due to the eastbound widening and the additional capacity for the ramp coming from southbound Route 28. Nearly the entire increase in volume along eastbound Route 267 is coming from this ramp.
- In the westbound direction at the east end of Route 267 (DTR), volumes increase by approximately 6 percent (approximately 4,000 vpd; 150 vph during the PM peak hour). The increase in volume in the westbound direction is less pronounced as the widening improvement is only in the eastbound direction; additionally, demand is constrained upstream in the westbound direction outside of the study area. Nearly the entire increase in volume along westbound Route 267 is associated with the ramp to northbound Route 28, which is widened and braided with the northbound Route 28 ramp to Innovation Avenue.
- At the south end of Route 28, volumes are essentially unchanged from No-Build, including AM and PM peak hour volumes.
- At the north end of Route 28, volumes increase in the northbound direction by approximately 4 percent (approximately 3,200 vpd and 200 vph during the PM peak hour) while volumes in the southbound direction increase by approximately 6 percent (approximately 4,700 vpd and 315 vph during the AM peak hour). These increases can be attributed to the additional capacity along Route 28, particular for the movements to and from the east along the Dulles Toll Road.
- The most significant increases in ramp volumes are as follows:
    - Southbound Route 28 to eastbound Route 267 (DTR): increase of 6,400 vpd (25 percent increase) / 600 vph during AM peak (24 percent increase)
    - Westbound Route 267 (DTR) to northbound Route 28: increase of 4,600 vpd (16 percent increase) / 330 vph during PM peak (17 percent increase)
- There is a decrease in volume on the ramps from Route 606 to southbound Route 28 as well as the ramp from southbound Route 28 to Innovation Avenue, as there is no longer a direct path from eastbound Route 606 to Innovation Avenue via Route 28 (due to ramp braiding). Thus, there is a slight increase in traffic volume staying on eastbound Route 606 and making and eastbound right turn onto Shaw Road southbound.

BUILD ALTERNATIVE 3

Build Alternative 3 considers “unconstrained infrastructure”, featuring more infrastructure build-out than both Alternatives 1 and 2.

Summary of Build Alternative 3 Improvements

Table 3 provides an overview of improvements featured in Build Alternative 3, with any improvements shown as underlined that are anticipated to affect demand or requiring a reassignment of volumes.

Table 3. Build Alternative 3 Improvements

Study Area Location	Improvements
Tolling/Policy	• (3a) Add ITS/DMS for traffic monitoring and management.
Route 28/Route 267 interchange	• (3b) Implement flyover ramp from southbound Route 28 to eastbound DTR and westbound DIAAH; remove (1) existing southbound Route 28 to eastbound DTR loop ramp and (2) existing access from southbound Route 28 to westbound DIAAH. • (3c) The ramp from westbound DTR to northbound Route 28 will be widened to two lanes, with ramp braiding added along northbound Route 28 between the off-ramp to Innovation Avenue and the on-ramp from westbound DTR. • (3d) Remove eastbound DIAAH toll plaza and implement all electronic tolling on Route 28 ramps.
Route 28 mainline	• (3e) Implement northbound Route 28 C-D road with two ramp braids from south of the loop ramp from DIAAH eastbound through to the Route 606 interchange. This braiding eliminates the movement from westbound Innovation Avenue to Route 606 via Route 28. • (3f) Implement southbound Route 28 C-D road with two ramp braids from Route 606 interchange through to Innovation Avenue interchange. This braiding eliminates the movement from eastbound Route 606 to Innovation Avenue via Route 28.
Sterling Boulevard interchange	• None
Route 606 interchange	• (3g) Convert to single point urban diamond interchange (SPUI)
Innovation Avenue interchange	• (3h) Replace existing westbound Innovation Avenue to southbound Route 28 loop ramp with new ramp providing access to southbound Route 28. Provide separate new loop ramp providing access from westbound Innovation Avenue to the ramp to eastbound DTR/westbound DIAAH. • (3i) Provide connection from westbound Innovation Avenue to westbound Dulles Greenway via signalized intersection. Modify southbound Route 28 off-ramp to Innovation Avenue; tie into signalized intersection with connection to Dulles Greenway and Innovation Avenue. • (3j) Construct Pacific Boulevard between Route 606 and Innovation Avenue. • (3k) Implement access from Innovation Avenue/Dulles Green Boulevard to Centreville Road/Dulles Toll Road. Provide access in both directions.

Study Area Location	Improvements
Frying Pan Road interchange	• (3l) Implement partial diverging diamond interchange (DDI).
Route 267 mainline	• (3m) Extend eastbound DTR 5th through lane from Centreville Road off-ramp to Fairfax County Parkway • (3n) Extend westbound HOV lane past left exit to DIAAH • (3o) Close eastbound DIAAH slip ramps east and west of Centreville Road • (3p) Close slip ramp from westbound DTR to DIAAH
Centreville Road interchange	• (3q) Widen Centreville Road to 6 lanes. • (2p) Provide ramp from Centreville Road to westbound DIAAH via a displaced left-turn signal.

Summary of Build Alternative 3 Forecast Volumes

- At the west end of Route 267 (Dulles Greenway), eastbound volumes remain generally consistent with No-Build; volumes in the westbound direction increase between 2 and 3 percent due to new the on-ramp from Innovation Avenue and southbound Route 28. This is consistent with Build Alternative 2.
- At the east end of Route 267 (DTR), eastbound volumes increase by approximately 10 percent (approximately 7,100 vpd and 680 vph during the AM peak hour) due to the eastbound widening and the additional capacity for the ramp coming from southbound Route 28. Nearly the entire increase in volume along eastbound Route 267 is coming from this ramp. This is again consistent with Build Alternative 2, with a slightly higher increase due to the additional new connection provided directly from Innovation Avenue to Centreville Road.
- In the westbound direction at the east end of Route 267 (DTR), volumes increase by approximately 7 percent (approximately 4,900 vpd; 230 vph during the PM peak hour). The increase in volume in the westbound direction is less pronounced as the widening improvement is only in the eastbound direction; additionally, demand is constrained upstream in the westbound direction outside of the study area. Nearly the entire increase in volume along westbound Route 267 is associated with the ramp to northbound Route 28, which is widened and braided with the northbound Route 28 ramp to Innovation Avenue. This is again consistent with Build Alternative 2, with a slightly higher increase due to the additional new connection provided directly from Centreville Road to Innovation Avenue.
- At the south end of Route 28, volumes are essentially unchanged from No-Build, including AM and PM peak hour volumes. This is consistent with Build Alternative 2.
- At the north end of Route 28, volumes increase in the northbound direction by approximately 4 percent (approximately 3,200 vpd and 200 vph during the PM peak hour) while volumes in the southbound direction increase by approximately 6 percent (approximately 5,100 vpd and 315 vph during the AM peak hour). These increases can be attributed to the additional capacity along Route 28, particular for the movements to and from the east along the Dulles Toll Road.

- The most significant increases in ramp volumes are as follows:
  - Southbound Route 28 to eastbound Route 267 (DTR): increase of 6,600 vpd (25 percent increase) / 490 vph during AM peak (19 percent increase)
  - Westbound Route 267 (DTR) to northbound Route 28: increase of 4,100 vpd (14 percent increase) / 310 vph during PM peak (16 percent increase)
- The new connection from Pacific Boulevard through to Innovation Avenue shifts volume along Route 606 eastbound to utilize southbound Pacific Boulevard instead of southbound Shaw Road to access the Innovation Avenue area; the return northbound-to-westbound movement also sees a shift in volume from Shaw Road northbound / Route 606 westbound to instead use Pacific Boulevard. The new connection has a forecasted two-way daily volume of approximately 18,500 vpd, with a higher volume in the eastbound direction as westbound Innovation Avenue is provided a direct connection to westbound Route 267.

BUILD ALTERNATIVE 3 – OPTION B

Based on discussions with Fairfax County DOT and their concerns with the connection between Innovation Avenue/Dulles Green Boulevard and Centreville Road/Dulles Toll Road (improvement 3k in **Table 3)**, an Option 3B has been included to consider modified access in this location. Alternative 3 - Option B is a reassignment of traffic volumes from Alternative 3, shifting volume between a few ramp movements.

Summary of Build Alternative 3 - Option B Improvements

Alternative 3 - Option B modifies improvement 3k described in Table 3:

- Westbound access from Centreville Road/Dulles Toll Road to the Innovation Avenue area is still provided, but via a connection to the Davis Drive overpass across Route 267.
- Eastbound access from the Innovation Avenue area to Centreville Road/Dulles Toll Road is no longer provided. Instead, a new ramp is provided from Dulles Corner Drive (off of Sunrise Valley Drive south of Route 267) connecting to the ramp from northbound Route 28 to westbound/eastbound DTR. Thus, a new connection is still provided from the Innovation Avenue area to eastbound DTR and Centreville Road. These trips would need to utilize the Davis Drive overpass southbound to Sunrise Valley Drive southbound to access this new ramp.

Summary of Build Alternative 3 – Option B Forecast Volumes

- Volumes are consistent with Alternative 3, with the exception of the following:
  - Volume in Alternative 3 utilizing the eastbound connection from Innovation Avenue to Centreville Road now is routed onto the new Dulles Corner Road ramp.
  - There is a subsequent reduction in volume on the ramp from Frying Pan Road to northbound Route 28 and the ramp from northbound Route 28 to eastbound Route 267

(DTR); however, once the Dulles Corner Road ramp joins, the total combined ramp to eastbound Route 267 increases.

Summary of Attachments

The PDF attachment to this memorandum contains the following graphics:

- 2045 No-Build
  - 2045 No-Build Freeway ADTs
  - 2045 No-Build Freeway AM peak hour volumes
  - 2045 No-Build Freeway PM peak hour volumes
  - 2045 No-Build Arterial AM (PM) turning movement volumes
- 2045 Build Alternative 1
  - 2045 Build Alternative 1 concept sketch
  - 2045 Build Alternative 1 Freeway ADTs
  - 2045 Build Alternative 1 Freeway AM peak hour volumes
  - 2045 Build Alternative 1 Freeway PM peak hour volumes
  - 2045 Build Alternative 1 Arterial AM (PM) turning movement volumes
- 2045 Build Alternative 2
  - 2045 Build Alternative 2 concept sketch
  - 2045 Build Alternative 2 Freeway ADTs
  - 2045 Build Alternative 2 Freeway AM peak hour volumes
  - 2045 Build Alternative 2 Freeway PM peak hour volumes
  - 2045 Build Alternative 2 Arterial AM (PM) turning movement volumes
- 2045 Build Alternative 3
  - 2045 Build Alternative 3 concept sketch
  - 2045 Build Alternative 3 Freeway ADTs
  - 2045 Build Alternative 3 Freeway AM peak hour volumes
  - 2045 Build Alternative 3 Freeway PM peak hour volumes
  - 2045 Build Alternative 3 Arterial AM (PM) turning movement volumes
- 2045 Build Alternative 3 – Option B
  - 2045 Build Alternative 3 - Option B concept sketch
  - 2045 Build Alternative 3 - Option B Freeway ADTs
  - 2045 Build Alternative 3 - Option B Freeway AM peak hour volumes
  - 2045 Build Alternative 3 - Option B Freeway PM peak hour volumes
  - 2045 Build Alternative 3 - Option B Arterial AM (PM) turning movement volumes

These attachments are best printed in 11x17.

Appendix

This appendix describes the tolling assumptions for Build Alternative 1 in more detail than provided in Table 1. Through discussions with MWAA and TRIP II, Kimley-Horn developed tolling assumptions aimed at alleviating some of the operational deficiencies at the Route 28 and Dulles Toll Road/Dulles Greenway interchange. These tolling assumptions were made with the understanding that they would require policy changes.

The MWCOG/TPB model was applied with the new tolls in Alternative 1, which may cause changes in the trip distribution in addition to the changes in route choice based on the toll changes. Per MWCOG modeling convention, tolls are assumed to remain consistent in real terms into the future. To be consistent with Alternatives 2 and 3, the base toll rates were modified from the MWCOG base toll rates to reflect the toll policy assumptions for the Dulles Toll Road and Greenway:

- **Dulles Toll Road:** the tolls on the Dulles Toll Road were increased 50% in the peak periods (6:00-9:00 AM and 3:00-7:00 PM) in both directions. The Mainline tolls increased from $3.25 to $4.90 and the Ramp tolls increased from $1.50 to $2.25. The off-peak tolls remain the same.
- **Dulles Greenway:** the Dulles Greenway tolls modified the current system of mainline and west-facing ramps toll collection (flat rate) to directional, distance-based tolls. The cost of the directional tolls were assumed to be $1 per mile, capped at the existing maximum of $5.80 in the peak-period, peak direction and $4.75 in the off-peak direction, with a 1% escalation over real terms. The escalation results in maximum full-length tolls of $7.45 (2020USD) in the peak and $6.10 (2020USD) in the off peak.

Figure A-1 shows the 2020 existing and 2045 Alternative 1 tolls for the Dulles Toll Road and the Greenway in a chart.

Tables A-1 through **A-4** show the proposed Greenway toll tables for existing (2020) and proposed (2045) AM and PM tolls.

Figure A-1: Existing (2020) and Alternative 1 (2045) Tolls on Dulles Toll Road and Greenway

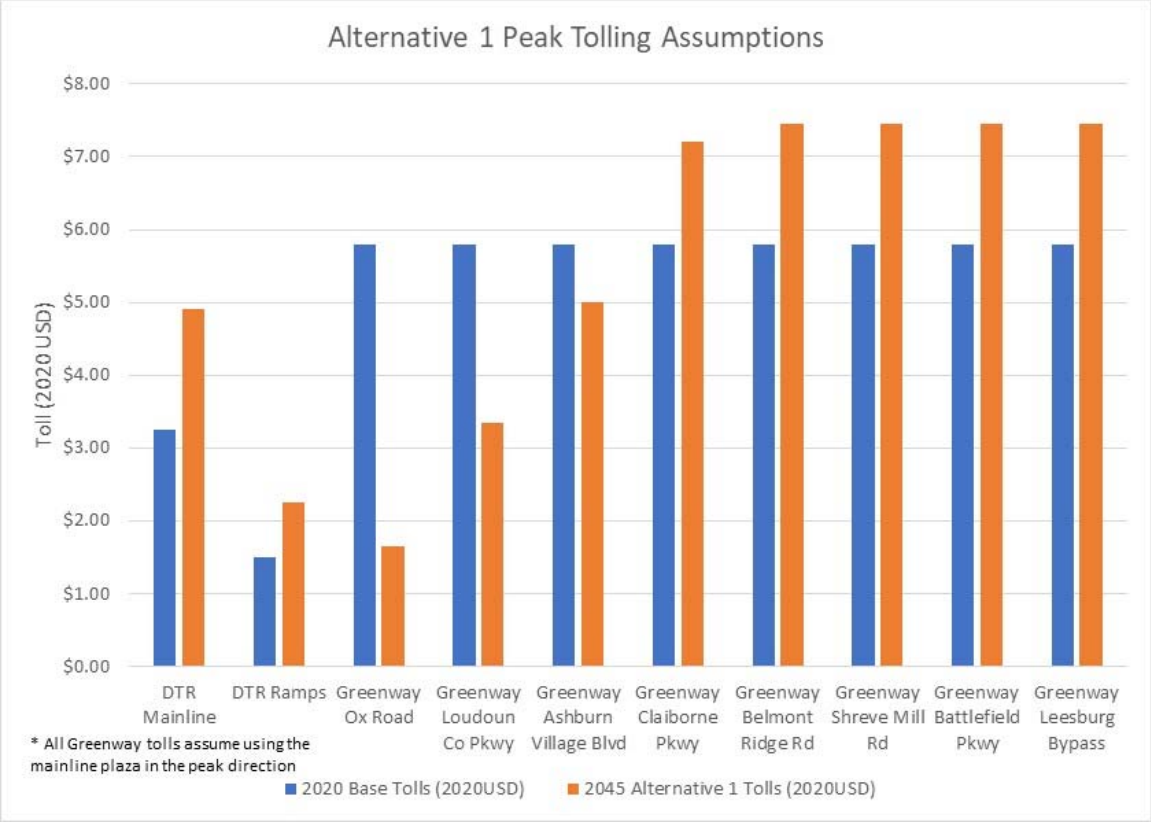

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Table A-1: 2020 (Existing) Peak Tolls (AM Peak Period)

From \ To	Main Line/ Rt 28	Ox Road	Loudoun Co Pkwy	Ashburn Village Blvd	Claiborne Pkwy	Belmont Ridge Rd	Shreve Mill Rd	Battlefield Pkwy	Leesburg Bypass
Main Line/ Rt 28	-	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75
Ox Road	$ 5.80	-	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75
Loudoun Co Pkwy	$ 5.80	$ 5.80	-	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75	$ 4.75
Ashburn Vill Blvd	$ 5.80	$ 5.80	$ 5.80	-	$ 3.55	$ 3.55	$ 3.55	$ 3.55	$ 3.55
Claiborne Pkwy	$ 5.80	$ 5.80	$ 5.80	$ 4.65	-	$ 3.55	$ 3.55	$ 3.55	$ 3.55
Belmont Ridge Rd	$ 5.80	$ 5.80	$ 5.80	$ 4.65	$ 4.65	-	$ 4.65	$ 4.65	$ 4.65
Shreve Mill Rd	$ 5.80	$ 5.80	$ 5.80	$ 4.65	$ 4.65	$ 4.65	-	$ 3.10	$ 3.10
Battlefield Pkwy	$ 5.80	$ 5.80	$ 5.80	$ 4.65	$ 4.65	$ 4.65	$ 3.10	-	-
Leesburg Bypass	$ 5.80	$ 5.80	$ 5.80	$ 4.65	$ 4.65	$ 4.65	$ 3.10	-	-

Table A-2: 2045 Alternative 1 Distance-Based Option (AM Peak Period (USD2020))

From \ To	Main Line/ Rt 28	Ox Road	Loudoun Co Pkwy	Ashburn Village Blvd	Claiborne Pkwy	Belmont Ridge Rd	Shreve Mill Rd	Battlefield Pkwy	Leesburg Bypass
Main Line/ Rt 28	-	$ 1.35	$ 2.65	$ 4.00	$ 5.75	$ 6.10	$ 6.10	$ 6.10	$ 6.10
Ox Road	$ 1.65	-	$ 1.35	$ 2.65	$ 4.40	$ 5.35	$ 6.10	$ 6.10	$ 6.10
Loudoun Co Pkwy	$ 3.35	$ 1.65	-	$ 1.35	$ 3.10	$ 4.00	$ 6.10	$ 6.10	$ 6.10
Ashburn Vill Blvd	$ 5.00	$ 3.35	$ 1.65	-	$ 1.75	$ 2.65	$ 5.45	$ 6.10	$ 6.10
Claiborne Pkwy	$ 7.20	$ 5.50	$ 3.85	$ 2.20	-	$ 0.90	$ 3.70	$ 5.65	$ 6.10
Belmont Ridge Rd	$ 7.45	$ 6.65	$ 5.00	$ 3.35	$ 1.15	-	$ 2.75	$ 4.70	$ 5.75
Shreve Mill Rd	$ 7.45	$ 7.45	$ 7.45	$ 6.80	$ 4.60	$ 3.45	-	$ 1.95	$ 3.00
Battlefield Pkwy	$ 7.45	$ 7.45	$ 7.45	$ 7.45	$ 7.05	$ 5.90	$ 2.45	-	-
Leesburg Bypass	$ 7.45	$ 7.45	$ 7.45	$ 7.45	$ 7.45	$ 7.20	$ 3.70	-	-

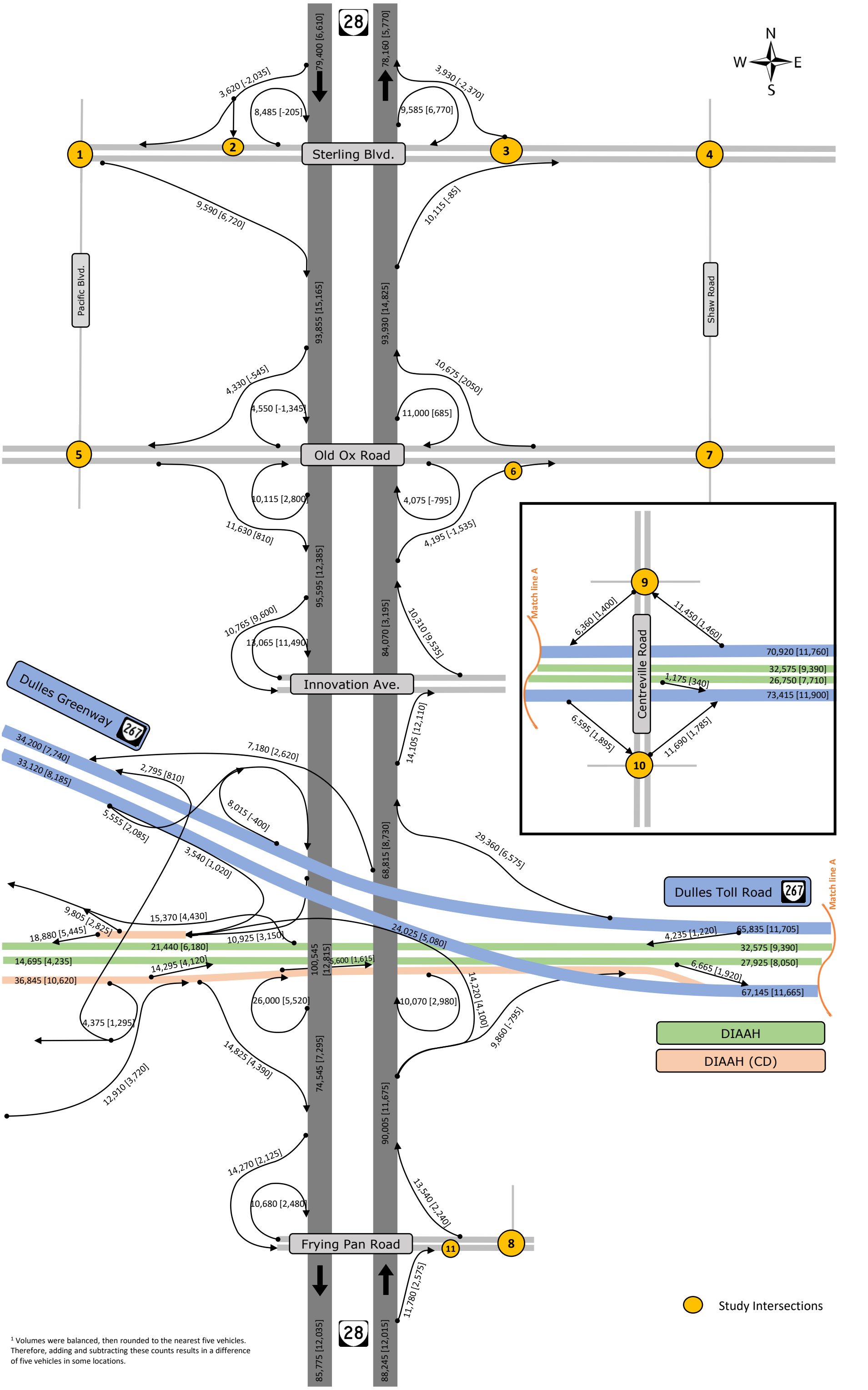
Table A-3: 2020 (Existing) Peak Tolls (PM Peak Period)

Greenway	Main Line/ Rt 28	Ox Road	Loudoun Co Pkwy	Ashburn Village Blvd	Claiborne Pkwy	Belmont Ridge Rd	Shreve Mill Rd	Battlefield Pkwy	Leesburg Bypass
Main Line/ Rt 28	-	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80
Ox Road	$ 4.75	-	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80
Loudoun Co Pkwy	$ 4.75	$ 4.75	-	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80	$ 5.80
Ashburn Vill Blvd	$ 4.75	$ 4.75	$ 4.75	-	$ 4.65	$ 4.65	$ 4.65	$ 4.65	$ 4.65
Claiborne Pkwy	$ 4.75	$ 4.75	$ 4.75	$ 3.55	-	$ 4.65	$ 4.65	$ 4.65	$ 4.65
Belmont Ridge Rd	$ 4.75	$ 4.75	$ 4.75	$ 3.55	$ 3.55	-	$ 4.65	$ 4.65	$ 4.65
Shreve Mill Rd	$ 4.75	$ 4.75	$ 4.75	$ 3.55	$ 3.55	$ 4.65	-	$ 3.10	$ 3.10
Battlefield Pkwy	$ 4.75	$ 4.75	$ 4.75	$ 3.55	$ 3.55	$ 4.65	$ 3.10	-	-
Leesburg Bypass	$ 4.75	$ 4.75	$ 4.75	$ 3.55	$ 3.55	$ 4.65	$ 3.10	-	-

Table A-4: 2045 Alternative 1 Distance-Based Option (PM Peak Period (USD2020))

Greenway	Main Line/ Rt 28	Ox Road	Loudoun Co Pkwy	Ashburn Village Blvd	Claiborne Pkwy	Belmont Ridge Rd	Shreve Mill Rd	Battlefield Pkwy	Leesburg Bypass
Main Line/ Rt 28	-	$ 1.65	$ 3.35	$ 5.00	$ 7.20	$ 7.45	$ 7.45	$ 7.45	$ 7.45
Ox Road	$ 1.35	-	$ 1.65	$ 3.35	$ 5.50	$ 6.65	$ 7.45	$ 7.45	$ 7.45
Loudoun Co Pkwy	$ 2.65	$ 1.35	-	$ 1.65	$ 3.85	$ 5.00	$ 7.45	$ 7.45	$ 7.45
Ashburn Vill Blvd	$ 4.00	$ 2.65	$ 1.35	-	$ 2.20	$ 3.35	$ 6.80	$ 7.45	$ 7.45
Claiborne Pkwy	$ 5.75	$ 4.40	$ 3.10	$ 1.75	-	$ 1.15	$ 4.60	$ 7.05	$ 7.45
Belmont Ridge Rd	$ 6.10	$ 5.35	$ 4.00	$ 2.65	$ 0.90	-	$ 3.45	$ 5.90	$ 7.20
Shreve Mill Rd	$ 6.10	$ 6.10	$ 6.10	$ 5.45	$ 3.70	$ 2.75	-	$ 2.45	$ 3.70
Battlefield Pkwy	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 5.65	$ 4.70	$ 1.95	-	-
Leesburg Bypass	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 6.10	$ 5.75	$ 3.00	-	-

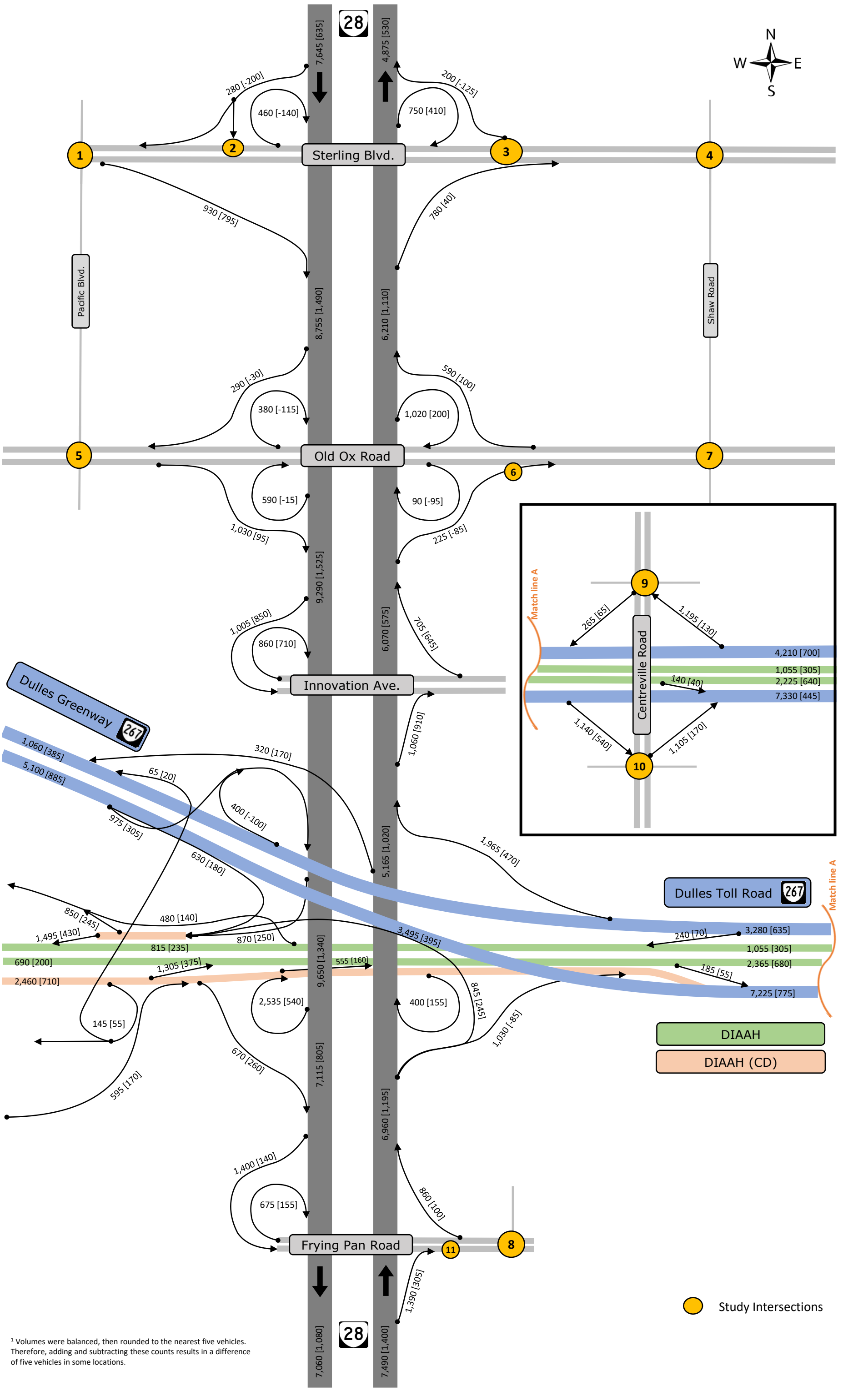
2045 No Build ADTs
[Difference from 2018 Balanced Volumes]



[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some locations.

Not To Scale

Kimley»Horn

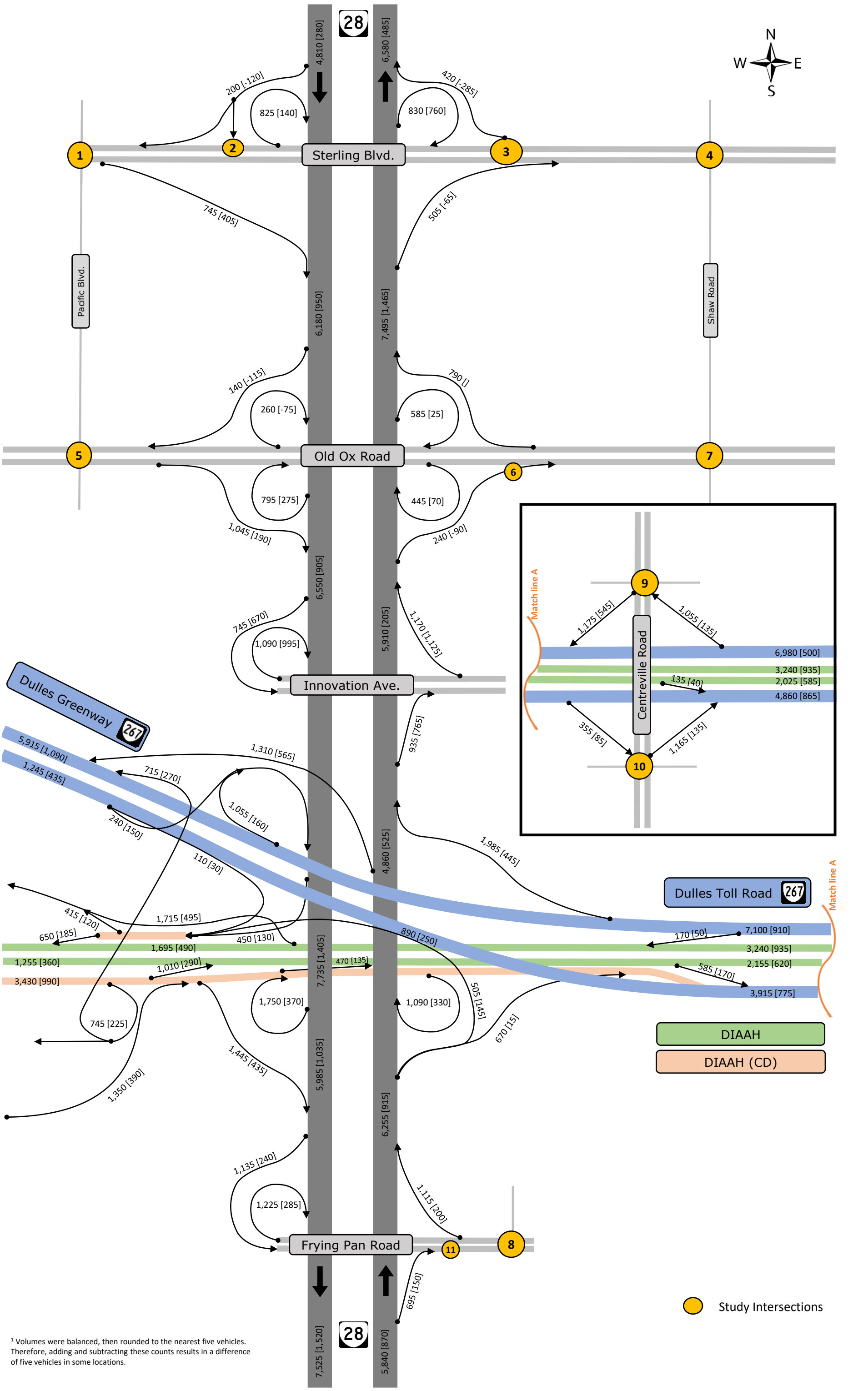


[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some locations.

Not To Scale

Kimley»Horn

2045 No Build PM Peak Hour (5-6PM)
[Difference from 2018 Balanced Volumes]



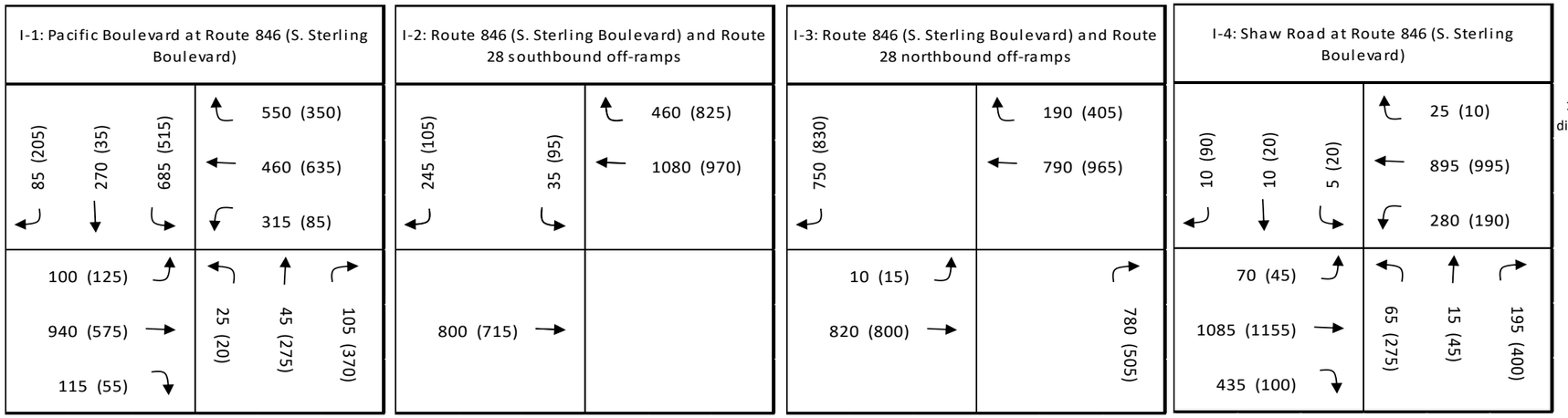
[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some locations.

Not To Scale

Kimley»Horn

Intersection Turning Movement Volume Forecasts
2045 No-Build AM Peak Hour (8AM-9AM) and PM Peak Hour (5PM-6PM)

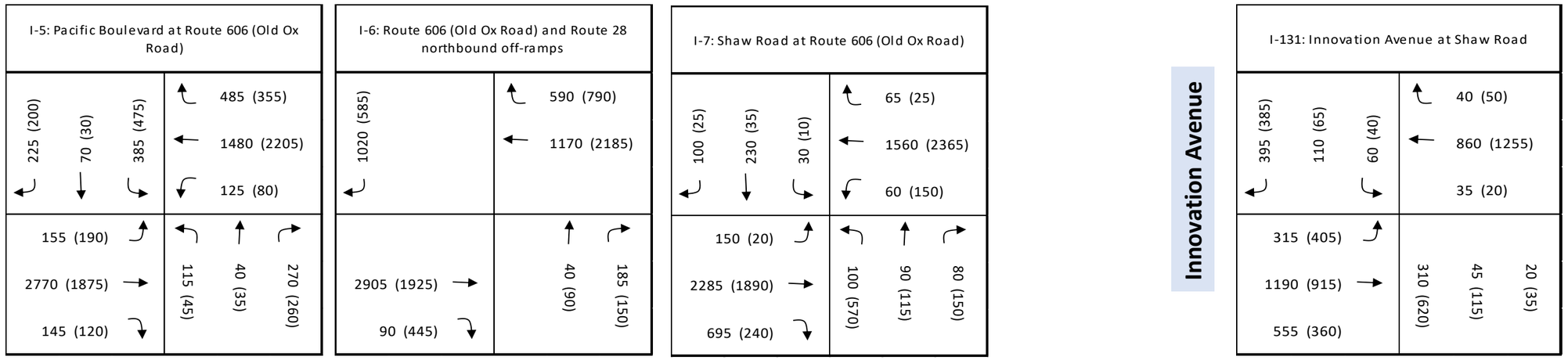
Route 846 | Sterling Blvd



AM Peak Hour Volume (PM Peak Hour Volume)

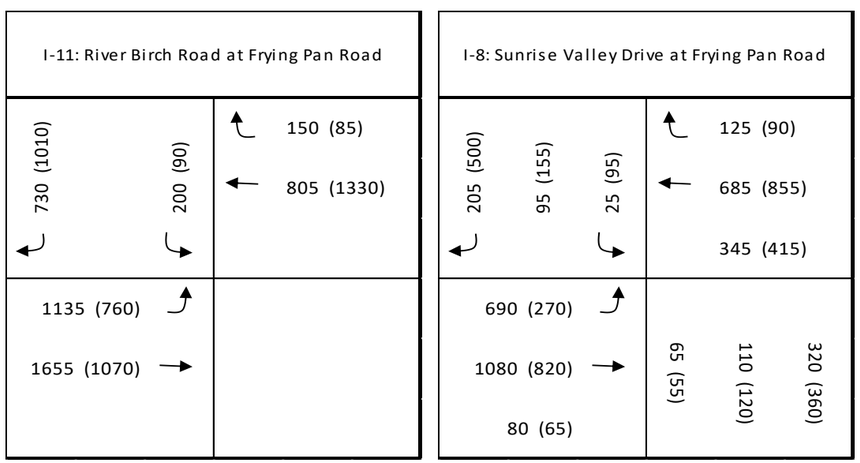
1 Volumes were balanced then rounded to the nearest five vehicles. Therefore, direct comparison of these counts with the controlling freeway mainline and ramp volumes results in a difference offive vehicles in some locations.

Route 606 | Old Ox Road

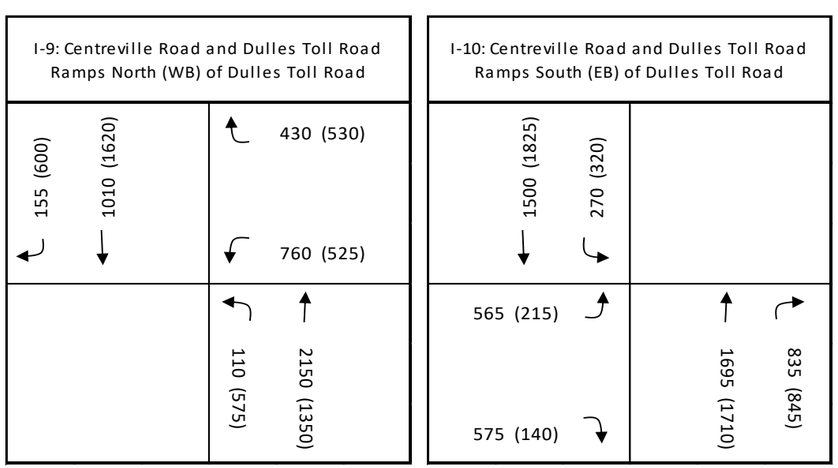


Innovation Avenue

Frying Pan Road



Centreville Road



Kimley»Horn

ALTERNATIVE 1
MAXIMIZING EXISTING INFRASTRUCTURE, MINIMIZING IMPACTS, AND IMPLEMENTING POLICY CHANGES

ROUTE 28 & DULLES TOLL ROAD/
DULLES GREENWAY STUDY

VDOT Virginia Department of Transportation

STARS

N

0' 300' 600' 900' 1200'

DECEMBER 4, 2019

LEGEND

- PARCEL/PROPERTY LINE
- LOUDOUN COUNTY/FAIRFAX COUNTY LINE
- PROJECT UNDER CONSTRUCTION
- PLANNED ROADWAY/PATH (CLRP OR DEVELOPER COMMITTED)
- (#X) PROPOSED IMPROVEMENT - REFER TO TABLE 1
- NO. PROP. LANES (FOR MORE THAN 1 PROPOSED)
- PROPOSED STRUCTURES
- RAMP TO BE CLOSED
- NEW ELECTRONIC TOLLING LOCATION
- PROPOSED TRAFFIC SIGNAL (BY PROJECT)
- EXISTING TRAFFIC SIGNAL
- PLANNED/FUTURE TRAFFIC SIGNAL (BY OTHERS)

NOTE: NO PROPOSED IMPROVEMENTS TO STERLING BLVD INTERCHANGE

(1k) CONVERT TO PARTIAL CLOVERLEAF

(1m) RECONFIGURE OFF-RAMP TO TIE TO SIGNALIZED INTERSECTION

(1l) PROVIDE CONNECTION TO WB GREENWAY FROM INNOVATION AVENUE

(1n) TIE TO SB C-D ROAD

(1g) BRAIDED RAMPS

(1j) SB C-D ROAD

(1h) BRAIDED RAMPS

(1f) BRAIDED RAMPS

(1e) WIDEN TO TWO-LANE RAMP

(1i) REMOVE TOLL PLAZA

(1s) CLOSE SLIP RAMP FROM DIAAH TO DTR

(1r) EXTEND WB HOV LANE

(1o) & (1p) IMPLEMENT BARRIER SEPARATED ON-RAMP, EXTEND ACCELERATION LANE ACROSS BRIDGE

(1s) CLOSE SLIP RAMP FROM DIAAH TO DTR

(1q) EXTEND EB THROUGH LANE TO FAIRFAX COUNTY PARKWAY

ADDITIONAL POLICIES INCLUDED IN ALTERNATIVE 1
(1a) MAINTAIN HOV-2 ON DTR
(1b) RESTRUCTURE DULLES GREENWAY TOLLS
(1c) CHANGE TO TIME OF DAY FIXED PRICING ALONG DTR
(1d) ADD ITS/DMS FOR TRAFFIC MONITORING/MANAGMENT

OLD OX ROAD
ROUTE 28
DULLES GREENWAY
SHAW ROAD
INNOVATION AVENUE
DULLES INTERNATIONAL AIRPORT ACCESS HIGHWAY
LOUDOUN COUNTY
FAIRFAX COUNTY
DAVIS DRIVE
ROCK HILL ROAD
DULLES TOLL ROAD
DIAAH
DULLES TOLL ROAD
COPPERMINE ROAD
SUNRISE VALLEY DR
RIVER BIRCH EXTENSION
FRYING PAN ROAD
SUNRISE VALLEY DR EXTENSION
CENTREVILLE ROAD

*This preliminary design is based on the GIS information available at this time only.

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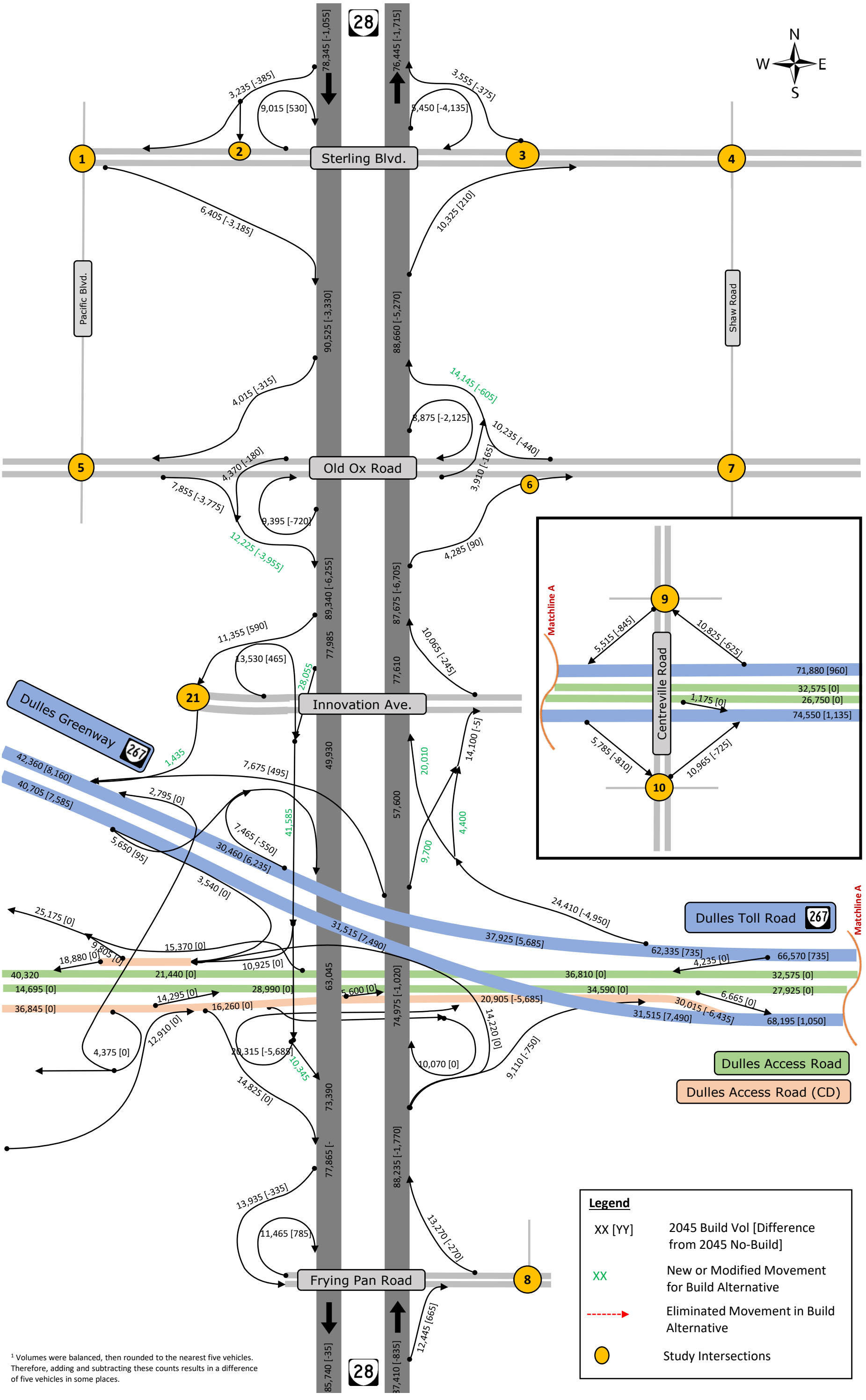
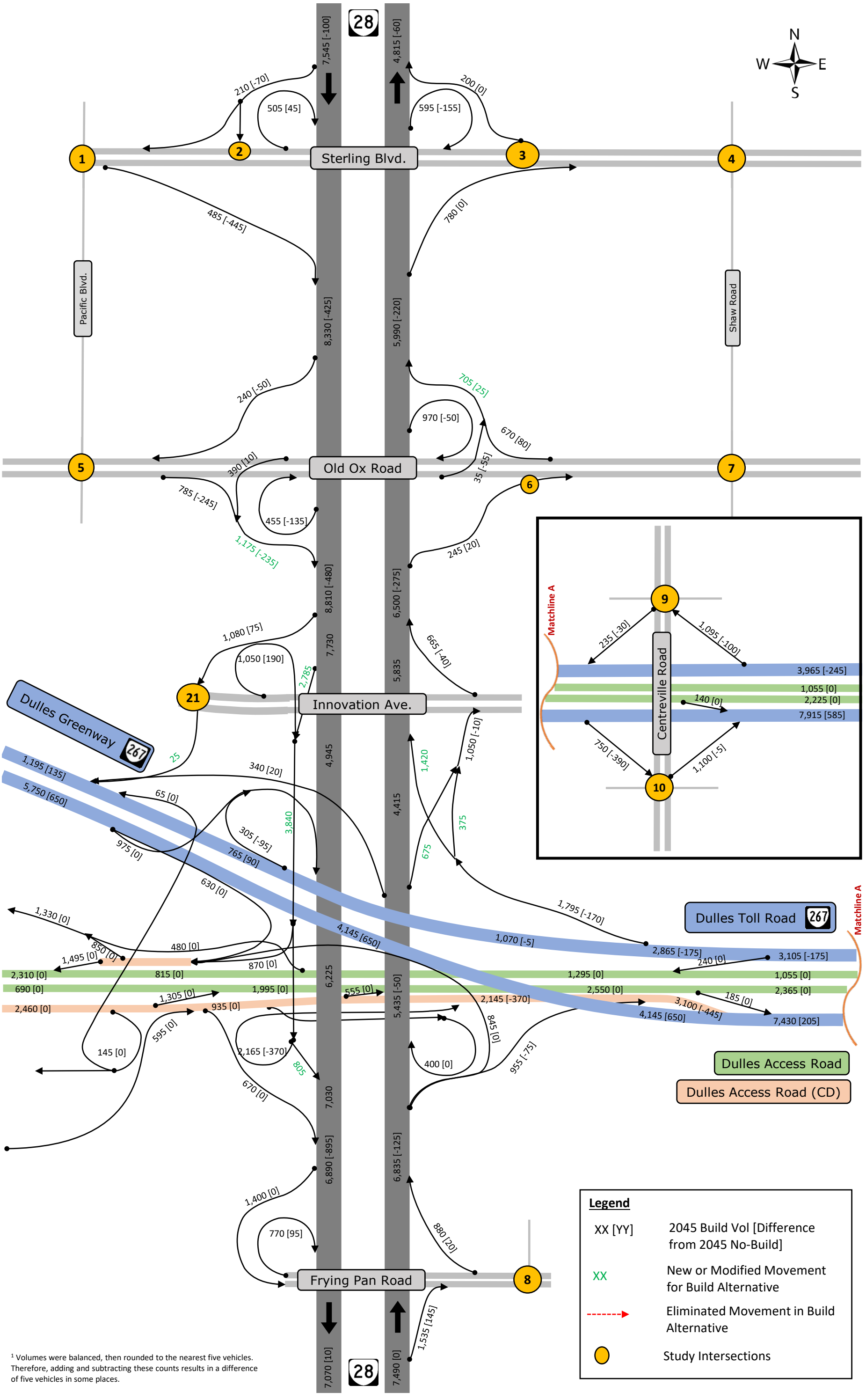
2045 Build Alternative 1 Volumes
ADT Comparison vs. 2045 No-Build



[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Not To Scale

Kimley»Horn



Legend

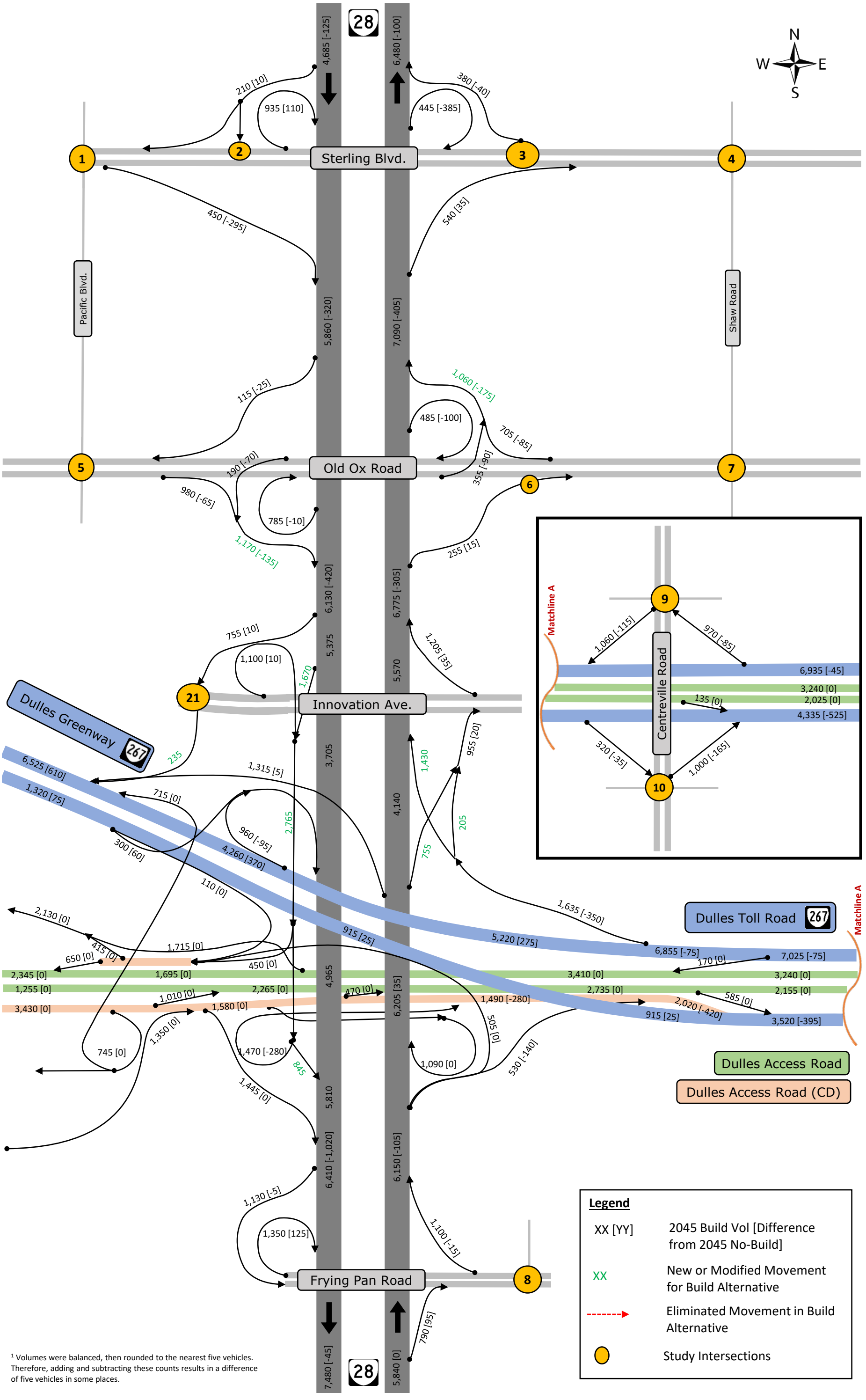
XX [YY]	2045 Build Vol [Difference from 2045 No-Build]
XX	New or Modified Movement for Build Alternative
------►	Eliminated Movement in Build Alternative
●	Study Intersections

[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Not To Scale

Kimley»Horn

2045 Build Alternative 1 Volumes
PM Peak Hour Comparison vs. 2045 No-Build



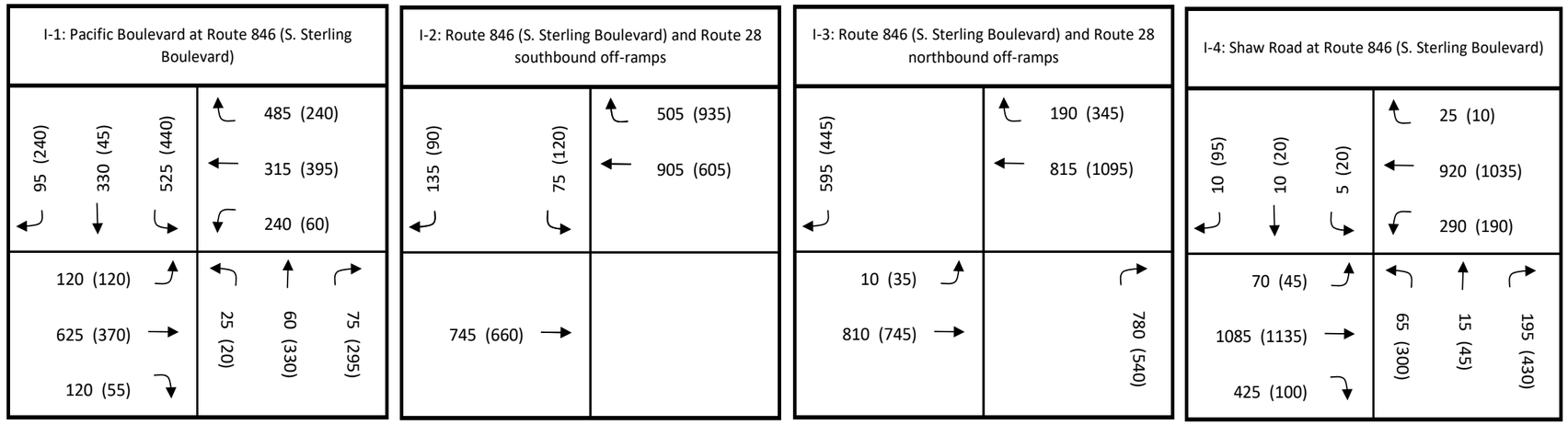
[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Not To Scale

Kimley»Horn

Intersection Turning Movement Volume Forecasts
2045 Build Alt 1 AM Peak Hour (8AM-9AM) and PM Peak Hour (5PM-6PM)

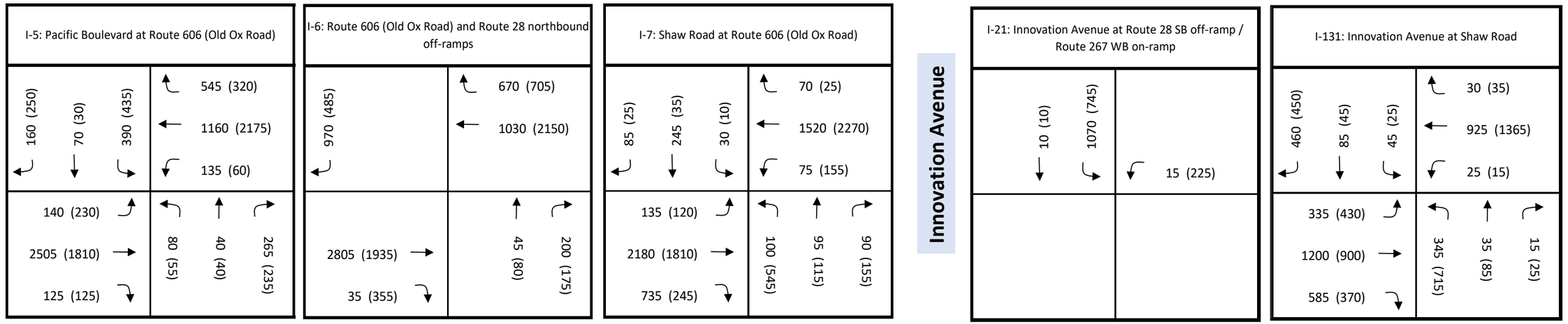
Route 846 | Sterling Blvd



AM Peak Hour Volume (PM Peak Hour Volume)

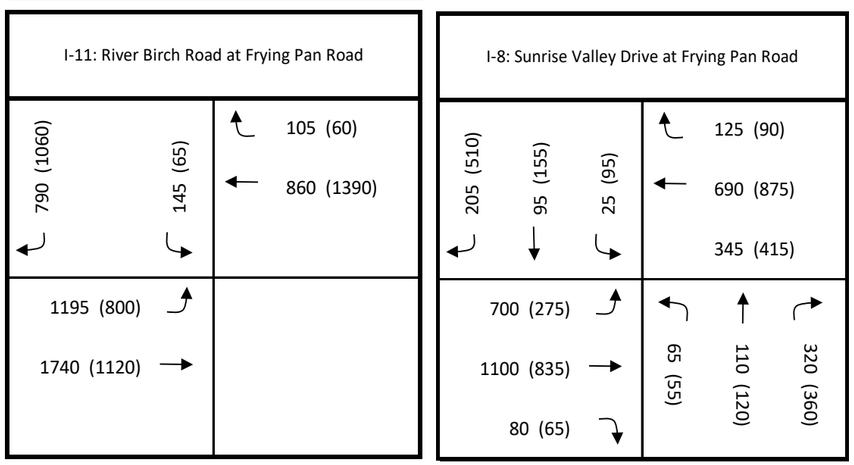
1 Volumes were balanced then rounded to the nearest five vehicles. Therefore, direct comparison of these counts with the controlling freeway mainline and ramp volumes results in a difference offive vehicles in some locations.

Route 606 | Old Ox Road

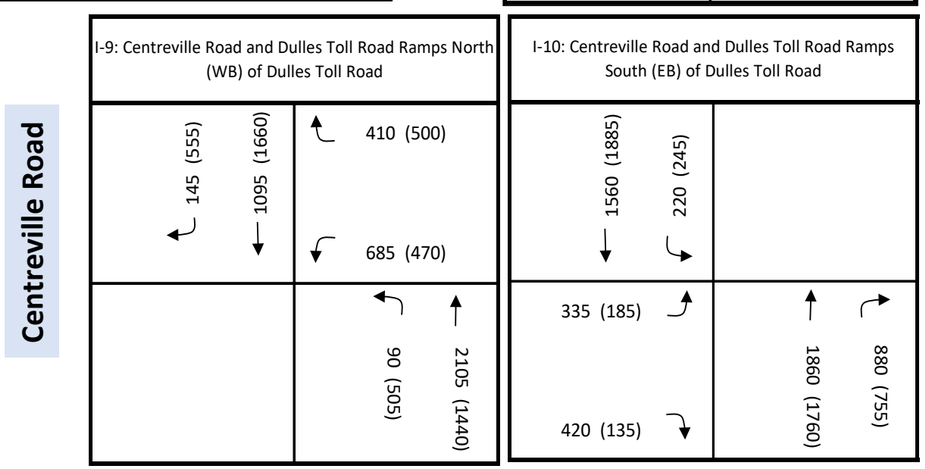


Innovation Avenue

Frying Pan Road



Centreville Road



Kimley»Horn

ALTERNATIVE 2
ADDRESSING CRITICAL ISSUES

ROUTE 28 & DULLES TOLL ROAD/
DULLES GREENWAY STUDY

VDOT Virginia Department of Transportation

STARS

N

0' 300' 600' 900' 1200'

DECEMBER 4, 2019

LEGEND

- PARCEL/PROPERTY LINE
- LOUDOUN COUNTY/FAIRFAX COUNTY LINE
- PROJECT UNDER CONSTRUCTION
- PLANNED ROADWAY/PATH (CLRP OR DEVELOPER COMMITTED)
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- PROPOSED STRUCTURES
- RAMP TO BE CLOSED
- NEW ELECTRONIC TOLLING LOCATION
- PROPOSED TRAFFIC SIGNAL (BY PROJECT)
- EXISTING TRAFFIC SIGNAL
- PLANNED/FUTURE TRAFFIC SIGNAL (BY OTHERS)

ADDITIONAL POLICIES INCLUDED IN ALTERNATIVE 2

(2a) ADD ITS/DMS FOR TRAFFIC MONITORING/MANAGMENT

NOTE: NO PROPOSED IMPROVEMENTS TO STERLING BLVD INTERCHANGE

(2f) CONVERT TO DIVERGING DIAMOND INTERCHANGE (DDI)

(2e) BRAIDED RAMPS ACCESS TO INNOVATION AVENUE FROM ROUTE 28 SB LANES

(2h) RECONFIGURE OFF-RAMP TO TIE TO SIGNALIZED INTERSECTION

(2g) PROVIDE CONNECTION TO WB GREENWAY FROM INNOVATION AVENUE

(2i) ACCESS TO ROUTE 28 SB, EB DULLES TOLL ROAD, WB DIAAH FROM INNOVATION AVE

(2b) FLYOVER RAMP FROM ROUTE 28 SB LANES TO EB DULLES TOLL ROAD/WB DIAAH

(2c) BRAIDED RAMPS

(2l) EXTEND WB HOV LANE

(2d) REMOVE TOLL PLAZA

(2n) CLOSE SLIP RAMP FROM DTR TO DIAAH

(2m) CLOSE SLIP RAMP FROM DIAAH TO DTR

(2j) INCREASE DESIGN SPEED OF TRUMPET INTERCHANGE

(2p) PROVIDE RAMP FROM SPUI TO WB DIAAH

(2o) IMPLEMENT SPUI

(2m) CLOSE SLIP RAMP FROM DIAAH TO DTR

(2k) EXTEND EB THROUGH LANE TO FAIRFAX COUNTY PARKWAY

OLD OX ROAD
ROUTE 28
SHAW ROAD
DULLES GREENWAY
INNOVATION AVENUE
DULLES INTERNATIONAL AIRPORT ACCESS HIGHWAY
DAVIS DRIVE
ROCK HILL ROAD
LOUDOUN COUNTY
FAIRFAX COUNTY
DULLES TOLL ROAD
DIAAH
DULLES TOLL ROAD
COPPERMINE ROAD
SUNRISE VALLEY DR
FRYING PAN ROAD
RIVER BIRCH EXTENSION
CENTREVILLE ROAD
SUNRISE VALLEY DR EXTENSION

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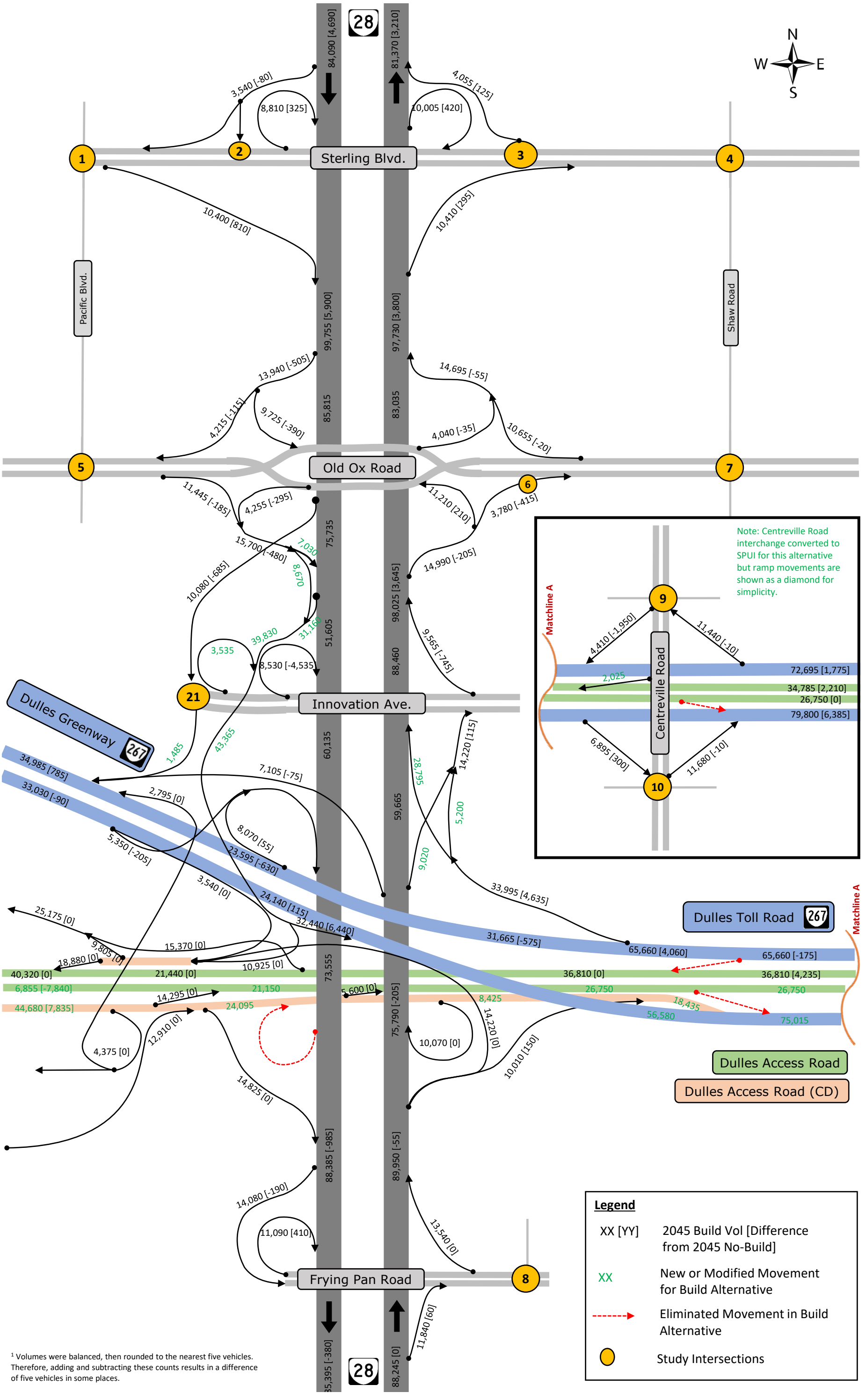

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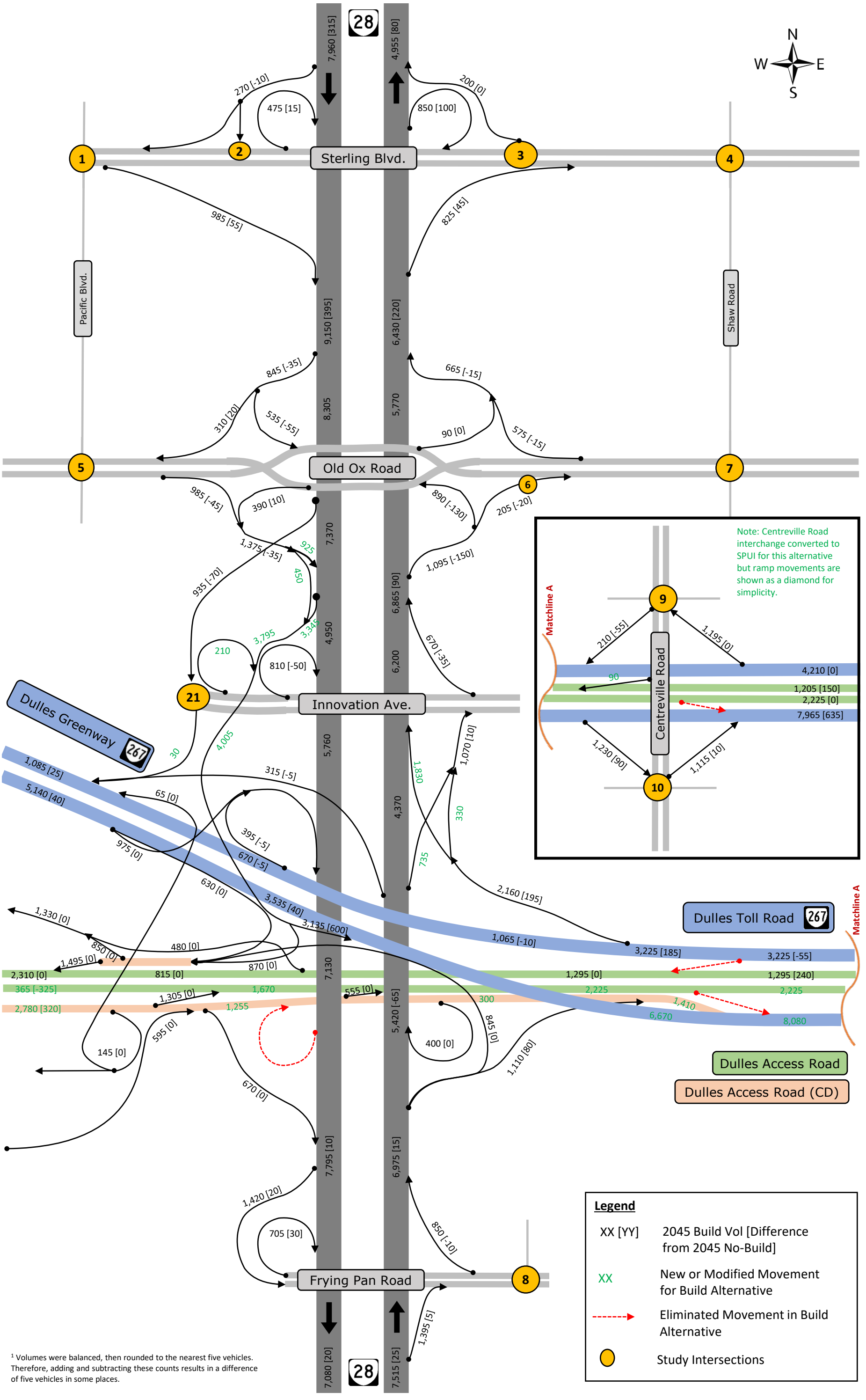
Not To Scale

Kimley»Horn



Legend

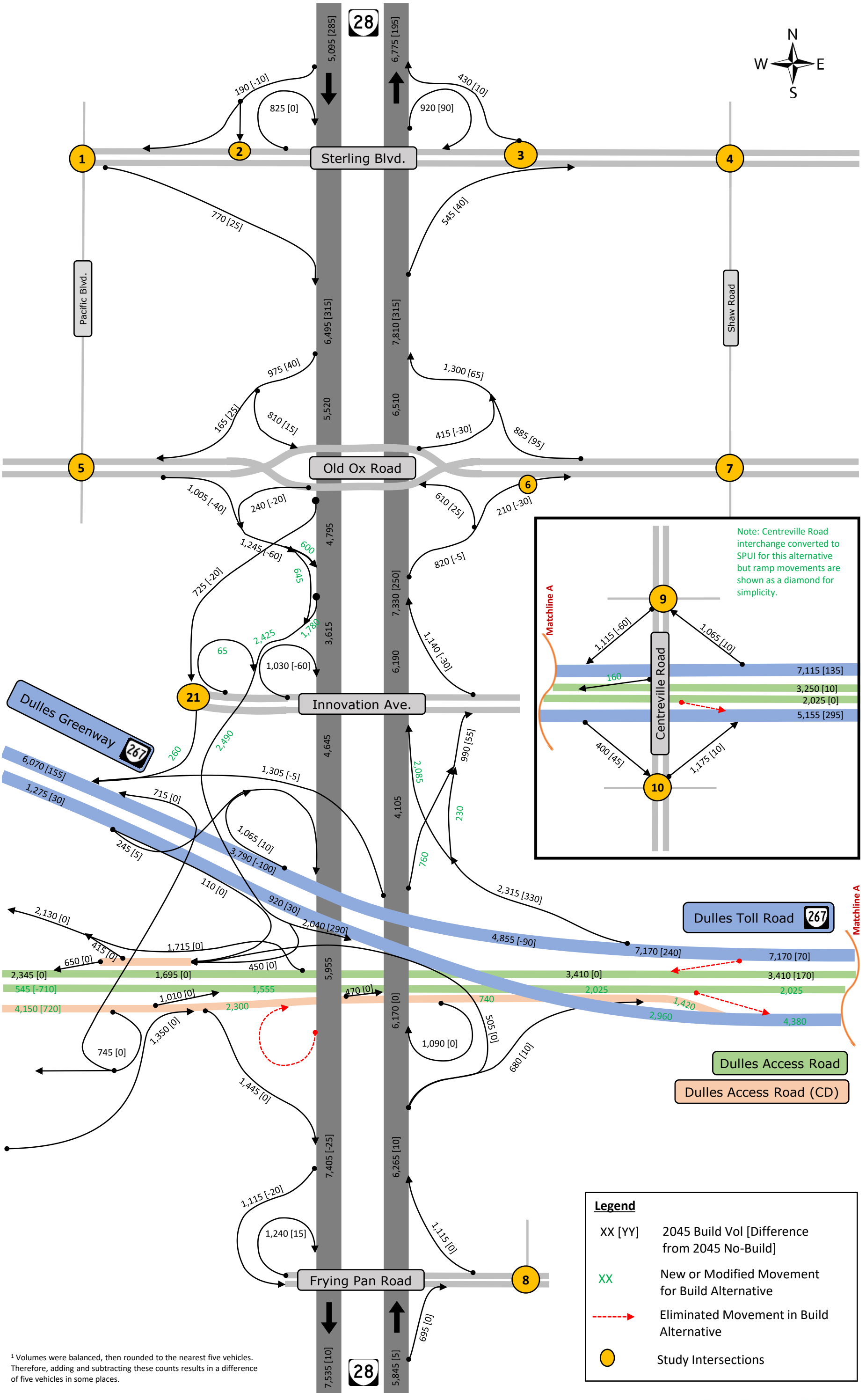
XX [YY]	2045 Build Vol [Difference from 2045 No-Build]
XX	New or Modified Movement for Build Alternative
---->	Eliminated Movement in Build Alternative
●	Study Intersections

[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Not To Scale

Kimley»Horn

2045 Build Alternative 2 Volumes
PM Peak Hour Comparison vs. 2045 No-Build



[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Legend

XX [YY]	2045 Build Vol [Difference from 2045 No-Build]
XX	New or Modified Movement for Build Alternative
---->	Eliminated Movement in Build Alternative
●	Study Intersections

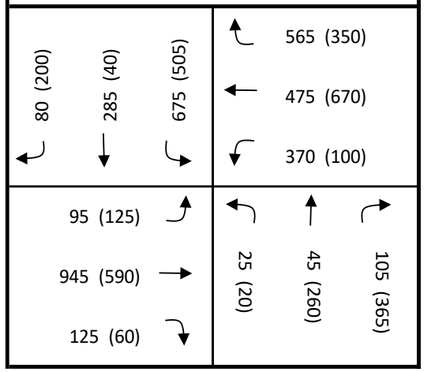
Not To Scale

Kimley»Horn

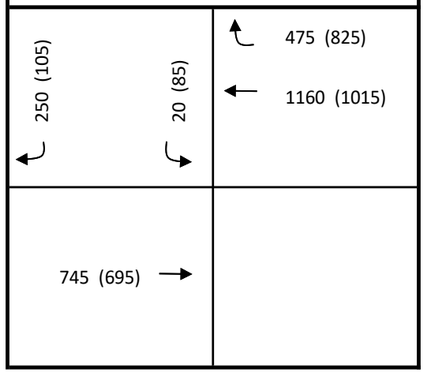
Intersection Turning Movement Volume Forecasts
2045 Build Alt 2 AM Peak Hour (8AM-9AM) and PM Peak Hour (5PM-6PM)

Route 846 | Sterling Blvd

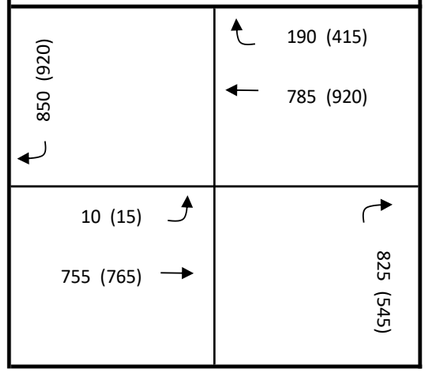
I-1: Pacific Boulevard at Route 846 (S. Sterling Boulevard)



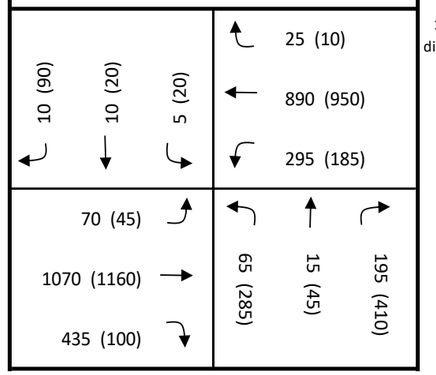
I-2: Route 846 (S. Sterling Boulevard) and Route 28 southbound off-ramps



I-3: Route 846 (S. Sterling Boulevard) and Route 28 northbound off-ramps



I-4: Shaw Road at Route 846 (S. Sterling Boulevard)

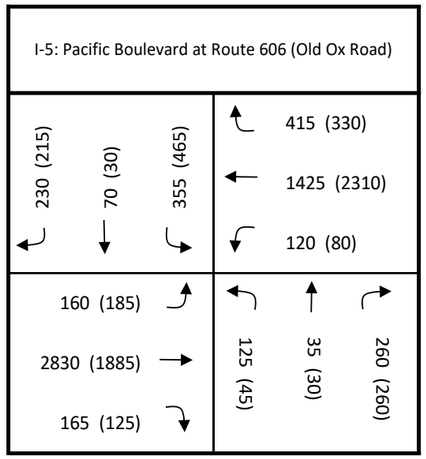


AM Peak Hour Volume (PM Peak Hour Volume)

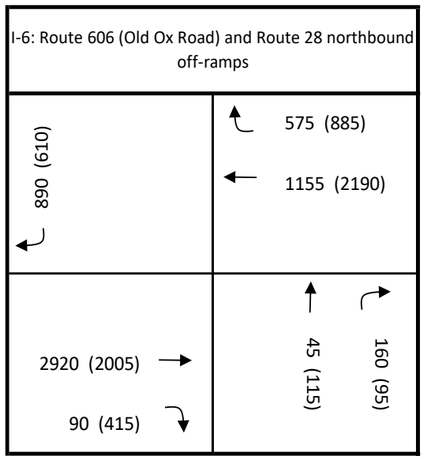
1 Volumes were balanced then rounded to the nearest five vehicles. Therefore, direct comparison of these counts with the controlling freeway mainline and ramp volumes results in a difference offive vehicles in some locations.

Route 606 | Old Ox Road

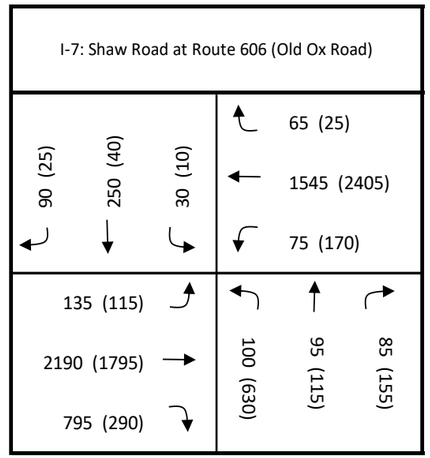
I-5: Pacific Boulevard at Route 606 (Old Ox Road)



I-6: Route 606 (Old Ox Road) and Route 28 northbound off-ramps

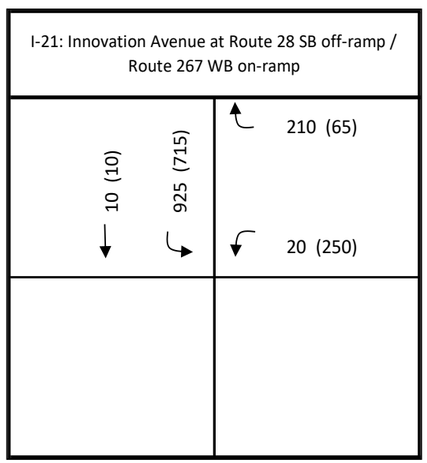


I-7: Shaw Road at Route 606 (Old Ox Road)

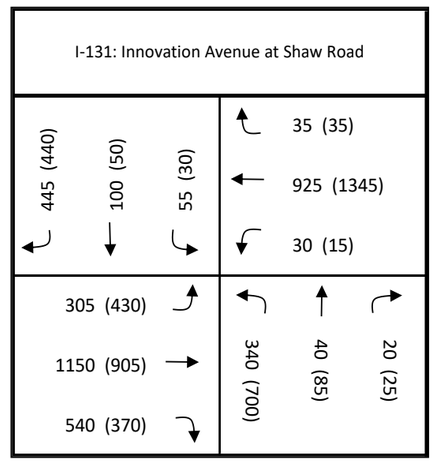


Innovation Avenue

I-21: Innovation Avenue at Route 28 SB off-ramp / Route 267 WB on-ramp

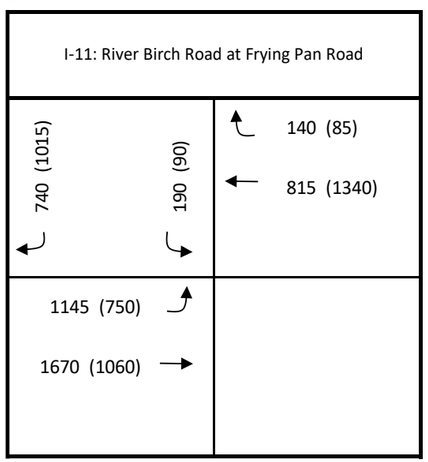


I-131: Innovation Avenue at Shaw Road

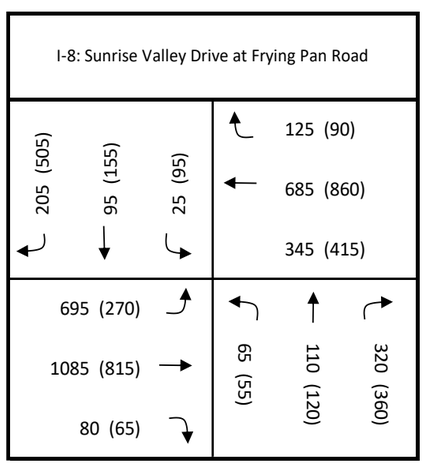


Frying Pan Road

I-11: River Birch Road at Frying Pan Road

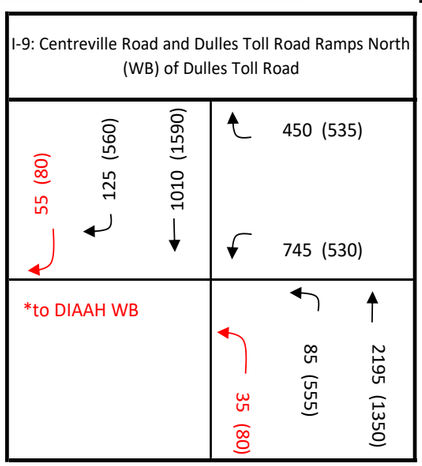


I-8: Sunrise Valley Drive at Frying Pan Road

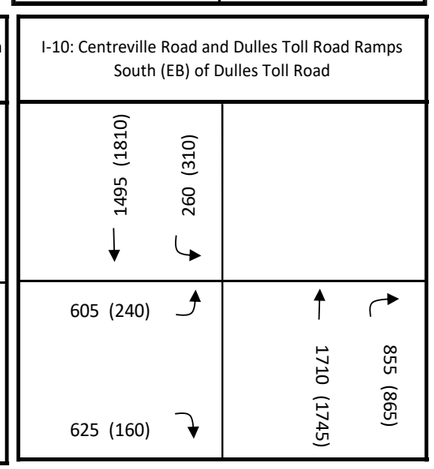


Centreville Road

I-9: Centreville Road and Dulles Toll Road Ramps North (WB) of Dulles Toll Road



I-10: Centreville Road and Dulles Toll Road Ramps South (EB) of Dulles Toll Road



Kimley»Horn

ALTERNATIVE 3
CONSIDERING UNCONSTRAINED INFRASTRUCTURE

ROUTE 28 & DULLES TOLL ROAD/
DULLES GREENWAY STUDY

VDOT Virginia Department of Transportation

STARS

N

0' 300' 600' 900' 1200'

DECEMBER 4, 2019

LEGEND

- PARCEL/PROPERTY LINE
- LOUDOUN COUNTY/FAIRFAX COUNTY LINE
- PROJECT UNDER CONSTRUCTION
- PLANNED ROADWAY/PATH (CLRP OR DEVELOPER COMMITTED)
- (#X) PROPOSED IMPROVEMENT - REFER TO TABLE 1
- 2 NO. PROP. LANES (FOR MORE THAN 1 PROPOSED)
- PROPOSED STRUCTURES
- RAMP TO BE CLOSED
- NEW ELECTRONIC TOLLING LOCATION
- PROPOSED TRAFFIC SIGNAL (BY PROJECT)
- EXISTING TRAFFIC SIGNAL
- PLANNED/FUTURE TRAFFIC SIGNAL (BY OTHERS)

ADDITIONAL POLICIES INCLUDED IN ALTERNATIVE 3

(3a) ADD ITS/DMS FOR TRAFFIC MONITORING/MANAGMENT

NOTE: NO PROPOSED IMPROVEMENTS TO STERLING BLVD INTERCHANGE

(3g) CONVERT TO SPUI

(3j) CONSTRUCT PACIFIC AVENUE TO INNOVATION AVENUE

(3i) PROVIDE CONECTION TO WB GREENWAY FROM INNOVATION AVENUE, EXTEND PACIFIC BLVD

(3h) NEW RAMP FROM INNOVATION AVE TO SB RT 28

(3f) SB C-D ROAD

(3b) FLYOVER RAMP FROM ROUTE 28 SB LANES TO EB DULLES TOLL ROAD/WB DIAAH

(3c) BRAIDED RAMPS

(3n) EXTEND WB HOV LANE

(3k) PROVIDE ACCESS BETWEEN INNOVATION AVENUE AND CENTREVILLE ROAD

(3e) BEGIN NB C-D ROAD

(3d) REMOVE TOLL PLAZA

(3p) CLOSE SLIP RAMP FROM DTR TO DIAAH

(3o) CLOSE SLIP RAMP FROM DIAAH TO DTR

(3r) PROVIDE RAMP FROM CENTREVILLE ROAD TO WB DIAAH, NB CENTREVILLE ROAD ACCESS VIA DISPLACED LEFT TURN

(3l) IMPLEMENT PARTIAL DDI

(3q) WIDEN CENTREVILLE ROAD TO 6 LANES

(3o) CLOSE SLIP RAMP FROM DIAAH TO DTR

(3m) EXTEND EB THROUGH LANE TO FAIRFAX COUNTY PARKWAY

OLD OX ROAD
PACIFIC BOULEVARD
ROUTE 28
DULLES GREENWAY
SHAW ROAD
INNOVATION AVENUE
DULLES INTERNATIONAL AIRPORT ACCESS HIGHWAY
LOUDOUN COUNTY
FAIRFAX COUNTY
DAVIS DRIVE
ROCK HILL ROAD
DULLES TOLL ROAD
DIAAH
DULLES TOLL ROAD
COPPERMINE RD
SUNRISE VALLEY DR
FRYING PAN ROAD
RIVER BIRCH EXTENSION
SUNRISE VALLEY DR EXTENSION
CENTREVILLE ROAD

*This preliminary design is based on the GIS information available at this time only.

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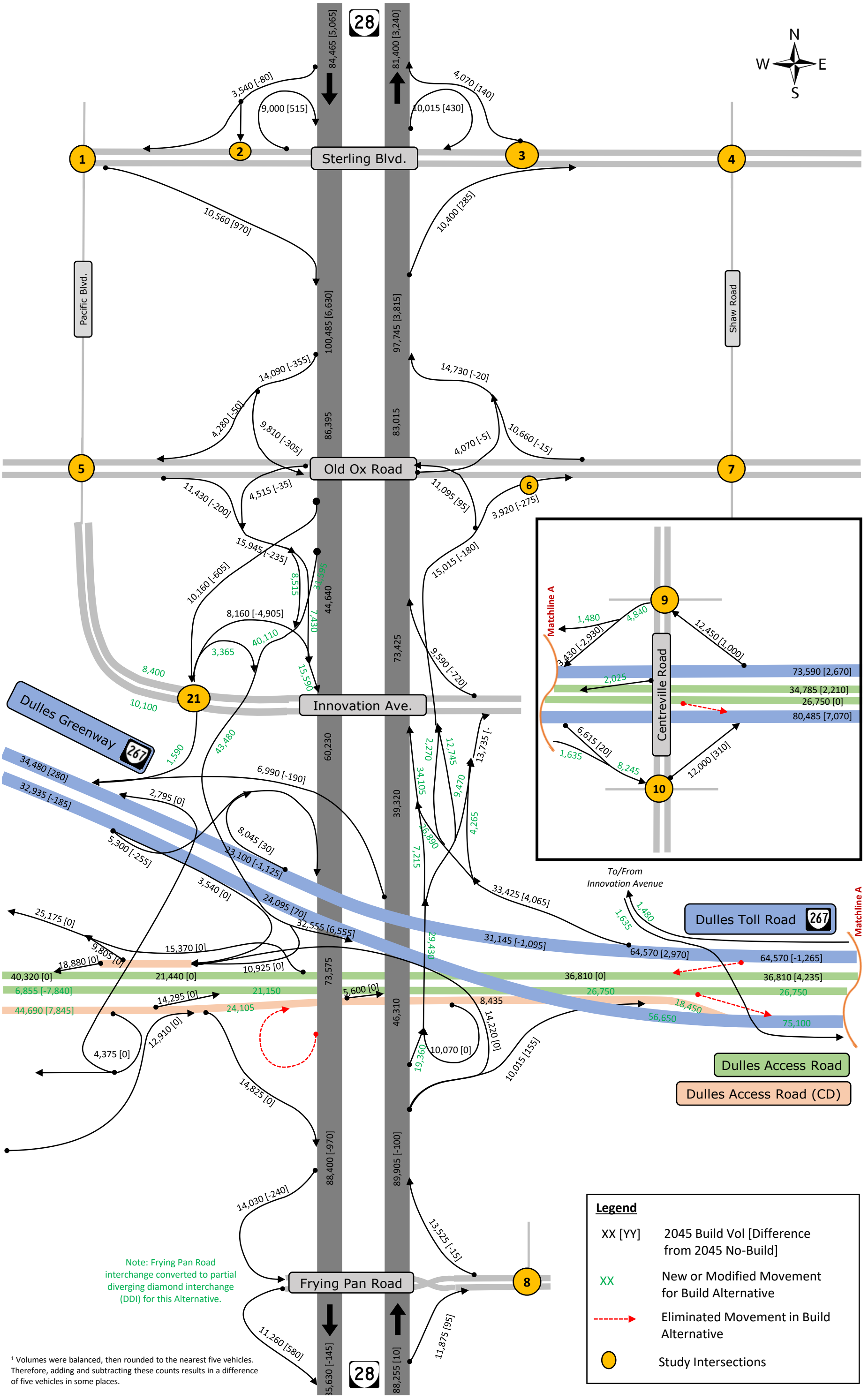
2045 Build Alternative 3 Volumes
ADT Comparison vs. 2045 No-Build



Note: Frying Pan Road interchange converted to partial diverging diamond interchange (DDI) for this Alternative.

[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

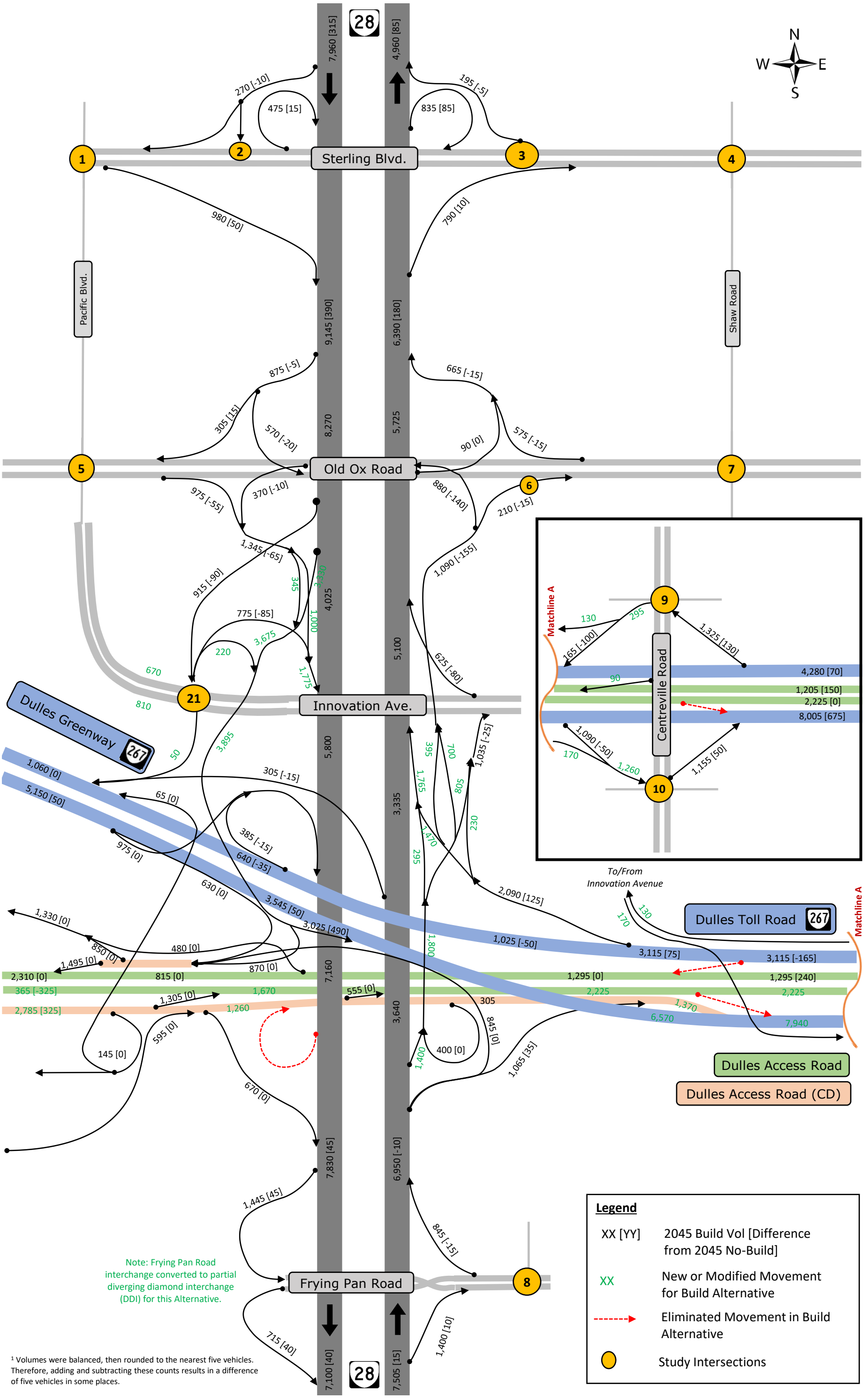
Legend

XX [YY]	2045 Build Vol [Difference from 2045 No-Build]
XX	New or Modified Movement for Build Alternative
----→	Eliminated Movement in Build Alternative
●	Study Intersections

Not To Scale

Kimley»Horn

2045 Build Alternative 3 Volumes
AM Peak Hour Comparison vs. 2045 No-Build

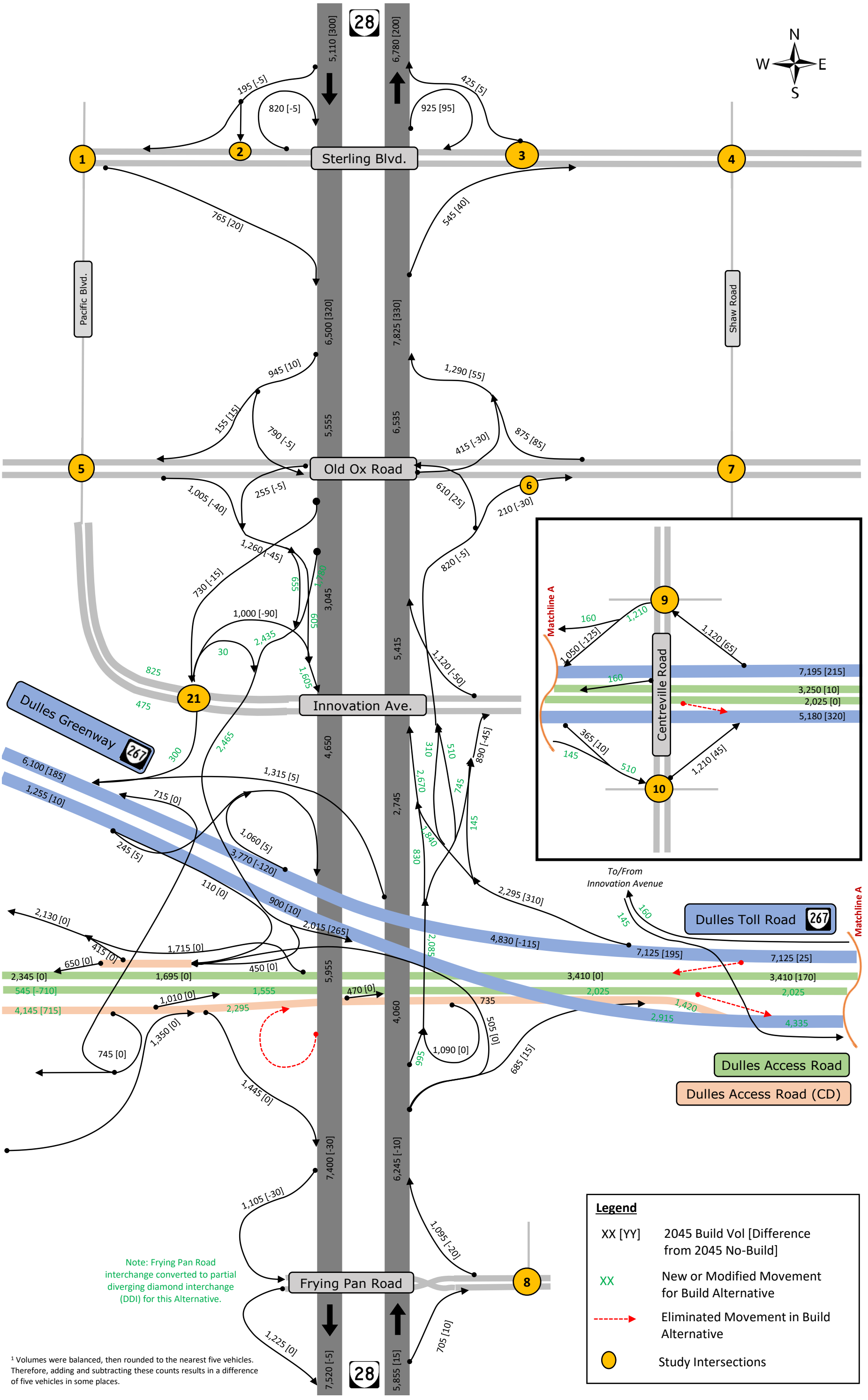


[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

Not To Scale

Kimley»Horn

2045 Build Alternative 3 Volumes
PM Peak Hour Comparison vs. 2045 No-Build



[1] Volumes were balanced, then rounded to the nearest five vehicles. Therefore, adding and subtracting these counts results in a difference of five vehicles in some places.

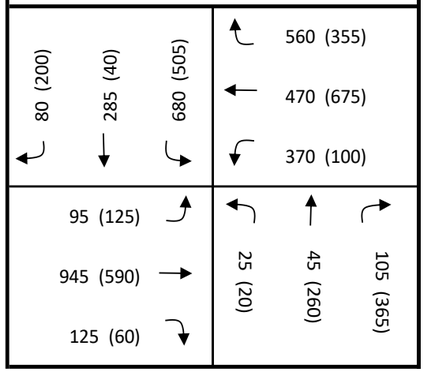
Not To Scale

Kimley»Horn

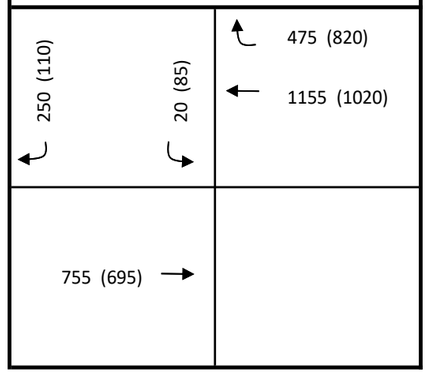
Intersection Turning Movement Volume Forecasts
2045 Build Alt 3 AM Peak Hour (8AM-9AM) and PM Peak Hour (5PM-6PM)

Route 846 | Sterling Blvd

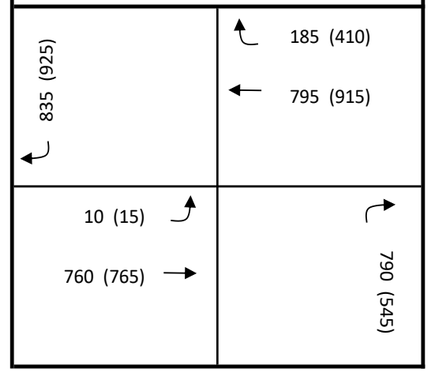
I-1: Pacific Boulevard at Route 846 (S. Sterling Boulevard)



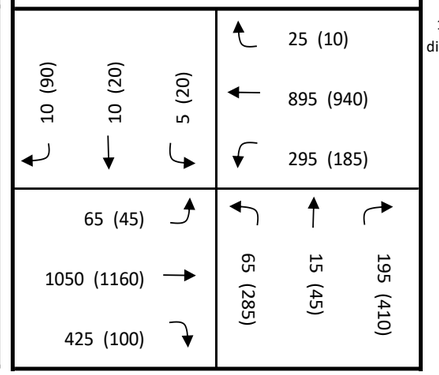
I-2: Route 846 (S. Sterling Boulevard) and Route 28 southbound off-ramps



I-3: Route 846 (S. Sterling Boulevard) and Route 28 northbound off-ramps



I-4: Shaw Road at Route 846 (S. Sterling Boulevard)

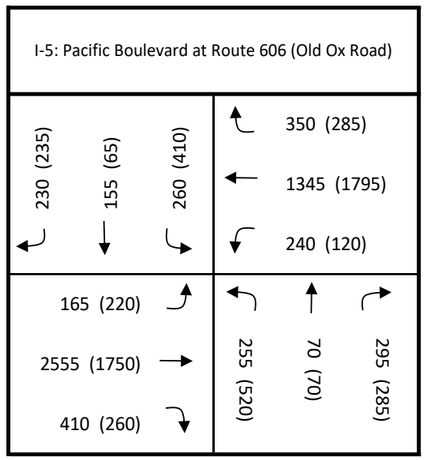


AM Peak Hour Volume (PM Peak Hour Volume)

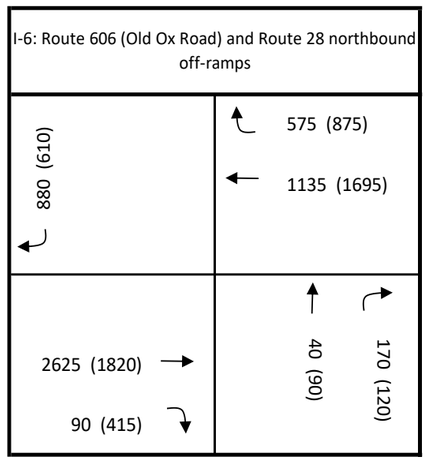
1 Volumes were balanced then rounded to the nearest five vehicles. Therefore, direct comparison of these counts with the controlling freeway mainline and ramp volumes results in a difference offive vehicles in some locations.

Route 606 | Old Ox Road

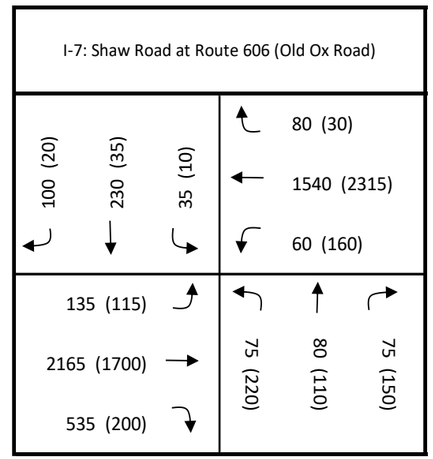
I-5: Pacific Boulevard at Route 606 (Old Ox Road)



I-6: Route 606 (Old Ox Road) and Route 28 northbound off-ramps

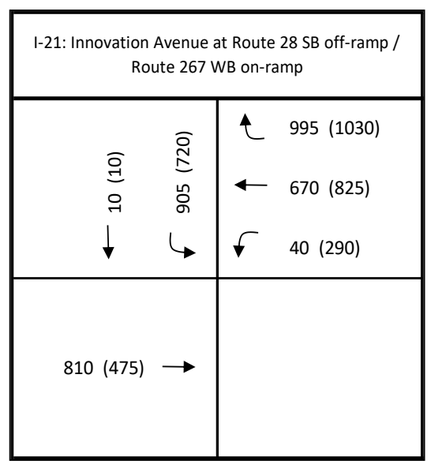


I-7: Shaw Road at Route 606 (Old Ox Road)

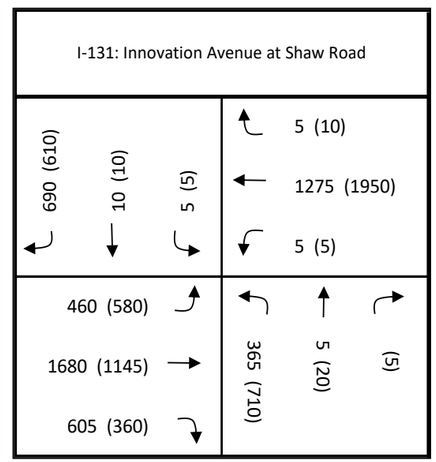


Innovation Avenue

I-21: Innovation Avenue at Route 28 SB off-ramp / Route 267 WB on-ramp

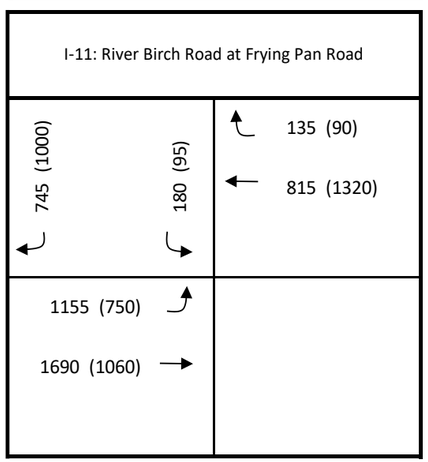


I-131: Innovation Avenue at Shaw Road

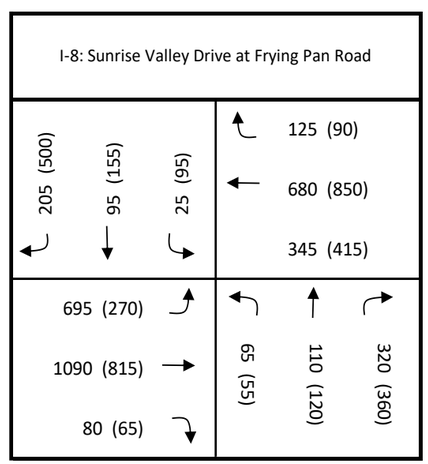


Frying Pan Road

I-11: River Birch Road at Frying Pan Road

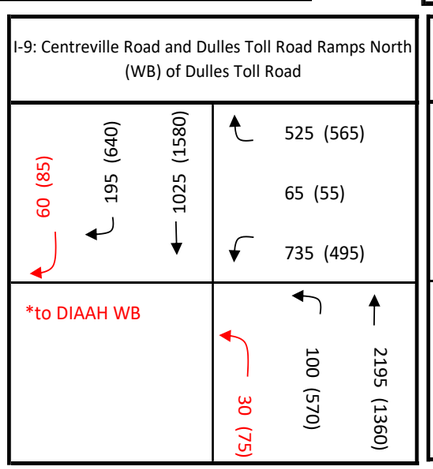


I-8: Sunrise Valley Drive at Frying Pan Road

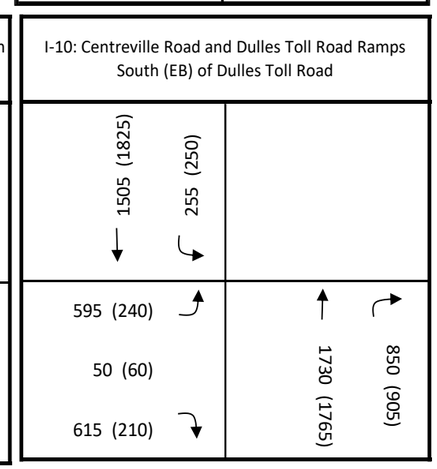


Centreville Road

I-9: Centreville Road and Dulles Toll Road Ramps North (WB) of Dulles Toll Road



I-10: Centreville Road and Dulles Toll Road Ramps South (EB) of Dulles Toll Road



Kimley»Horn

ALTERNATIVE 3
CONSIDERING UNCONSTRAINED INFRASTRUCTURE
OPTION B, INNOVATION AVENUE TO CENTREVILLE ROAD MODIFICATION

ROUTE 28 & DULLES TOLL ROAD/
DULLES GREENWAY STUDY

VDOT Virginia Department of Transportation

STARS

N

0' 300' 600' 900' 1200'

DECEMBER 4, 2019

LEGEND

- PARCEL/PROPERTY LINE
- LOUDOUN COUNTY/FAIRFAX COUNTY LINE
- PROJECT UNDER CONSTRUCTION
- PLANNED ROADWAY/PATH (CLRP OR DEVELOPER COMMITTED)
- (#X) PROPOSED IMPROVEMENT - REFER TO TABLE 1
- 2 NO. PROP. LANES (FOR MORE THAN 1 PROPOSED)
- PROPOSED STRUCTURES
- RAMP TO BE CLOSED
- NEW ELECTRONIC TOLLING LOCATION
- PROPOSED TRAFFIC SIGNAL (BY PROJECT)
- EXISTING TRAFFIC SIGNAL
- PLANNED/FUTURE TRAFFIC SIGNAL (BY OTHERS)

ADDITIONAL POLICIES INCLUDED IN ALTERNATIVE 3

(3a) ADD ITS/DMS FOR TRAFFIC MONITORING/MANAGMENT

NOTE: NO PROPOSED IMPROVEMENTS TO STERLING BLVD INTERCHANGE

(3g) CONVERT TO SPUI

(3j) CONSTRUCT PACIFIC AVENUE TO INNOVATION AVENUE

(3i) PROVIDE CONECTION TO WB GREENWAY FROM INNOVATION AVENUE, EXTEND PACIFIC BLVD

(3h) NEW RAMP FROM INNOVATION AVE TO SB RT 28

(3f) SB C-D ROAD

(3b) FLYOVER RAMP FROM ROUTE 28 SB LANES TO EB DULLES TOLL ROAD/WB DIAAH

(3c) BRAIDED RAMPS

(3n) EXTEND WB HOV LANE

(3b-k) PROVIDE WESTBOUND ACCESS BETWEEN CENTREVILLE ROAD AND DAVIS DRIVE OVERPASS

(3e) BEGIN NB C-D ROAD

(3b-s) NEW RAMP TO EASTBOUND DTR

(3d) REMOVE TOLL PLAZA

(3p) CLOSE SLIP RAMP FROM DTR TO DIAAH

(3o) CLOSE SLIP RAMP FROM DIAAH TO DTR

(3r) PROVIDE RAMP FROM CENTREVILLE ROAD TO WB DIAAH, NB CENTREVILLE ROAD ACCESS VIA DISPLACED LEFT TURN

(3l) IMPLEMENT PARTIAL DDI

(3q) WIDEN CENTREVILLE ROAD TO 6 LANES

(3o) CLOSE SLIP RAMP FROM DIAAH TO DTR

(3m) EXTEND EB THROUGH LANE TO FAIRFAX COUNTY PARKWAY

OLD OX ROAD
PACIFIC BOULEVARD
DULLES GREENWAY
ROUTE 28
SHAW ROAD
INNOVATION AVENUE
DULLES INTERNATIONAL AIRPORT ACCESS HIGHWAY
DAVIS DRIVE
ROCK HILL ROAD
LOUDOUN COUNTY
FAIRFAX COUNTY
DULLES TOLL ROAD
DIAAH
DULLES TOLL ROAD
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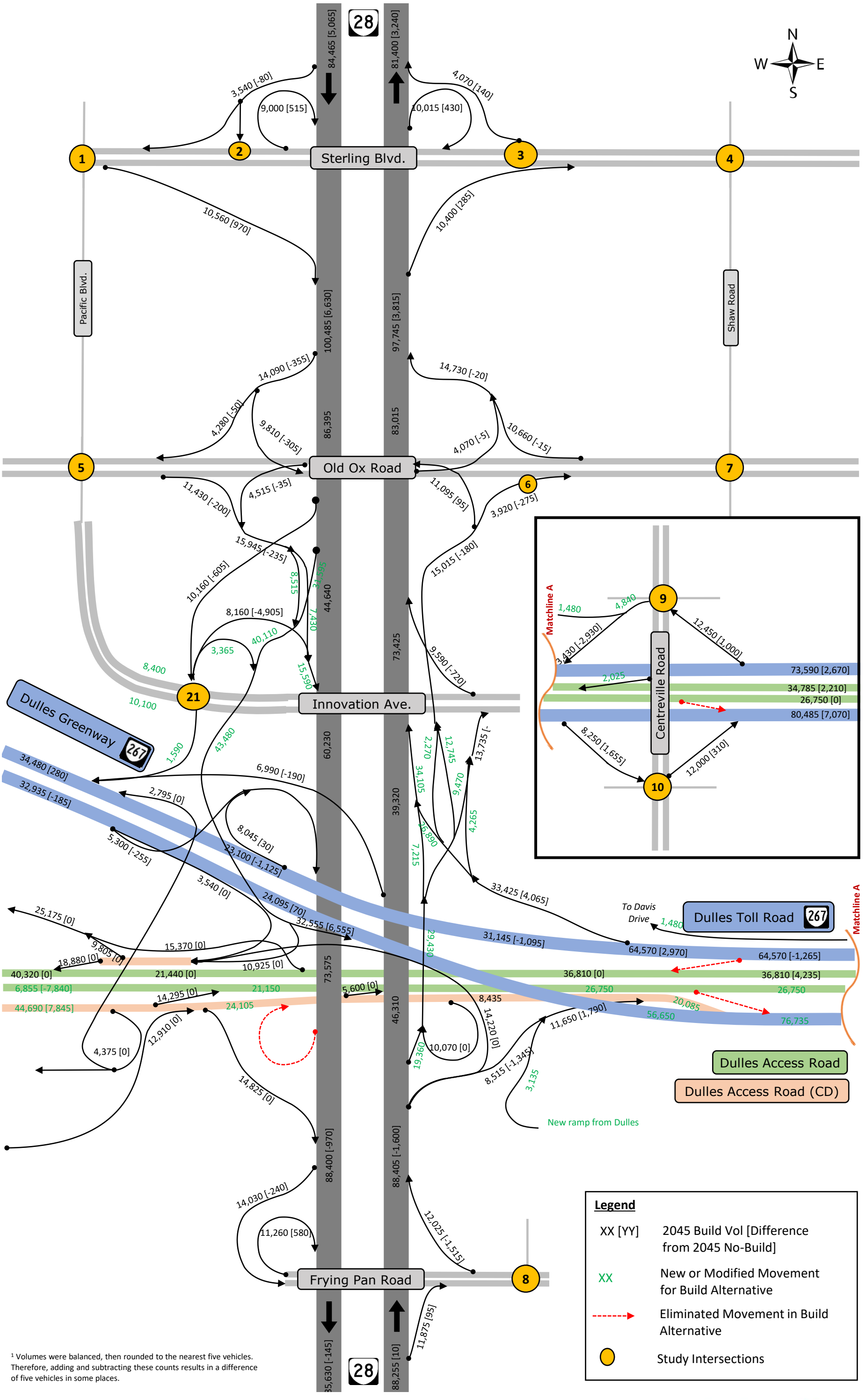

Legend

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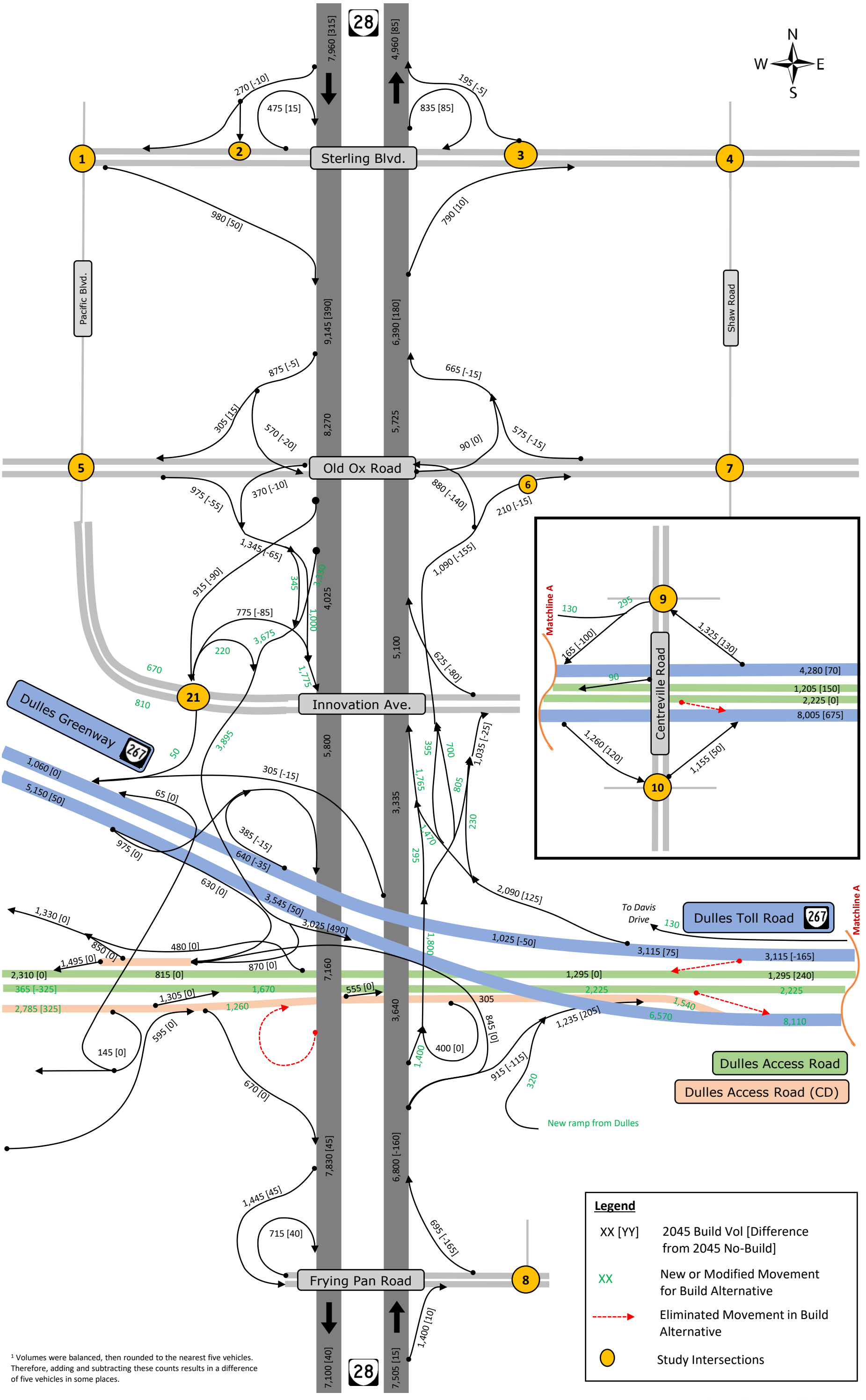
Not To Scale

Kimley»Horn

2045 Build Alternative 3 - Option B Volumes
AM Peak Hour Comparison vs. 2045 No-Build



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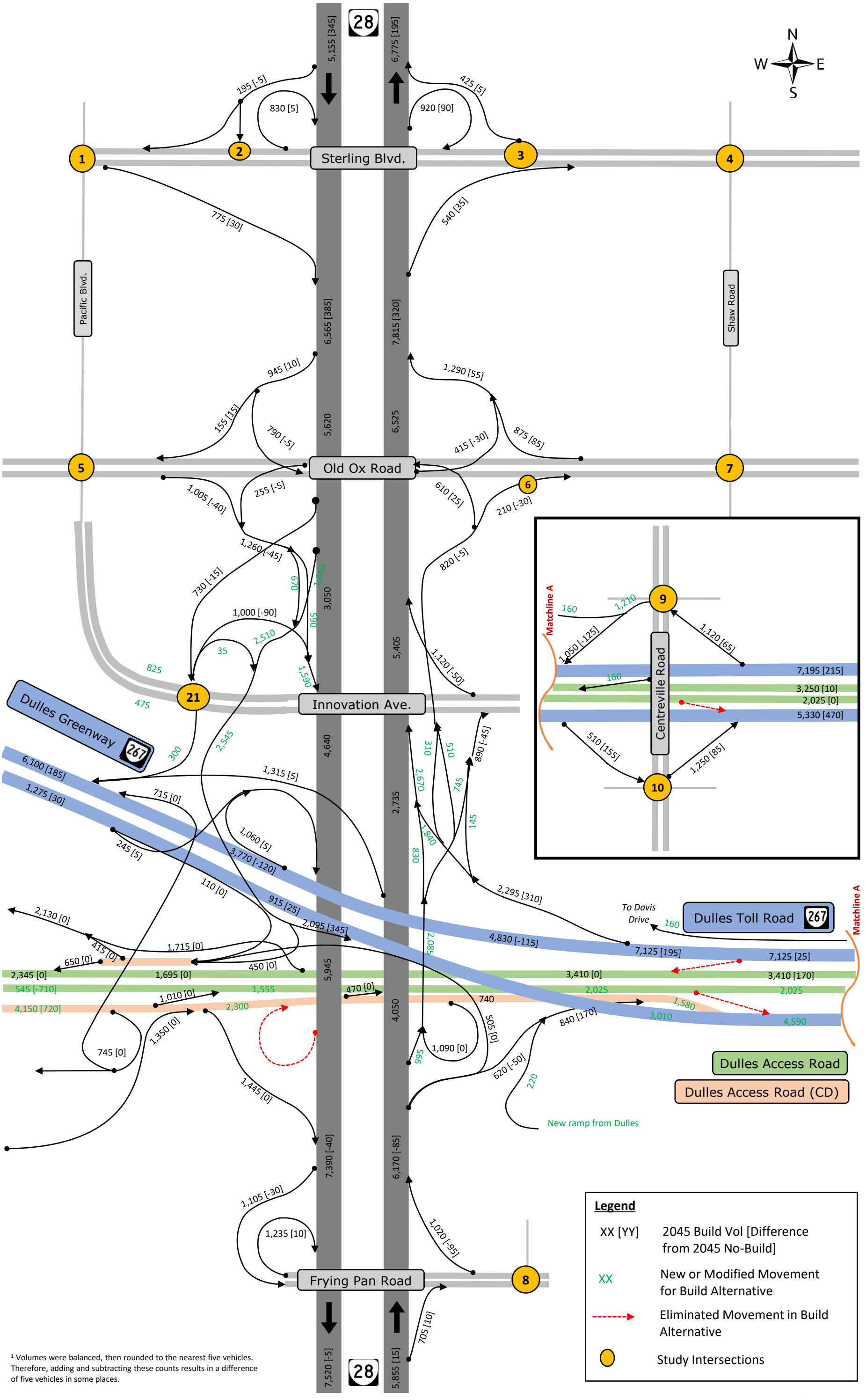
Kimley»Horn

2045 Build Alternative 3 - Option B Volumes
PM Peak Hour Comparison vs. 2045 No-Build



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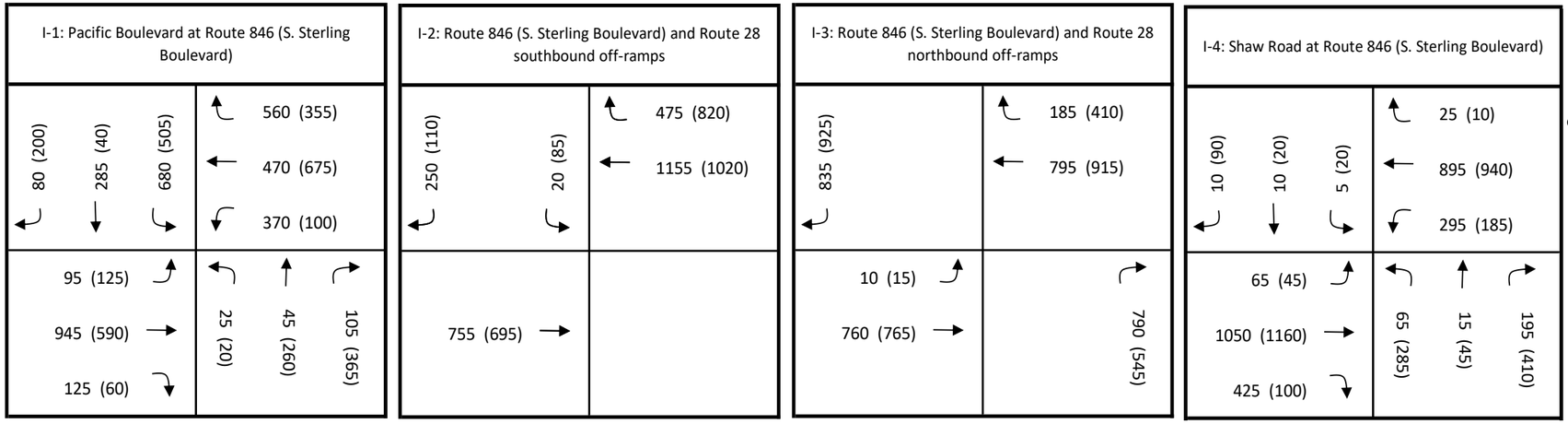

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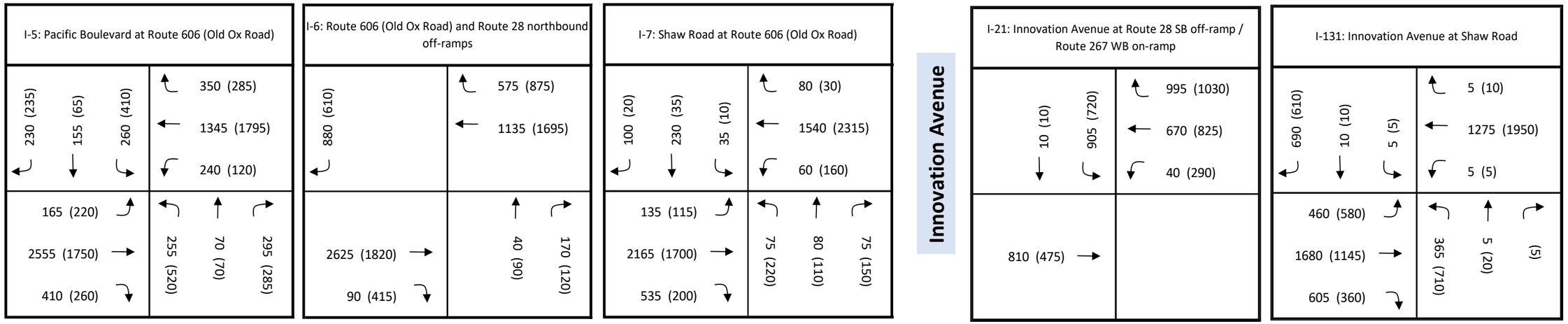
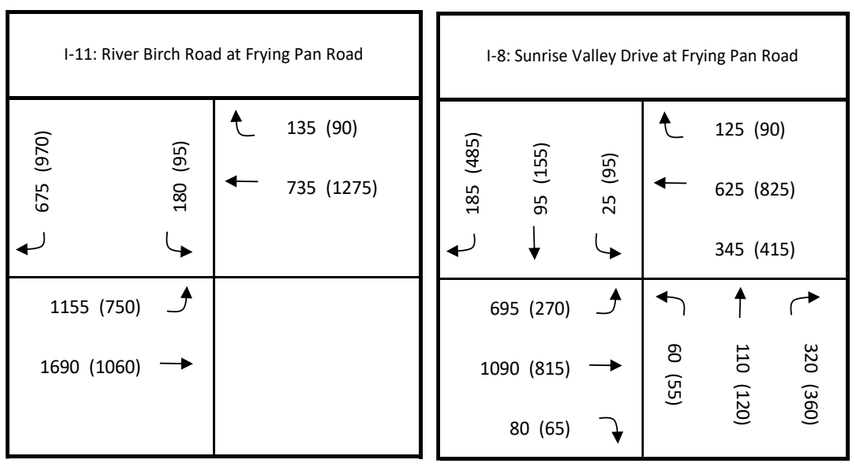
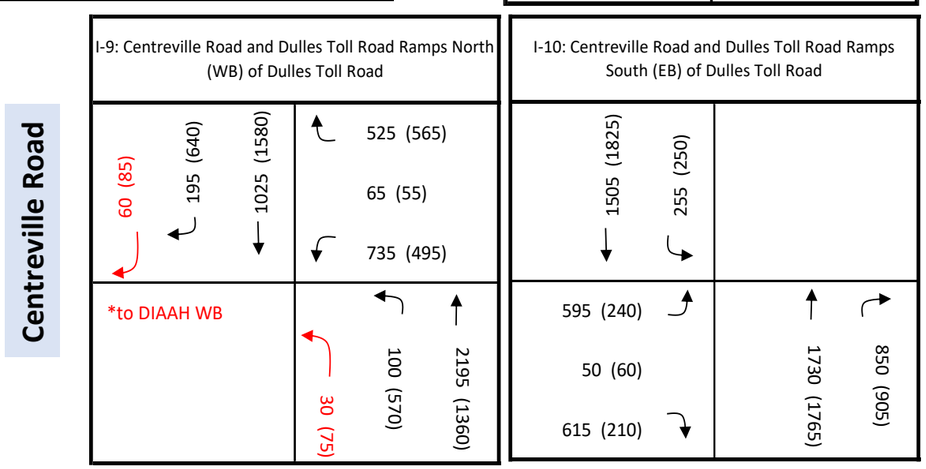


Innovation Avenue

Frying Pan Road



Centreville Road



Kimley»Horn