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PLANNING

TRAFFIC IMPACT STUDY

**Holland Road Subdivision
Suffolk, VA**

Prepared for:

Coastal Virginia Developers

By:

**Charles Smith, P.E., PTOE
EPR**

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TABLE OF CONTENTS

- 1.0 Project Overview
- 2.0 Background
- 3.0 Future Year Traffic Volumes
- 4.0 Intersection Capacity Analyses
- 5.0 Summary

LIST OF FIGURES

- Figure 1 Vicinity Map
- Figure 2 Existing Peak Hour Volumes
- Figure 3 No Build 2021 Background Volumes
- Figure 4 Site Trip Generation
- Figure 5 Year 2021 Build Peak Hour Volumes

LIST OF TABLES

- Table 1 Historic Traffic Volume Data
- Table 2 Site Generated Traffic
- Table 3 LOS & Delay Thresholds
- Table 4 Route 58 Bypass and Holland (Bus) – Delay and LOS
- Table 4 Holland and Kilby Shores – Delay and LOS
- Table 5 Washington and Constance – Delay and LOS

TECHNICAL APPENDICES

- Appendix A Site Plan
- Appendix B Traffic Count Data
- Appendix C Intersection Capacity Analysis Worksheets – Existing
- Appendix D Intersection Capacity Analysis Worksheets – 2021 No Build
- Appendix E Intersection Capacity Analysis Worksheets – 2021 Build

1.0 PROJECT OVERVIEW

This technical memorandum summarizes the work effort undertaken by EPR for Coastal Virginia Developers (Coastal) to document the traffic impacts of the proposed Holland Road subdivision in Suffolk, Virginia. The parcel is located off of Holland Road (Business) between Kilby Shores Drive and the railroad tracks.

This study is based on the conceptual site plan provided by Coastal (see Appendix A). The site plan identifies a development with 140 single family units on a site that is approximately 23.3 acres. The current zoning is RLM and B2 with a requested zoning of RU.

As requested by the City, this study includes an evaluation of traffic impacts to three intersections plus the proposed entrances.

A vicinity map is provided in Figure 1.

2.0 BACKGROUND

The proposed development is on the south side of Holland Road (Business) between Kilby Shores Drive and the railroad tracks. The City requested that the traffic study include an evaluation of impacts at three intersections plus the proposed entrances. The study intersections are:

1. Route 58 Bypass and Holland Road (Business) (signalized)
2. Holland Road and Kilby Shores Drive (unsignalized)
3. Washington Street and Constance Road (signalized)

Traffic Volumes

Manual turning movement counts were conducted on Tuesday, September 26 and Thursday, September, 28, 2017 at the two signalized intersections. A recent manual turning movement count taken on Thursday, December 15, 2016 was utilized for Holland Road and Kilby Shores Drive. The counts were from 7 – 9 AM and 4 – 6 PM on a typical day with school in session. The existing peak hour traffic volumes are illustrated in Figures 2A and 2B. Figure 2A illustrates the raw existing volumes while Figure 2B illustrates the existing volumes with the Kilby Shores Drive intersection volumes increased by the background growth rate for one year to represent year 2017 volumes as a standard existing baseline for all study intersections. The count worksheets are provided in Appendix B.

3.0 FUTURE YEAR TRAFFIC VOLUMES

Background Traffic

The development is proposed to be built in four years, thus the build year is 2021. To evaluate a year 2021 no build condition (the background traffic in the study area without considering the proposed development), the existing traffic volumes were projected to the year 2021. A two percent per year growth rate was applied to the existing volumes to derive the 2021 background volumes. Historic VDOT traffic data is provided in Table 1. Over the last three to five years, the data indicate 1.5% to 2.5% growth along Route 58 and zero to one percent growth along Holland Road (Business) and Constance Road. As a conservative estimate of future traffic

volume, a two percent per year growth rate was applied to all movements. The no build 2021 volumes are illustrated in Figure 3.

TABLE 1
VDOT Historic Traffic Data
(Vehicles Per Day)

Year	Rte 58 Bypass N/E of Holland (Bus)	Rte 58 Bypass S/W of Holland (Bus)	Holland (Bus)	Constance
2016	41000	34000	9800	8800
2013	40000	31000	9800	8300
2011	38000	30000	9900	8400

Proposed Site Trip Generation

The trip generation potential of the proposed development was determined using data published in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (10th Edition). The resulting number of trips estimated to be generated by the proposed development are identified in Table 2.

TABLE 2
Site Generated Traffic
(Vehicles Per Day and Vehicles Per Hour)

USE	ITE Code	ADT	AM PEAK		PM PEAK	
			IN	OUT	IN	OUT
140 Single Family Detached	210	1417	26	78	88	52

Source: ITE Trip Generation Manual

Traffic Distribution

The projected site generated traffic volumes were assigned to the study area. The site trips were assigned to the study intersections by examination of the existing traffic patterns along the study roadway network. The AM and PM distributions were calculated at the three study intersections to determine the current distribution to / from the five possible origins / destinations – both directions on Route 58, Kilby Shores Drive, Constance Road, and continuing on Washington Street past Constance Road.

Figure 4 illustrates the resulting site generated trips and Figure 5 illustrates the projected year 2021 build traffic volumes.

4.0 INTERSECTION CAPACITY ANALYSES

The intersection capacity analyses were performed using Synchro per the methodology documented in the Highway Capacity Manual (Transportation Research Board). The HCM based calculations are provided in this report.

Capacity analyses are utilized to determine a Level of Service (LOS) for a given intersection operating under either signalized or unsignalized control. The LOS is based on estimated delay and range from LOS A, the best, to LOS F, the worst. In general LOS A and LOS B indicate

little or no delay, LOS C indicates average delay, LOS D indicates delay is increasing and noticeable, LOS E indicates the limit of acceptable delay and LOS F is characteristic of over saturated conditions. The actual delays associated with these levels of service are identified in Table 3.

**TABLE 3
LOS and Delay Thresholds**

LOS	UNSIGNALIZED INT. DELAY (secs)	SIGNALIZED INT. DELAY (secs)
A	0 – 10	< 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

Source: Highway Capacity Manual

Capacity analyses were conducted for each of the study intersections for existing conditions, year 2021 no build conditions, and year 2021 build conditions. The analysis results are summarized by intersection in the following sections.

Route 58 Bypass and Holland Road (Business) (Signalized Intersection)

Delay and level of service (LOS) are summarized in Table 4 below. All movements are expected to operate at LOS D or better during both peaks for all scenarios. As expected, given the relatively small number of site trips added to this intersection (compared to the current volume), there is only a slight increase in delay from the no build to build scenario (with the same levels of service).

**TABLE 4
Route 58 Bypass and Holland Road (Business)
Delay (sec/veh) and LOS**

	Existing		2021 No Build		2021 Build	
	AM	PM	AM	PM	AM	PM
Holland (Bus) WB Left	35.0 C	33.7 C	35.0 C	33.7 C	34.9 C	33.8 C
Rte 58 Bypass NB Thru	13.7 B	12.4 B	15.8 B	13.6 B	16.7 B	14.5 B
Rte 58 Bypass NB Right	6.3 A	8.3 A	6.7 A	8.9 A	6.9 A	9.5 A
Rte 58 Bypass SB Left	50.8 D	41.0 D	49.3 D	42.9 D	48.1 D	45.3 D
Rte 58 Bypass SB Thru	4.9 A	5.1 A	5.4 A	5.7 A	5.6 A	5.9 A
Intersection	12.2 B	10.3 B	13.3 B	11.2 B	14.0 B	12.0 B

Holland Road and Kilby Shores Drive (Unsignalized Intersection)

Delay and level of service (LOS) are summarized in Table 5 below. The mainline left turn movement is expected to operate at LOS A during both peaks for all scenarios. The Kilby Shores approach is expected to operate at LOS E in the no build (just over the LOS D threshold) as well as in the build condition. Further evaluation of the data indicates that the projected 95th percentile queue in the no build condition is five vehicles with only one additional vehicle expected in queue in the build condition.

**TABLE 5
Holland Rd and Kilby Shores Dr
Delay (sec/veh) and LOS**

	Existing		2021 No Build		2021 Build	
	AM	PM	AM	PM	AM	PM
Holland Rd WB Left	8.4 A	9.0 A	8.5 A	9.3 A	8.6 A	9.5 A
Kilby Shores NB Left	17.6 C	26.2 D	20.4 C	35.4 E	23.4 C	42.6 E
Kilby Shores NB Right	17.6 C	26.2 D	20.4 C	35.4 E	23.4 C	42.6 E

Washington Street and Constance Road (Signalized Intersection)

Delay and level of service (LOS) are summarized in Table 6 below. All movements are expected to operate at LOS C or better during both peaks for all scenarios. There is only a slight increase in delay from the no build to build scenario (with the same levels of service).

**TABLE 6
Washington Street and Constance Road
Delay (sec/veh) and LOS**

	Existing		2021 No Build		2021 Build	
	AM	PM	AM	PM	AM	PM
Washington St EB Left	18.2 B	21.9 C	18.2 B	22.6 C	17.9 B	23.6 C
Washington St EB Thru	5.1 A	5.8 A	5.1 A	6.0 A	5.1 A	6.2 A
Washington St WB Thru	12.8 B	16.4 B	13.1 B	17.3 B	13.7 B	18.3 B
Washington St WB Right	13.9 B	16.6 B	14.3 B	17.5 B	14.7 B	17.8 B
Constance Rd SB Left	14.9 B	15.8 B	15.8 B	16.7 B	16.5 B	17.3 B
Constance Rd SB Right	9.8 A	11.4 B	9.9 A	11.7 B	9.8 A	12.1 B
Intersection	11.5 B	14.6 B	11.7 B	15.2 B	11.8 B	15.8 B

The intersection capacity analysis worksheets from Synchro are provided in the appendix. The existing scenario is located in Appendix C, the 2021 No Build is in Appendix D and the 2021 Build is in Appendix E.

Entrance Turn Lane Requirements

The proposed development concept includes two access locations on Holland Road (Business). Based on the Unified Development Ordinance (UDO), the functional classification of the roadway, the posted speed limit and the size of the development, entrance turn lanes are required per the code. There is a current two way left turn lane (twltl) on Holland Road (Business) along the frontage of the proposed development; therefore, only the construction of right turn lanes will be required.

5.0 SUMMARY

A summary of the analysis conducted is provided as follows:

1. Intersection Capacity Analysis

Both signalize intersections are expected to operate satisfactorily in the build condition. The Kilby Shores Drive approach at the unsignalized Holland Road (Business) intersection is expected to operate at LOS E during the PM peak hour in the no build condition – just 0.4 seconds of delay over the threshold for LOS D. Analysis indicates that the build condition will result in just one additional vehicle in the 95th percentile queue over the no build condition.

2. Proposed Entrances

Entrance turn lanes are required per City code. However, there is a currently a two way left turn lane (twltl) along the Holland Road (Business) frontage so only the addition of right turn lanes are required.

FIGURE 1
VICINITY MAP

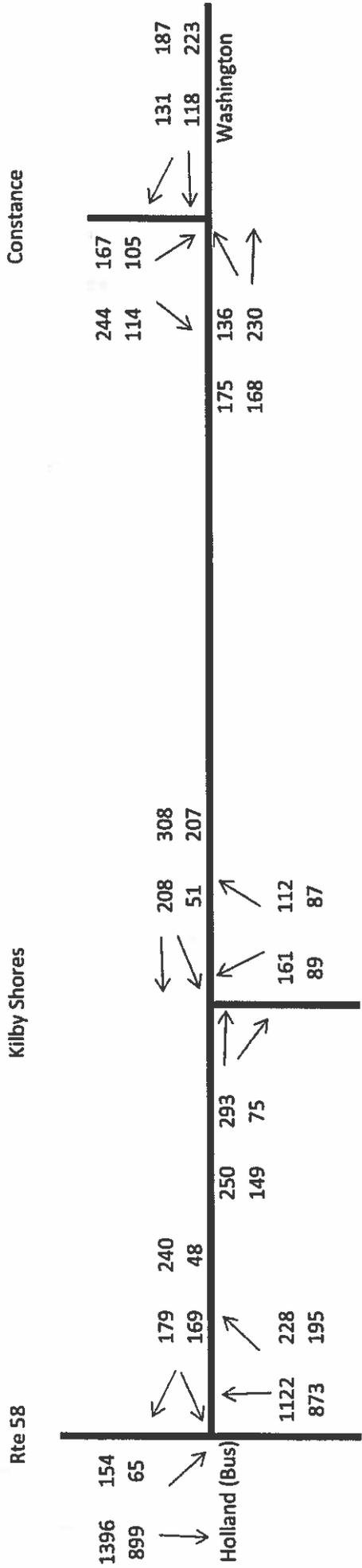


LEGEND

- ★ Proposed Site
- Study Intersection

↑
NORTH
(not to scale)

FIGURE 2A
EXISTING 2016 / 2017
PEAK HOUR VOLUMES



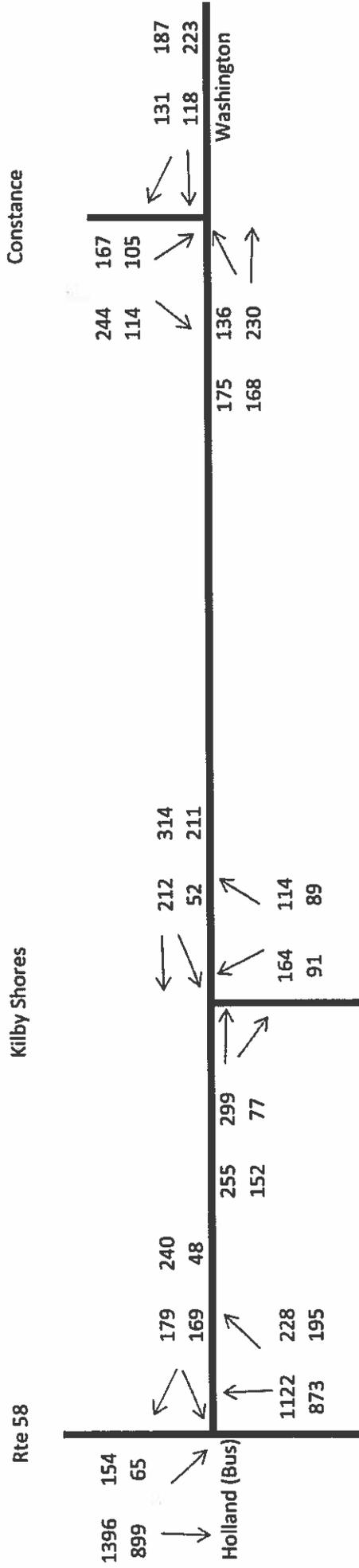
PROP SITE

NOTE
 Count at Kilby Shores intersection is from Dec 2016
 All other counts from September 2017

LEGEND
 123 234 →
 PM AM
 (closest to the arrow is AM)

LEGEND
 ↑
 NORTH
 (not to scale)

FIGURE 2B
EXISTING 2017
PEAK HOUR VOLUMES



CALCULATE "2017 EXISTING" FOR KILBY SHORES INTERSECTION

Annual growth rate % 2%

1 year growth rate 1.02 (2016 to 2017)

PROP
SITE

LEGEND

123 234 →

PM AM

(closest to the arrow is AM)



NORTH
(not to scale)

FIGURE 3
BACKGROUND 2021
PEAK HOUR VOLUMES

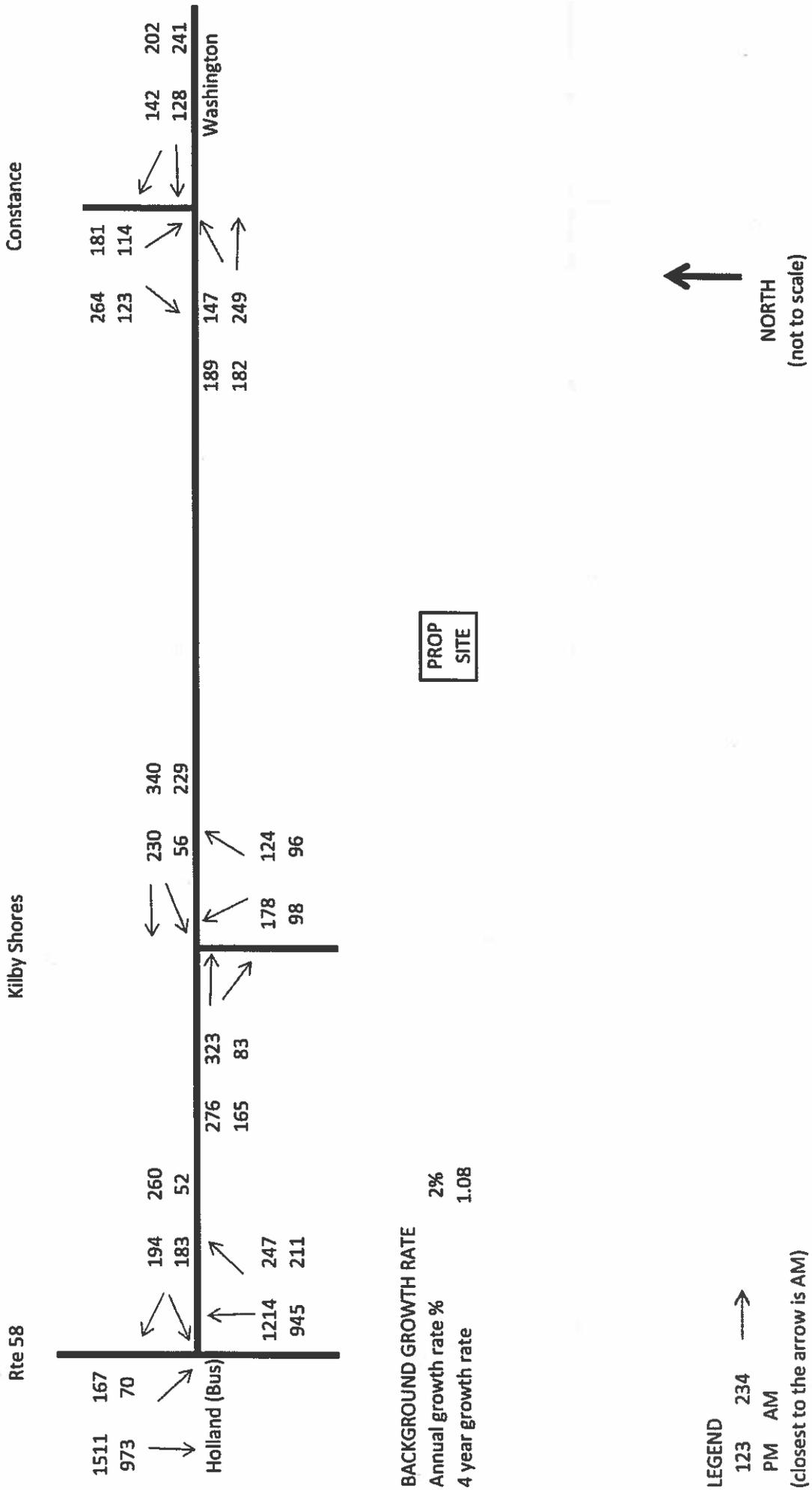
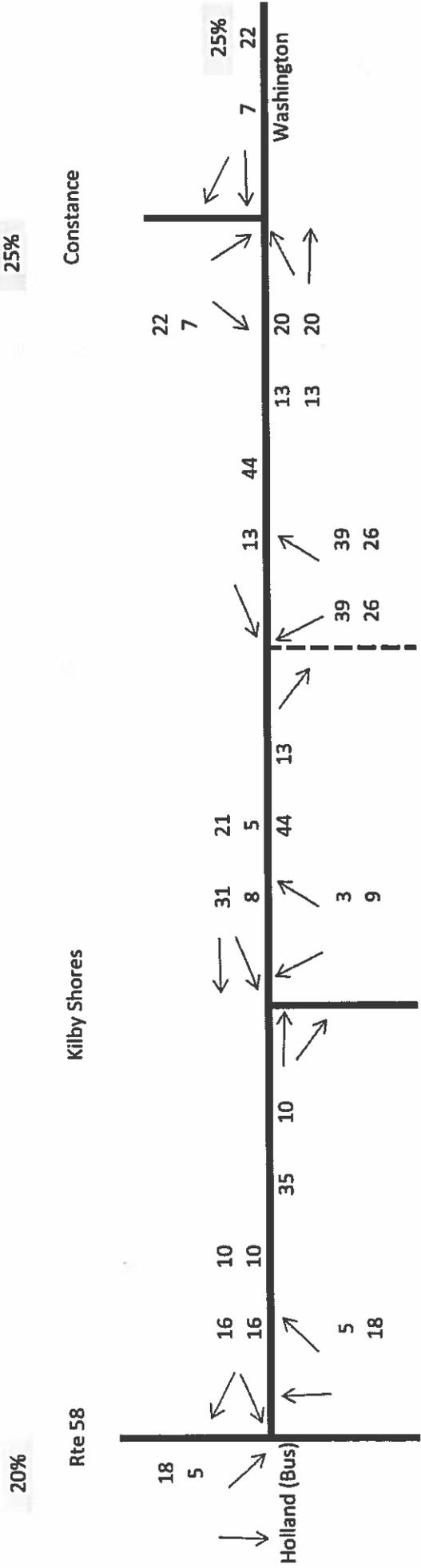


FIGURE 4
SITE TRIPS
PEAK HOUR VOLUMES

	AM		PM		ADT
	in	out	in	out	
140 units	26	78	88	52	1417



LEGEND
 123 234 →
 PM AM
 (closest to the arrow is AM)

NORTH
 (not to scale)

FIGURE 5
BUILD 2021
PEAK HOUR VOLUMES

