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Project name: NAIPTA BRT Design

Project ref: 60568704

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From: Travis Bailey

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Date:
August 1, 2019

Memo

Introduction

As part of the traffic analysis for the NAIPTA Bus Rapid Transit project, the AECOM team has prepared a detailed VISSIM model of the BRT corridor for existing (2018) and future (2040) conditions. These models are also being used as a base for the Arizona Department of Transportation's (ADOT) evaluation of the Milton Road and US-180 corridor. The existing conditions model was calibrated and provided to ADOT's consultant, Michael Baker International, for review and comment. Comments were received, addressed and incorporated into the existing and future conditions models.

The AECOM team estimated the volumes for the future (2040) models by applying calculated growth rates to current traffic counts using the methodology documented in the email dated January 16, 2019, which was sent to ADOT, NAIPTA, and FMPO. Michael Baker International was also provided the opportunity to comment on the no-build model. Comments were received and incorporated. Existing and future conditions models were provided to Michael Baker International for use on ADOT's project. The purpose of this memo is to formally document the process used to estimate future traffic volumes and present resulting volumes for key intersections in the project area.

Methodology

The Flagstaff Metropolitan Planning Organization (FMPO) maintains a travel demand model for the Flagstaff area. FMPO provided volumes from their travel demand models for the years 2015 and 2040. The 2040 travel demand model includes programmed improvements including the Lone Tree Road overpass and Beulah Boulevard extension, which are expected to divert traffic away from otherwise congested corridors. The AECOM team used these volumes to calculate the ADT annual growth rate at each roadway segment with the following formula:

$$\frac{\left(\frac{2040\ MPO\ Volume - 2015\ MPO\ Volume}{2015\ MPO\ Volume}\right)}{2040 - 2015}$$

We applied the ADT annual growth rates to recent ADT counts to estimate 2040 No-Build ADT throughout the network. We then used 2017/2018 traffic counts to calculate the peak hour K and D factors at each intersection, by approach. We applied the K factors to estimate the peak hour traffic for each approach and applied the D factor to estimate directional split yielding 2040 peak hour directional, approach volumes at each intersection. We then estimated the 2040 turning movement counts based on 2017/2018 turning percentages. We balanced our turning movement estimates by applying the Furness method, which is an iterative method of balancing traffic, at each intersection. After applying the Furness method, we further balanced turning movement volumes, as needed, based on engineering judgement. We then balanced the traffic volumes between intersections as needed.

Results

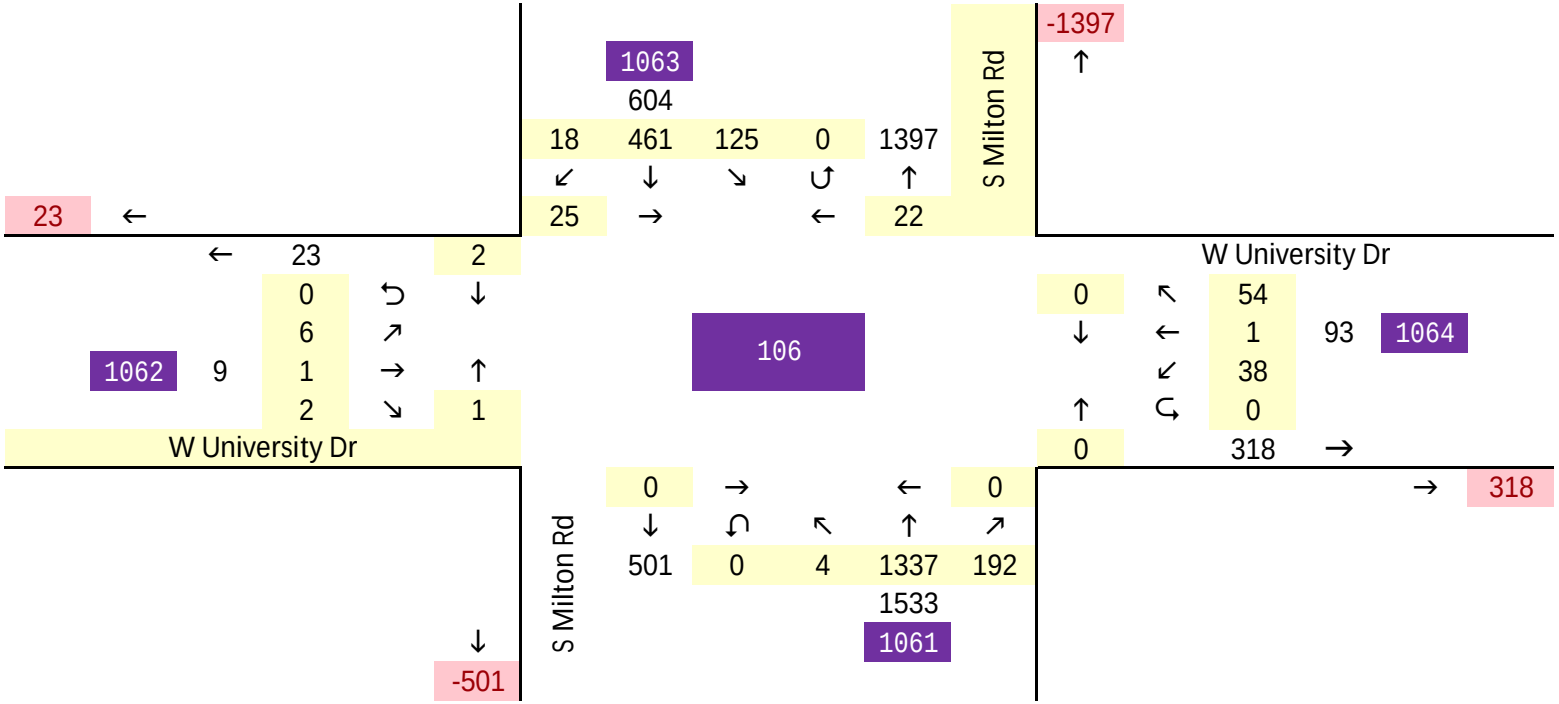
Table 1 displays the calculated growth rates at each leg of key intersections in the project corridor. Typical growth rates at these key intersections ranged between 0.5% and 2.5% with two notable exceptions: the west leg of the intersection of Clay Ave and Milton Rd and the south leg of the intersection of Rte. 66 and Beaver St. The growth rates at these locations were 5.5% and 12.7%, respectively. Appendix A contains a more detailed display of the current turning movement counts and projected traffic volumes at each of the intersections listed in Table 1.

Table 1. Calculated growth rates at each leg of key intersections.

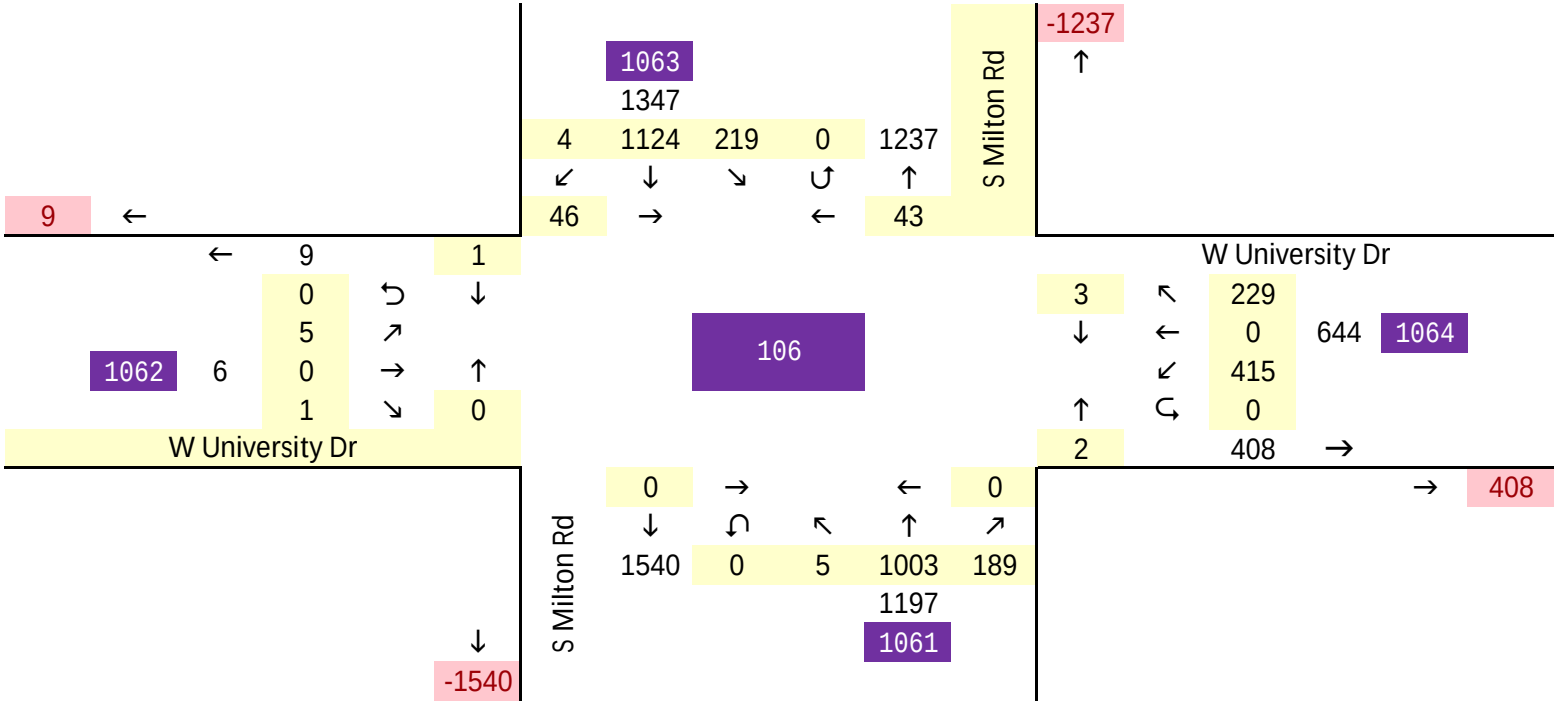
Intersection Name	Intersection Number	South Approach	North Approach	West Approach	East Approach
University Dr / Milton Rd	106	1.7%	1.7%	1.8%	1.9%
Rte. 66 / Milton Rd	109	0.9%	0.5%	0.9%	1.0%
Clay Ave / Milton Rd	111	0.3%	1.0%	5.5%	0.4%
Rte. 66 / Humphreys St	115	N/A	0.3%	0.7%	0.7%
Rte. 66 / Beaver St	116	12.7%	2.0%	0.7%	1.6%
Columbus Ave / Humphreys St	324	0.9%	1.0%	0.2%	1.5%
Columbus Ave / Beaver St	325	1.8%	1.2%	1.5%	2.5%

Appendix A

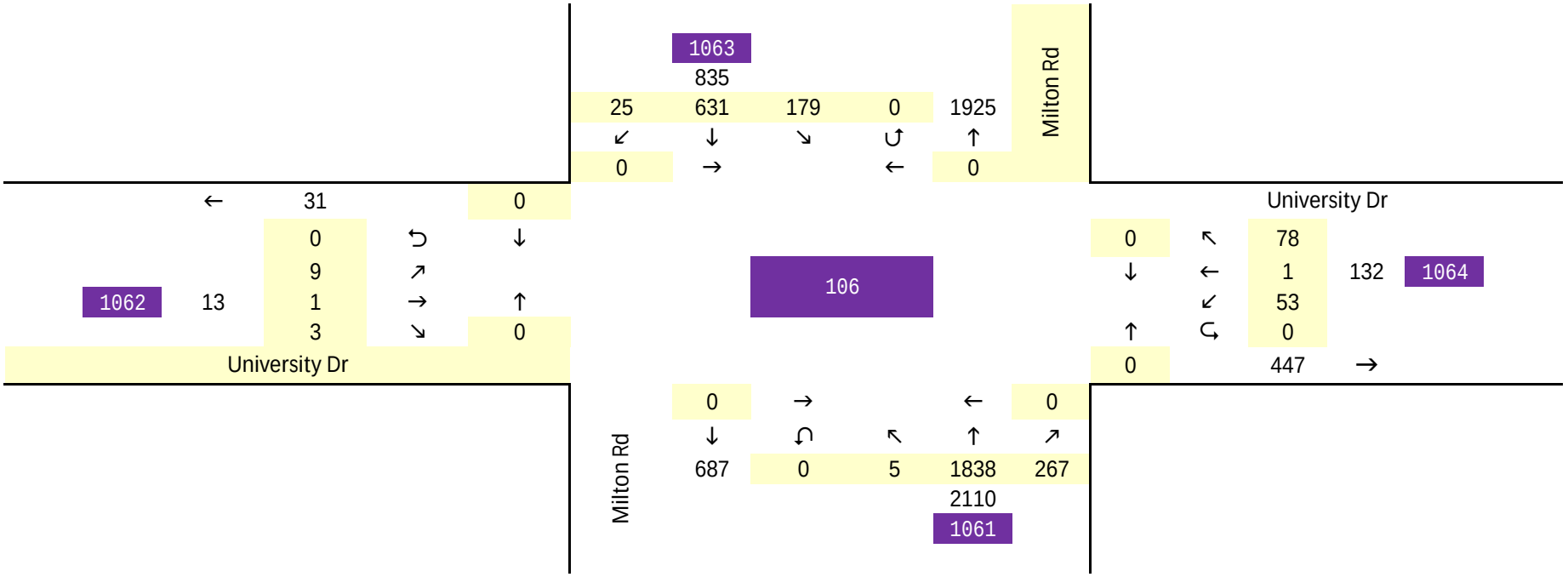
Intersection 106
2018 Existing AM O-D



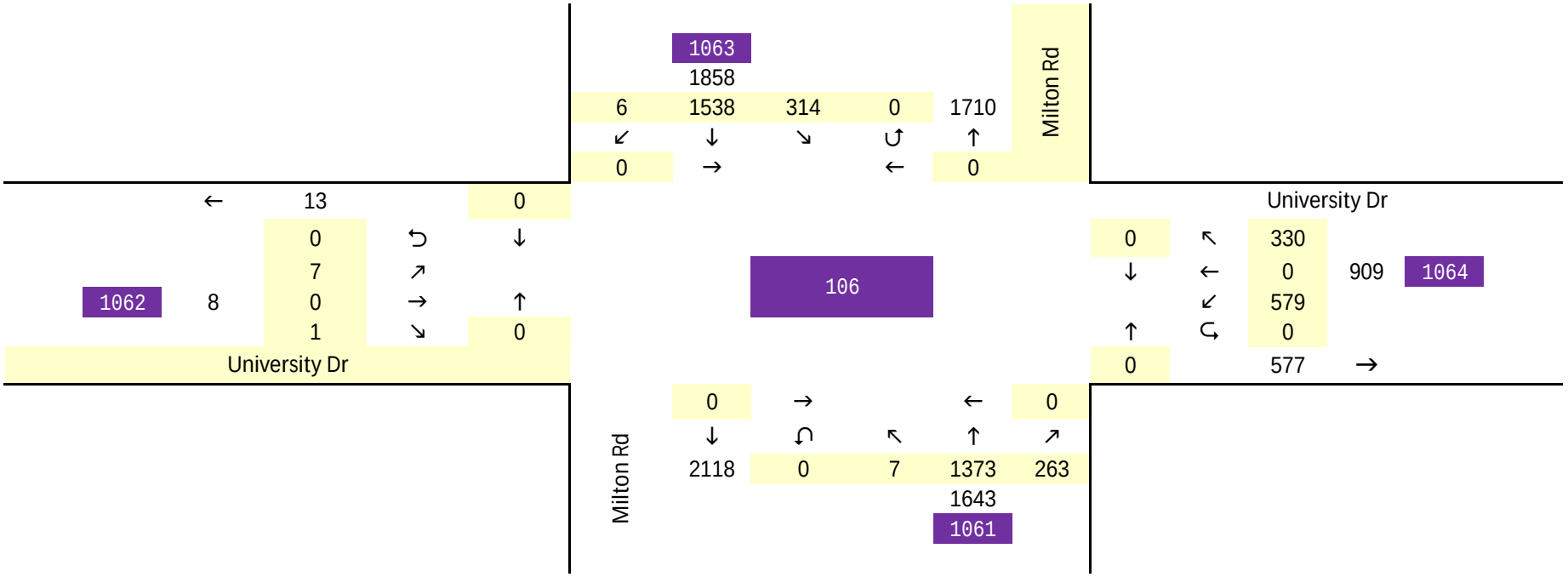
Intersection 106
2018 Existing PM O-D



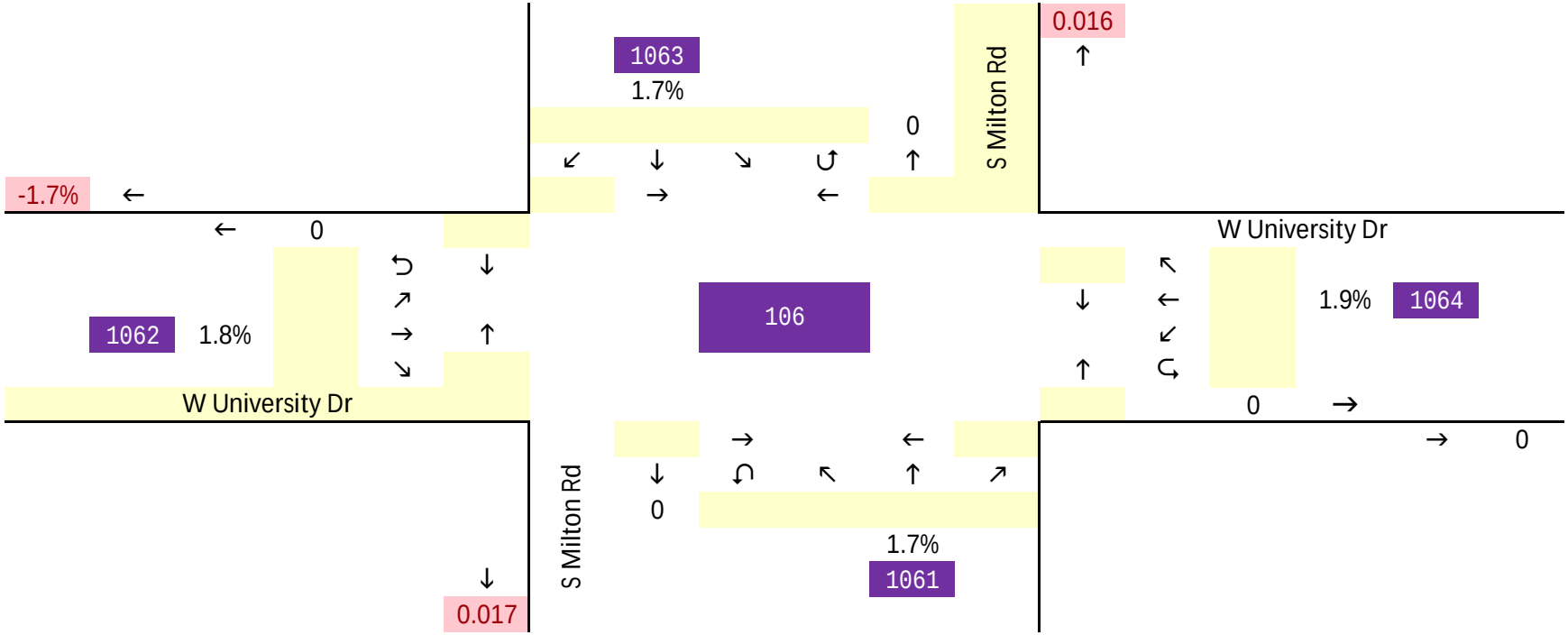
Intersection 106
2040 AM Forecast



Intersection 106
2040 PM Forecast



Intersection 106
Growth Rate



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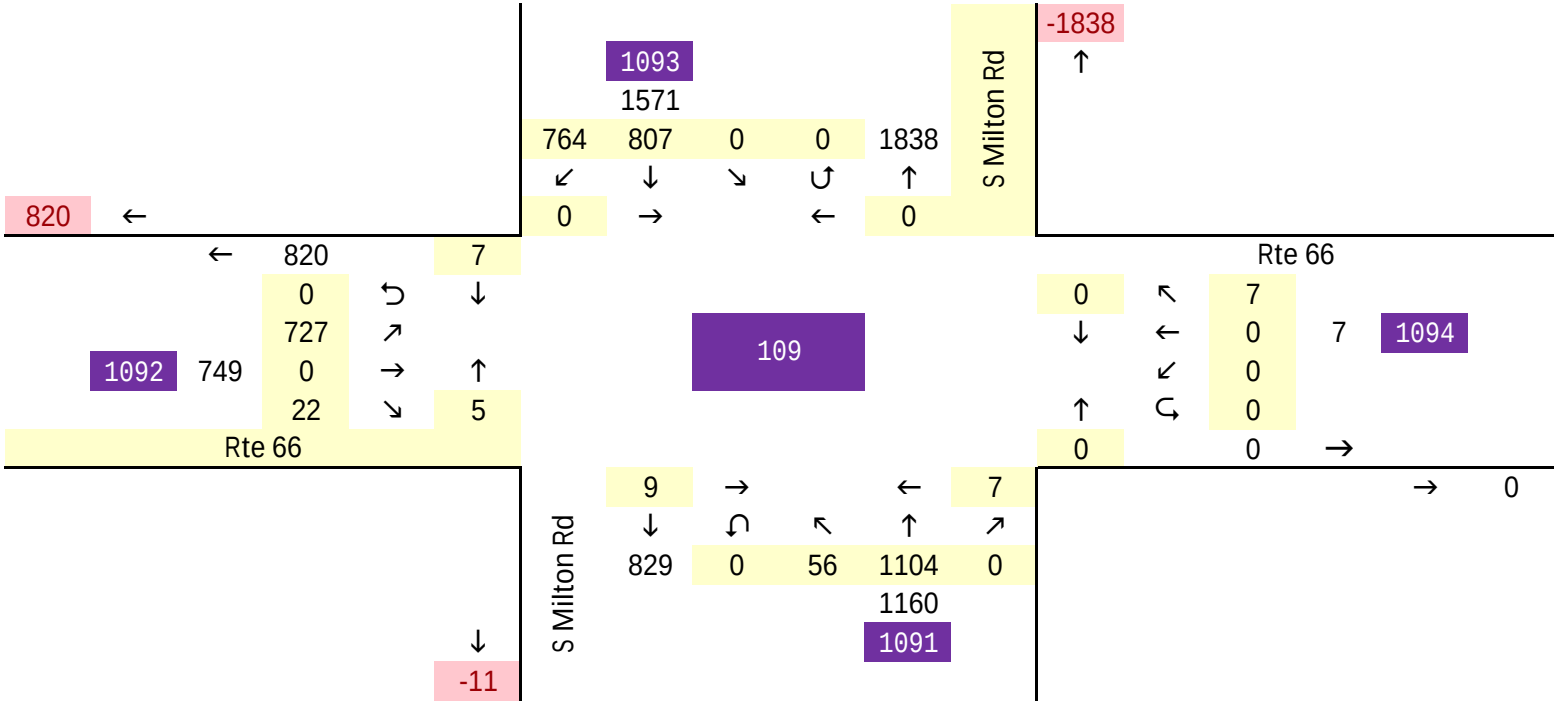
2018 Existing AM O-D



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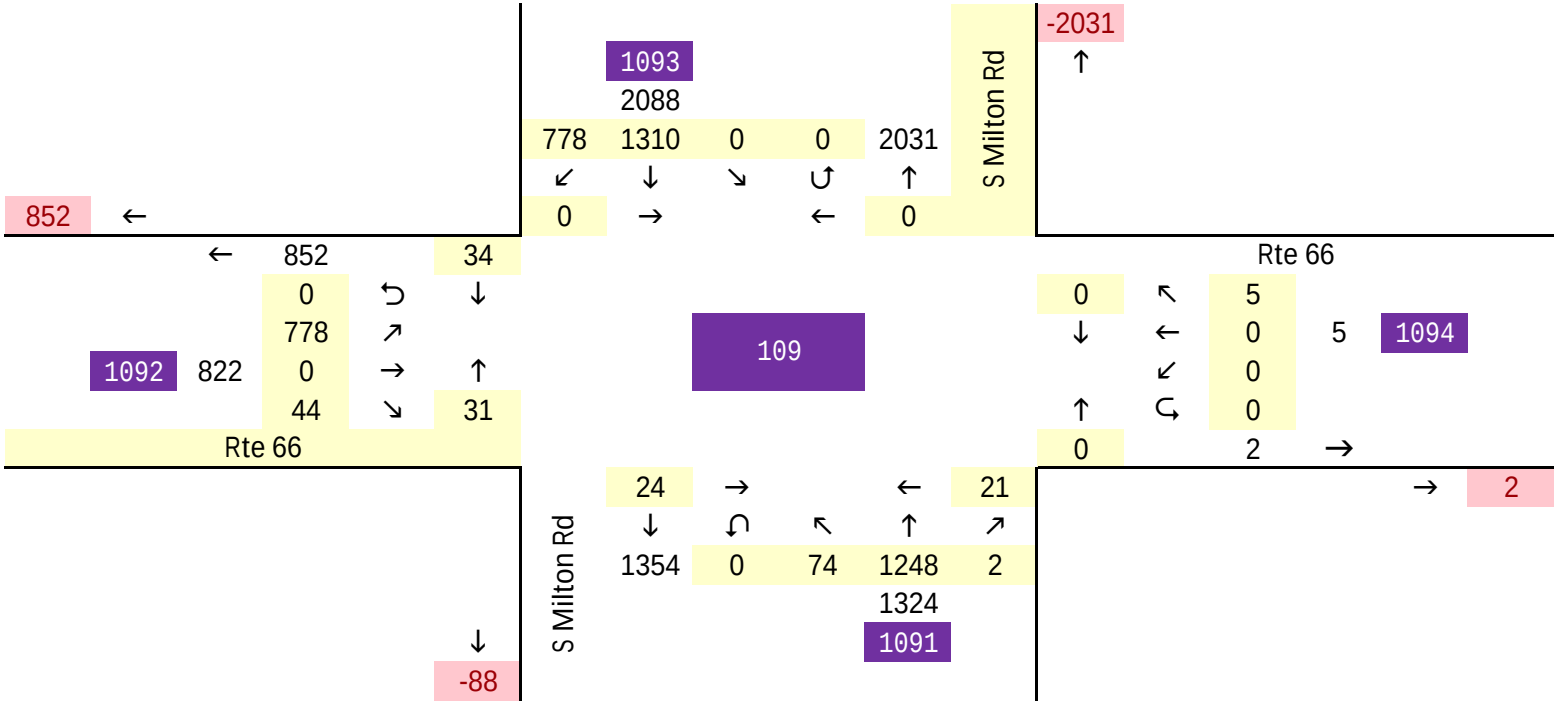
2018 Existing PM O-D



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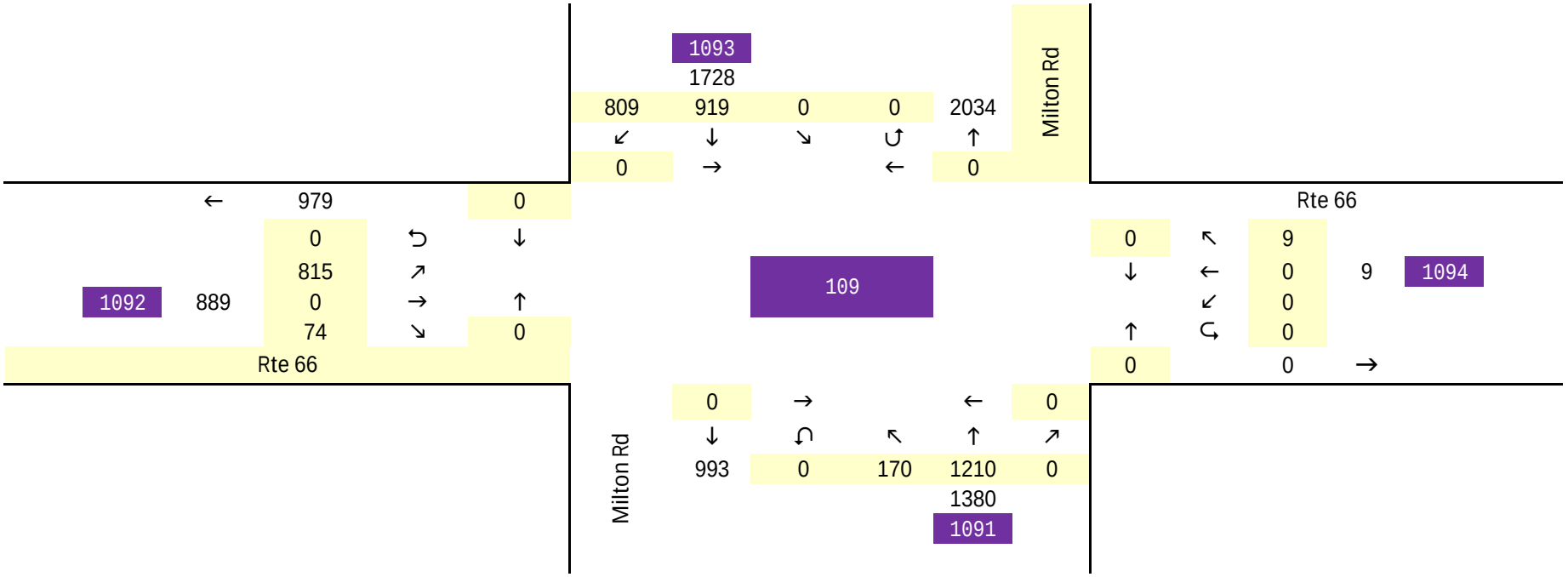

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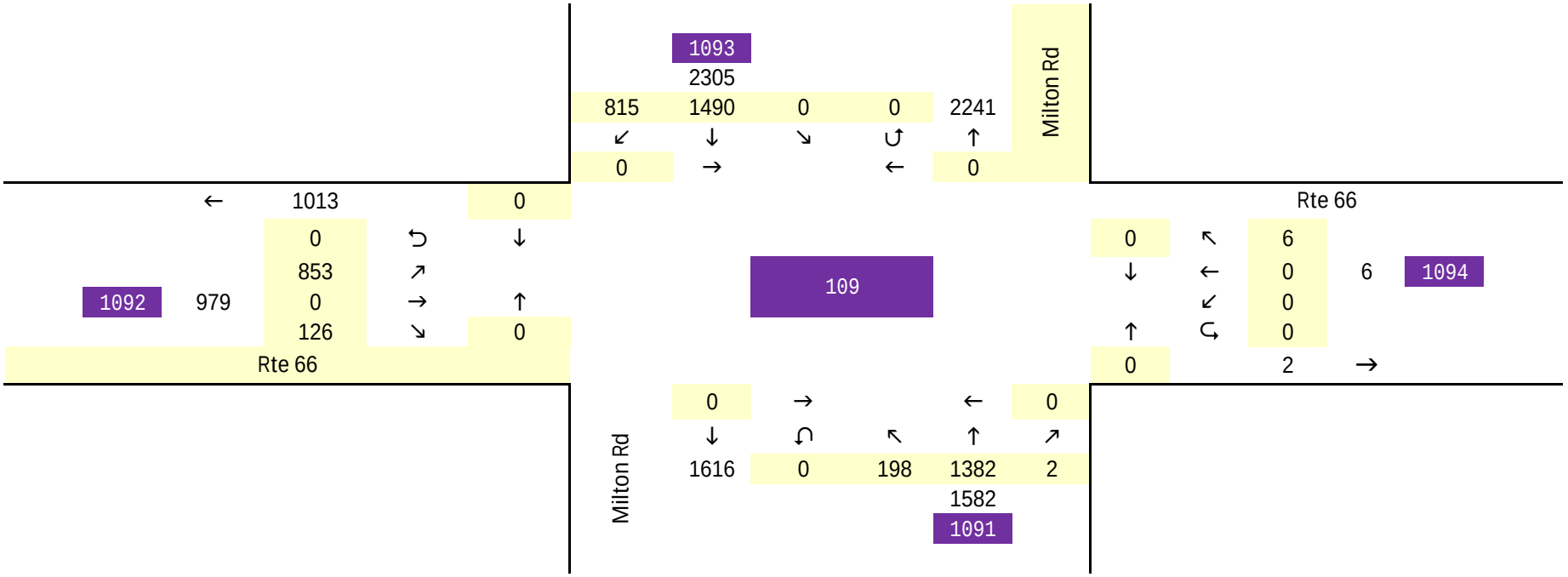

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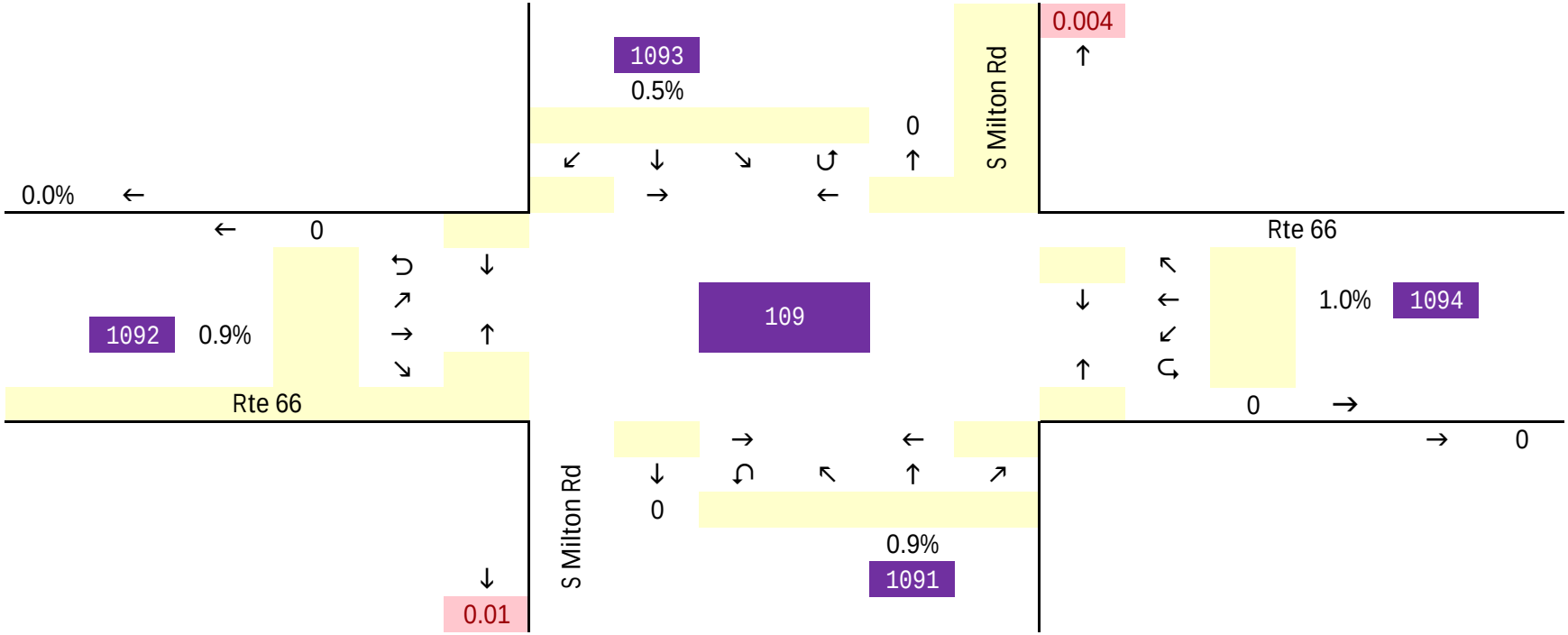
Growth Rate



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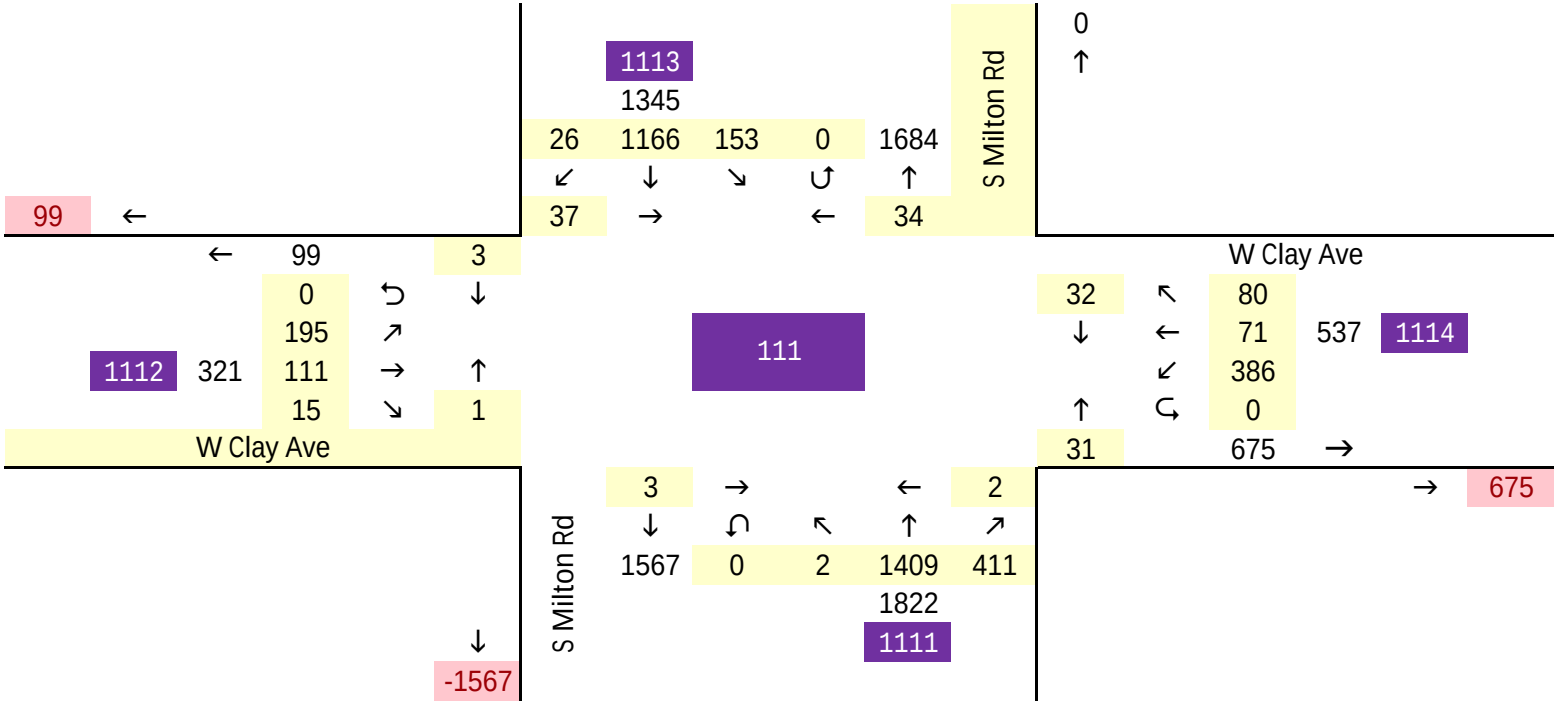

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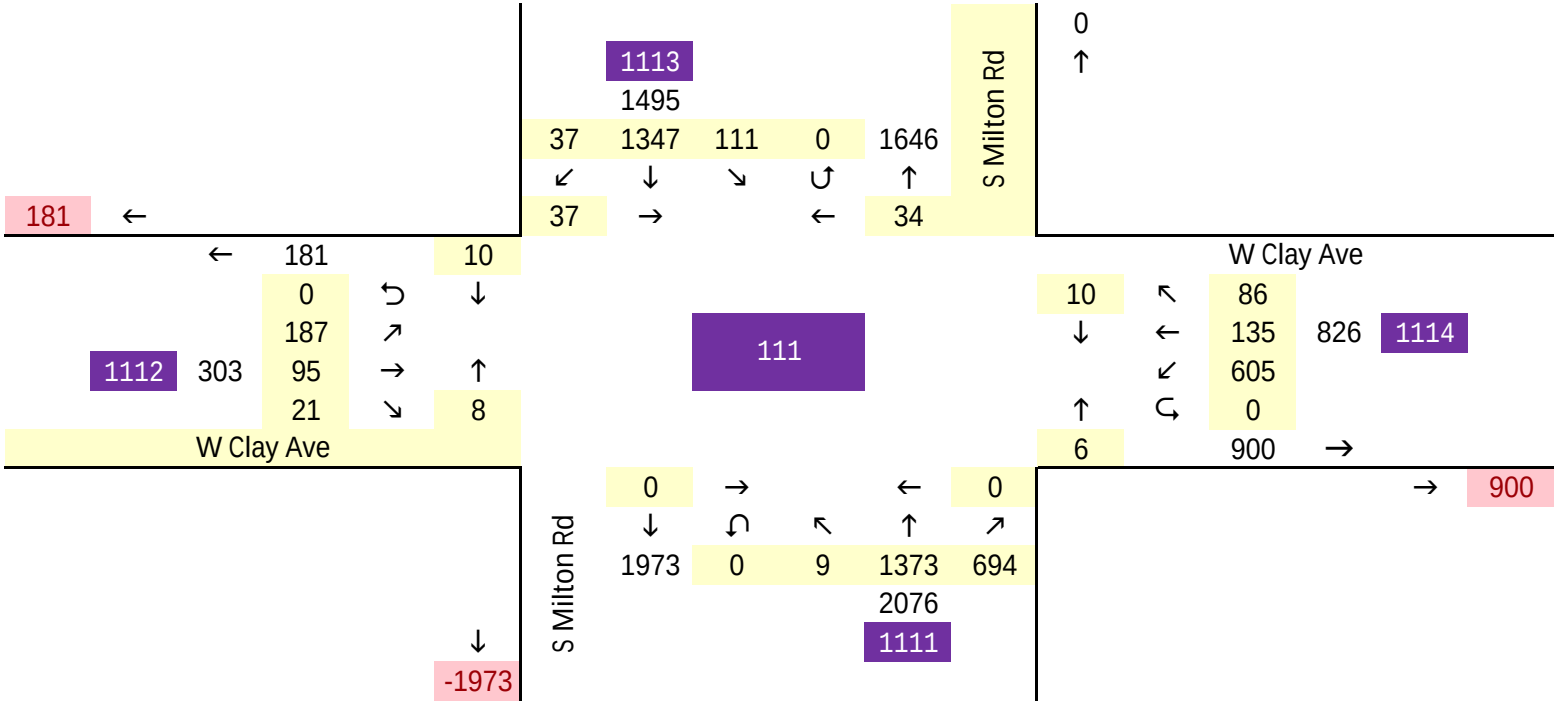

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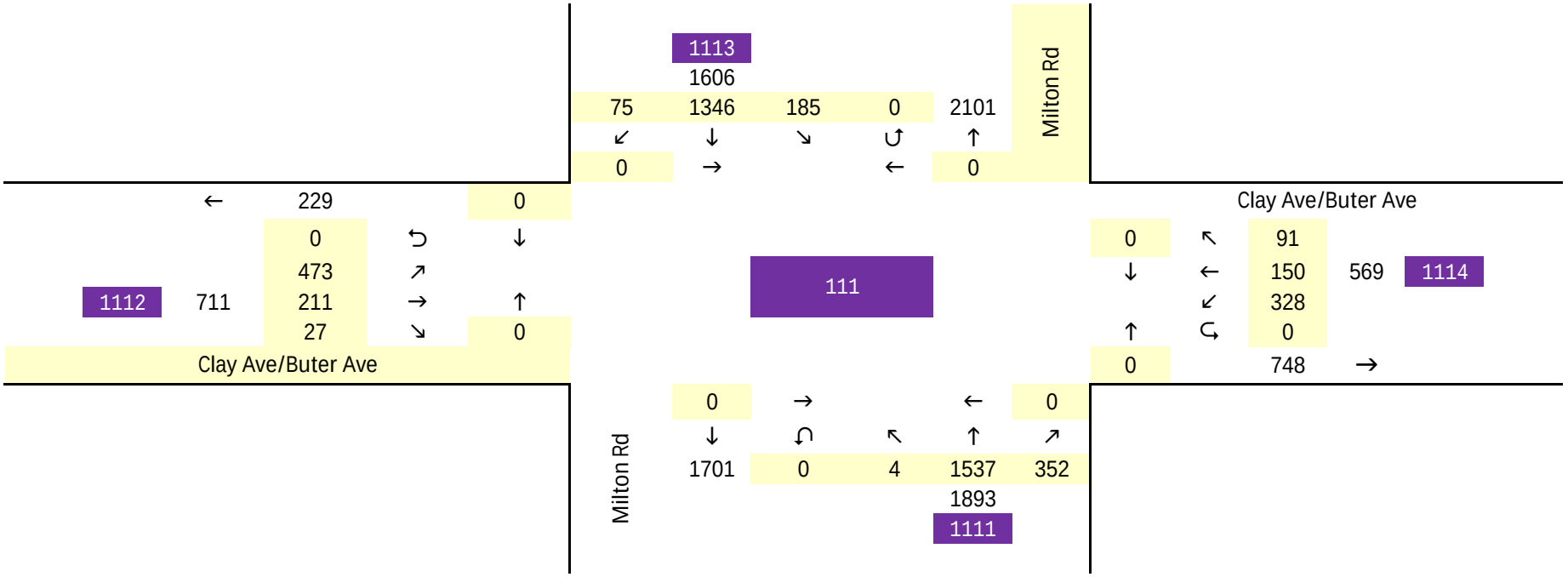

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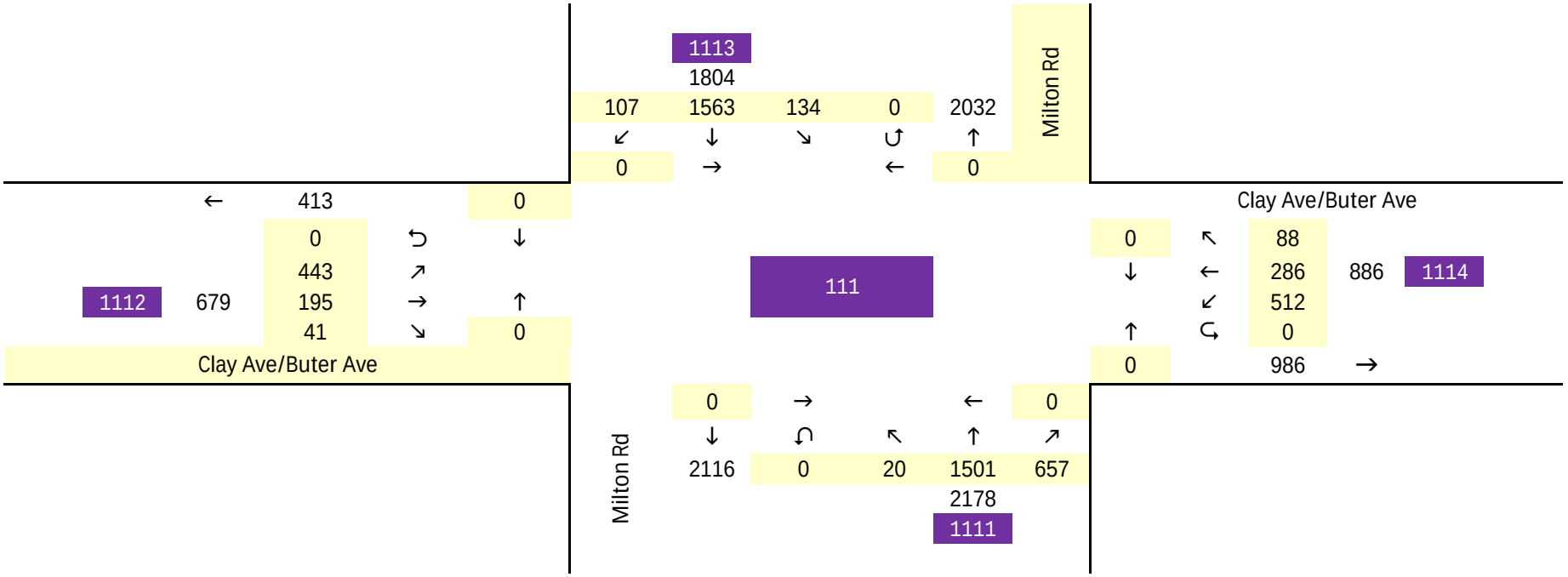

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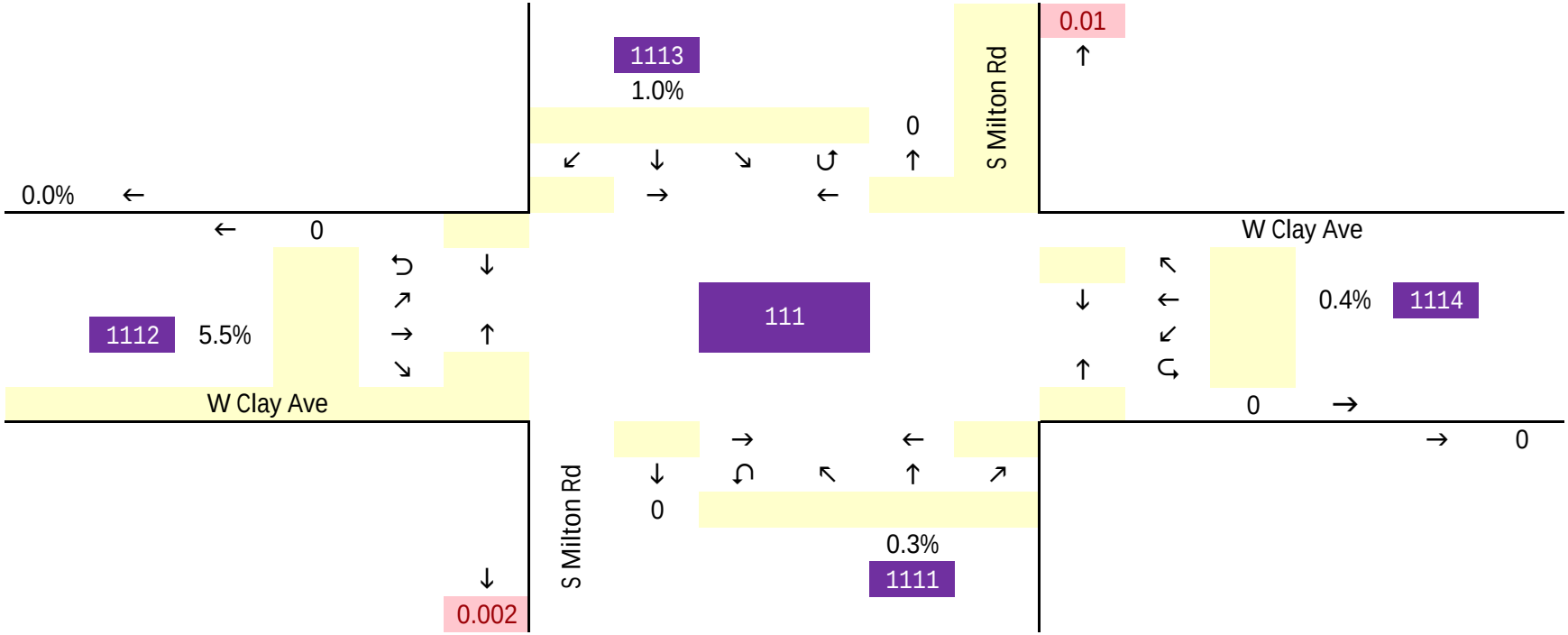
Growth Rate



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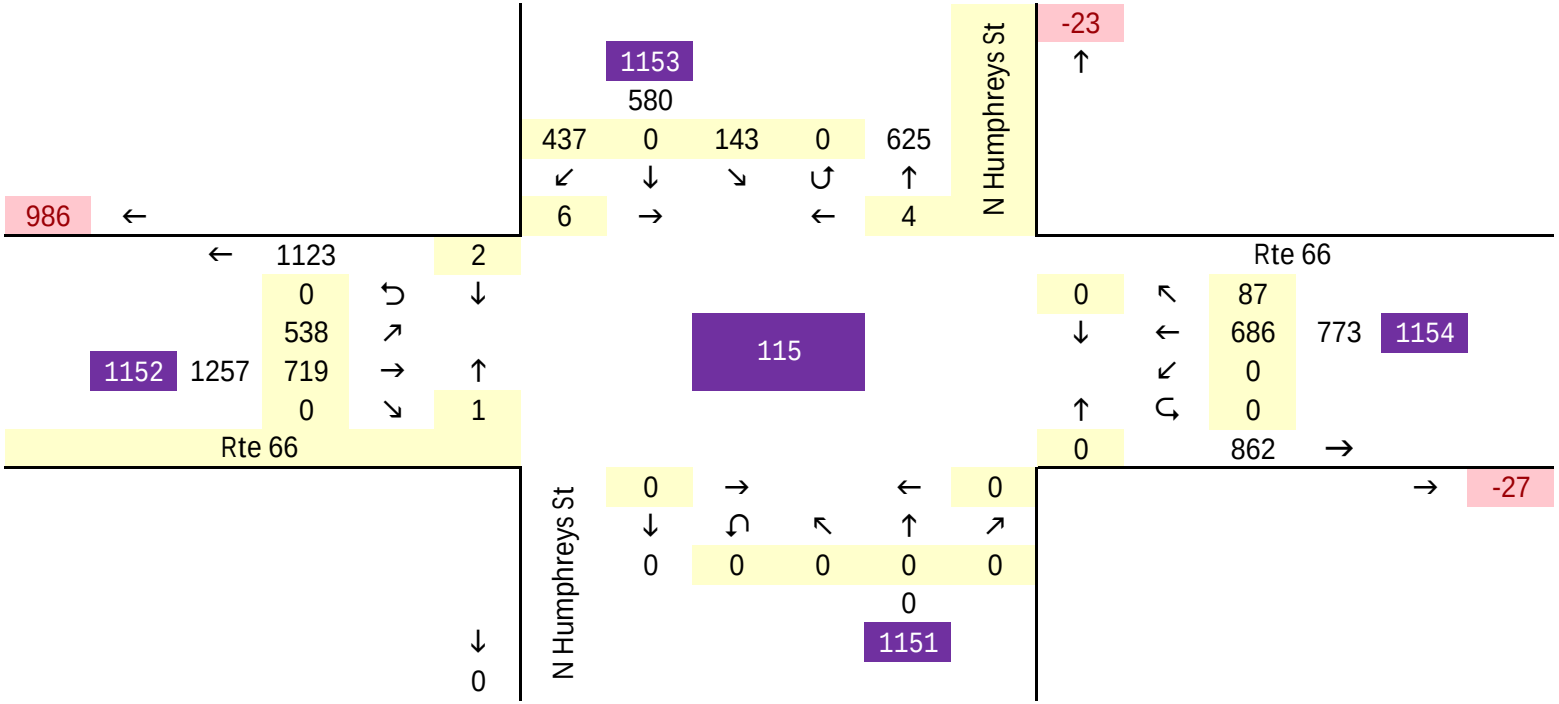

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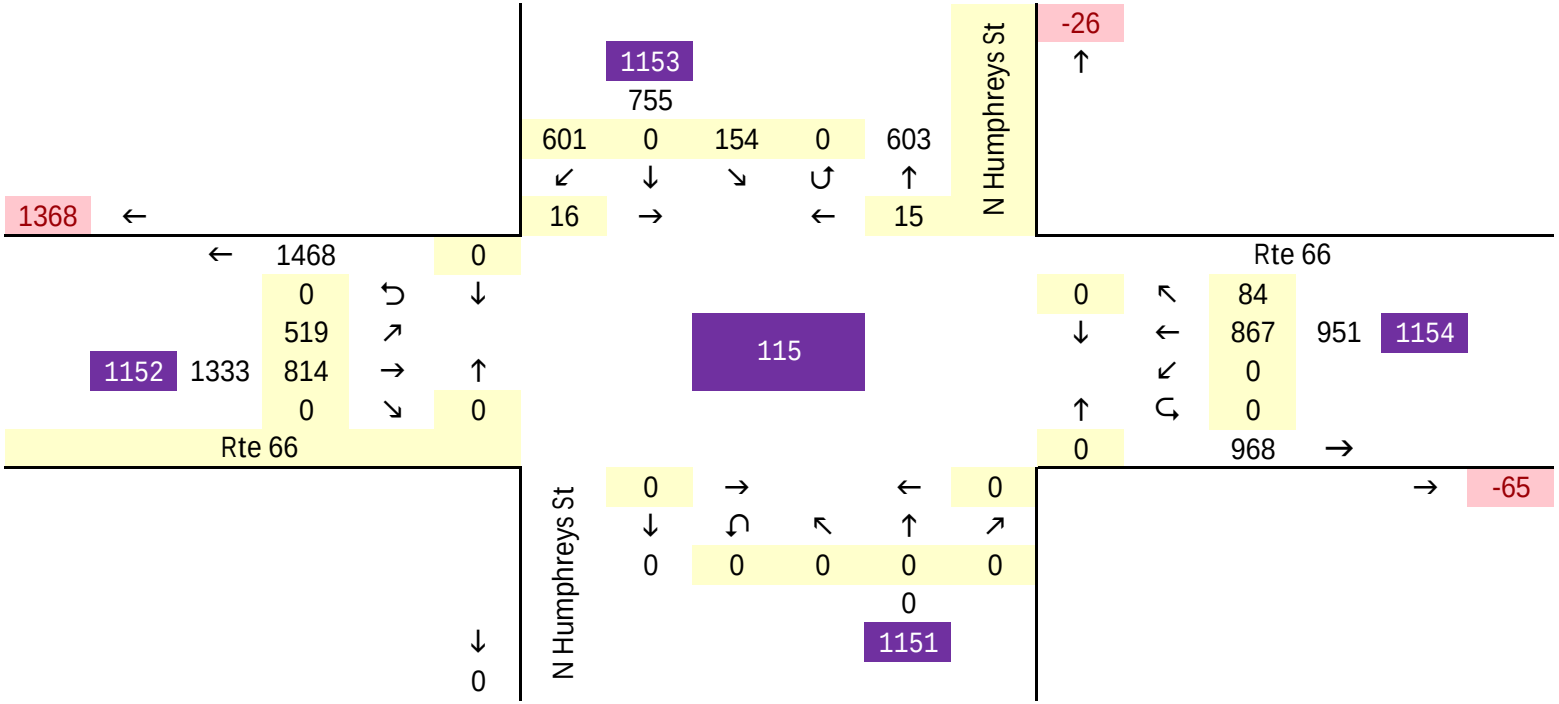

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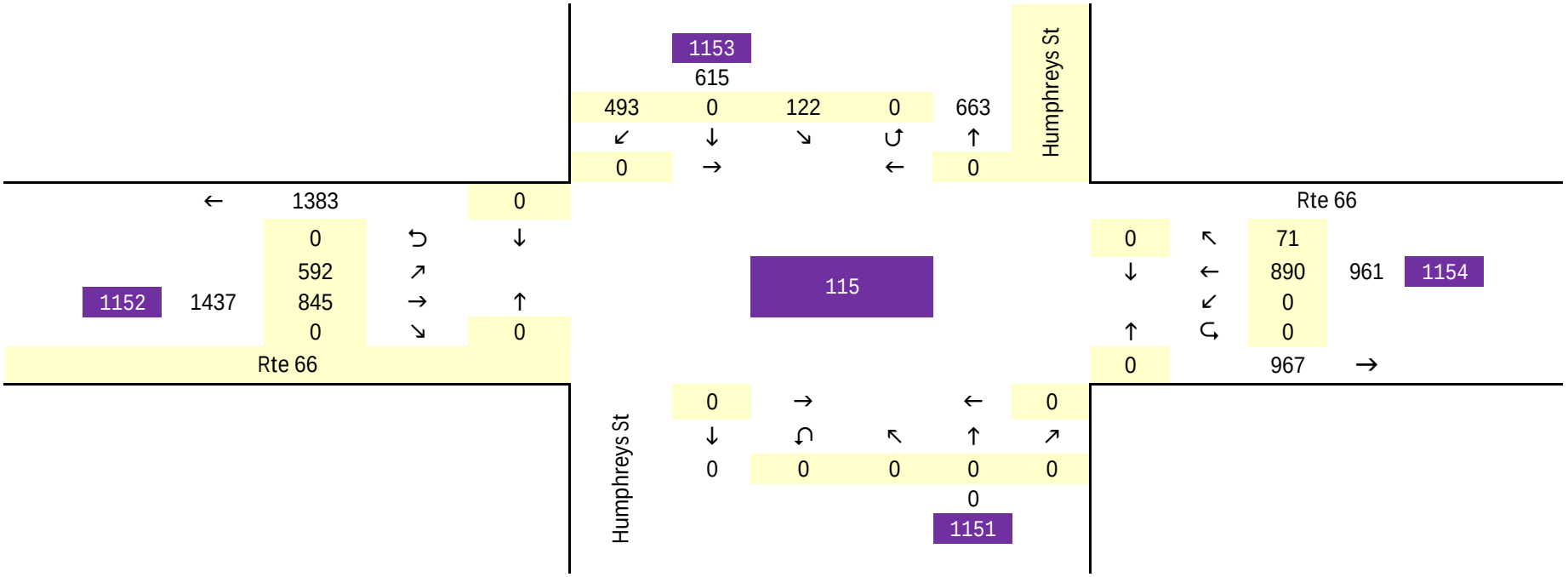

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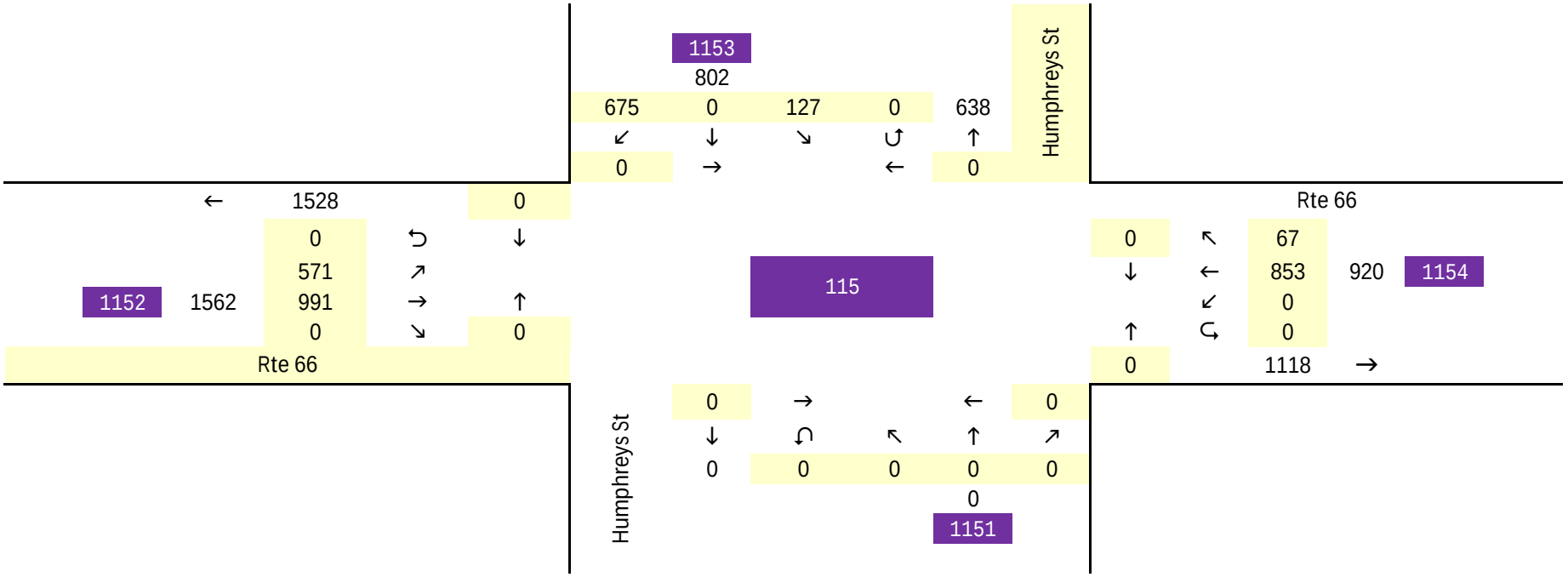

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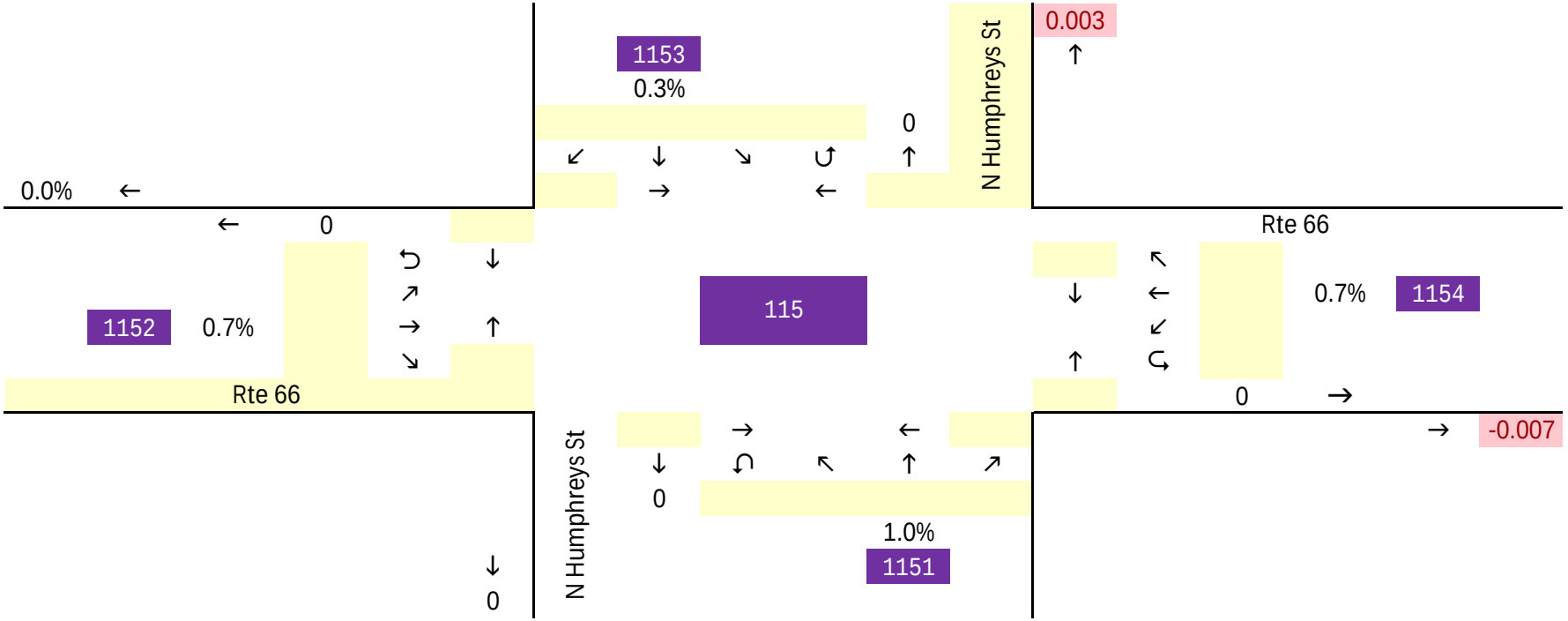
Growth Rate



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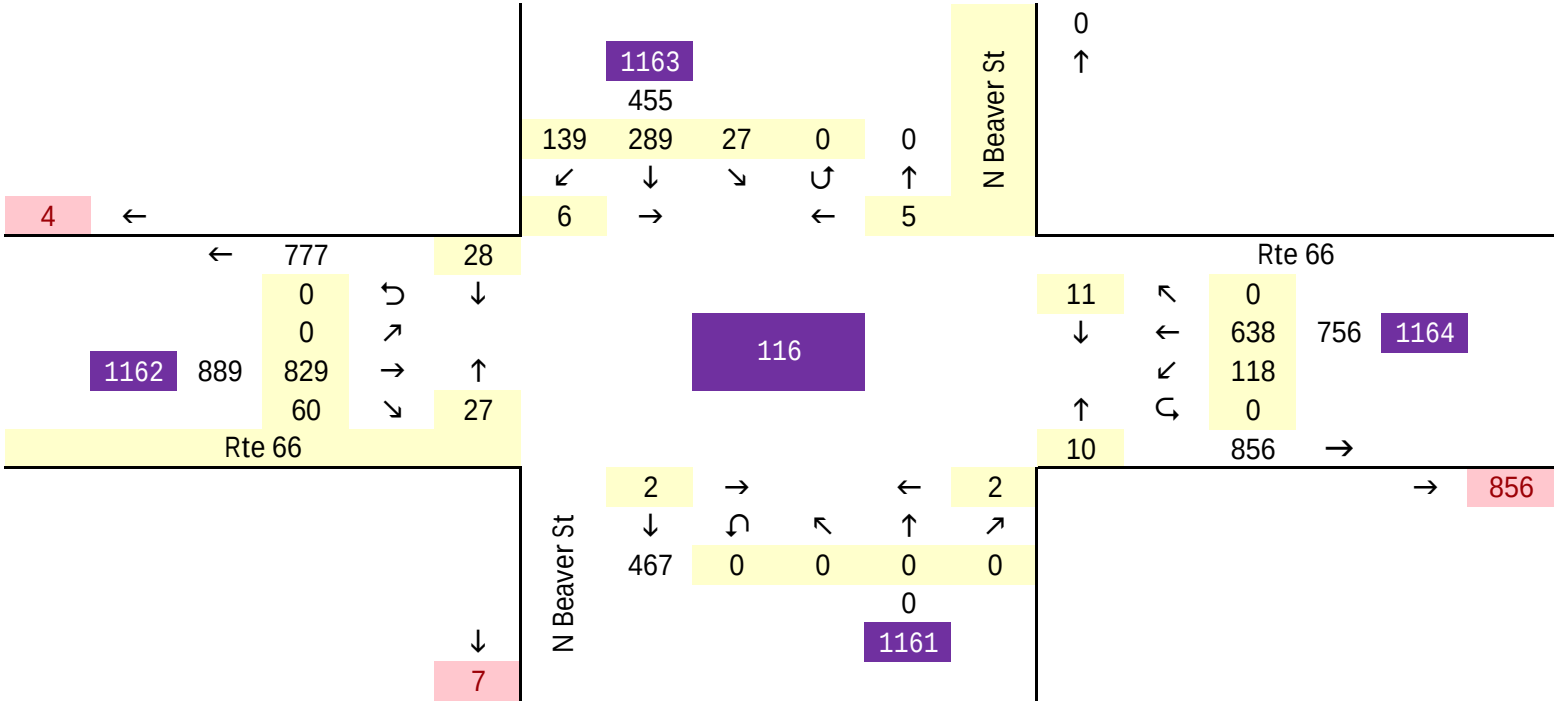

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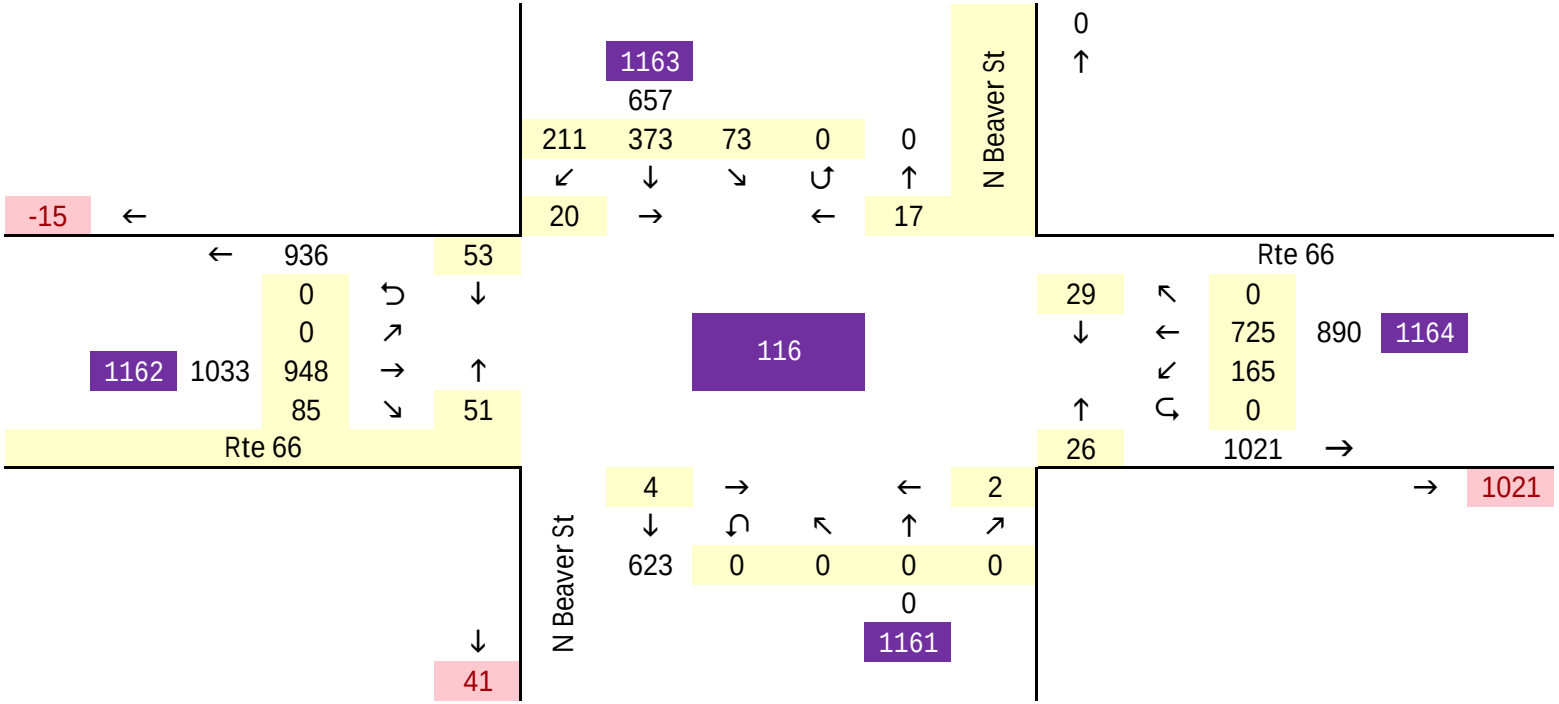

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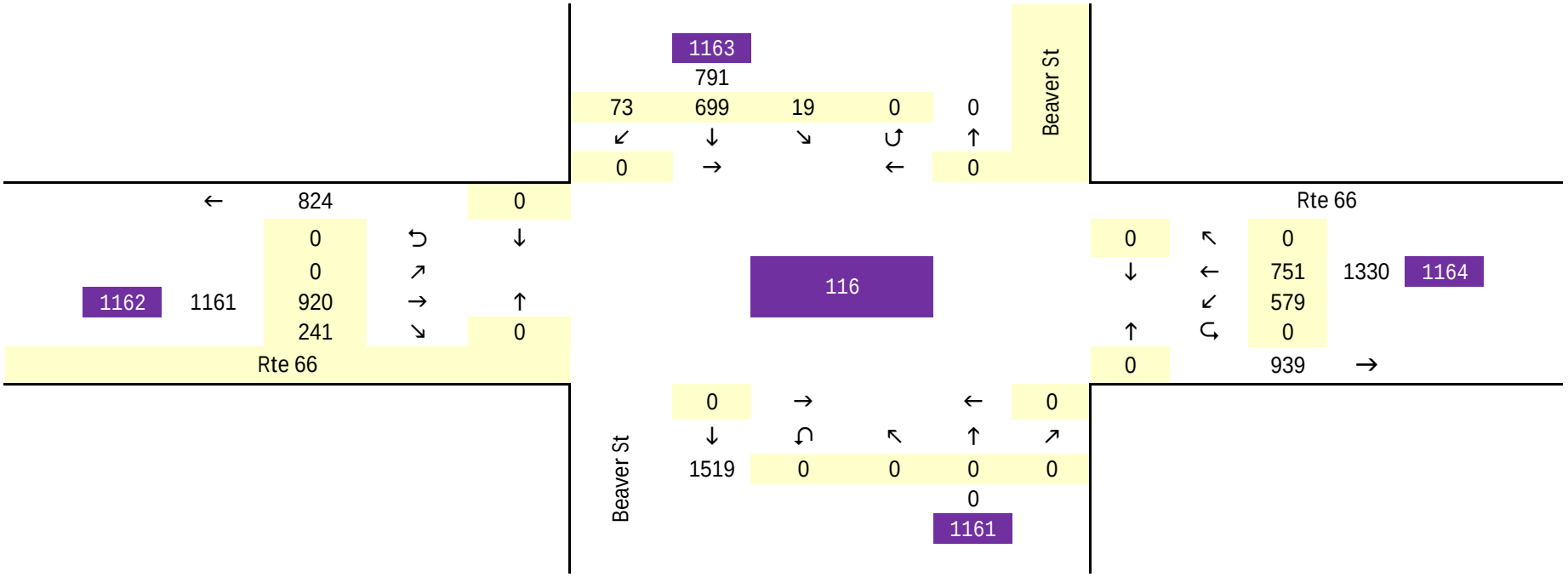

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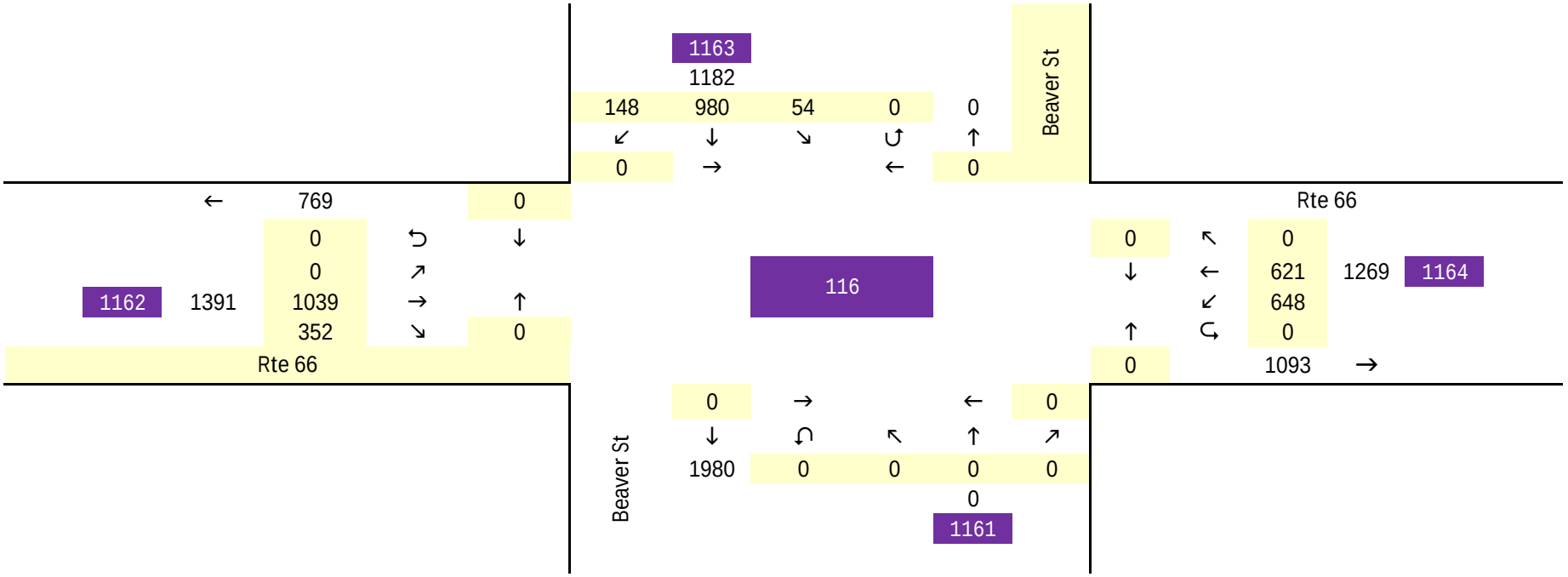

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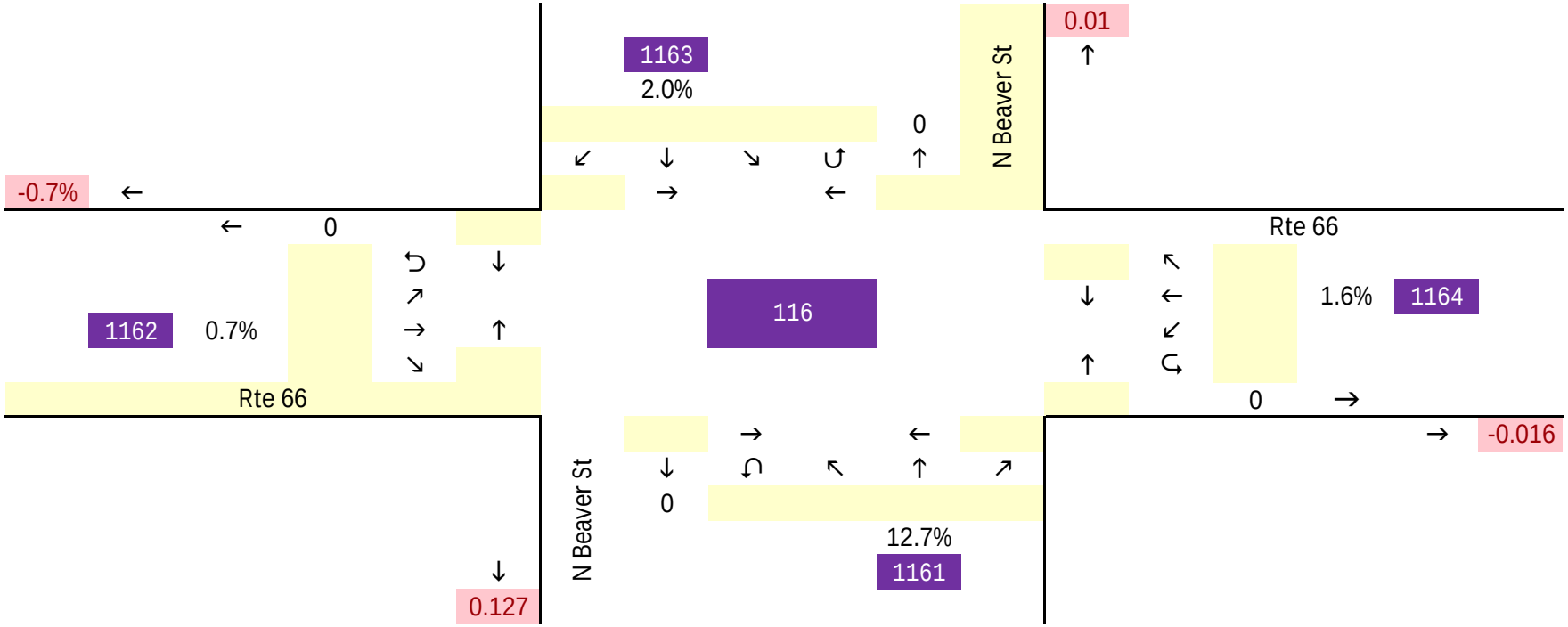
Growth Rate



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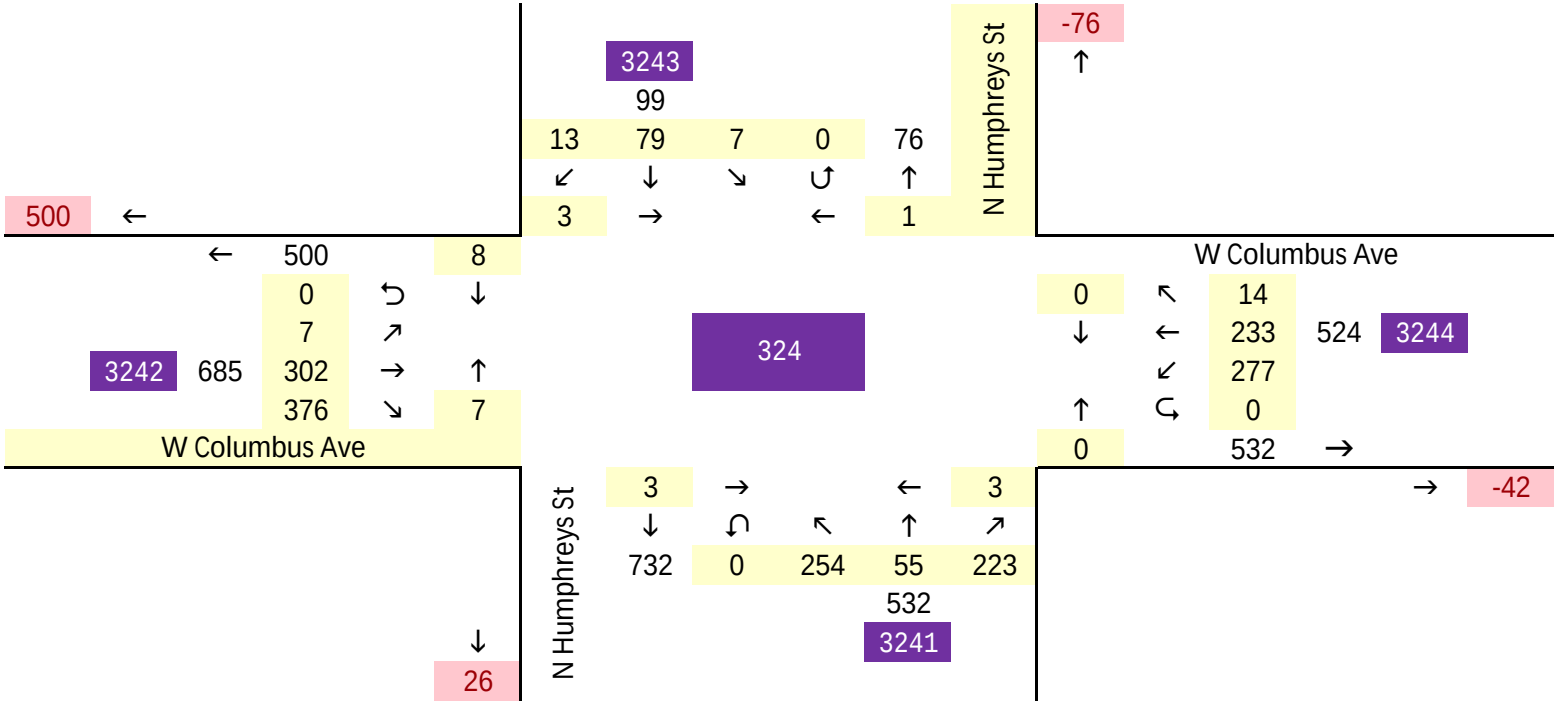

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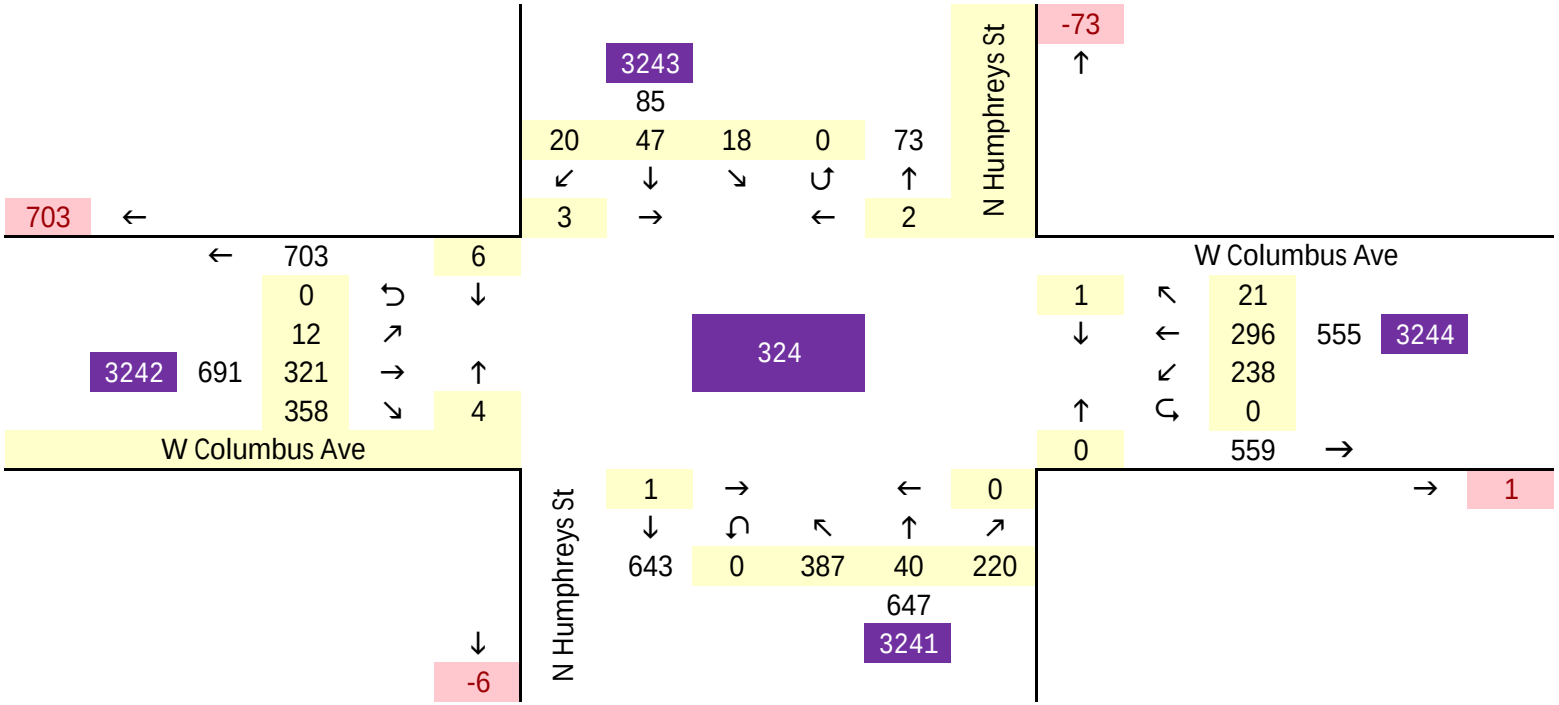

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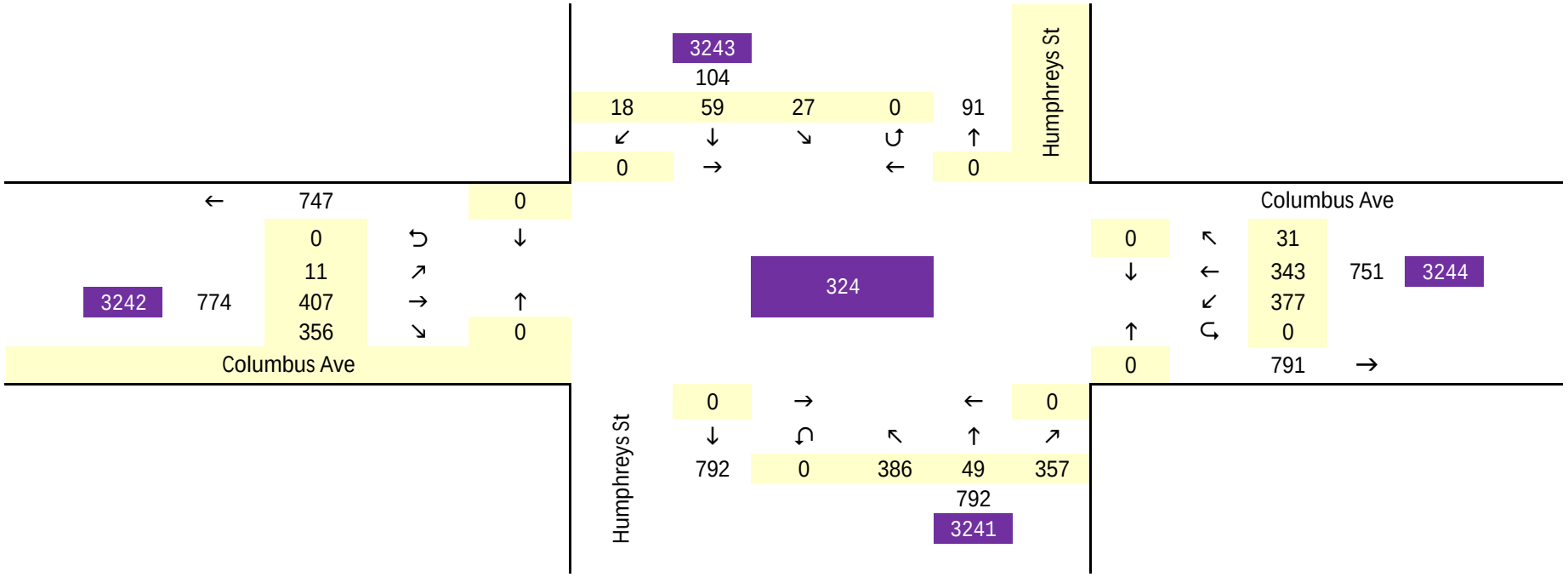

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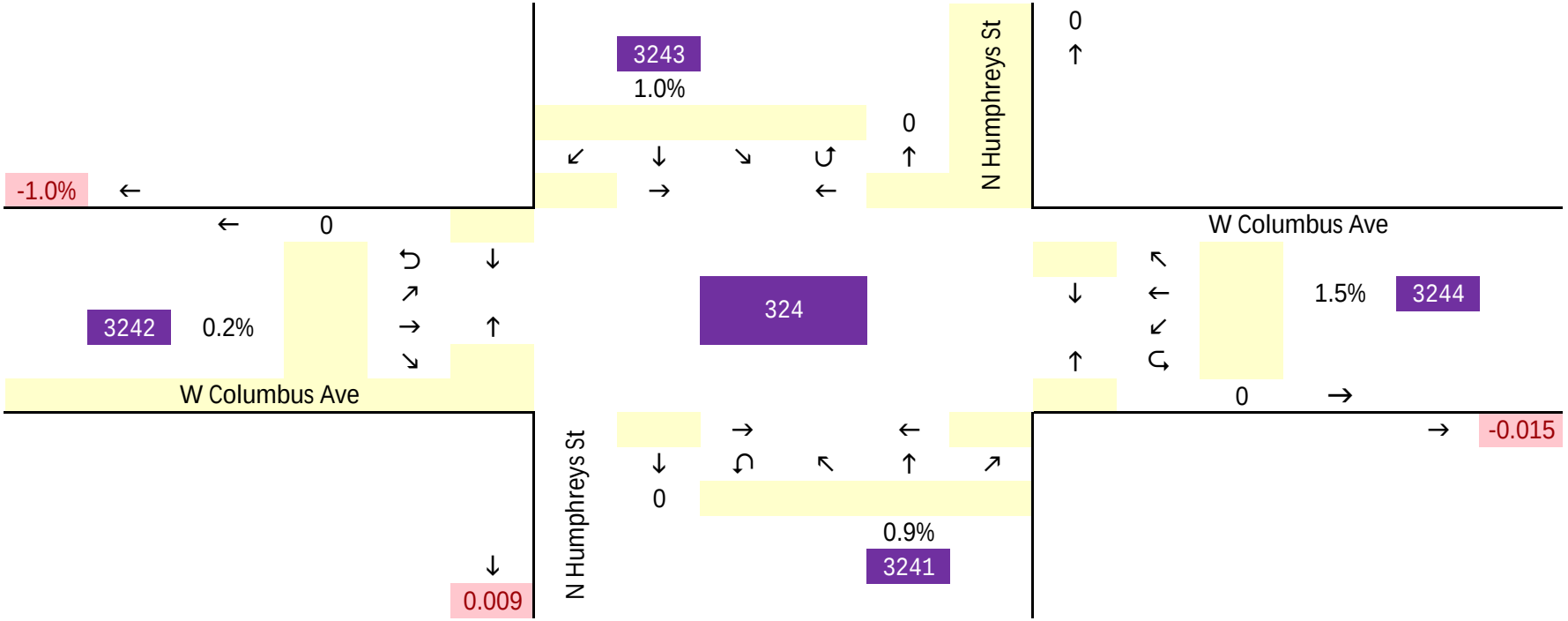
Growth Rate



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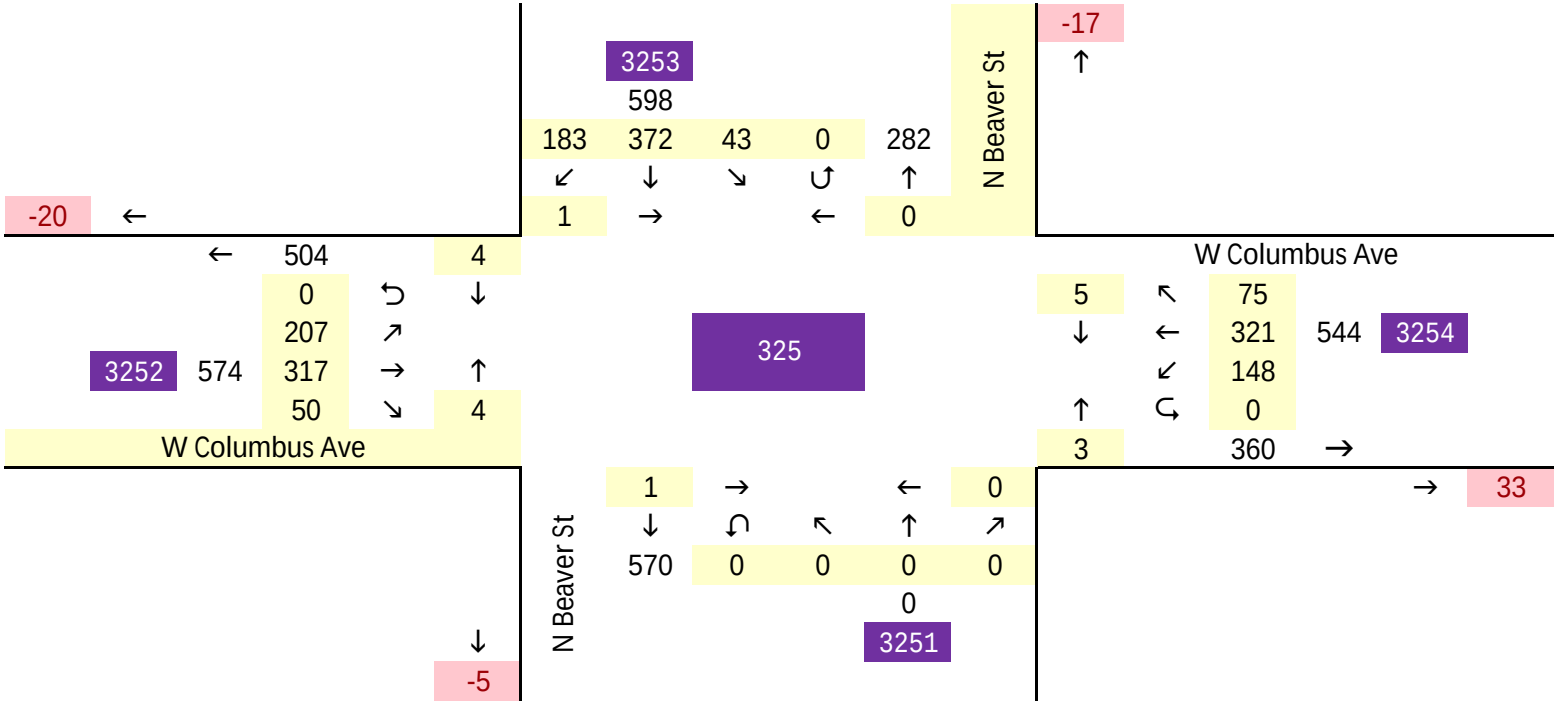

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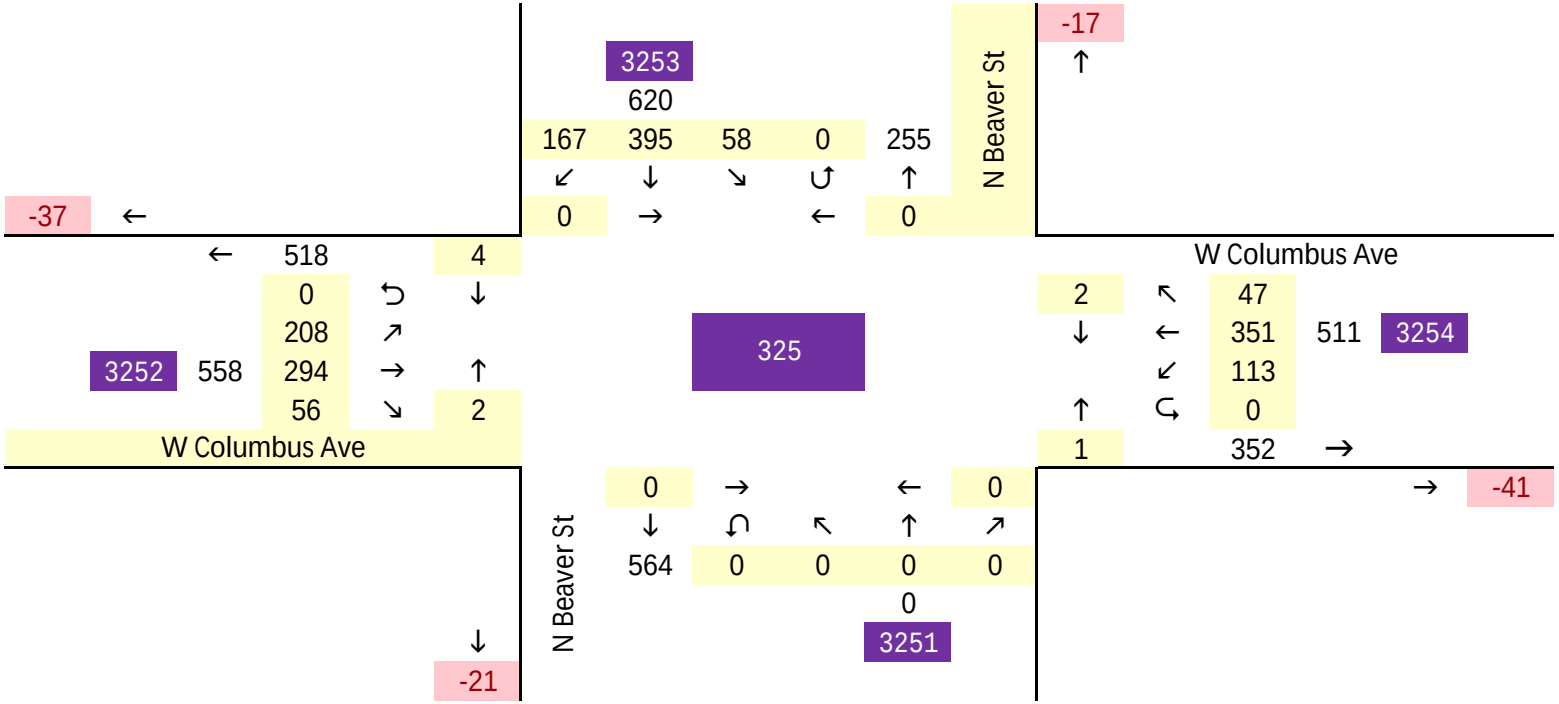

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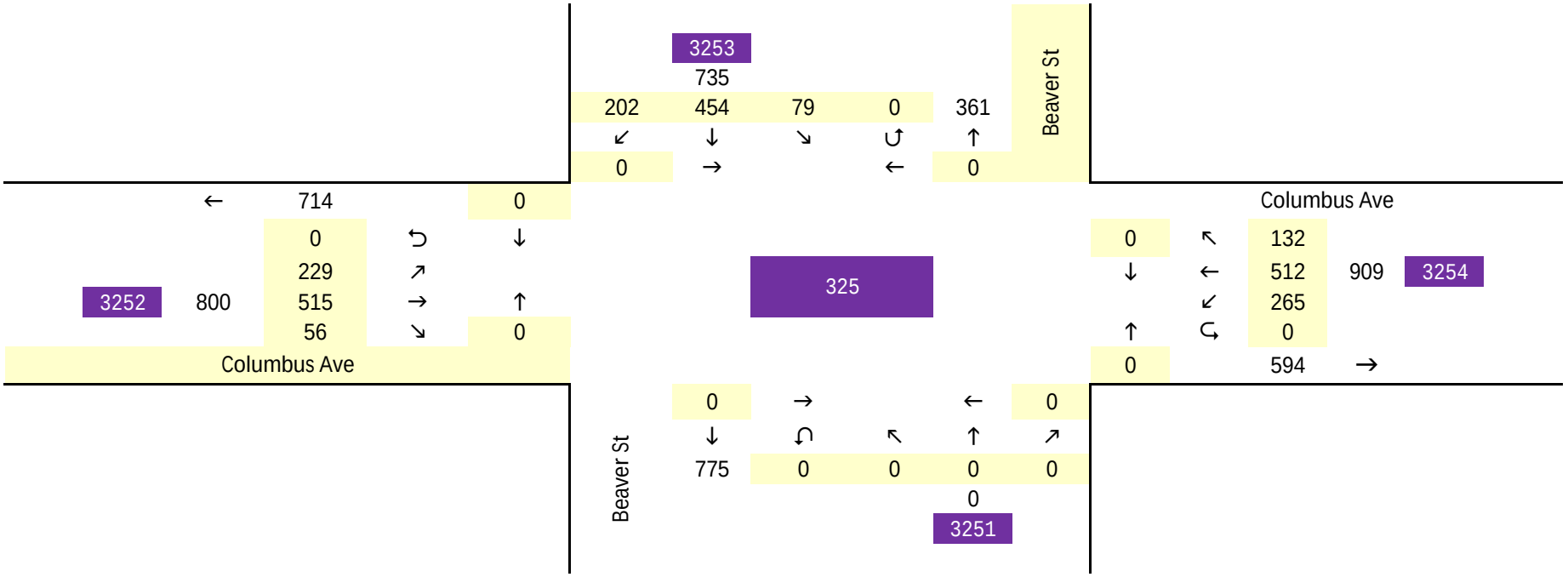

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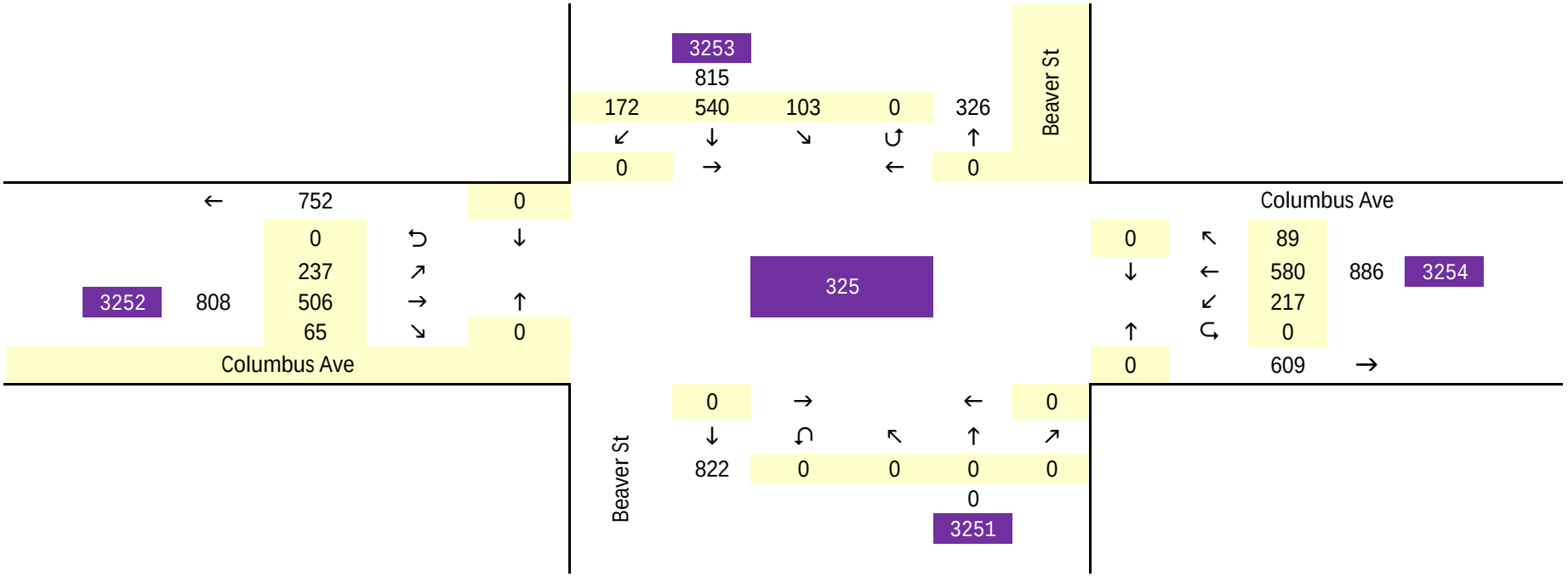

Intersection 325
Growth Rate