Traffic Modelling for PSP 1059 Beveridge North West

transportation planning, design and delivery

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GTAconsultants

Traffic Modelling for

PSP 1059 Beveridge North West

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1. Introduction

1.1 Background

The Beveridge North West (1059) PSP comprises of 15 properties with a total of over 1,250 hectares (gross) of land that is expected to accommodate over 10,000 residential lots. The precincts primary land use is identified as residential with landscape values along the north and west boundary. The PSP is situated to the west of the Hume Freeway, north of Cameron's Lane, west of Old Sydney Road and is south of Wallan. The approved Lockerbie North PSP is located south east of the precinct on the opposite side of the Hume Freeway, and the Beveridge Central and Mandalay precinct are located to the south.

The PSP is located within the Northern Growth Corridor Plan (GCP) and is proposed to include two north-south arterial roads and three east-west arterial roads.

1.2 Purpose of this Report

GTA Consultants (GTA) has been engaged by the Metropolitan Planning Authority (MPA) to undertake strategic transport modelling and to determine the anticipated demands on the transport network. The outputs will be used to:

- Inform the road cross sections for an interim (2026) and ultimate (2046) scenario.
- Understand the need for any further infrastructure including duplicating arterial roads in the future or additional turn lanes at an intersection.
- Determine the functional intersection design requirements for an interim (2026) and ultimate (2046) scenario. The layouts will then be used as input into the preparation of the Development Contributions Plan (DCP).

This report sets out the methodology undertaken to determine the demand volumes and layout plans.

1.3 References

In preparing this report, reference has been made to a number of background documents, including:

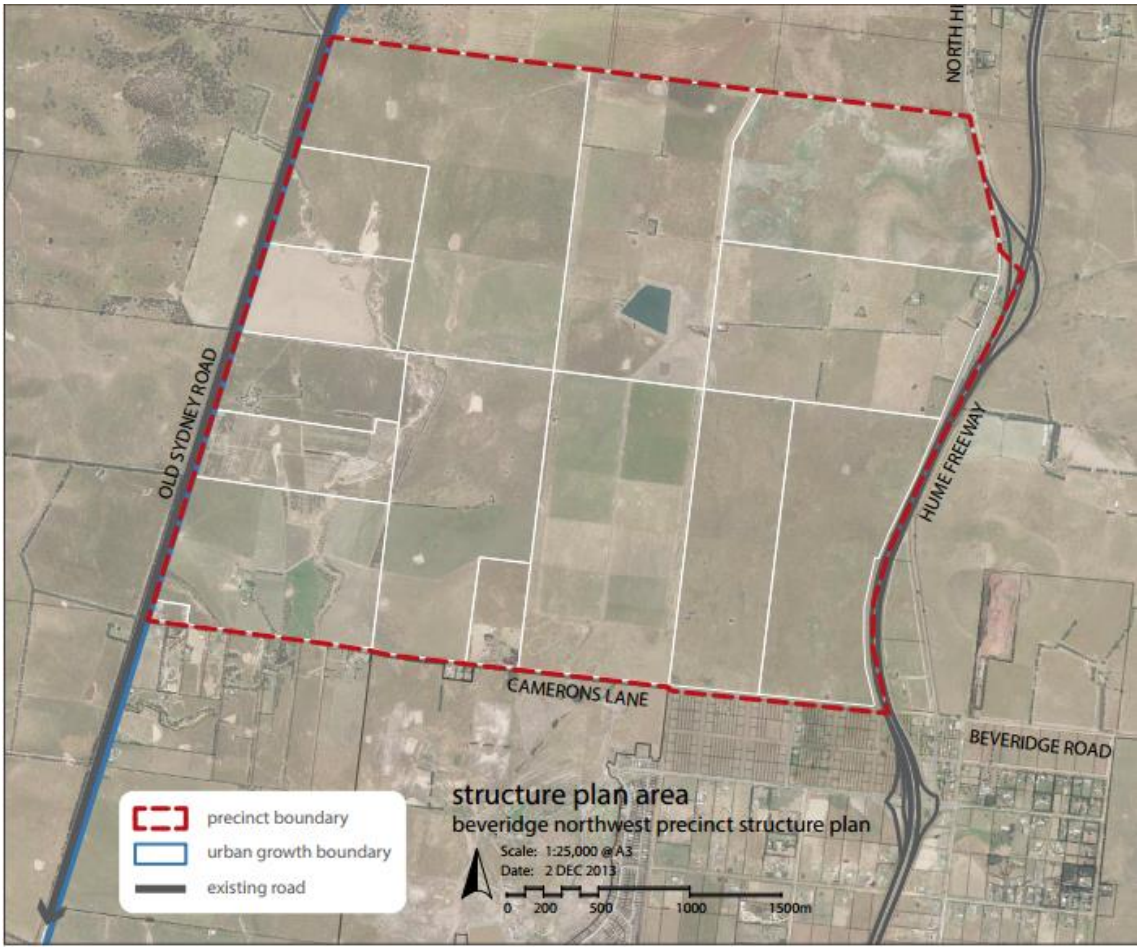
- plans for the PSP prepared by Metropolitan Planning Authority
- Victorian Integrated Transport Model (VITM)
- VITM Northern Growth Corridor Model
- various technical data as referenced in this report
- other documents as nominated.

2. Site Context

2.1 Subject Site

The Beveridge North West PSP (No. 1059) is located within the Mitchell Shire Council municipal area north of the Melbourne CBD. The precinct is bound by Wallan to the north, Old Sydney Road to the west, Camerons Lane to the south, and the Hume Freeway to the east. The location of the Beveridge North West PSP boundary is shown in Figure 2.1.

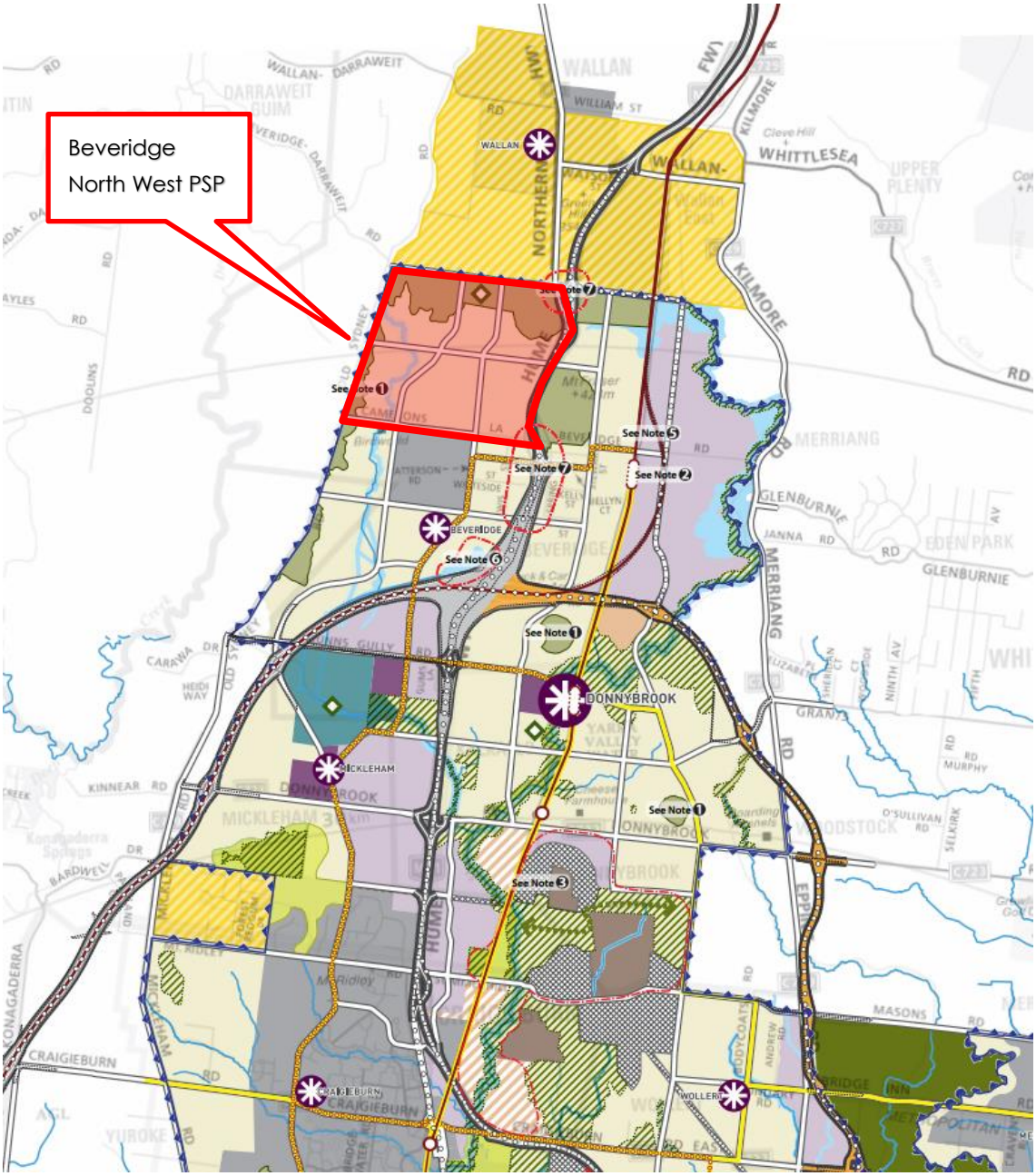
Figure 2.1: Beveridge North West PSP Boundary



2.2 Northern Growth Corridor

The location of the Beveridge North West PSP in relation to the wider Northern Growth Corridor and its local context are illustrated in Figure 2.2.

Figure 2.2: Beveridge North West PSP in the Context of the Northern Growth Corridor



SKM was commissioned by MPA (formerly GAA) to calibrate and refine the Department of Transport's (now DTPLI) Victorian Integrated Transport Model (VITM) for Melbourne's North Growth Corridor. The refinements to VITM included the following:

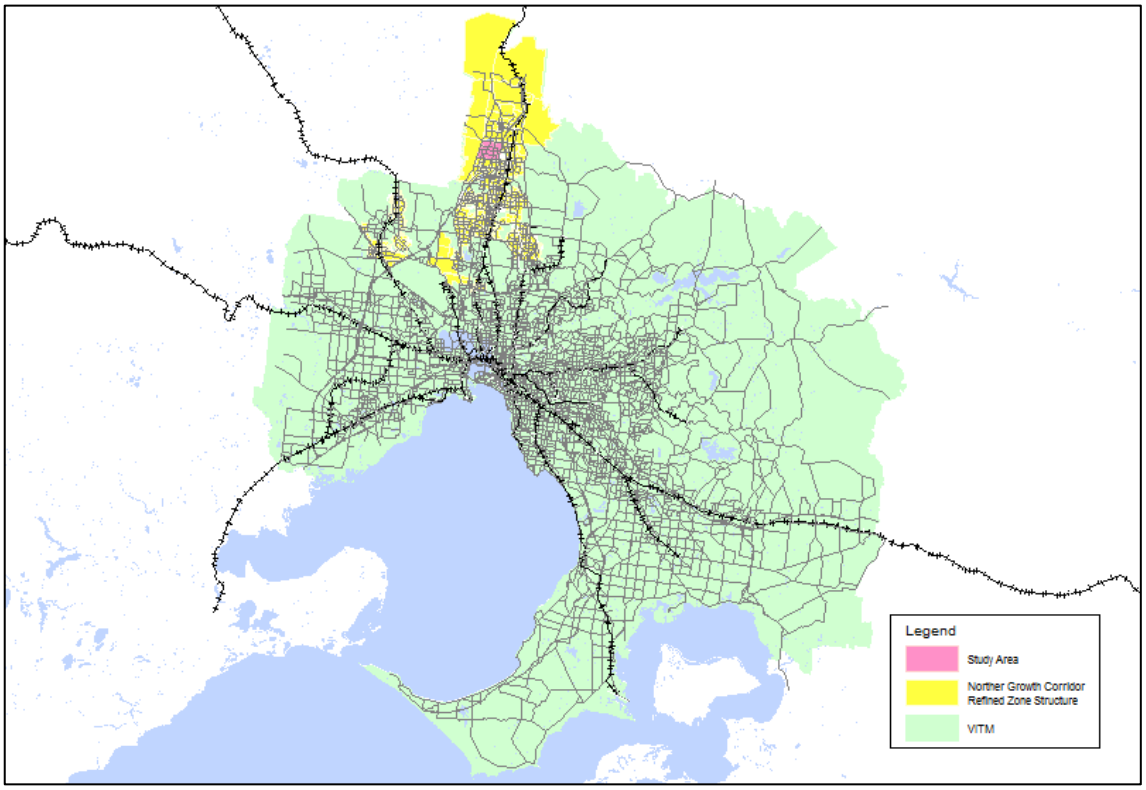
- disaggregation of the zone system within the growth corridor
- updates to the future modelled land use yields to reflect the level of growth predicted by the MPA within the corridor
- updates to the road network within the corridor.

The purpose of the project was to provide a strategic model of the North Growth Corridor which could be to understand the transport needs of the MPA, Hume City Council, Sunbury City

Council, Whittlesea City Council and VicRoads for projects (such as PSPs) within the corridor. This model is referred to as the NGC VITM hereafter.

The context of the study area as it relates to the northern growth area and the study area for Beveridge North West PSP is shown in Figure 2.3.

Figure 2.3: VITM Zone Structure in the Context of the Northern Growth Corridor Model

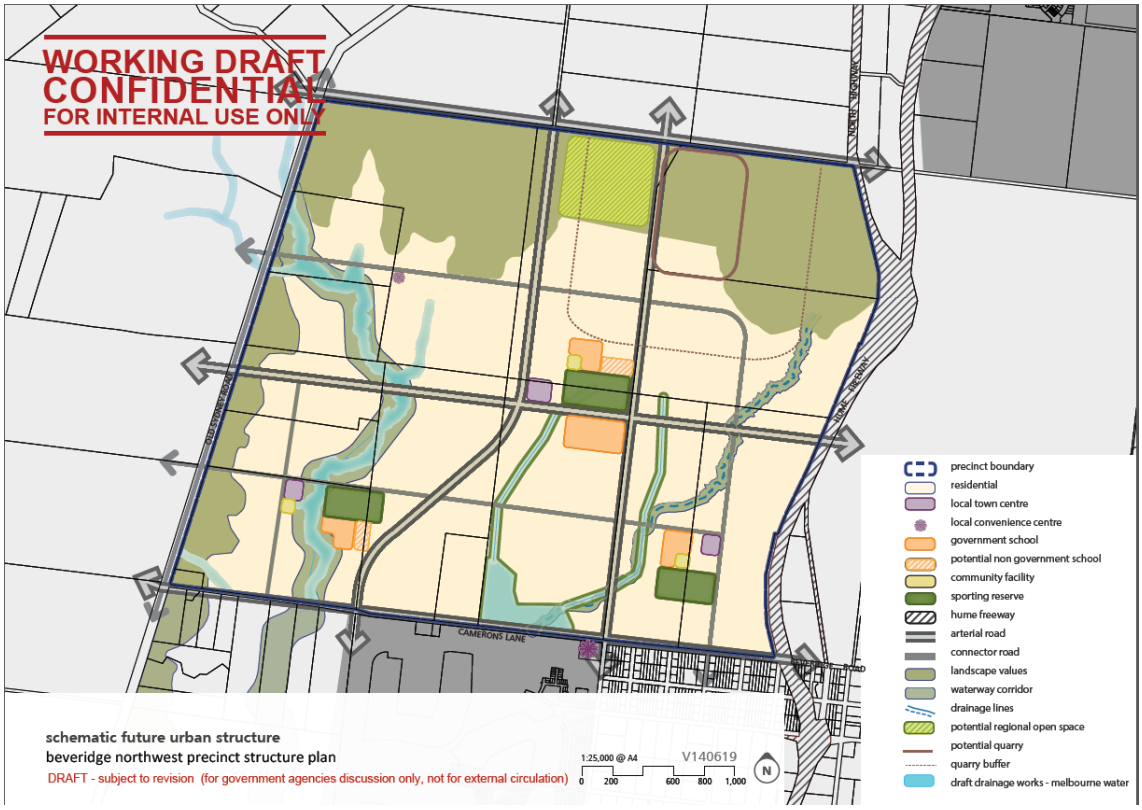


3. PSP Context

3.1 Urban Structure Plan

The indicative Urban Structure Plan for the Beveridge North West PSP is shown Figure 3.1. The plan was developed by MPA as part of the structure planning process.

Figure 3.1: Beveridge North West Draft Future Urban Structure



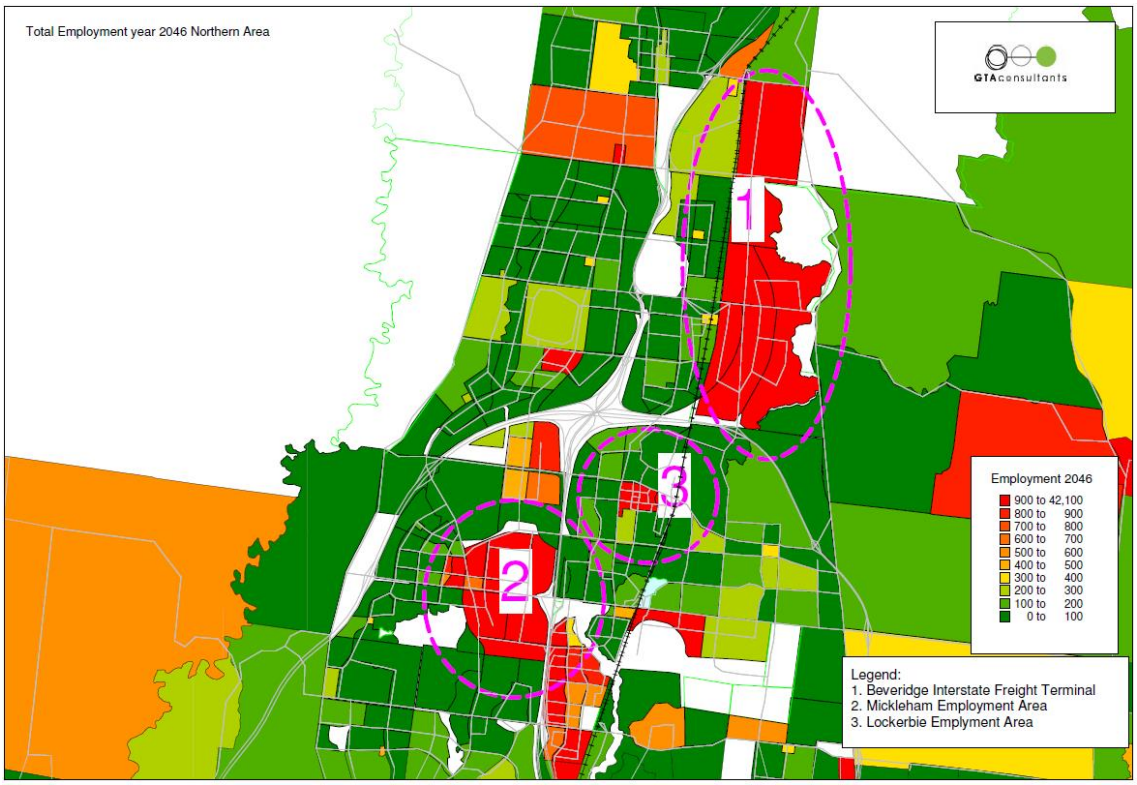
The Beveridge North West PSP comprises of primarily residential developments with landscape values along the north and west boundary. A quarry is also proposed to be located north of the precinct (south of Wallan) along the second north-south arterial road. The precinct includes a total of three Local Town Centres (LTCs) that comprise of a mix of retail, school and community facilities. Access is provided by two north-south arterial roads, three lower order north-south connectors as well as a series of east-west connectors. Further discussion on the road layout is provided in Section 4.

3.2 Surrounding Land Uses

The study area is surrounding by a range of proposed residential and economic land uses, as depicted in Figure 3.1. The Major Activity Centre of Lockerbie North is located immediately east of the PSP which has forecast a high proportion of jobs (employment) as well as Wallan located on to the north of the precinct.

Figure 3.2 has been prepared to demonstrate the employment forecast within the VITM zones in the surrounding employment areas as they relate to the study area.

Figure 3.2: Northern Growth Corridor – VITM Employment Characteristics



The areas depicted in Figure 3.2 highlight the influence that these are likely to have on the travel patterns across the network. Of note are the Mickleham Employment Area, Donnybrook Town Centre and the Beveridge Interstate Freight terminal, that are all forecast to exhibit high employment numbers thus influencing travel patterns in the region.

4. Existing and Future Road Network

4.1 Overview

The boundaries of the PSP are bounded by the Hume Freeway to the east, Camerons Lane to the south, Old Sydney Road to the west and the Wallan boundary to the north. The existing and anticipated future characteristics of key roads in the vicinity of the PSP area are discussed below. This section describes the key arterials bounding the PSP.

4.2 Arterial Road Network

4.2.1 Hume Freeway

The Hume Freeway corridor along eastern boundary of the precinct and is the most significant north – south corridor linking northern Victoria with the Melbourne CBD. The freeway cross section is generally configured with two traffic lanes and an emergency lane in each direction separated by a 30m central median. The 50 metre carriageway (approx.) is set within a 75 metre road reserve (approx.). The large road reserve allows for additional traffic lanes to be added to the corridor to cater for future growth.

4.2.2 Camerons Lane

Camerons Lane located on the southern boundary of the precinct and is configured as a two lane rural cross-section (one lane in each direction) adjacent to the site. The North Growth Corridor Plan identifies that sections of Camerons Lane will be upgraded to Arterial Standard with up to two lanes in each direction.

The existing interchange at Lithgow Street does not meet current VicRoads standards and it is earmarked to be replaced by a full interchange at Camerons Lane, which is earmarked to attract funding via GAIC or GAIC WIK, particularly from the Lithgow development.

4.2.3 Old Sydney Road

Old Sydney Rd is a two-way unsealed road aligned in a north-south direction located to the west of the subject site. It provides direct access to Wallan and will ultimately consist of a two lane cross section (one lane in each direction) through the study area.

4.2.4 Stockade Road

Stockade Road is proposed to be located north of the precinct and is the boundary separating Beveridge North and Wallan. It will ultimately be configured as a four lane cross section (two lanes in each direction).

4.3 Internal Road Network

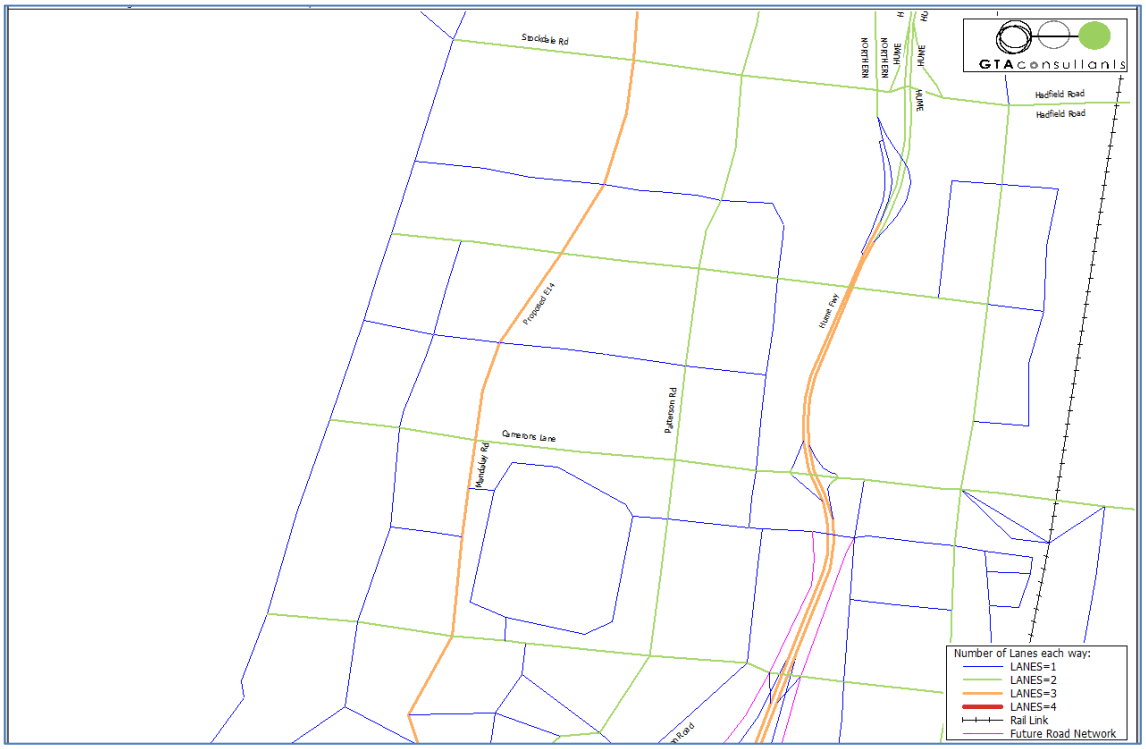
The internal road network is underpinned by a grid network of collector and boulevard road types that provide internal connectivity to local town centres as well as the external network. Key features of the network include:

- Two new north-south arterial roads (Proposed E14 and Paterson Street) located west of Hume Freeway connecting to Camerons Lane and the new east-west arterial road bordering Wallan (Stockade Road).

- Three new east-west arterial roads north of Camerons Lane that will pass through the Beveridge North West PSP.
- A number of new east-west and north-south connectors will be placed at strategic locations between the arterial road network that are aimed at providing local connectivity and access.

The refined road network as depicted in the VITM model is shown in Figure 4.1.

Figure 4.1: Beveridge North West PSP VITM Road Network (2046)



Further discussion on the transport modelling is provided in Section 5.

5. Transport Modelling

5.1 Background

VITM is a tool developed by the Department of Transport, Planning and Local Infrastructure (Formerly DoT) to assist in the planning of road and public transport infrastructure in Victoria. It is a multimodal strategic model that uses future population, employment and land use data projections to forecast travel behaviour and the impacts of changes to the road and public transport networks. VITM contains all major freeways, main arterials and connector roads within the Melbourne Statistical Division.

The model is a link-based traffic model which is implemented in the CUBE Voyager software environment (developed by Citilabs). The model version that used for this project was obtained from the DTPLI in May 2013, version VITM2012_V120110 GAA NGC. This is the latest release of the model from the DTPLI (DoT formerly).

The MPA commissioned a study to refine the Victorian Integrated Transport Model (VITM) for Melbourne's North Growth Corridor. The refinements to VITM included the following:

- disaggregation of the zone system within the growth corridor
- updates to the future modelled land use yields to reflect the level of growth predicted by the MPA within the corridor
- updates to the road network within the corridor.

The purpose of the project was to provide a strategic model of the North Growth Corridor which could be to understand the transport needs of the MPA, Hume City Council, Whittlesea City Council and VicRoads for projects (such as PSPs) within the corridor.

This model formed the basis for the VITM modelling undertaken as part of this package of work.

5.2 Design Years - Interim (2026) vs. Ultimate (2046)

Both interim and ultimate traffic volumes are presented in this report. The interim traffic volumes represent the +10 year scenario (~2026) and the ultimate volumes the 2046 scenario. The interim volumes are used to inform intersection works up to the interim scenario for inclusion into the Development Contributions Plan (DCP), whilst the ultimate volumes are used to validate the provision of ultimate road reserves including flaring requirements at intersections.

5.3 GTA Road Network Refinements

GTA refined a copy of the Northern Growth Corridor version of VITM (herein referred to as the NGCVITM) and has used it in the assessment of the Beveridge North West PSP. For the purposes of this assessment the following network refinements were made to the NGC VITM (both the 2026 and 2046 models):

- additional and editing road network in the study area
- refinement of the zones
- refinement of the zone centroid connection locations for the PSP.

The extent of the GTA network refinements are shown in Figure 5.1and Figure 5.2.

Figure 5.1: NGC - VITM Road Network

Figure 5.2: Refined VITM Road Network

The GTA refinements were made to enhance how the NGC VITM reflected the likely access arrangements for the Beveridge North West PSP. It is highlighted that the GTA refinements did not result in any noteworthy changes to the 2026 and 2046 VITM network beyond the bounds of the study area.

Plots of the road network characteristics (i.e. speeds, lanes, capacities etc.) are located in Appendix A.

5.4 Land use Refinements

In addition to the road network refinements, the zone configuration of the PSP was desegregated for the purpose of the traffic assessment. The zone system was based around the proposed urban structure plan's land uses and road network characteristics.

The zone refinements are shown graphically in Figure 5.3 and Figure 5.4, whilst Figure 5.5 provides details of the zone numbering adopted for the study area.

Figure 5.3: NGC VITM Zone Structure

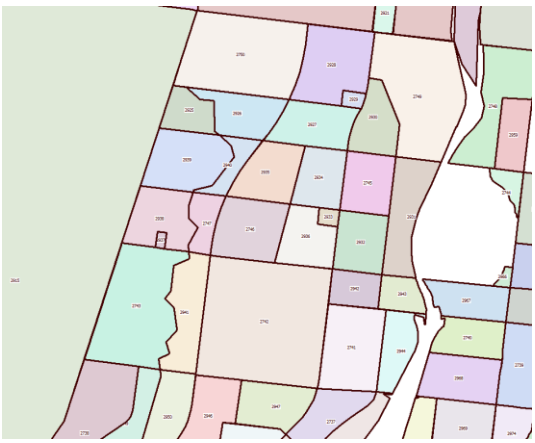
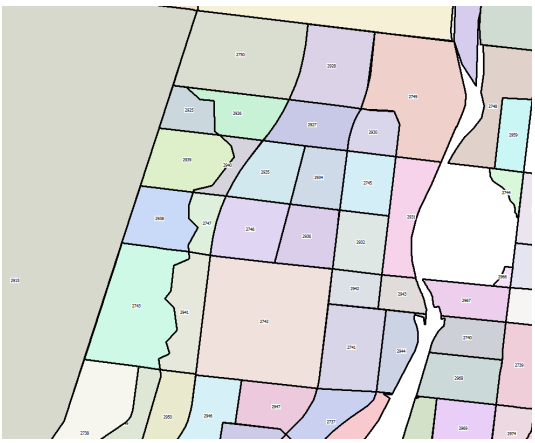


Figure 5.4: Refined VITM Zone Structure



In addition, the land use specifications for the zones have been provided from the MPA, and are shown and summarised in Figure 5.5 and Table 5.1.

Figure 5.5: Beveridge North West PSP Zone Numbering

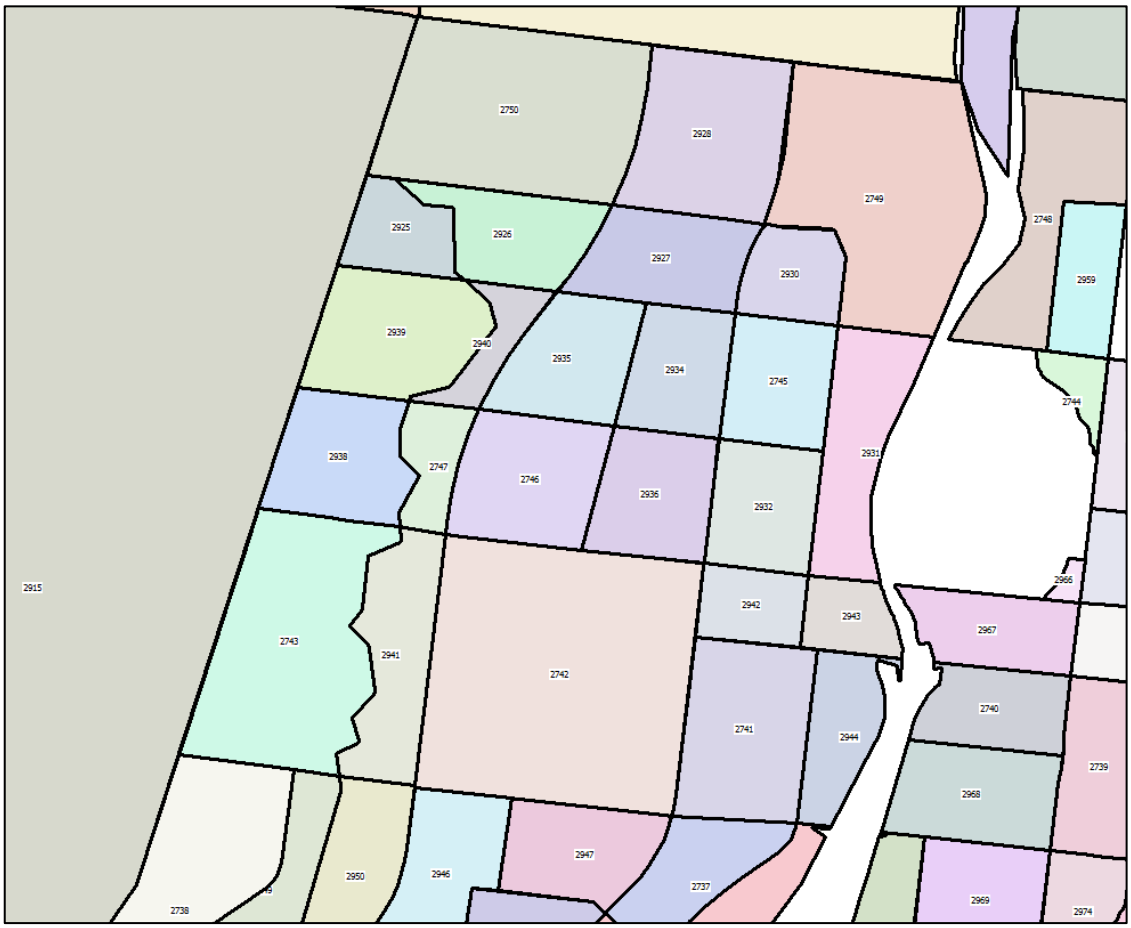


Table 5.1: Beveridge North West PSP Land Use Summary (2026 and 2046)

Zone	2026				2046			
	Population	Dwelling	Employment	Enrolment	Population	Dwelling	Employment	Enrolment
2745	901	429	29	0	1,601	572	38	0
2746	1,233	587	39	0	2,193	783	52	0
2747	237	113	43	851	421	150	80	851
2749	541	258	17	0	962	344	23	0
2750	586	279	19	0	1,041	372	25	0
2925	591	282	19	0	1,051	375	25	0
2926	915	436	29	0	1,627	581	39	0
2927	704	335	115	851	1,251	447	245	851
2928	919	438	29	0	1,635	584	39	0
2930	829	395	26	0	1,474	526	35	0
2931	1,166	555	37	0	2,072	740	49	0
2932	679	323	78	400	1,207	431	181	400
2934	710	338	68	1,100	1,261	450	120	1,100
2935	1,006	479	32	0	1,788	638	43	0
2936	995	474	32	0	1,769	632	42	0
2938	1,106	526	91	0	1,966	702	159	0
2939	1,328	633	42	0	2,362	843	56	0
2940	392	187	12	0	698	249	17	0
Total PSP	**14,837**	**7,065**	**756**	**3,202**	**26,378**	**9,421**	**1,267**	**3,202**

As shown in Table 5.1, population in the Beveridge North West PSP are to increase by 78% from 2026 to 2046, 68% for employment and no increase for enrolment. Ultimately, the PSPs will total a population over 26,300, including 9,400 households, 1,200 jobs and 3,200 enrolments.

Of note for the PSP in that it exhibits a low amount of jobs relative to the population, meaning that trips to and from the precinct are likely to be tidal.

5.5 Scenarios

A total of six scenarios have been tested as part of this project, including

- four scenarios in 2026
- two scenarios in 2046.

Each of the scenarios contains a combination of links that have been identified as part of this study. The links include two north-south connectors (the proposed E14 and Paterson Street) that connect from Camerons Lane to Wallan, and an east-west connector.

Table 5.2 summaries each of the scenarios tested, noting that each of the scenarios includes the same land uses identified in Table 5.1.

Table 5.2: Summary of Road Network Inclusions for each Scenario

No	Year	Scenario No	Scenario Detail
1	2026	Scenario 1	Base case
2		Scenario 2	Base case without Paterson Street
3		Scenario 3	Base case without E14
4		Scenario 4	Base case without east – west connector
5	2046	Scenario 1	Base case
6		Scenario 2	Base case without east – west arterial

The location of the links indicated in Table 5.2 is shown graphically in Figure 5.6.

Figure 5.6: Location of Links Included for Scenarios Modelled

6. Anticipated Traffic Volumes

6.1 Introduction

An assessment of the PSP transport demands and network performance has been undertaken for the Base Scenario in this section of the report. The outcomes from the assessment of the Base Scenario will inform the road network requirements at full development, whilst the determination of a need for the four crossings previously identified is within Section 7.

6.2 GTA VITM Traffic Generation

Table 6.1 lists the inputs and outputs of the GTA VITM modelling. It shows the AM and PM 2-hour peak and daily traffic generation for the PSP along with the corresponding land use inputs.

Table 6.1: Updated VITM Traffic Generation – Base Scenario

Year	Land Use			AM 2 hr Trips	PM 2 Hr Trips	Daily Vehicle Trips
	Residential (hh)	Employment (jobs)	Schools (enrolments)			
2026	7,000	750	3,200	7,700	8,700	44,300
2046	9,500	1,300	3,200	11,100	12,900	67,500

The model outputs suggest that by 2046 the PSP is expected to generate traffic in the order of 67,500 vehicle trips per day with 11,060 and 12,920 vehicles for the AM and PM 2-hour peak periods respectively.

Adopting a typical (industry standard) two-hour to peak hour factor of 0.55, the PSP is anticipated to generate in the order of 6,100 vehicles in the AM peak hour and 7,100 vehicles in the PM peak hour.

6.3 Validation of VITM Traffic Generation Rates

6.3.1 First Principles Generation Rates

A summary of the individual land uses and the resulting first principles traffic generation for the study area is provided in Table 6.2. This assessment compares the modelled traffic volume outputs to commonly used generation rates as confirmation that VITM is generating realistic traffic demands.

Table 6.2: First Principles Traffic Generation Assessment – Base Scenario

Area	Land Use	Yield	Traffic Generation Rate			Reduction Factor for Internal Trips	Resultant Trips		
			AM (1hr)	PM (1hr)	Daily		AM (1hr)	PM (1hr)	Daily
2026	Residential [1]	7,065 dwellings	0.6 trips /hh	0.6 trips /hh	6.0 trips /hh	15%[1]	3,603	3,603	36,034
	Employment (jobs)	756 jobs	[2] 0.5 trips / 3 jobs	[2] 4.6 trips / 3 jobs	[2] 50 trips / 3 jobs	[3] 25%	94	863	9,382
	School	3,202 enrolments	[4] 0.75 trips / enrol	[4] 0 trips / enrol	[4] 1.5 trips / enrol	n/a	2,402	0	4,803
Total							**6,099**	**4,466**	**40,218**
2046	Residential [1]	9,421 dwellings	0.6 trips /hh	0.6 trips /hh	6.0 trips /hh	15%[1]	4,804	4,804	48,045
	Employment (jobs)	1,267 jobs	[2] 0.5 trips / 3 jobs	[2] 4.6 trips /3 jobs	[2] 50 trips / 3 jobs	[3] 25%	157	1,446	15,723
	School	3,202 enrolments	[4] 0.75 trips / enrol	[4] 0 trips / enrol	[4] 1.5 trips / enrol	n/a	2,402	0	4,803
Total							**7,363**	**6,251**	**68,571**

[1] Daily rate based on VISTA 09 data for the Whittlesea LGA, with the peak hour rates assumed to be 10% of the daily rate. A reduction factor of 15% has been applied to account for inter-zonal trips

[2] Daily rate sourced from the RTANSW "Guide to Traffic Generating Developments" report (dated October 2002) with PM peak hour rate assumed to be 10% of the daily rate. An AM rate of 0.5 trips/100sqm has been adopted for service vehicle movements given that the LTC will not be fully operational during the AM peak hour. A rate of 3 jobs per 100sqm has been adopted for this assessment.

[3] Based on Section 3.3 of the RTANSW "Guide to Traffic Generating Developments" report. It is assumed that 25% of all trips within the PSP will be internal to the zone given that the PSP includes a number of LTC's and schools.

[4] Based on a first principles assessment

It is highlighted that the first principles assessment outlined in Table 6.2 takes into consideration the results of the Victorian Integrated Survey of Travel and Activity 2009 (VISTA09) undertaken by the DoT/DTPLI. VISTA09 is a comprehensive survey of how, when and why Victorians travel and is both more recent and locality specific than most other available empirical data sources. The average VISTA09 traffic generation rate of 6.0 movements per dwelling for the Mitchell LGA is lower than other empirical data sources which generally have a daily generation rate in the order of 6.0 vehicle movements per dwelling. The lower VISTA 09 generation rate can be partially attributed to amongst other things, a shift in mode choice away from private vehicle use.

6.3.2 Comparison of VITM and First Principles Volume Analysis

A comparison of the GTA VITM generation and first principles generation assessment is provided in Table 6.3.

Table 6.3: VITM versus First Principles Assessment - Base Scenario

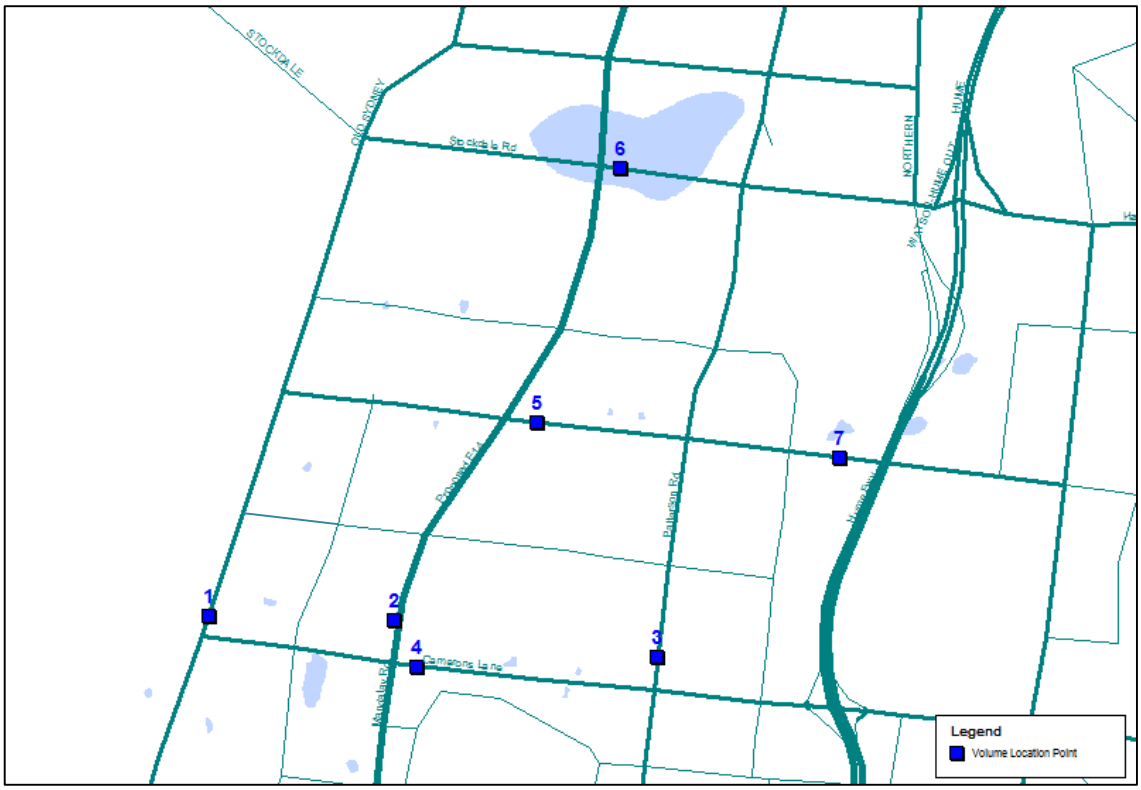
Year	Traffic Volumes	AM Peak	PM Peak	Daily
2026	VITM	4,248	4,798	44,300
	First Principle Assessment	6,099	4,466	50,218
	% Difference	144%	93%	113%
2046	VITM	6,082	7,107	67,500
	First Principle Assessment	7,363	6,251	68,571
	% Difference	121%	88%	102%

Table 6.3 show that the forecast GTA VTIM traffic demands are generally within 15% of the daily trips to those of a first principles assessment, noting that some of the land use rates and yields can vary depending on the ultimate mix and density of development, and the strategic nature of VITM. It is noted that the VITM generally produces low traffic demands when compared with the first principles assessment due to short trips (trips within zones) being excluded, this is particularly noticed in the AM peak in 2026 which has a high proportion of school trips when compared to 2046.

6.4 Daily Modelled Volumes

Seven key locations within the PSP have been identified in consultation with MPA to report on a range of outputs including volumes and capacity information. The seven locations are shown graphically in Figure 6.1.

Figure 6.1: Transport Network with Key Locations



Based on the outcomes of the VITM modelling, the expected two-way daily traffic volumes on key roads for 2046 are summarised in Table 6.4. The volumes reported are for the Base Scenario.

Table 6.4: Summary of Ultimate Daily Volumes on Key Roads (2046)

No.	Road Name	Expected Daily Traffic Volume	Proposed Classification and No. lanes	Daily Traffic Volume Limit Associated with Classification	Austroads Capacity Limit (based on No. lanes) [1]	Proposed Classification is Considered Appropriate?
1	Old Sydney Road (north of Camerons Lane)	3,600	Connector Street (2 lanes)	3,000 to 7,000vpd	18,000vpd	Yes
2	Proposed E14 (north of Camerons Lane)	26,400	Primary Arterial (6 lanes)	Greater than 30,000vpd	54,000vpd	Yes
3	Paterson Street (north of Camerons Lane)	14,200	Secondary Arterial (4 lanes)	12,000 to 40,000vpd	36,000vpd	Yes
4	Camerons Lane (east of Proposed E14)	2,400	Secondary Arterial (4 lanes)	12,000 to 40,000vpd	36,000vpd	Yes
5	East-west Connector (east of Proposed E14	3,600	Secondary Arterial (4 lanes)	12,000 to 40,000vpd	36,000vpd	Yes
6	Stockade Road (east of Proposed E14)	3,900	Secondary Arterial (4 lanes)	12,000 to 40,000vpd	36,000vpd	Yes
7	East-west Connector (at Hume Hwy)	6,000	Connector Street (2 lanes)	3,000 to 7,000vpd	18,000vpd	Yes

[1] Capacity limits scoured from Austroads Standards "Guide to Traffic Management – Part 3 Traffic Studies and Analysis" document from Table 4.3 as follows: 2-lane road: 18,000vpd, 4–lane road: 36,000vpd, 6-lane road 54,000vpd.

As shown in Table 6.4 the proposed road classifications align with the daily traffic volume ranges associated with the classification and Austroads based road capacity limits. Indeed, many of the roads could be considered to provide more capacity than what would be required, based on traffic demand alone. Further investigation of the usage of these roads should be investigated through the PSP design process, including consideration of road management within local town centres and through school precincts. This could be in the form of lane management, parking management and Public Transport Priority if, and when, required.

6.5 Model Plots

In addition to the information presented in this section, a range of outputs have been extracted from the model. The intention of these is to assist in the understanding of travel demand for the two design years. These are located within Appendix B and include the following:

- Select Link Analysis Plots for the eight locations identified, for the AM and PM peak periods, and by direction
- Degree of saturation for the AM and PM peak
- Daily volume plots
- Travel speed plots for the AM and PM peak period.

The SLA plots, along with the daily volume plots, demonstrate that, as expected, there is a large proportion of traffic from the PSP travelling to the employment areas and arterial road network to the south. In particular, Patterson Street carries the highest daily volumes as well as links near the Hume Freeway such as the Northern Highway.

7. Scenario Assessment

7.1 Overview

A range of outputs have been extracted from the model and are reported in this section. These are:

- Link volumes at key locations for the AM, PM and Daily periods. These have been reported for both the interim (2026) and ultimate design years (2046).
- Volume to capacity or degree of saturation outputs for the respective peak periods and design years.
- Select link plots or assessments for the key locations previously identified.
- Network Performance characteristics.

The outputs are discussed in the following sections with a summary provided thereafter.

7.2 Link Volumes

7.2.1 Interim 2026

The link volumes for the key locations, as identified in Section 6 (Figure 6.1), have been extracted from the model and are summarised in Table 7.1 through to 7.3.

Table 7.1: AM Peak (two hour) Link Volumes 2026

No	Road Name	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1	Old Sydney Road north of Camerons Lane NB	4	4	10	4
	Old Sydney Road north of Camerons Lane SB	15	18	17	17
2	Proposed E14 north of Camerons Lane NB	478	627	-	484
	Proposed E14 north of Camerons Lane SB	1018	1252	-	1046
3	Paterson Street north of Camerons Lane NB	630	-	882	668
	Paterson Street north of Camerons Lane SB	1036	-	1330	1136
4	Camerons Lane east of Proposed E14 EB	127	125	282	142
	Camerons Lane east of Proposed E14 EB	158	194	113	160
5	East west arterial east of Proposed E14 EB	260	162	474	226
	East west arterial east of Proposed E14 WB	125	72	174	122
6	Stockade Road east of Proposed E14 EB	137	123	0	141
	Stockade Road east of Proposed E14 WB	50	38	0	51
7	East west Connector at Hume Highway EB	204	265	300	-
	East west Connector at Hume Highway WB	73	127	92	-

Table 7.2: PM Peak (two hour) Link Volumes 2026 (Rounded)

No	Road Name	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1	Old Sydney Road north of Camerons Lane NB	14	16	16	15
	Old Sydney Road north of Camerons Lane SB	5	5	11	5
2	Proposed E14 north of Camerons Lane NB	1110	1305	-	1142
	Proposed E14 north of Camerons Lane SB	542	729	-	552
3	Paterson Street north of Camerons Lane NB	1036	-	1409	1157
	Paterson Street north of Camerons Lane SB	670	-	993	745
4	Camerons Lane east of Proposed E14 EB	172	198	146	171
	Camerons Lane east of Proposed E14 EB	122	92	256	147
5	East west arterial east of Proposed E14 EB	164	116	237	152
	East west arterial east of Proposed E14 WB	244	171	549	195
6	Stockade Road east of Proposed E14 EB	78	90	0	80
	Stockade Road east of Proposed E14 WB	202	167	0	204
7	East west Connector at Hume Highway EB	134	167	162	-
	East west Connector at Hume Highway WB	286	400	383	-

Table 7.3: Daily Link Volumes 2026

No	Road Name	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1	Old Sydney Road north of Camerons Lane NB	100	100	100	100
	Old Sydney Road north of Camerons Lane SB	100	100	100	100
2	Proposed E14 north of Camerons Lane NB	3900	5100	-	3900
	Proposed E14 north of Camerons Lane SB	3900	5400	-	4000
3	Paterson Street north of Camerons Lane NB	4900	-	6600	5300
	Paterson Street north of Camerons Lane SB	5100	-	6900	5600
4	Camerons Lane east of Proposed E14 EB	1100	1300	1400	1100
	Camerons Lane east of Proposed E14 EB	900	1100	1300	1000
5	East west arterial east of Proposed E14 EB	1300	700	2000	1200
	East west arterial east of Proposed E14 WB	1200	600	1900	1100
6	Stockade Road east of Proposed E14 EB	500	500	0	500
	Stockade Road east of Proposed E14 WB	600	400	0	600
7	East west Connector at Hume Highway EB	900	1100	1100	-
	East west Connector at Hume Highway WB	800	1200	1000	-

7.2.2 Ultimate (2046)

The link volumes for the key locations, as identified in Section 6 (Figure 6.1), have been extracted from the model and are summarised in Table 7.4.

Table 7.4: AM/PM/Daily Peak Link Volumes 2046

No	Road Name	AM (two hours)		PM (two hours)		Daily	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
1	Old Sydney Road north of Camerons Lane NB	109	142	853	864	1700	1800
	Old Sydney Road north of Camerons Lane SB	719	720	310	320	1900	1900
2	Proposed E14 north of Camerons Lane NB	1302	1296	3168	3189	13000	13000
	Proposed E14 north of Camerons Lane SB	2651	2674	1786	1784	13400	13400
3	Paterson Street north of Camerons Lane NB	695	755	1858	1937	7000	7500
	Paterson Street north of Camerons Lane SB	1638	1736	899	979	7200	7700
4	Camerons Lane east of Proposed E14 EB	249	272	175	200	1200	1400
	Camerons Lane east of Proposed E14 EB	143	164	287	310	1200	1400
5	East west arterial east of Proposed E14 EB	363	272	271	188	1800	1300
	East west arterial east of Proposed E14 WB	217	160	392	302	1800	1300
6	Stockade Road east of Proposed E14 EB	442	490	299	359	2000	2200
	Stockade Road east of Proposed E14 WB	236	277	494	536	1900	2100
7	East west Connector at Hume Highway EB	574	-	526	-	3100	-
	East west Connector at Hume Highway WB	378	-	635	-	2900	-

7.3 Degree of Saturation

The volume to capacity ration (degree of saturation) is a good indicator as to the operation of the network at the specific link locations. The volume to capacity ratio (VCR) are also able to be correlated with the Level of Service Definitions as defined in Austroads outlined in Table 7.5.

Table 7.5: Level of Service Definitions

LOS	Definition	Volume to Capacity Ratio
A	Conditions of free flow, speed is controlled by driver's desires, speed limits or physical Roadway conditions	0.0-0.35
B	Conditions of stable flow, operating speeds begin to be restricted, little or no restrictions on manoeuvrability from other vehicles	0.35-0.50
C	Conditions of stable flow, speeds and manoeuvrability more closely restricted, occasional backups behind left-turning vehicles at intersections	0.50-0.75
D	Conditions approach unstable flow, tolerable speeds can be maintained but temporary restrictions may cause extensive delays, little freedom to manoeuvre	0.75-0.90
E	Conditions approach capacity, unstable flow with stoppages of momentary duration, manoeuvrability severely limited	0.90-1.00
F	Forced flow conditions, stoppages for long periods, low operating speeds	1.00 or >1.00

7.3.1 Interim 2026

The VCR outputs for the key locations, as identified in Section 6 (Figure 6.1), have been extracted from the model and are summarised in Table 7.6 through to 7.7.

Table 7.6: AM Peak (two hour) Volume to Capacity Outputs and Level of Service 2026

No	Road Name	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1	Old Sydney Road north of Camerons Lane NB	0.00	0.00	0.01	0.00
	Old Sydney Road north of Camerons Lane SB	0.01	0.01	0.01	0.01
2	Proposed E14 north of Camerons Lane NB	0.28	0.37	-	0.28
	Proposed E14 north of Camerons Lane SB	0.60	0.74	-	0.62
3	Paterson Street north of Camerons Lane NB	0.37	-	0.52	0.39
	Paterson Street north of Camerons Lane SB	0.61	-	0.78	0.67
4	Camerons Lane east of Proposed E14 EB	0.08	0.08	0.18	0.09
	Camerons Lane east of Proposed E14 EB	0.10	0.12	0.07	0.10
5	East west arterial east of Proposed E14 EB	0.15	0.10	0.28	0.13
	East west arterial east of Proposed E14 WB	0.07	0.04	0.10	0.07
6	Stockade Road east of Proposed E14 EB	0.08	0.07	-	0.08
	Stockade Road east of Proposed E14 WB	0.03	0.02	-	0.03
7	East west Connector at Hume Highway EB	0.12	0.16	0.18	-
	East west Connector at Hume Highway WB	0.04	0.07	0.05	-

Table 7.7: PM Peak (two hour) Volume to Capacity Outputs and Level of Service 2026

No	Road Name	Scenario 1	Scenario 2	Scenario 3	Scenario 4
1	Old Sydney Road north of Camerons Lane NB	0.01	0.01	0.01	0.01
	Old Sydney Road north of Camerons Lane SB	0.00	0.00	0.01	0.00
2	Proposed E14 north of Camerons Lane NB	0.65	0.77	-	0.67
	Proposed E14 north of Camerons Lane SB	0.32	0.43	-	0.32
3	Paterson Street north of Camerons Lane NB	0.61	-	0.83	0.68
	Paterson Street north of Camerons Lane SB	0.39	-	0.58	0.44
4	Camerons Lane east of Proposed E14 EB	0.11	0.12	0.09	0.11
	Camerons Lane east of Proposed E14 EB	0.08	0.06	0.16	0.09
5	East west arterial east of Proposed E14 EB	0.10	0.07	0.14	0.09
	East west arterial east of Proposed E14 WB	0.14	0.10	0.32	0.11
6	Stockade Road east of Proposed E14 EB	0.05	0.05	-	0.05
	Stockade Road east of Proposed E14 WB	0.12	0.10	-	0.12
7	East west Connector at Hume Highway EB	0.08	0.10	0.10	-
	East west Connector at Hume Highway WB	0.17	0.24	0.23	-

7.3.2 Ultimate 2046

The VCR outputs for the key locations, as identified in Section 6 (Figure 6.1), have been extracted from the model and are summarised in Table 7.8.

Table 7.8: AM Peak (two hour) Volume to Capacity Outputs and Level of Service 2046

No	Road Name	AM		PM	
		Scenario 1	Scenario 2	Scenario 1	Scenario 2
1	Old Sydney Road north of Camerons Lane NB	0.05	0.07	0.43	0.43
	Old Sydney Road north of Camerons Lane SB	0.36	0.36	0.16	0.16
2	Proposed E14 north of Camerons Lane NB	0.22	0.22	0.53	0.53
	Proposed E14 north of Camerons Lane SB	0.44	0.45	0.30	0.30
3	Paterson Street north of Camerons Lane NB	0.19	0.21	0.52	0.54
	Paterson Street north of Camerons Lane SB	0.45	0.48	0.25	0.27
4	Camerons Lane east of Proposed E14 EB	0.07	0.08	0.05	0.06
	Camerons Lane east of Proposed E14 EB	0.04	0.05	0.08	0.09
5	East west arterial east of Proposed E14 EB	0.11	0.08	0.08	0.06
	East west arterial east of Proposed E14 WB	0.06	0.05	0.12	0.09
6	Stockade Road east of Proposed E14 EB	0.11	0.12	0.07	0.09
	Stockade Road east of Proposed E14 WB	0.06	0.07	0.12	0.13
7	East west Connector at Hume Highway EB	0.17	-	0.15	-
	East west Connector at Hume Highway WB	0.11	-	0.19	-

The information presented in Table 7.6 to Table 7.8 indicate that the exclusion of either the E14 or the Paterson St from the network (i.e. Scenarios 2 or 3) place additional pressure on one or other.

The roads, however, do not reach undesirable levels of degree of saturation (i.e. D or less) and demonstrate an ability to function should only one road be removed.

7.4 Road Network Performance

The VKT, VHT and average speeds for the wider study area are provided in Table 7.9.

Table 7.9: Network Statistic within PSP

Year	Scenario	AM			PM		
		Vehicle Kilometres Travelled (VKT)	Vehicle Hours Travelled (VHT)	Average Speed (km/h)	Vehicle Kilometres Travelled (VKT)	Vehicle Hours Travelled (VHT)	Average Speed (km/h)
2026	Scenario 1	11216	328	34	12567	370	34
	Scenario 2	10995	356	31	12351	397	31
	Scenario 3	11626	355	33	13851	428	32
	Scenario 4	10940	324	34	12109	361	34
2046	Scenario 1	63732	1251	51	77624	1532	51
	Scenario 2	62054	1201	52	75692	1474	51

Scenarios with a higher VKT demonstrate a model network where vehicles generally travel longer distances to reach their destinations whilst the VHT is a representation of the time taken to reach their destination. The average speed is a good way to compare the operation of the network against one another.

As the land uses are the same between each of the scenarios, Scenario 1 features all of the road links and is expected to demonstrate the highest values of VKT. In both the interim and ultimate design years, Scenario 4 exhibits VKT values similar to that of the Scenario 1, indicating that the network is not reliant on its existence.

The average speed of Scenario 2A is the highest when compared to the remaining scenarios indicating that it performs quite well from a network perspective.

7.5 Plots

A range of pots for the Modelled Scenarios have been prepared and are located in Appendix C and Appendix D. These include:

- Daily Link Volumes
- AM and PM Peak Period Travel Speeds
- AM and PM Peak Period Degree of Saturation.

8. Intersection Volumes

8.1 Methodology

VITM is a strategic network model and hence care should be exercised when extracting individual links or turning movement flows. It typically is not used for determining intersection turning movements as it is not used for this purpose, and turning movements are influenced by a number of factors not included in VITM.

Nevertheless, a requirement of the brief is to develop intersection turning movements to assist in determining the infrastructure requirements for the PSP. As such, we have developed an approach that seeks to provide a balanced outcome for each intersection.

The approach adopted in arriving at future turning flows for the purpose of assessing the PSPs is summarised as follows:

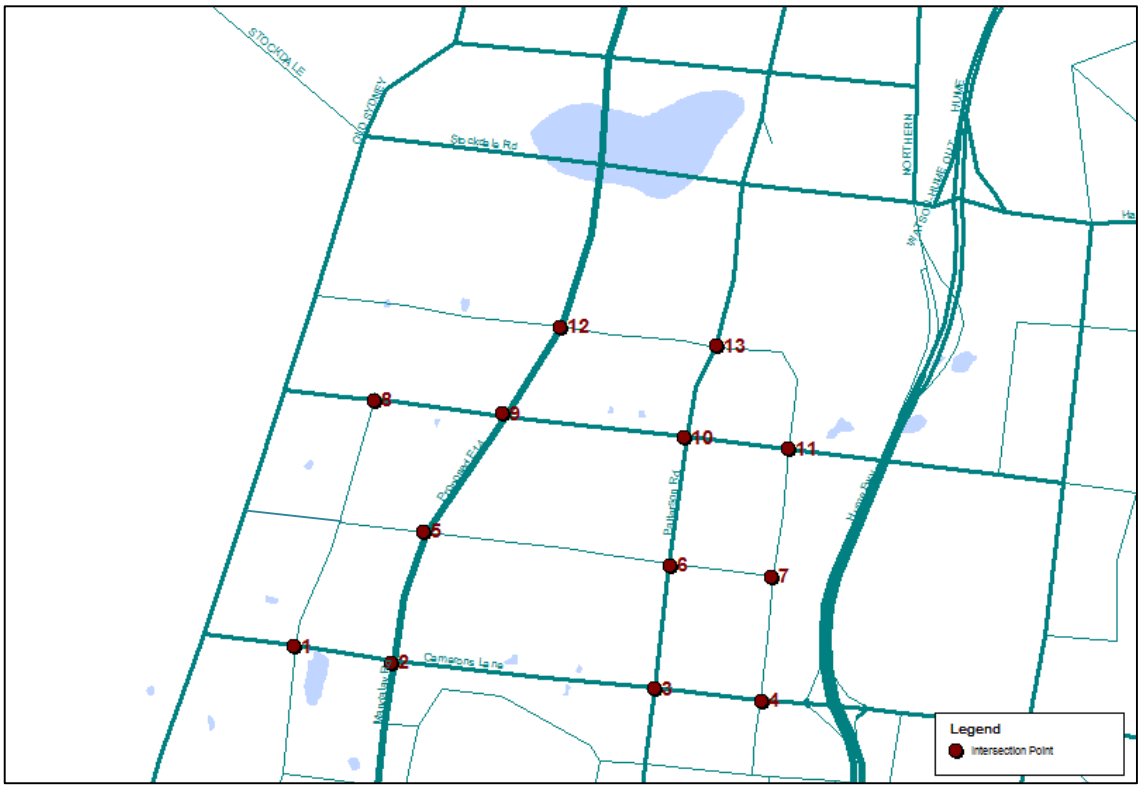
- Extract AM and PM peak period (2-hour) intersection turning movements from VITM for key intersections and covert to peak hour flows using the 0.55 factor.
- Assess each intersection individually to ensure that turn flows are reasonable having regard for the arterial and local road networks and adjacent activity centre and schools and make refinements where appropriate.
- Factor the VITM traffic volumes to achieve consistency with the anticipated first principles traffic generation assessment.
- Engineering 'judgement' has been applied to turning movements that exhibit low or unrealistic movements based on the network layout and accounting for individual.

In terms of the quantum of intersection turning movements, the results for all option are provided in Appendix E.

8.2 Intersections Assessed

A total of 13 intersections have been selected within the study area, as depicted in Figure 8.1.

Figure 8.1: Key Intersection Locations



The resultant intersection turning movements, for the AM and PM peak periods for the interim (2026) and ultimate (2046) scenarios are located in Appendix E.

9. Comparison Beveridge Central Precinct with Cardno Analysis

9.1 Overview

Cardno was commissioned by the Shire of Mitchell in 2012 to provide transport advice in association with the Beveridge Central Precinct Structure Plan. As part of Cardno's assessment – The MITM Dec 2010 model was utilised which has not been built for the PM peak and daily trips, rather, it is an AM peak model.

9.2 Zone Structure and Land uses

Zoning structure that had been used for Cardno and GTA model are shown on Figure 9.1and Figure 9.2

Figure 9.1: Cardno Road Network and Zone Structure

Figure 9.2: GTA Road Network and Zone Structure

It is clear that whilst the core of the network is similar there are a number of refinement that could impact on an outcome of the result.

The Land use data for zones located north of the OMR that have been used for both model is summarised in Table 9.1

Table 9.1: Comparison Cardno Land Use and GTA Land Use in Wallan and Beveridge Area

Model	Population	Dwelling	Employment		Enrolment		
			Retail	Total	Primary	Secondary	Tertiary
Cardno*	149,460	51,293	10,897	15,073	11,700	15,346	74,699
GTA	166,562	57,347	5,001	25,472	8,046	9,600	-
Difference	10%	11%	-118%	41%	-45%	-60%	N/A

** Based on information provided in Cardno report dated 24 June 2014, "Beveridge Central Precinct – Beveridge Central – Traffic Analysis Study*

The table shows that the VITM model exhibits higher residential, higher employment but lower enrolments.

9.3 Summary

A high level review of the Cardno outputs has indicated that generally, the volumes are comparable with, as expected, the GTA volume higher than Cardno. Table 9.2 provides a summary of the daily flows.

Table 9.2: Daily Volume Comparison

No	Corridor	Daily Trips		
		Cardno Model	GTA Model	Difference (%)
1	Old Sydney Rd north of Camerons Lane	8821	4700	188
2	E14 north of Camerons Lane	23326	20800	112
3	Patterson Rd north of Camerons Lane	32323	8000	404
4	Hume Hwy north of Camerons Lane	61800	88200	70
5	East West Connector at Hume Hwy	5241	5900	89
6	East West local road east of E14	4022	6100	66
7	Camerons Lane east of E14	8529	2400	355

As the Cardno model is only an AM peak model, the daily flows have been extrapolated which could account for some of the large differential. Nevertheless, it is clear that the two models have been developed for differing purposes and should be viewed in that regard.

10. Conclusion

Strategic transport modelling of the Beveridge North West PSP has been undertaken using the Victoria Integrated Transport Model (VITM). The information presented within this report outlines the land use inputs, assumptions and resultant transport demands for the proposed road network.

Three specific road projects have been identified for further analysis for 2026 and one alternate scenario for 2046. The road network in 2026 demonstrates that it is more than capable of accommodating the demands of the PSP as well as the addition of through trips.

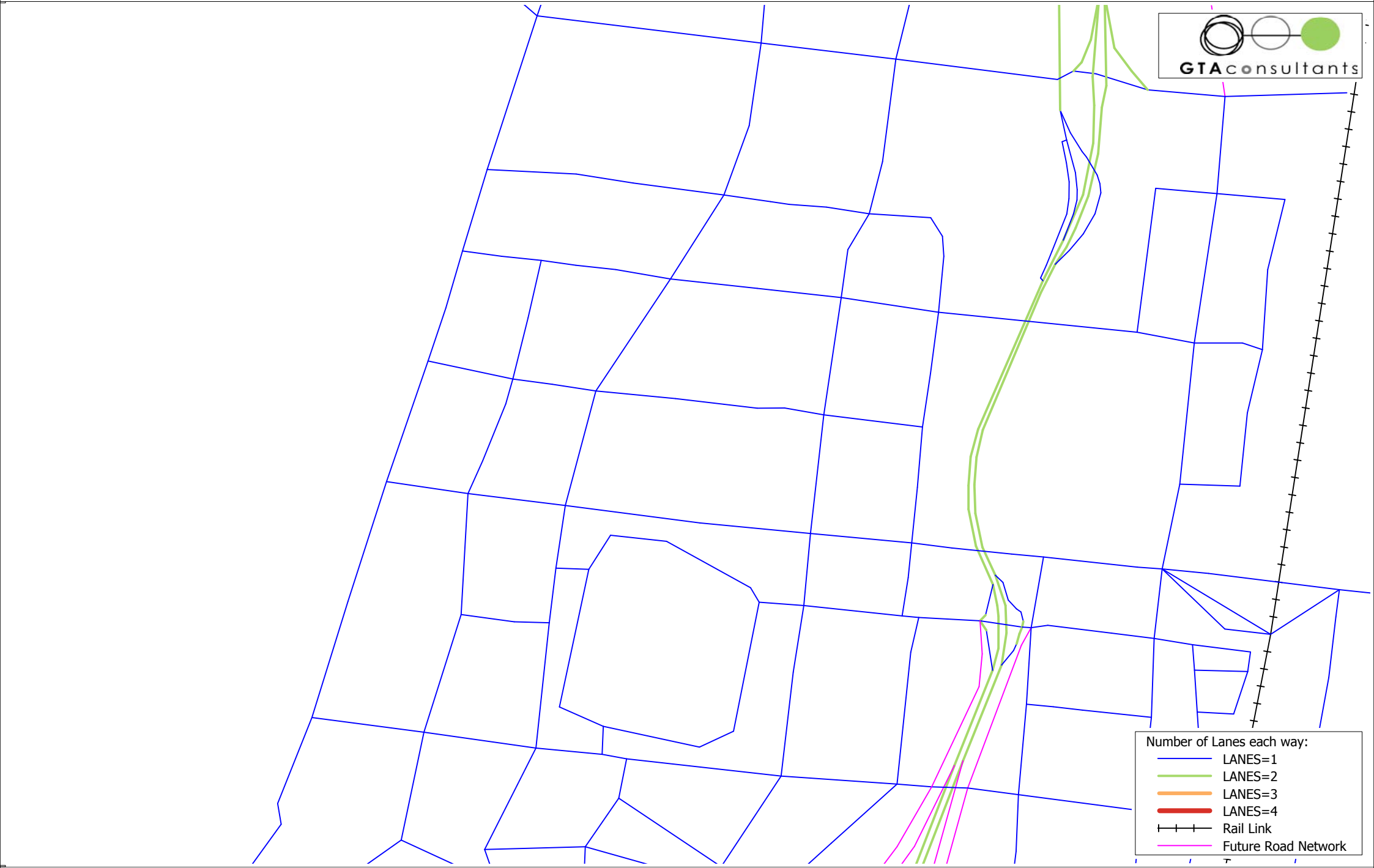
Three scenarios tested how the transport network will respond to changes to the road structure, in particular the ability for Patterson Street and the E14 to function with and without one another. The analysis shows that in each of the scenarios and design years, the network is flexible demands, with acceptable levels of service experienced (i.e. less than D).

Indeed, the modelling demonstrates, that based on traffic capacity alone, that the network may provide too much capacity, and that investigation into the management of the road network, in consultation with key stakeholders, is recommended.

Appendix A

Interim (2026) and Ultimate (2046) Modelled Road Networks

VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2026 Scenario 1



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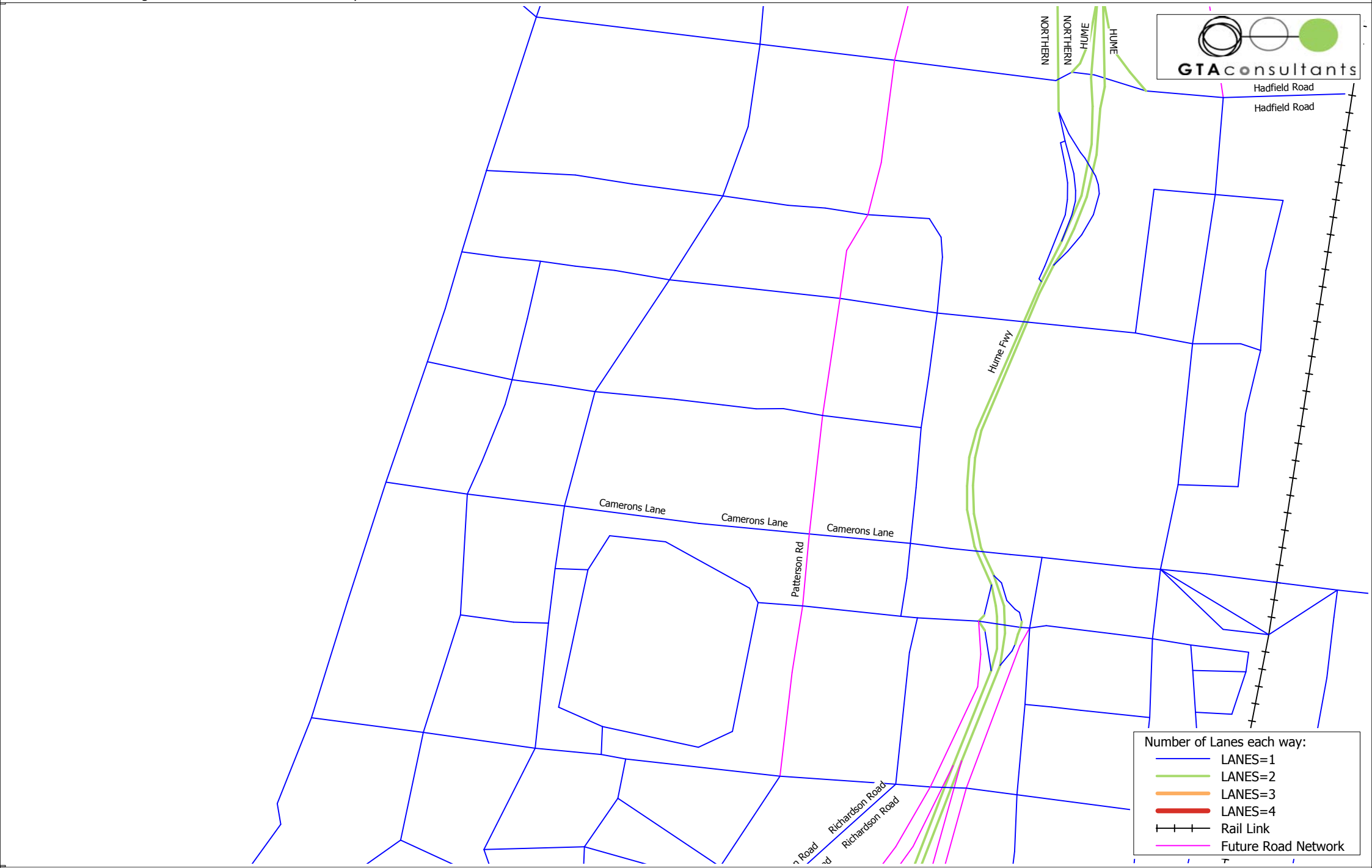
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2026 Scenario 2



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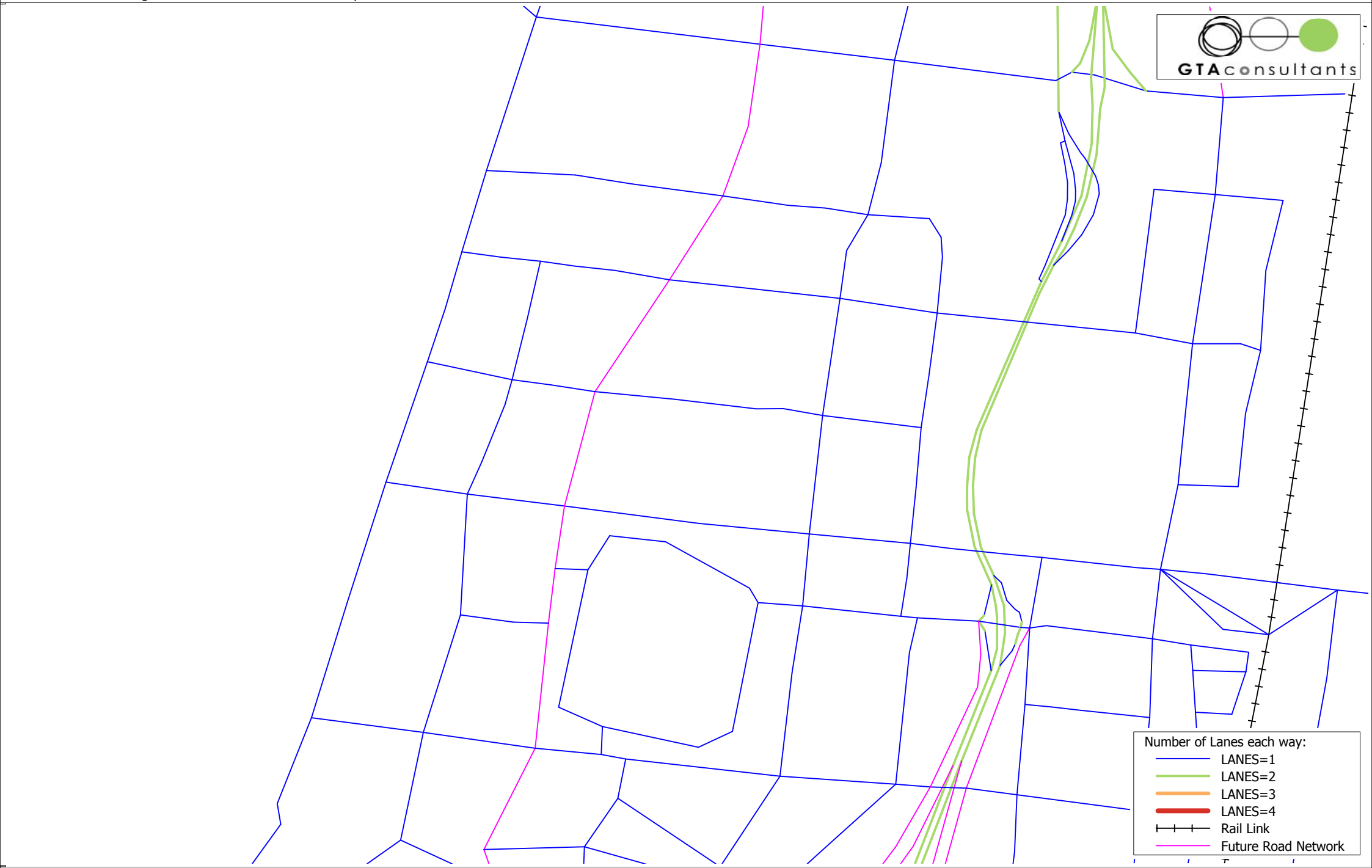
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2026 Scenario 3



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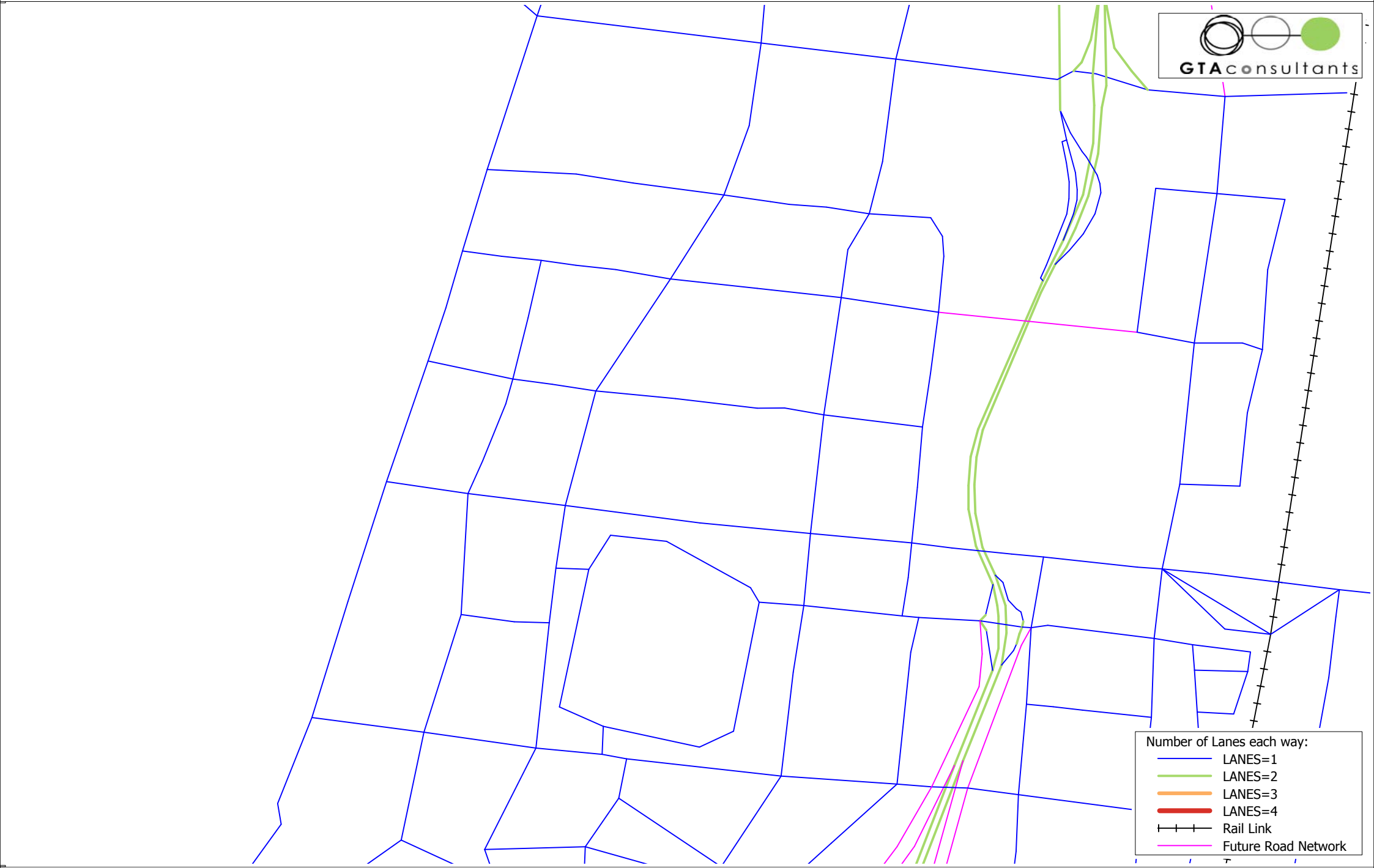
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2026 Scenario 4



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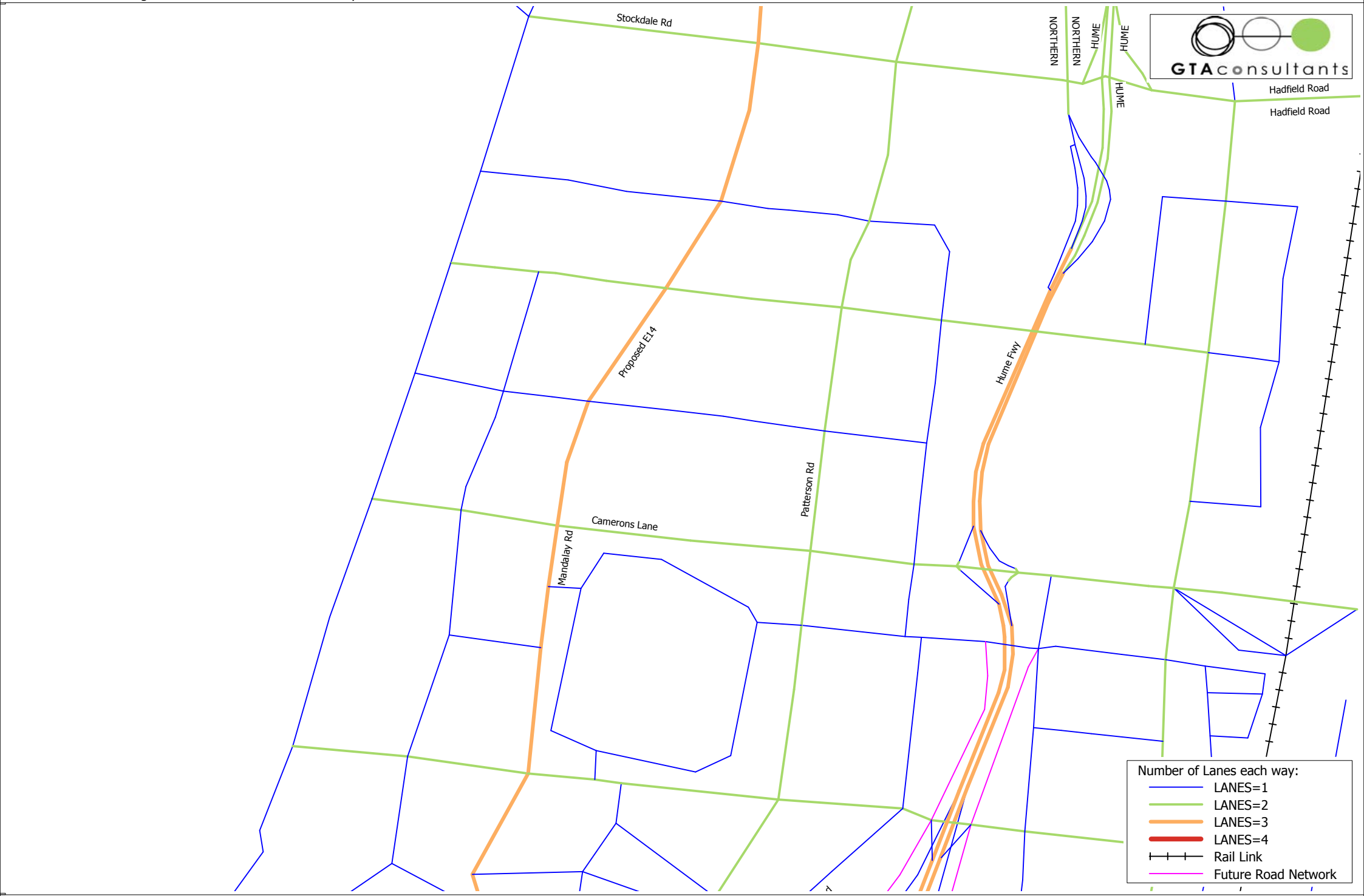
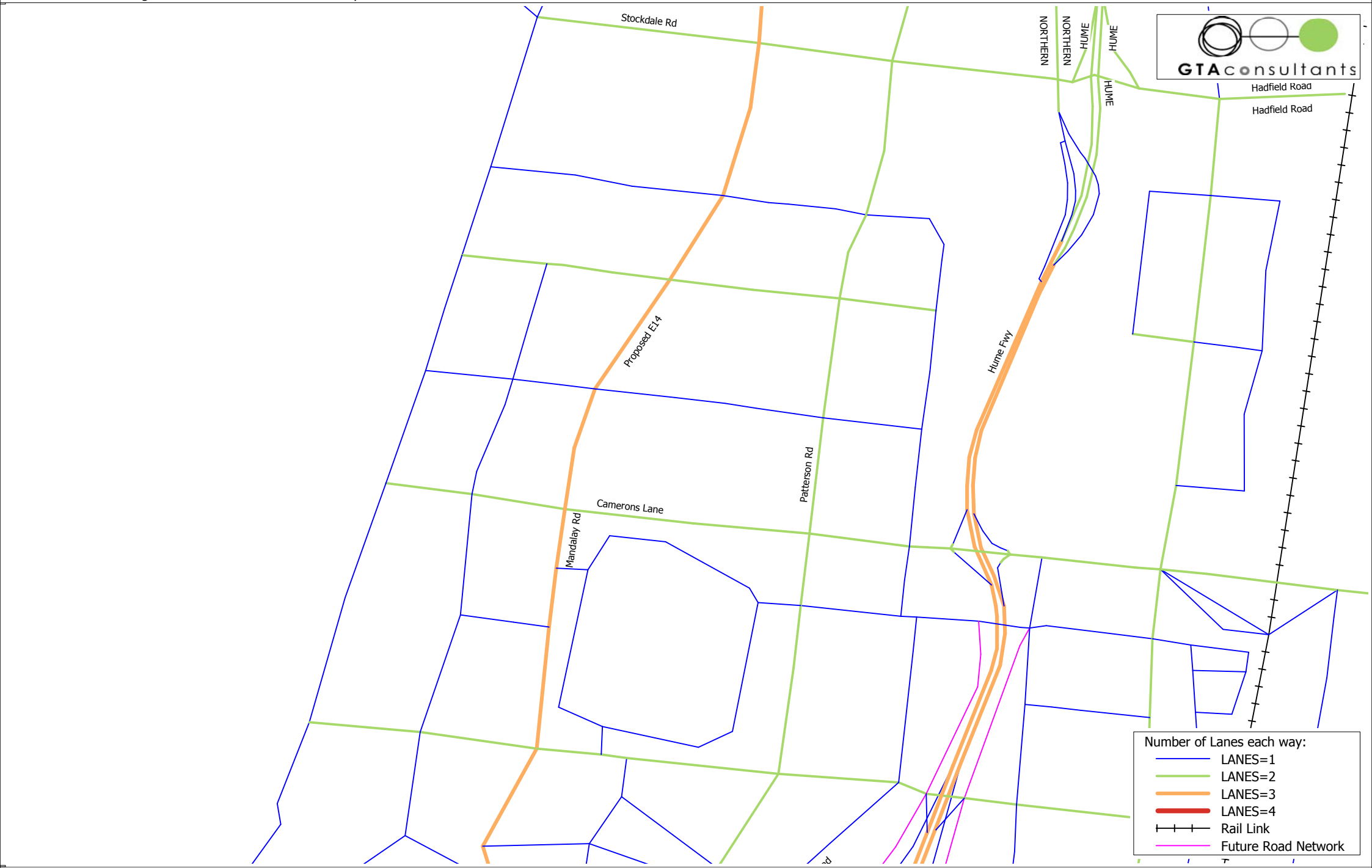
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2046 Scenario 1



VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP number of lanes year 2046 Scenario 2



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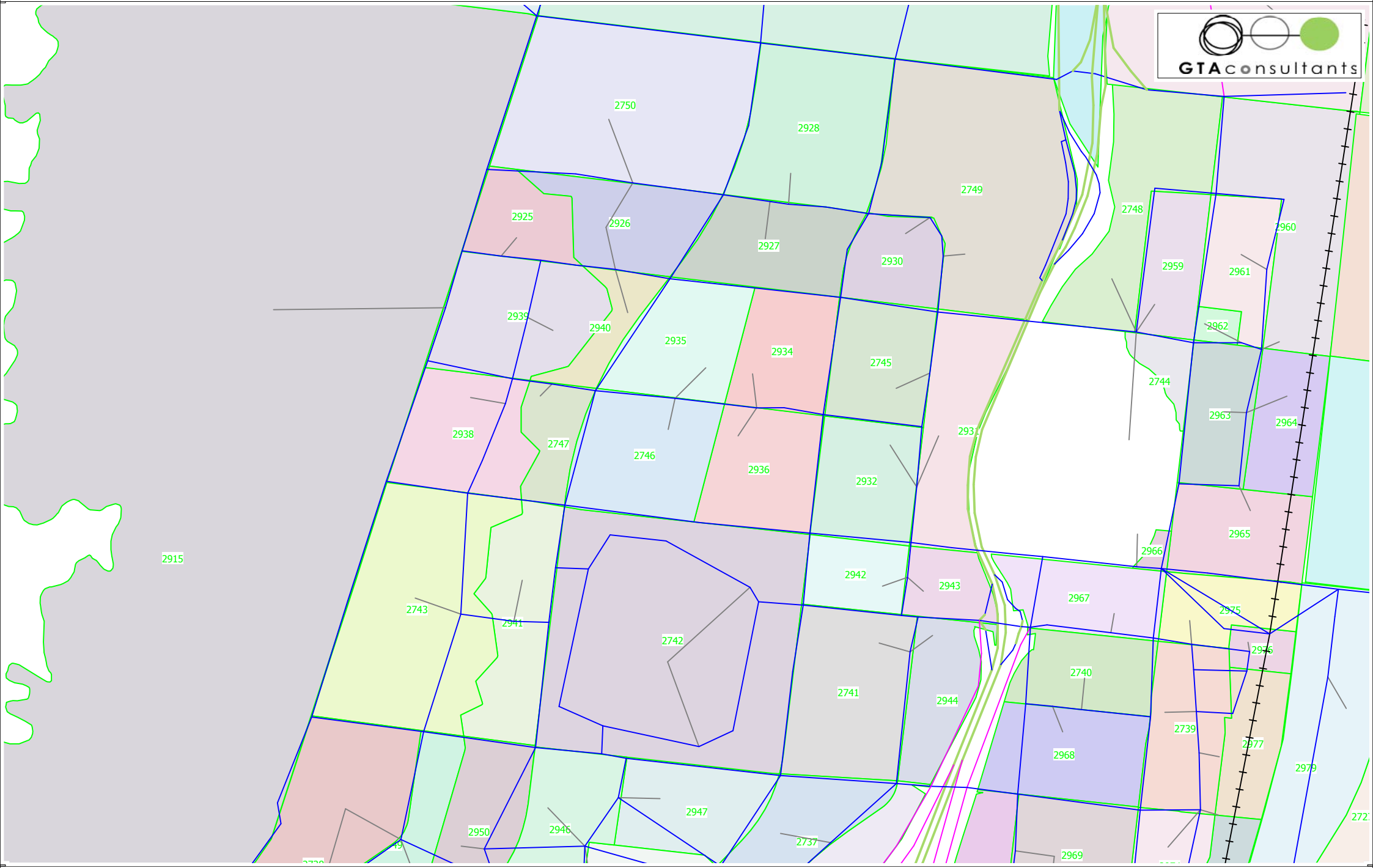
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP Zone Structure



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VITM Northern Growth Corridor Model

14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2026 Scenario 1 (Base Case)

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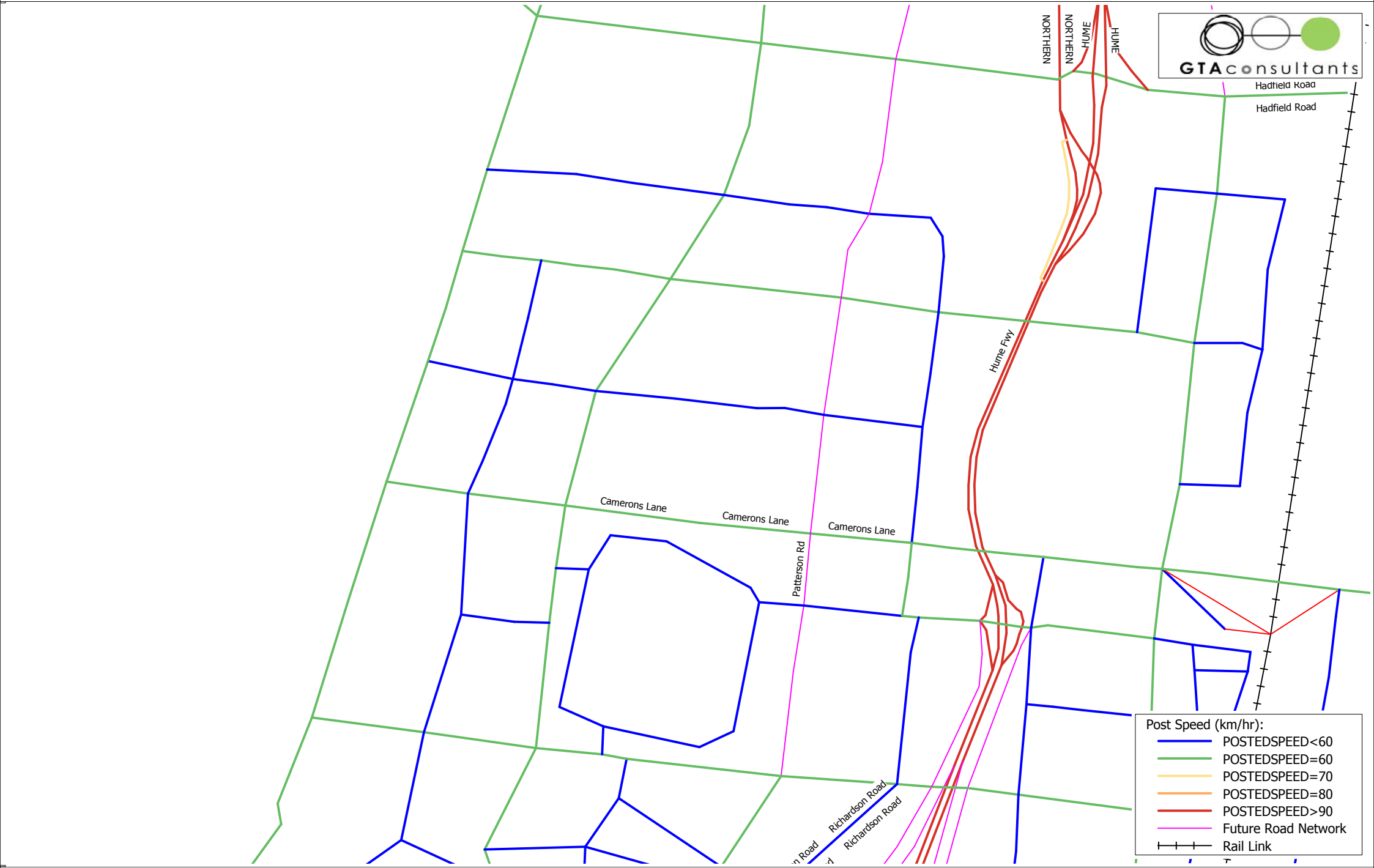
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2026 Scenario 2 (without Patterson St)



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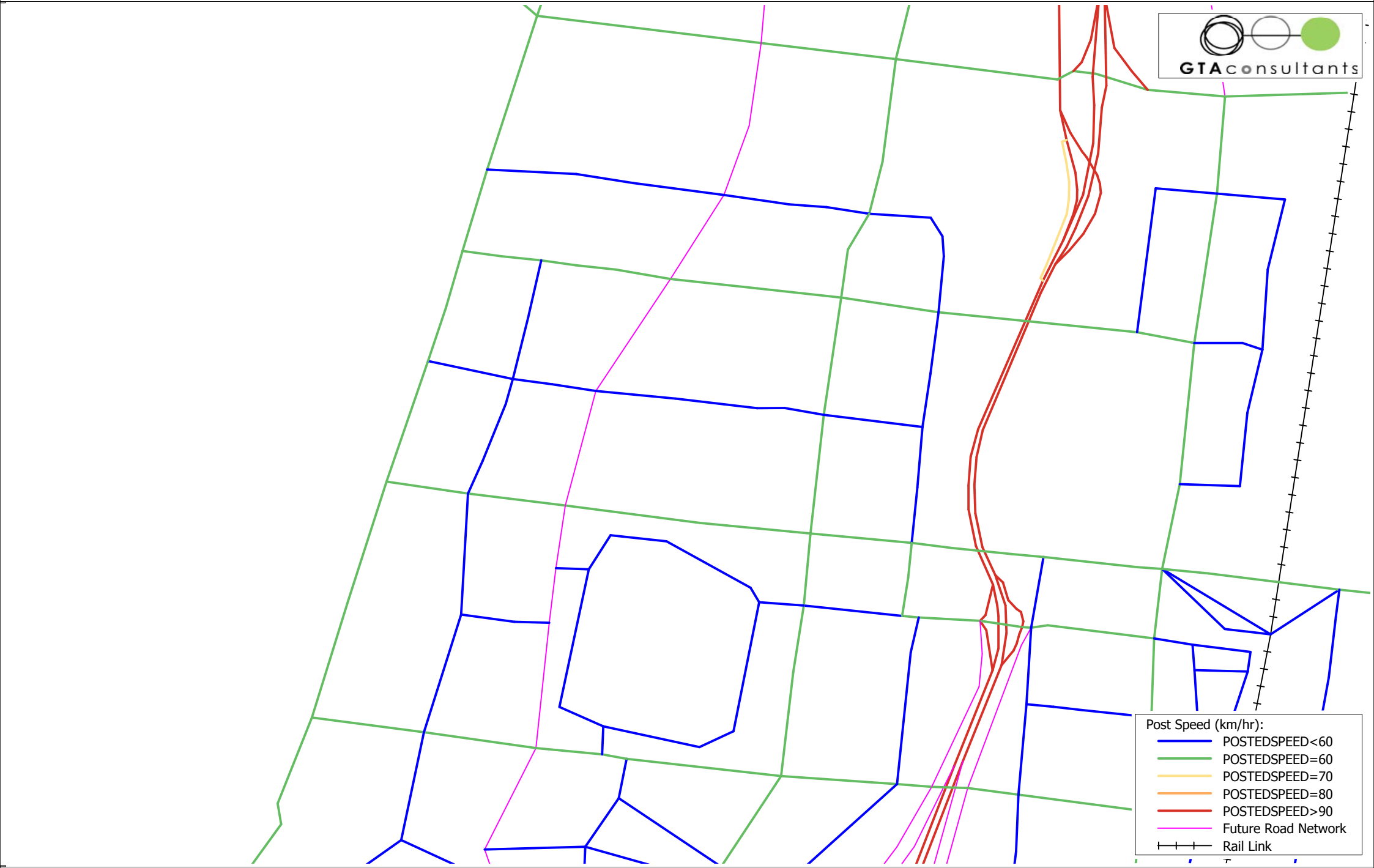
VITM Northern Growth Corridor Model

14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2026 Scenario 3 (without E14)



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VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2026 Scenario 4

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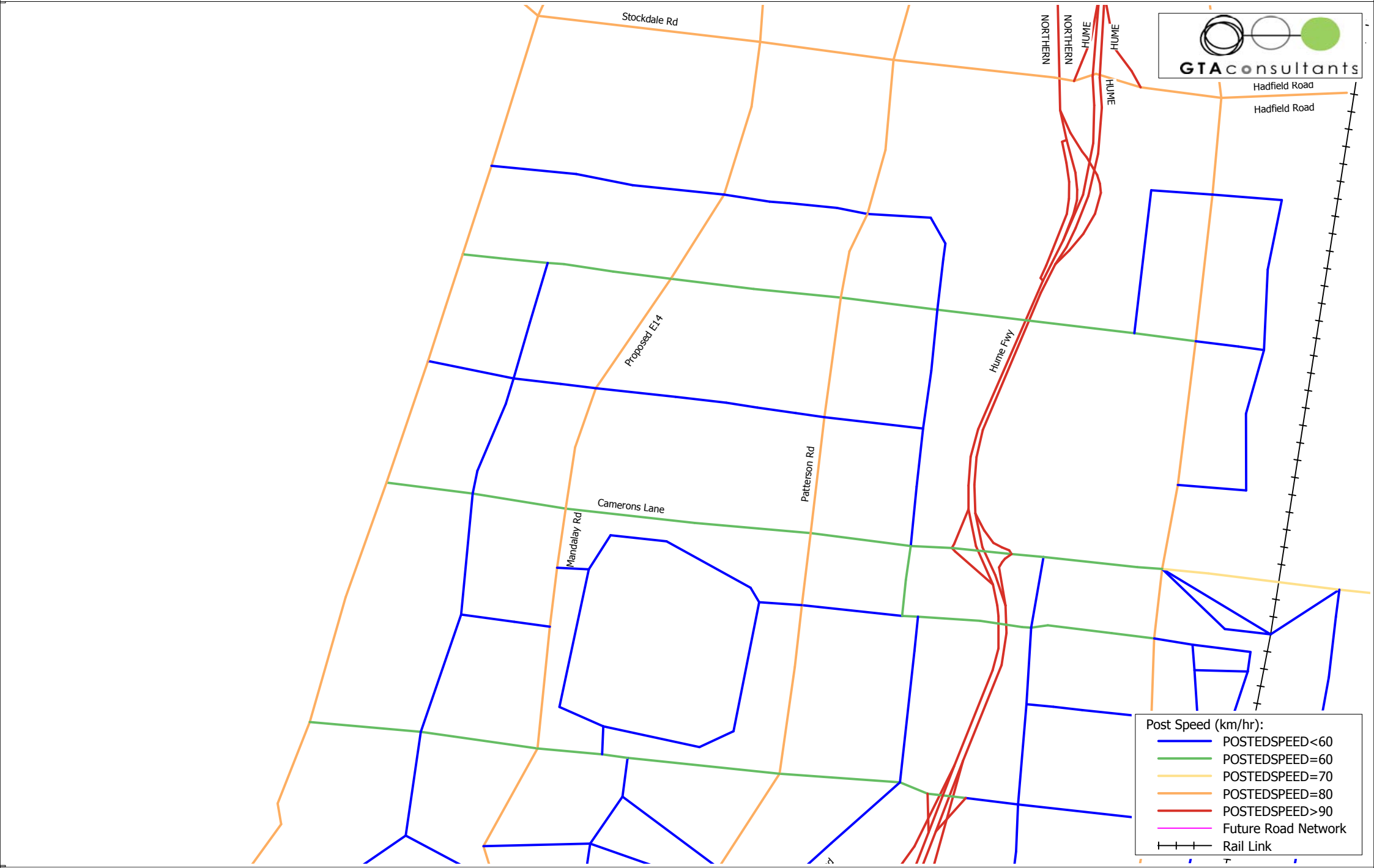
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2046 Scenario 1



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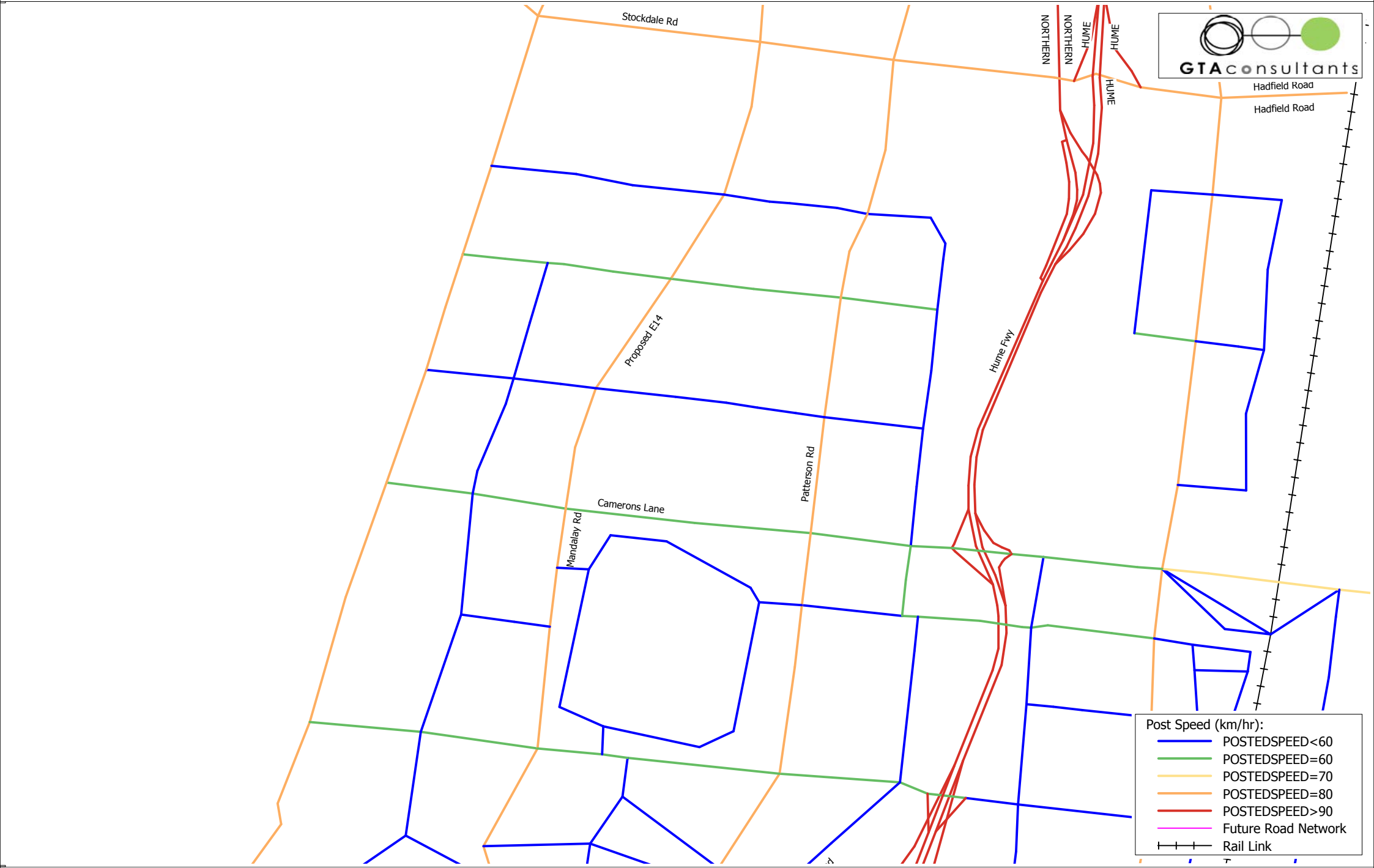
VITM Northern Growth Corridor Model
14M2269000 - Beveridge North West PSP Post Speed (km/hr) year 2046 Scenario 2



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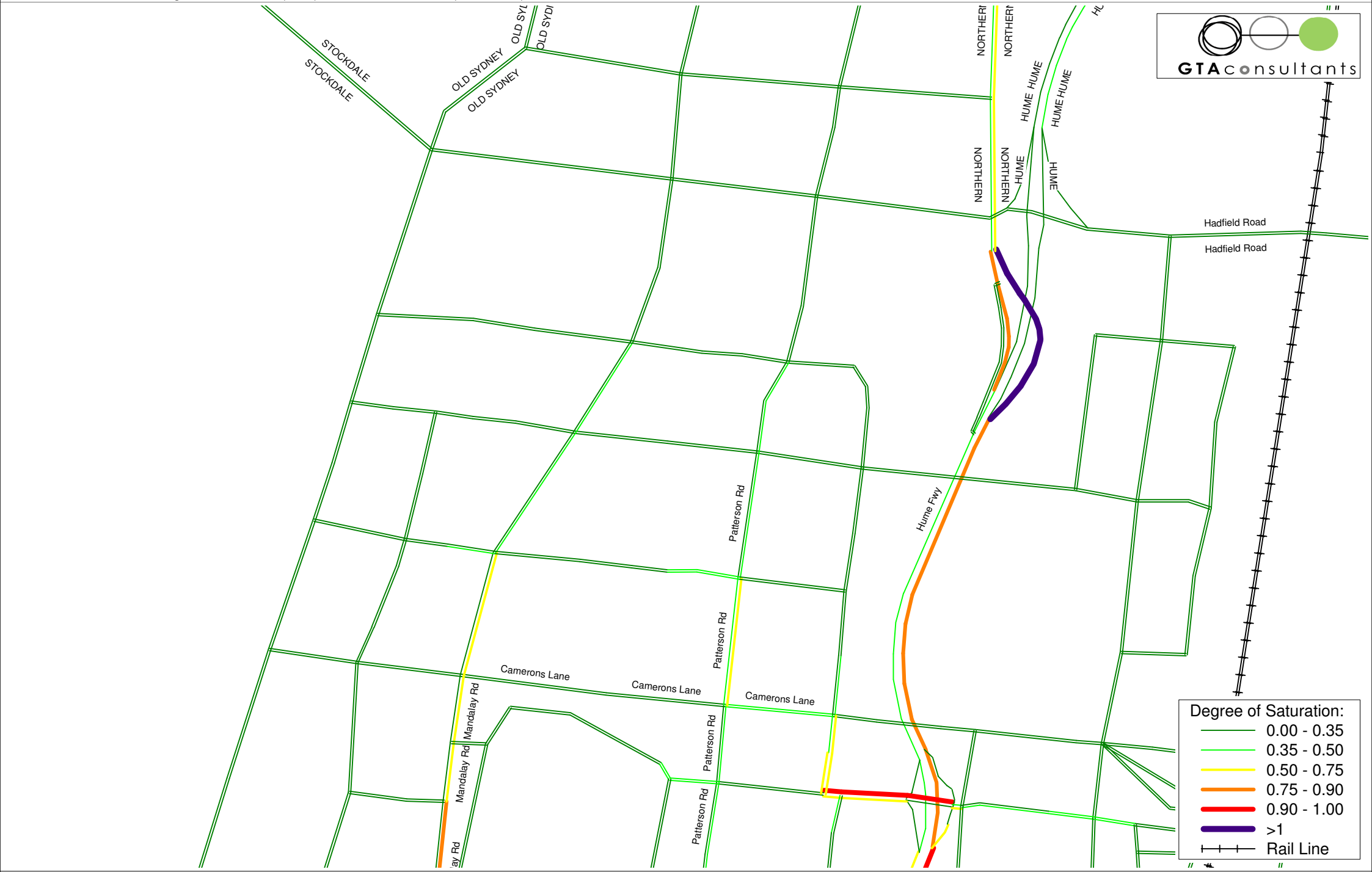
Appendix B

Interim (2026) and Ultimate (2046) Base Network Output Plots

VITM Northern Growth Corridor Model

14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 1 (Base Case)



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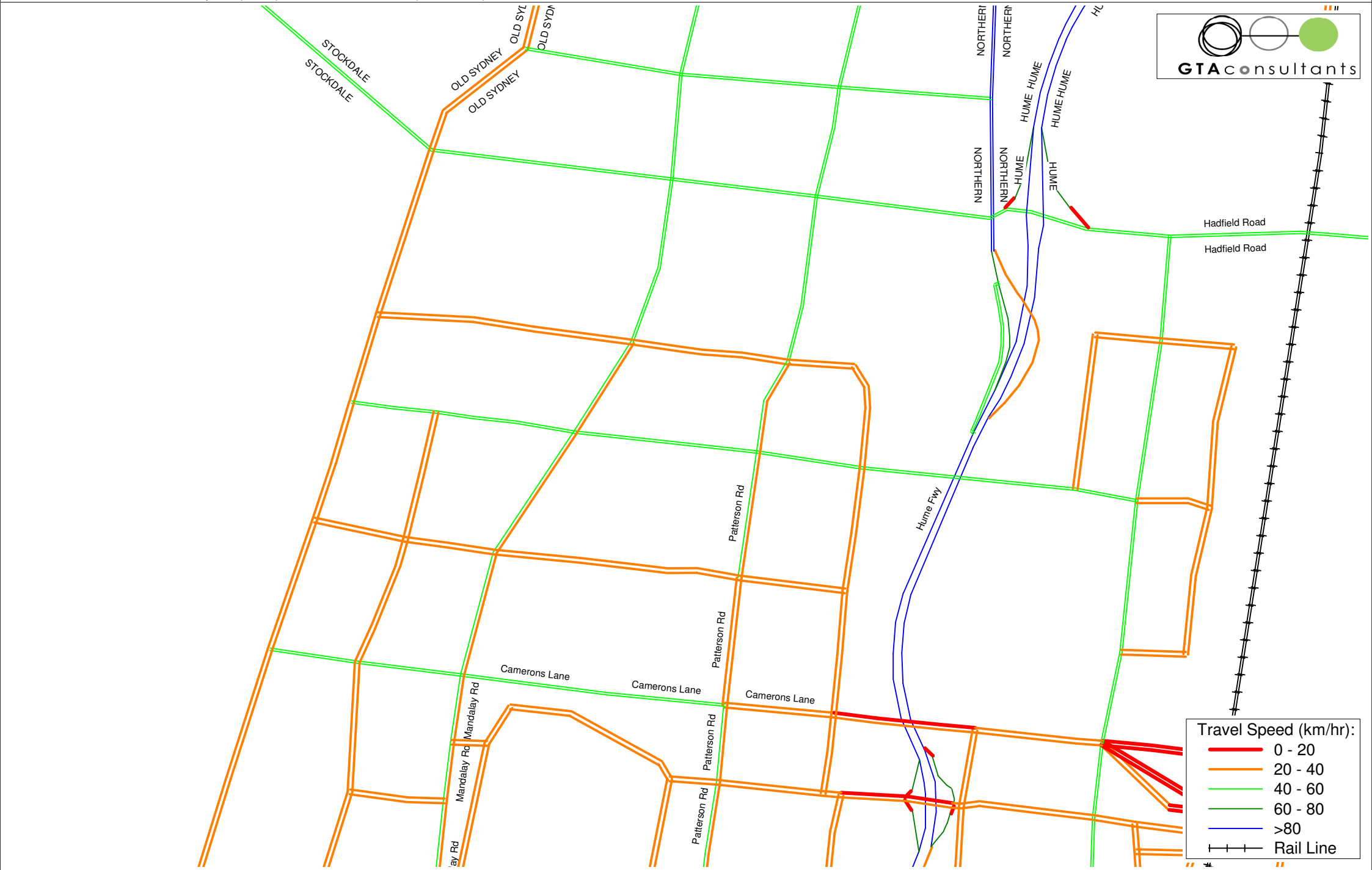
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 1 (Base Case)



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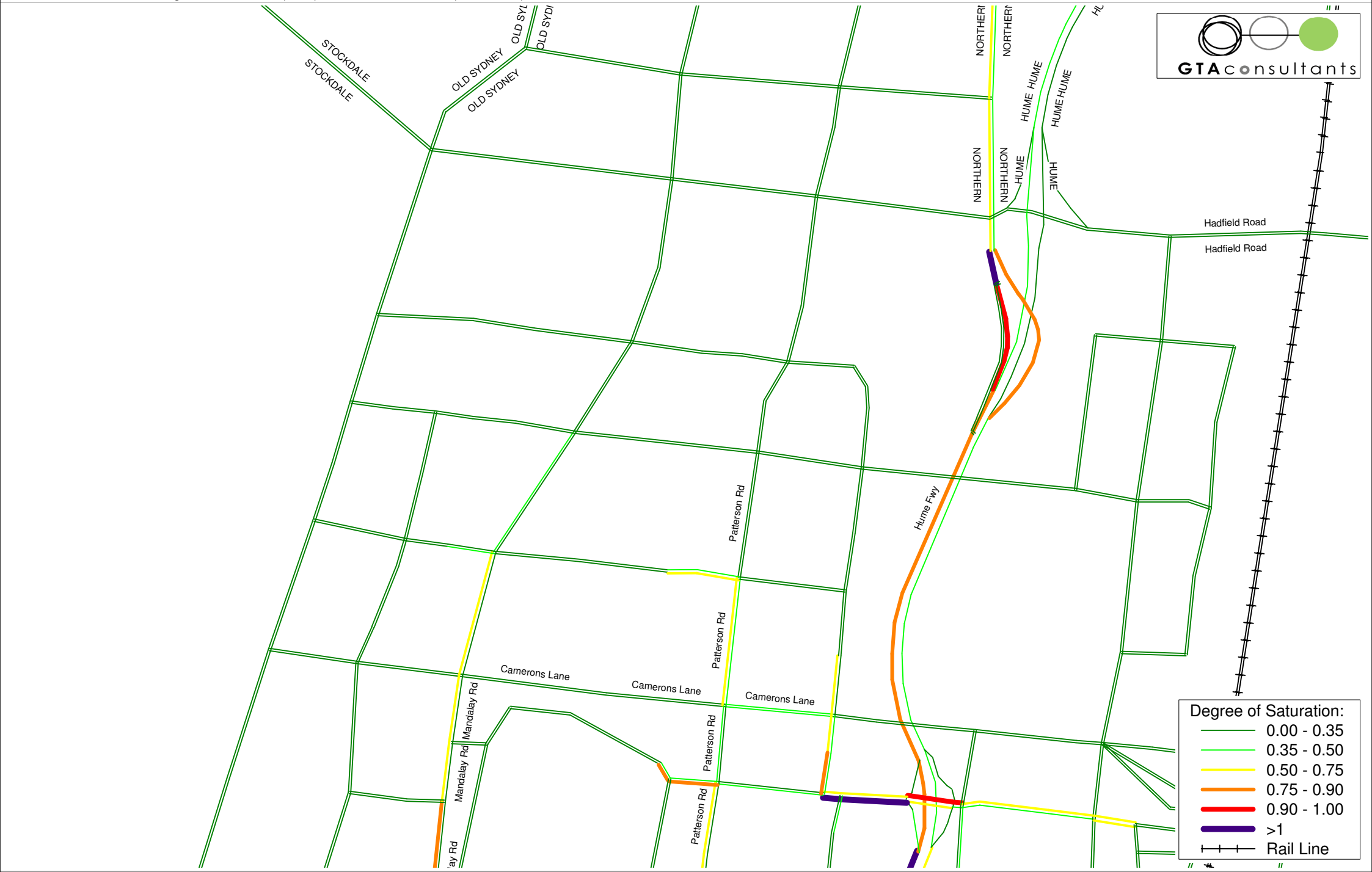
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 1 (Base Case)



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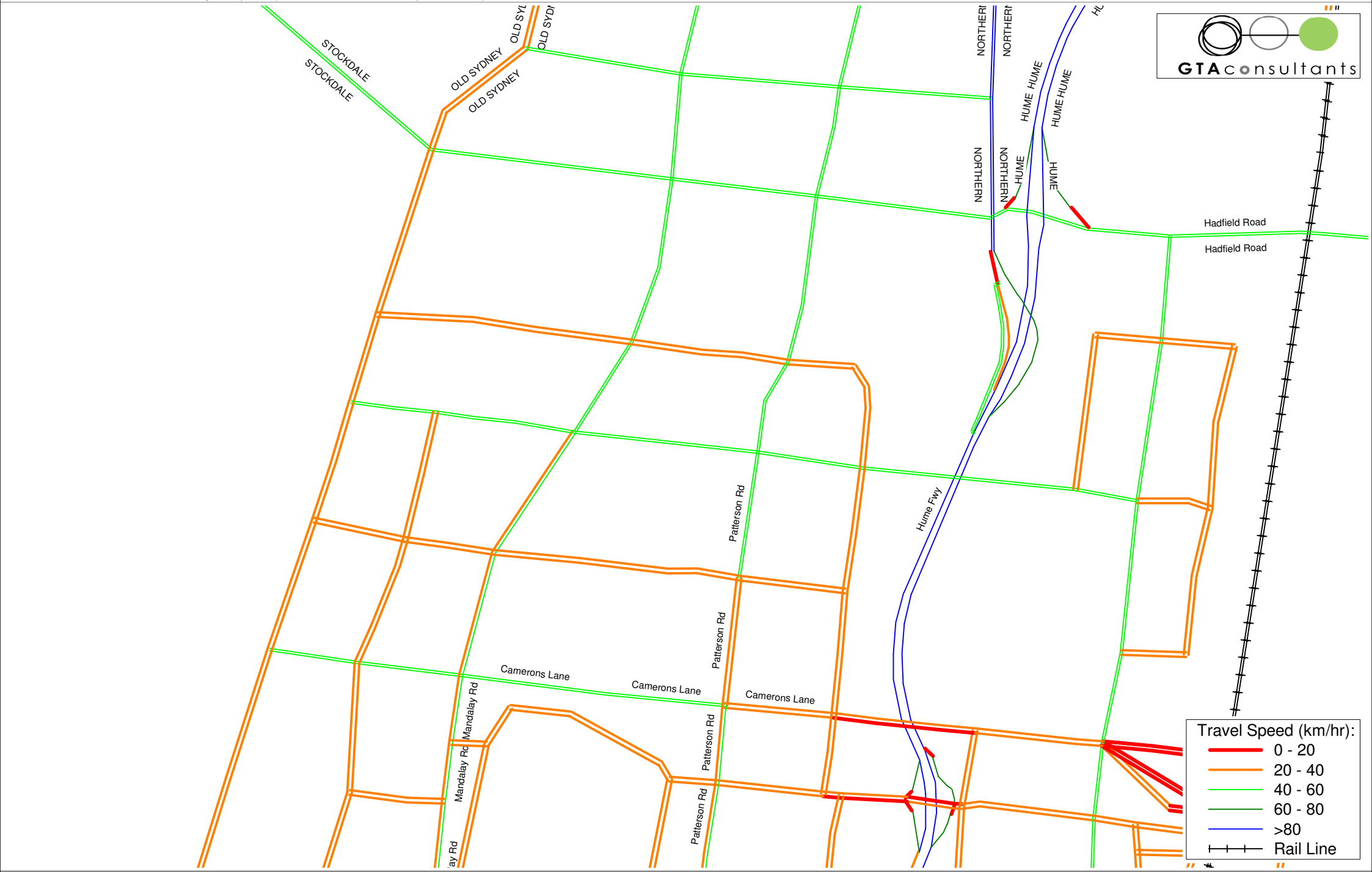
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 1 (Base Case)



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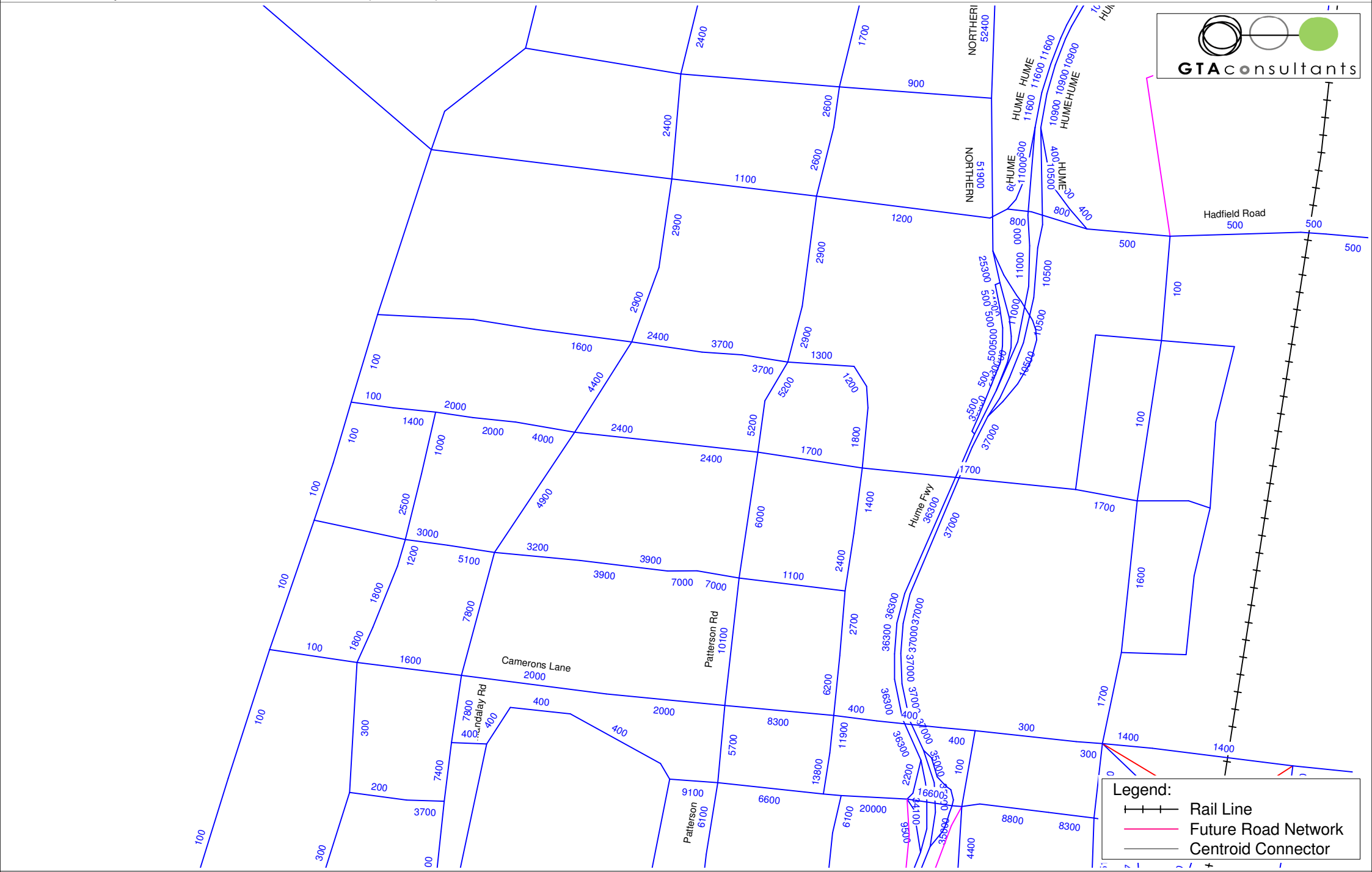
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 1 (Base Case)



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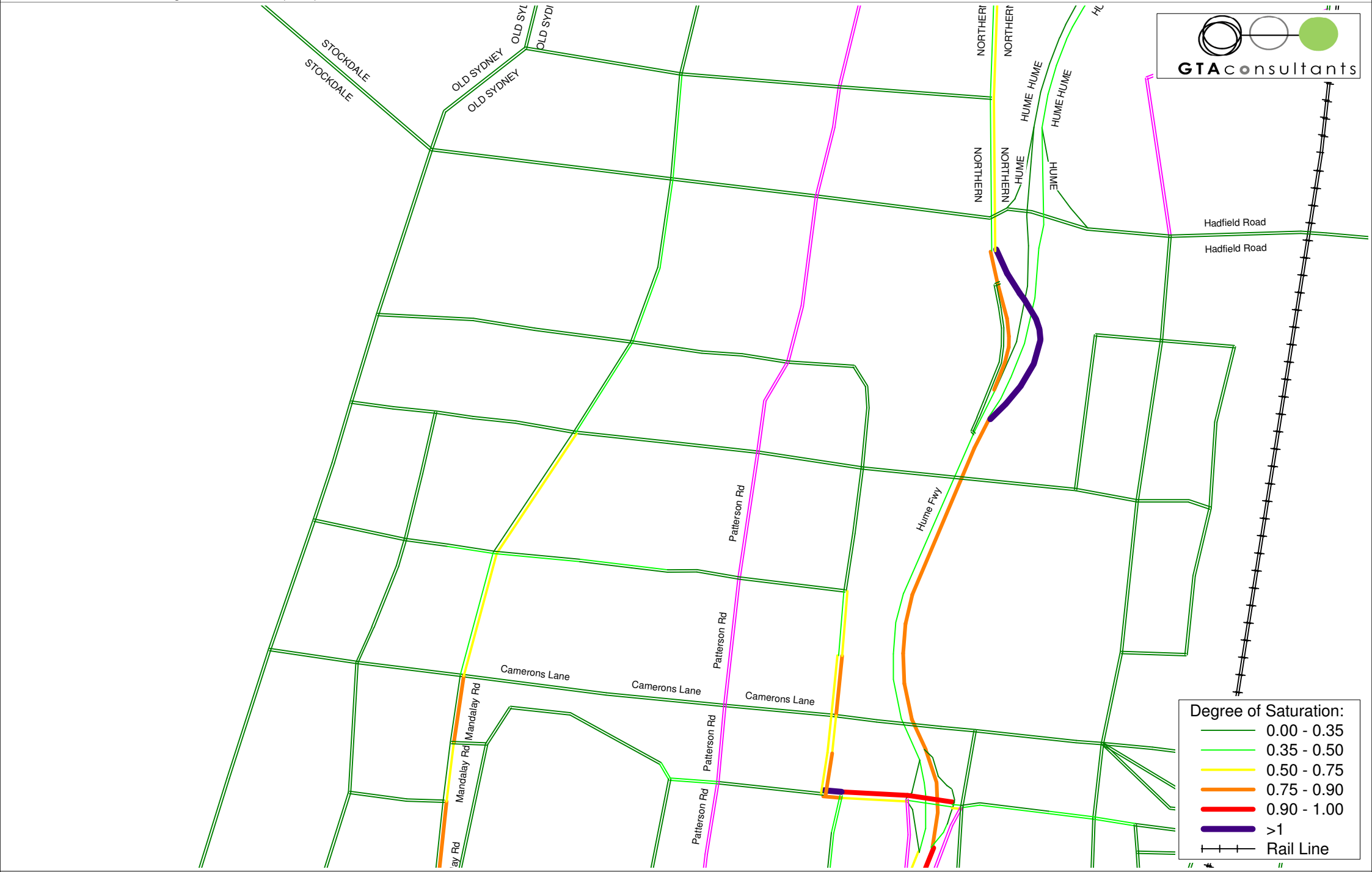
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 2



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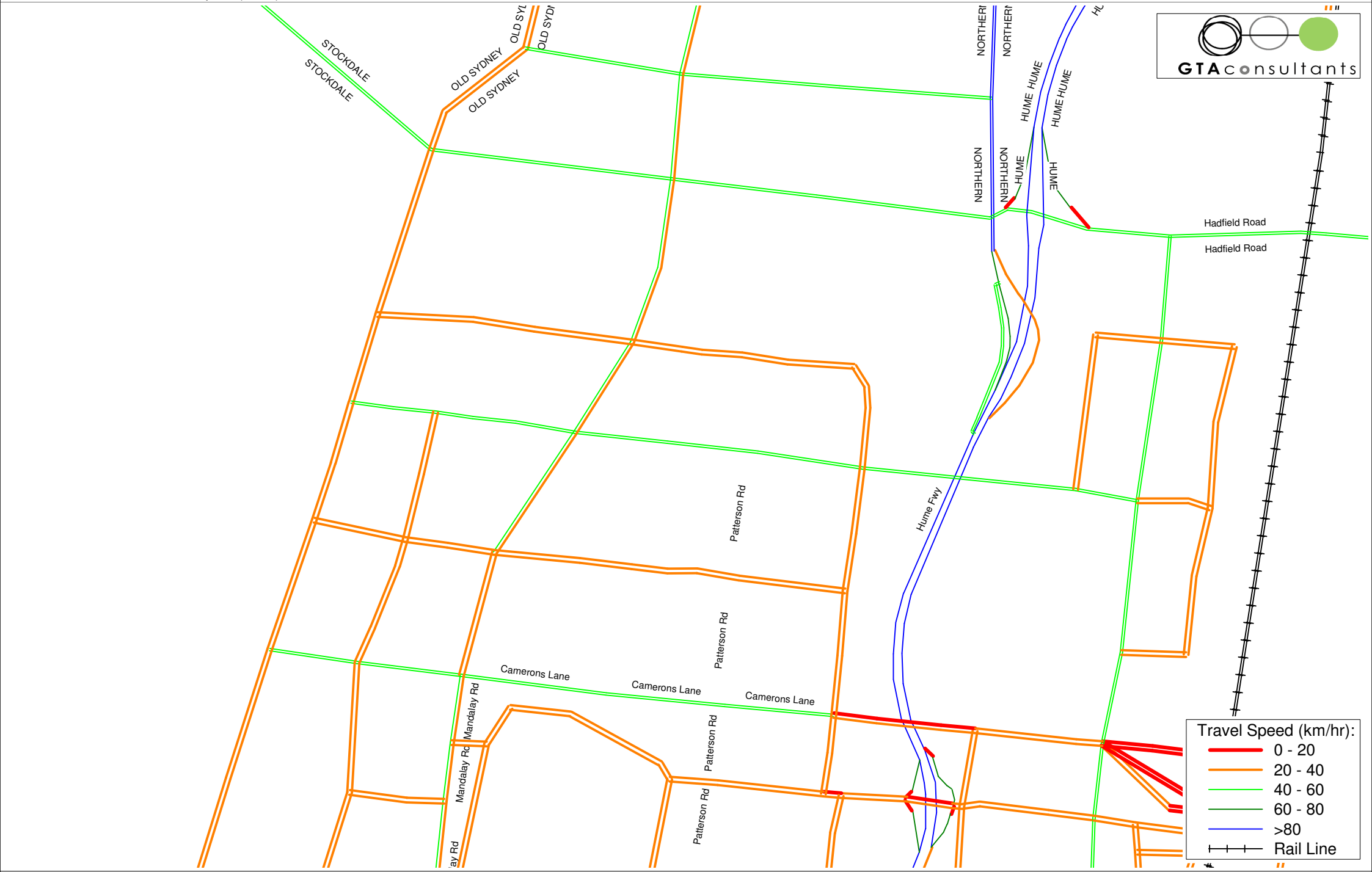
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 2



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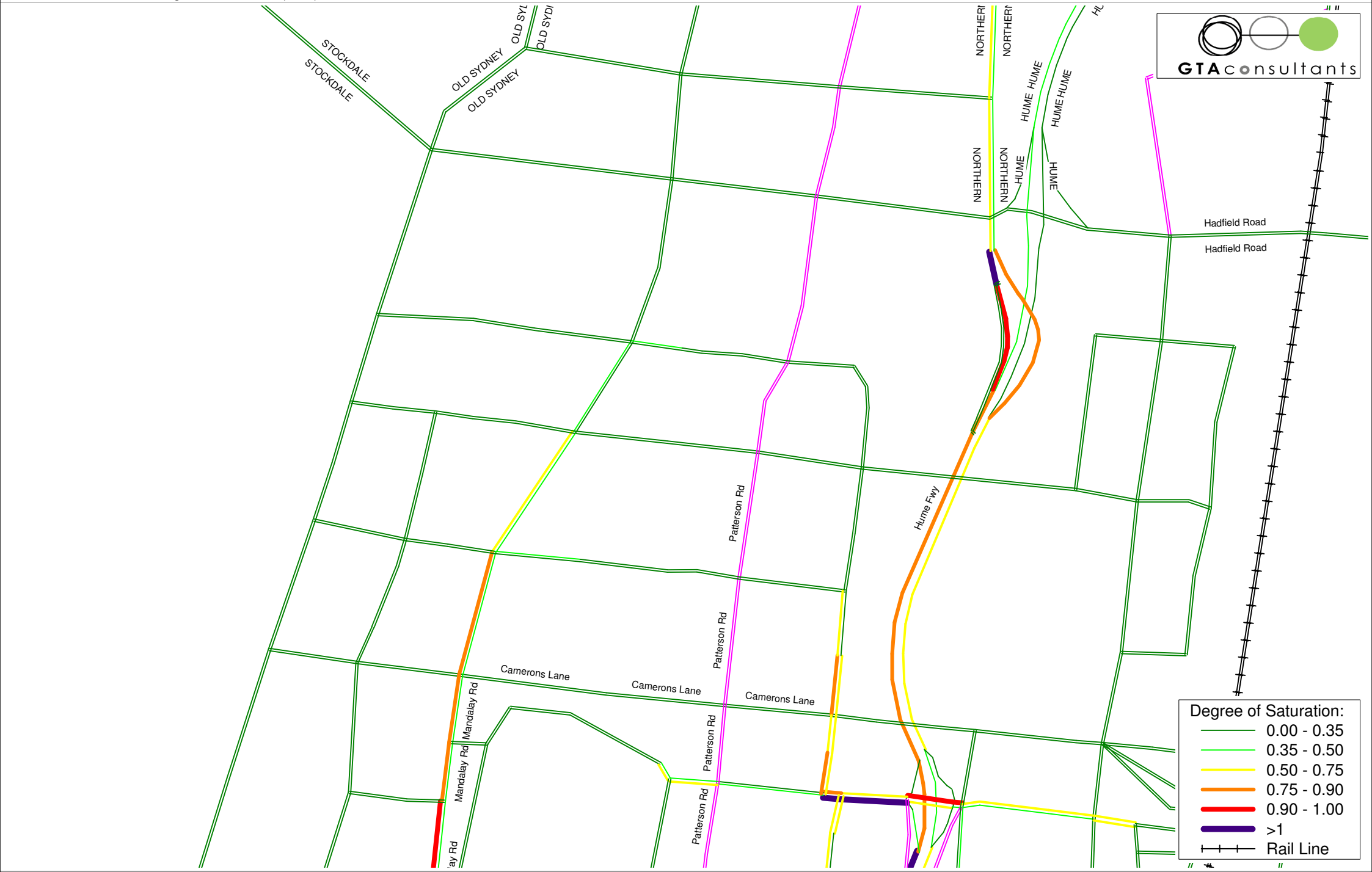
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 2



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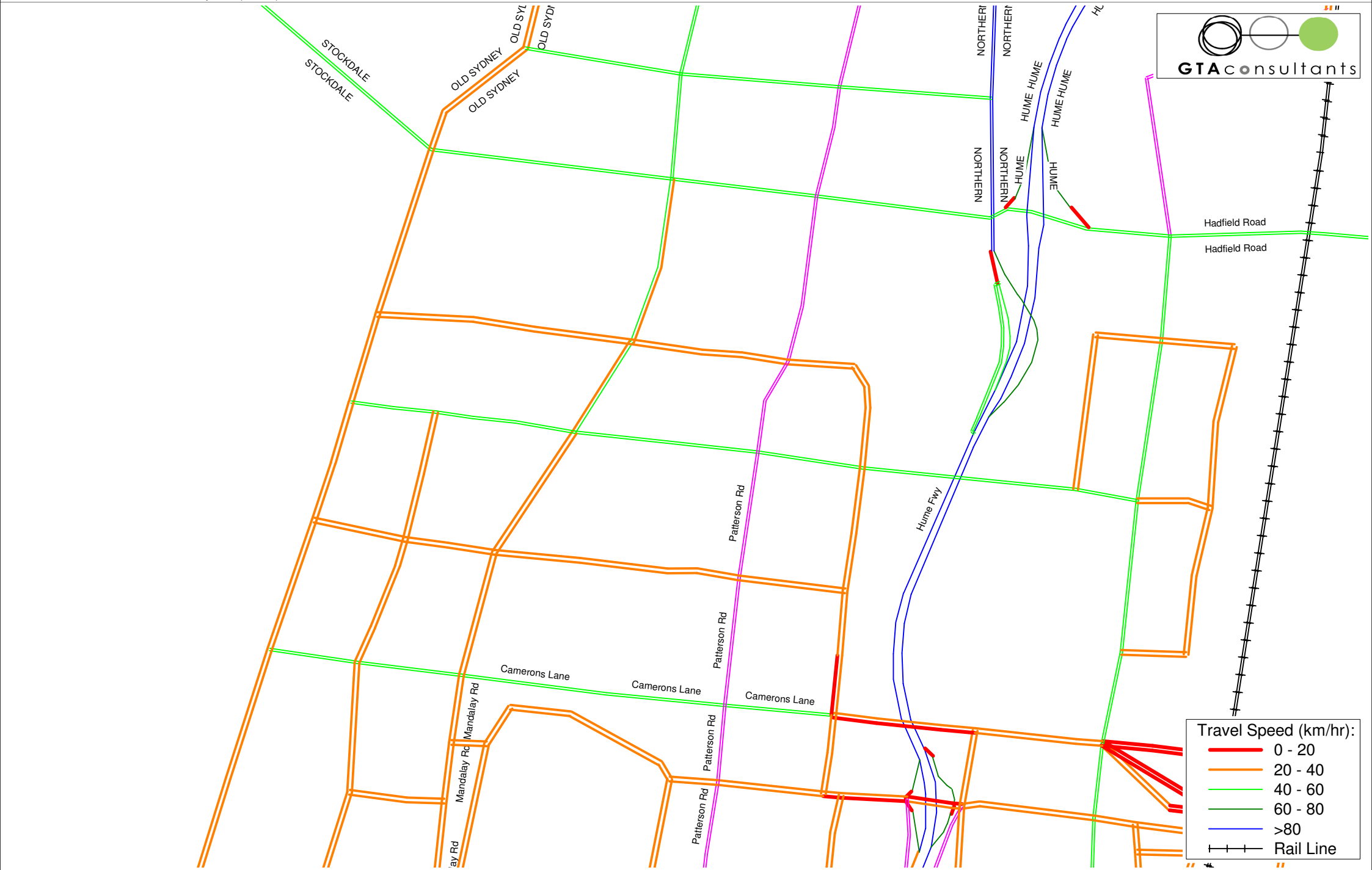
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 2



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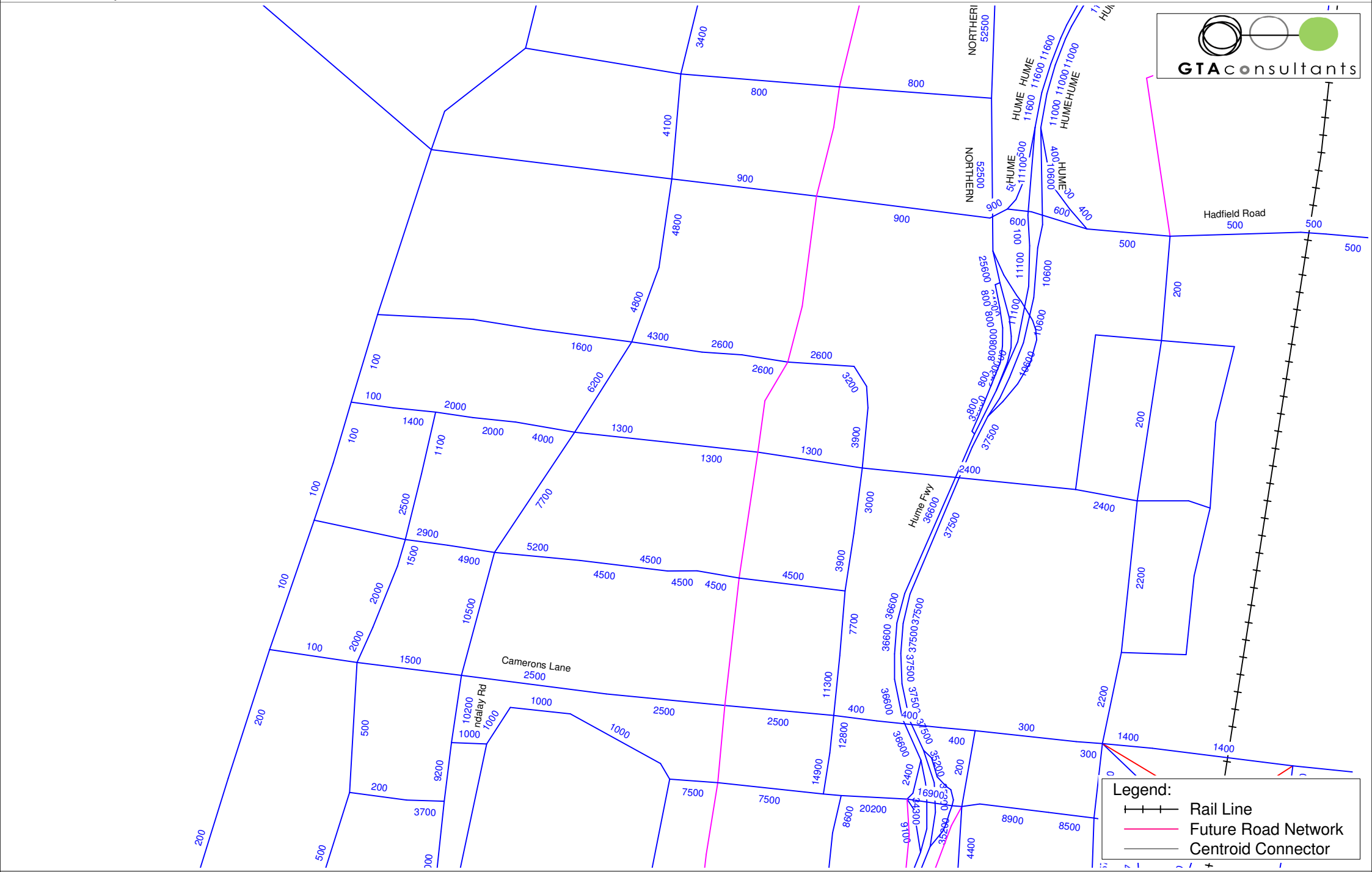
23/07/2014

VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 2



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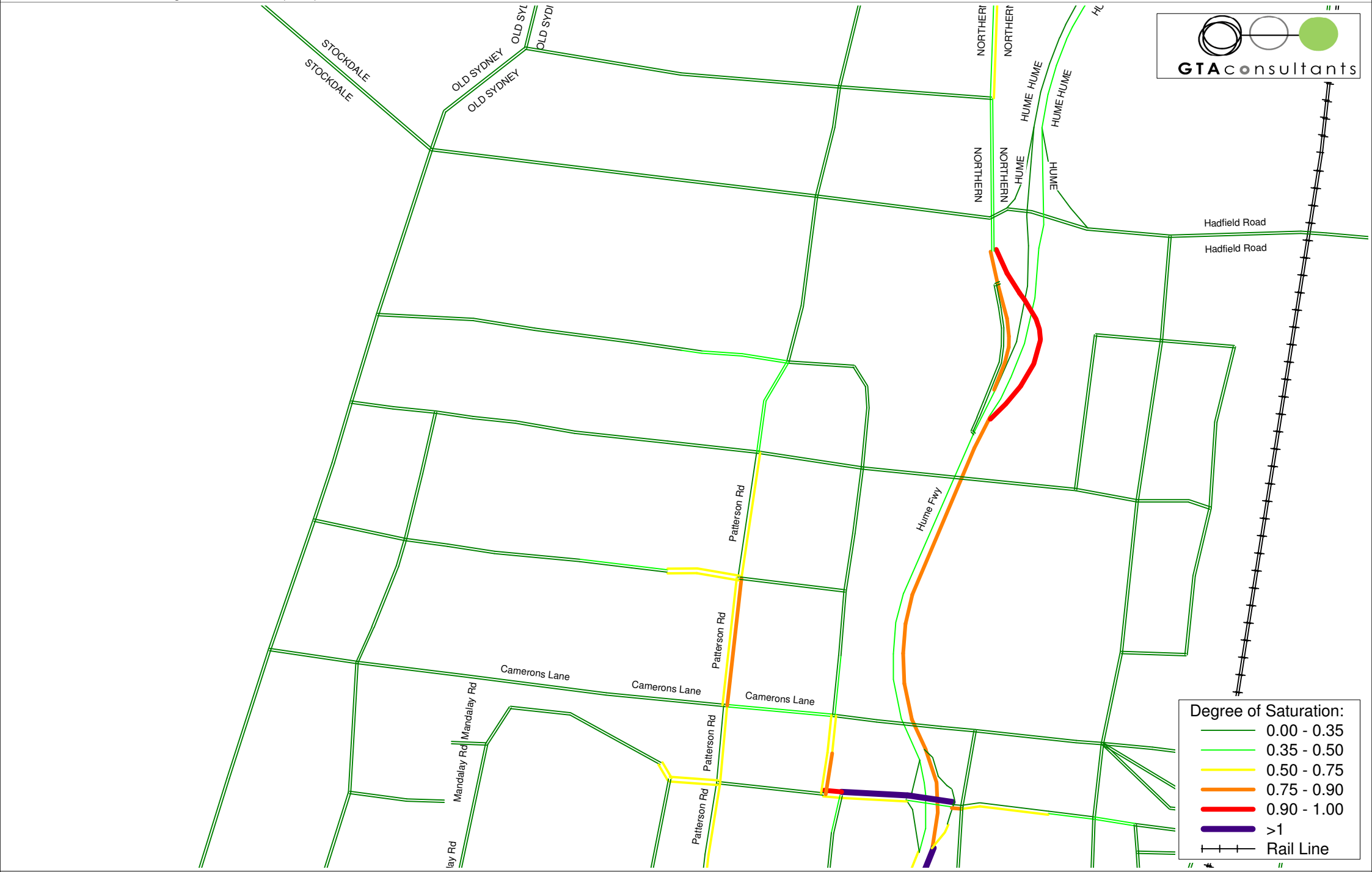
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 3



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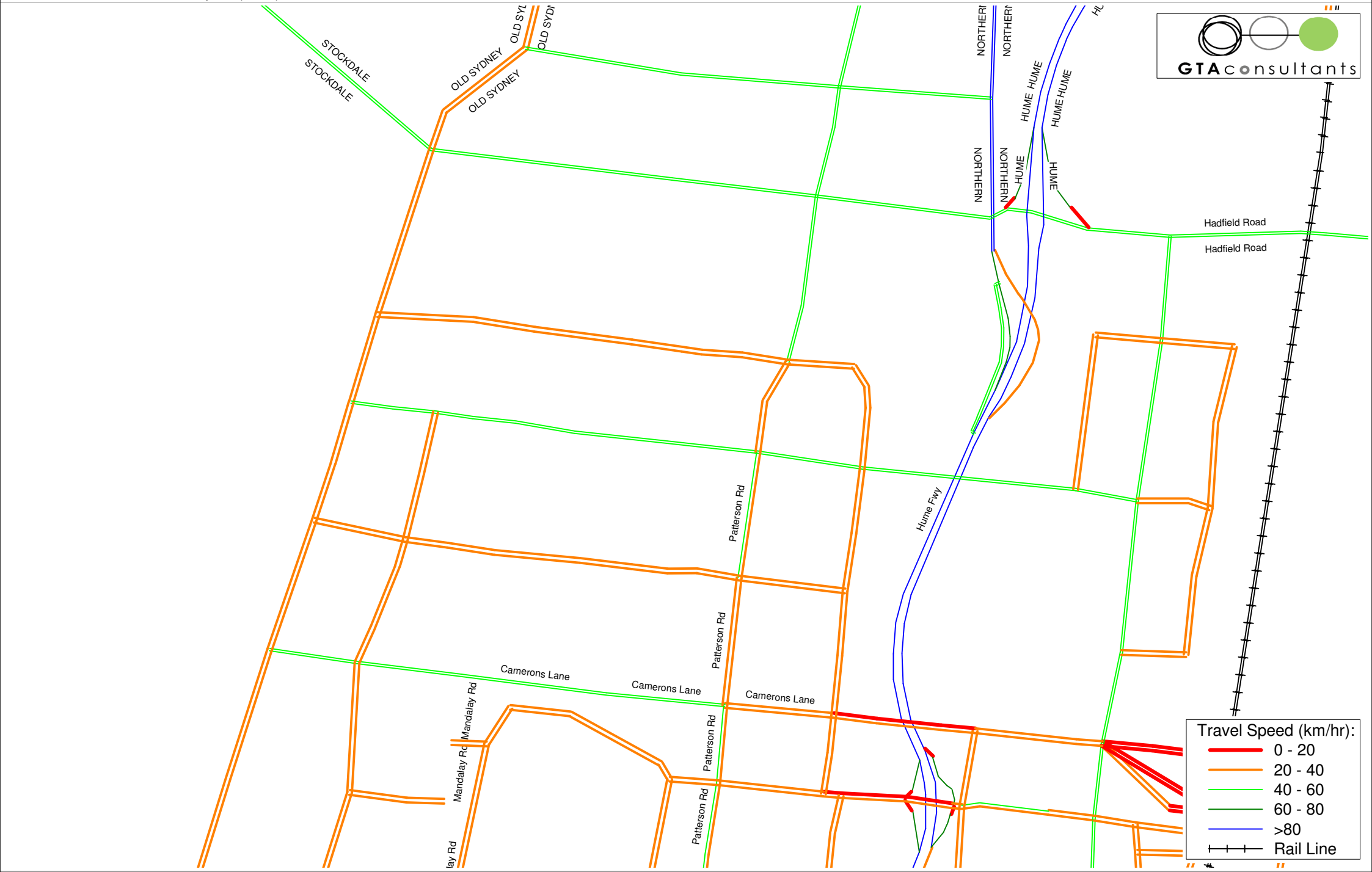
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 3



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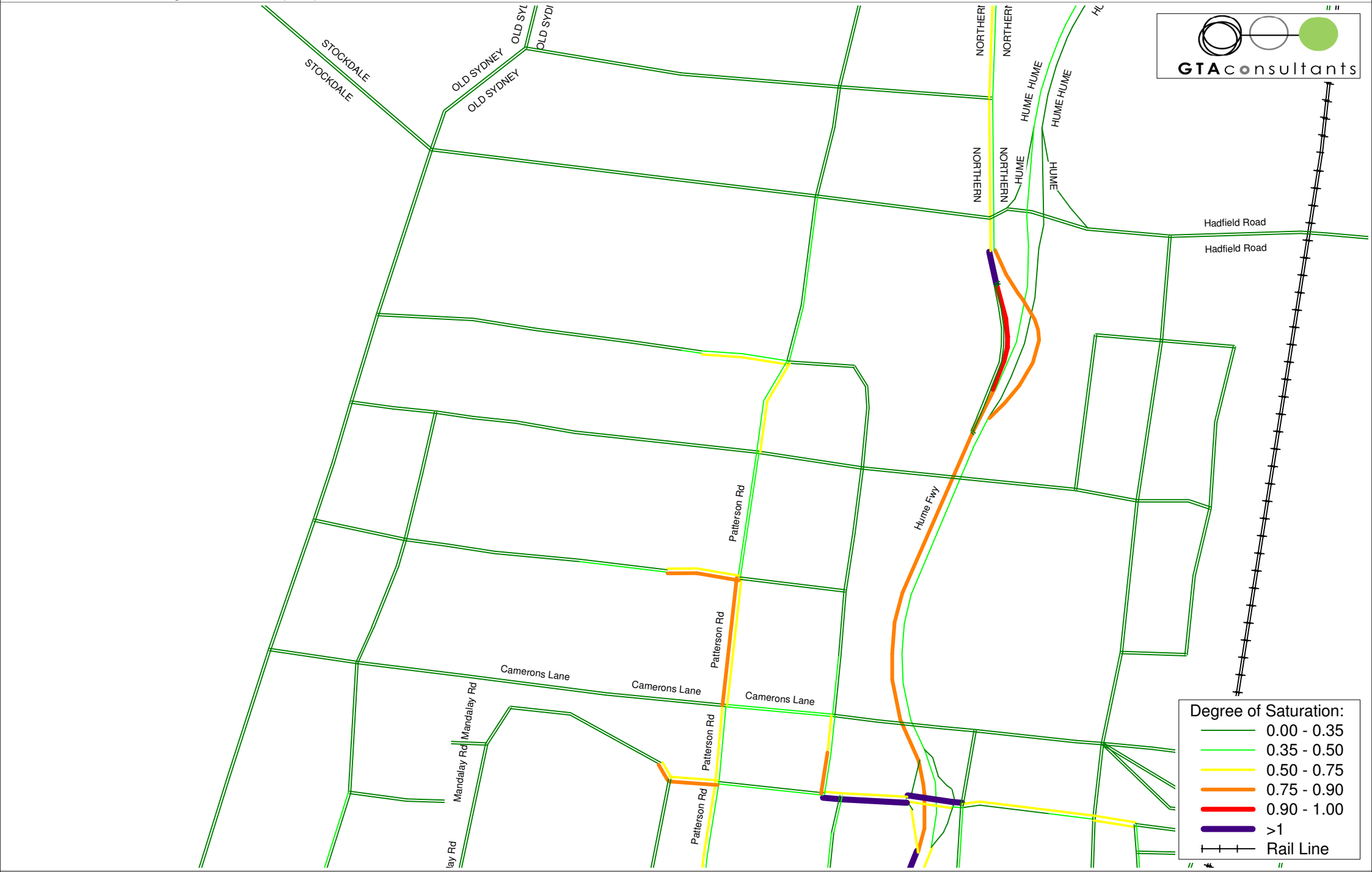
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 3



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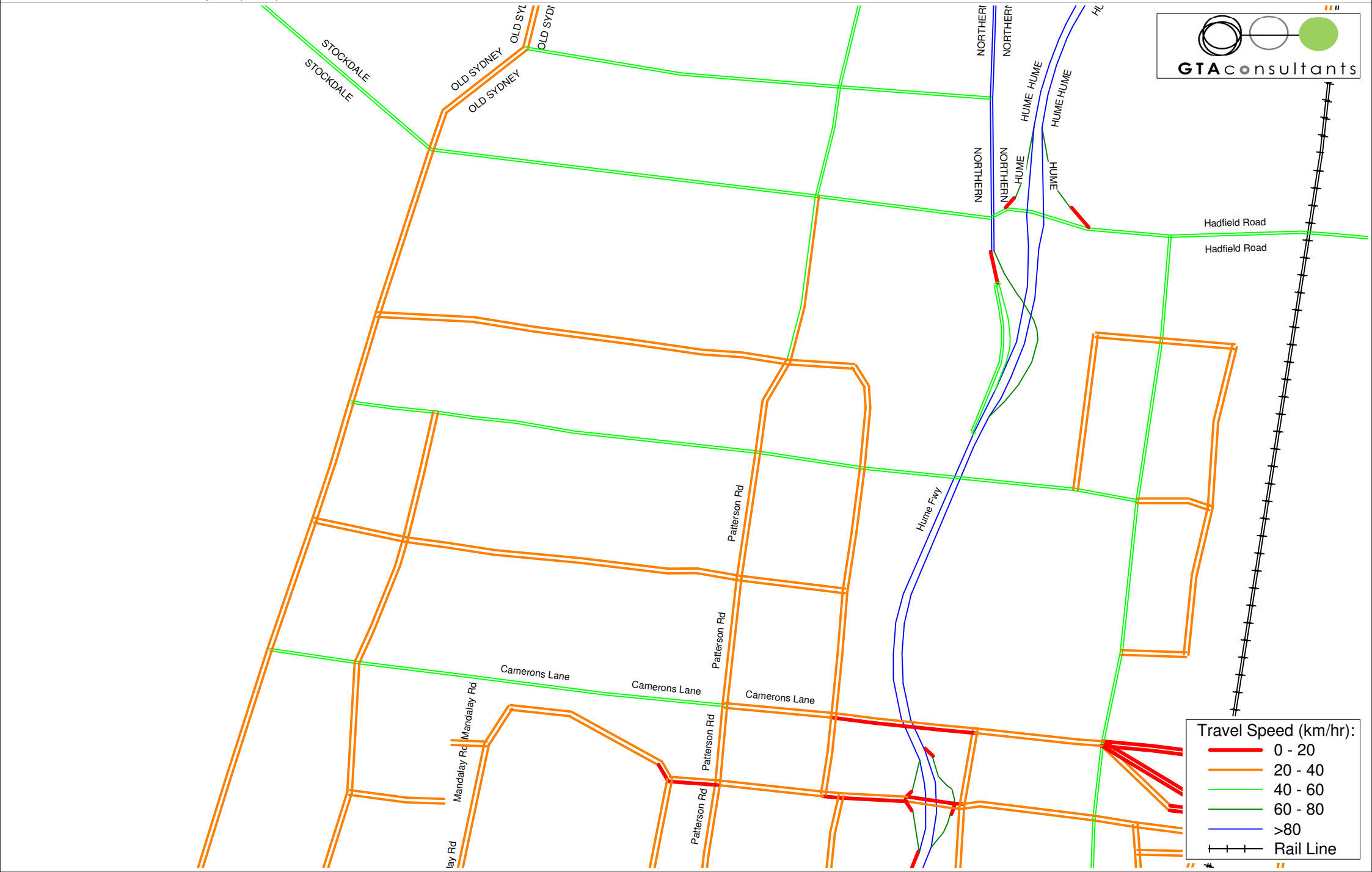
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 3



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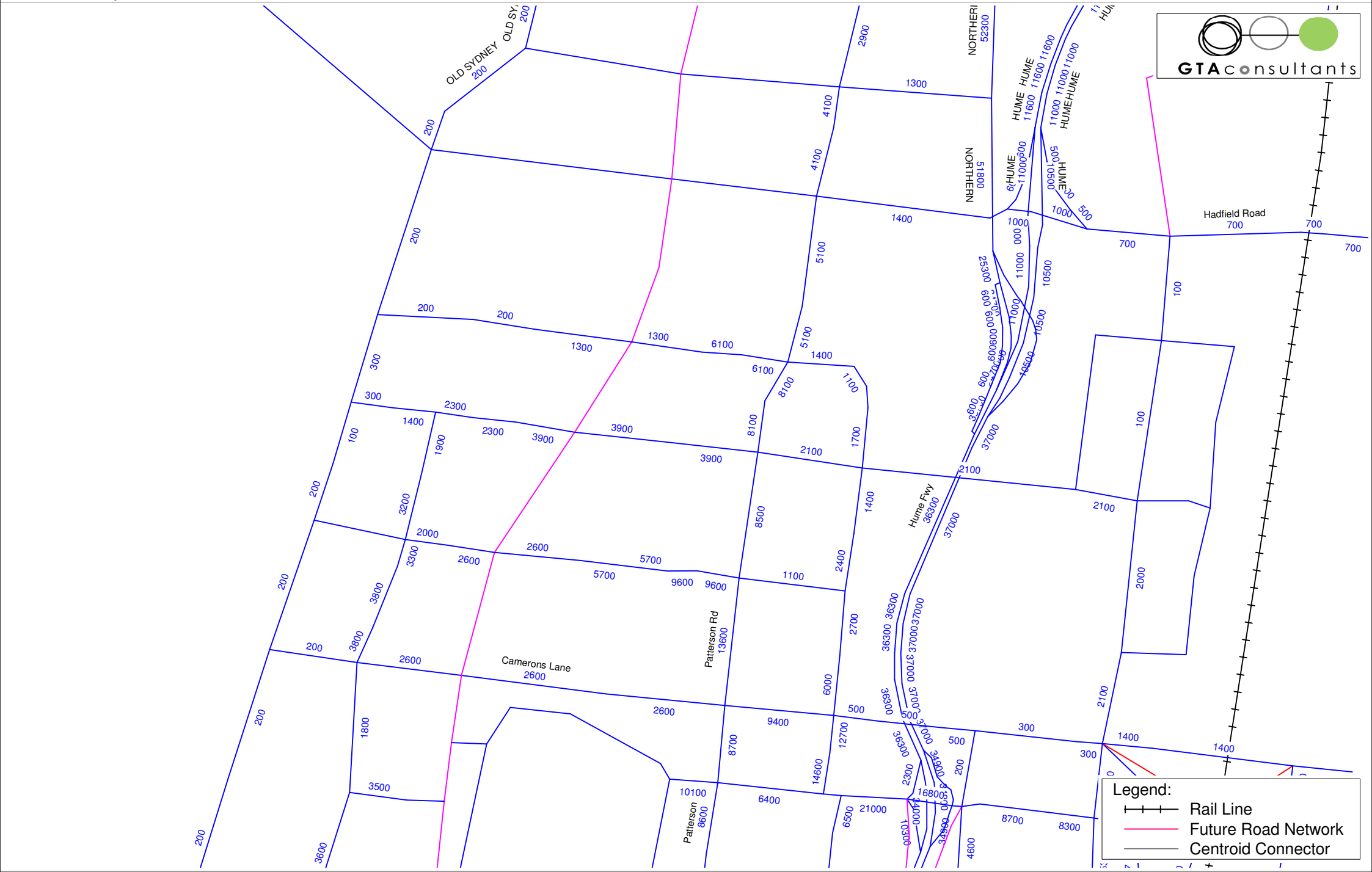
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 3



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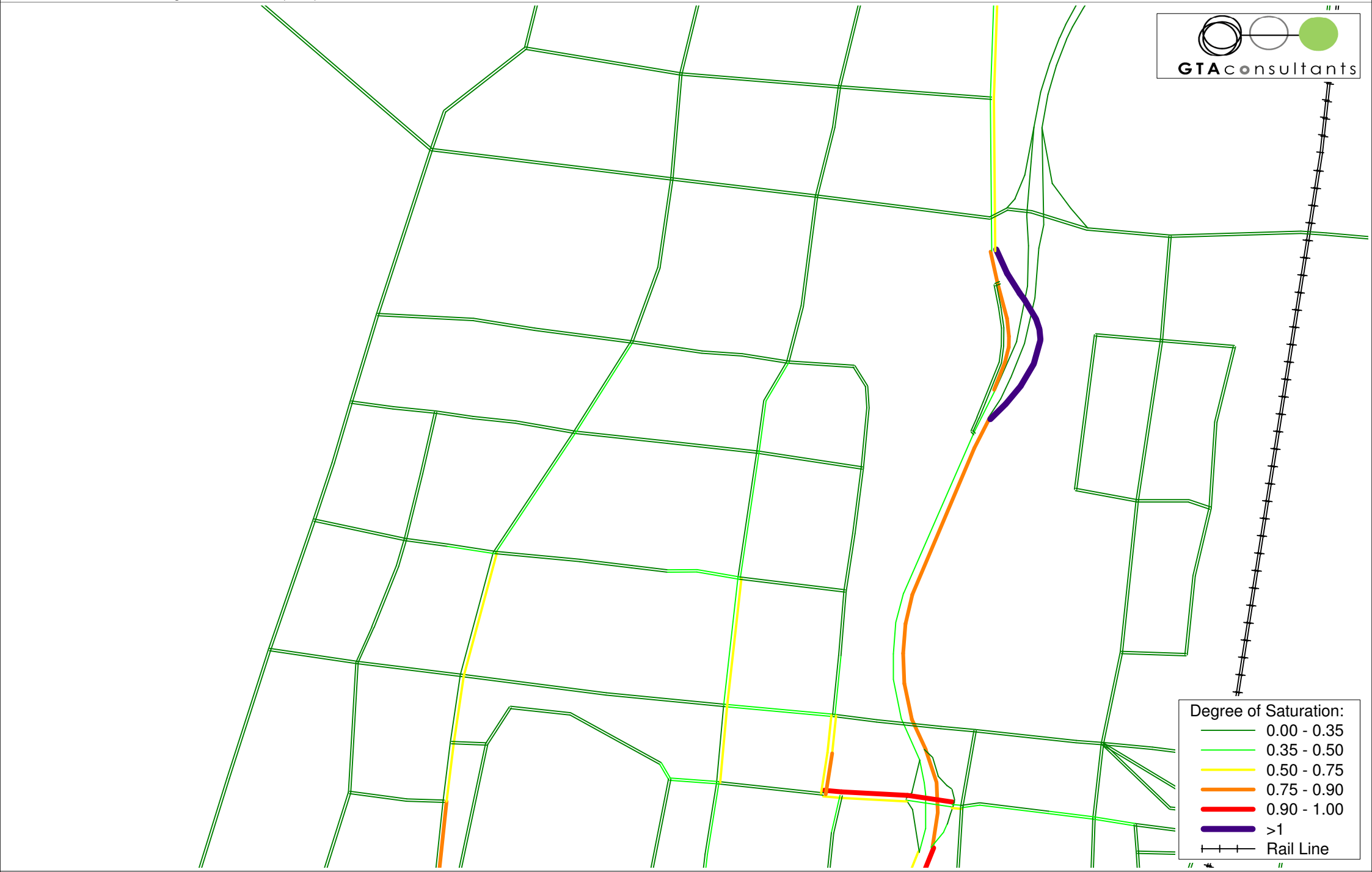
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 4



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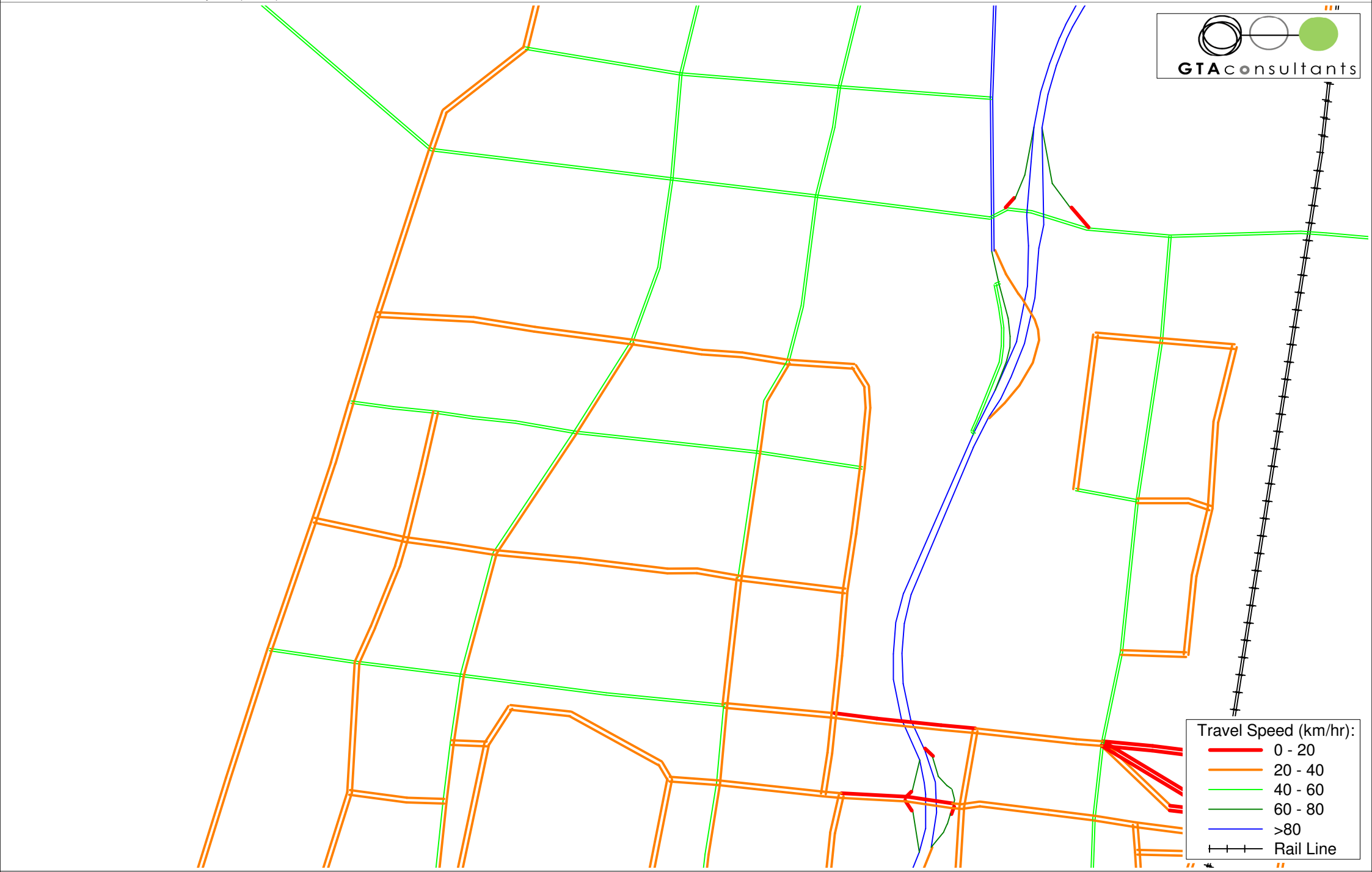
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 4



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7/25/2014

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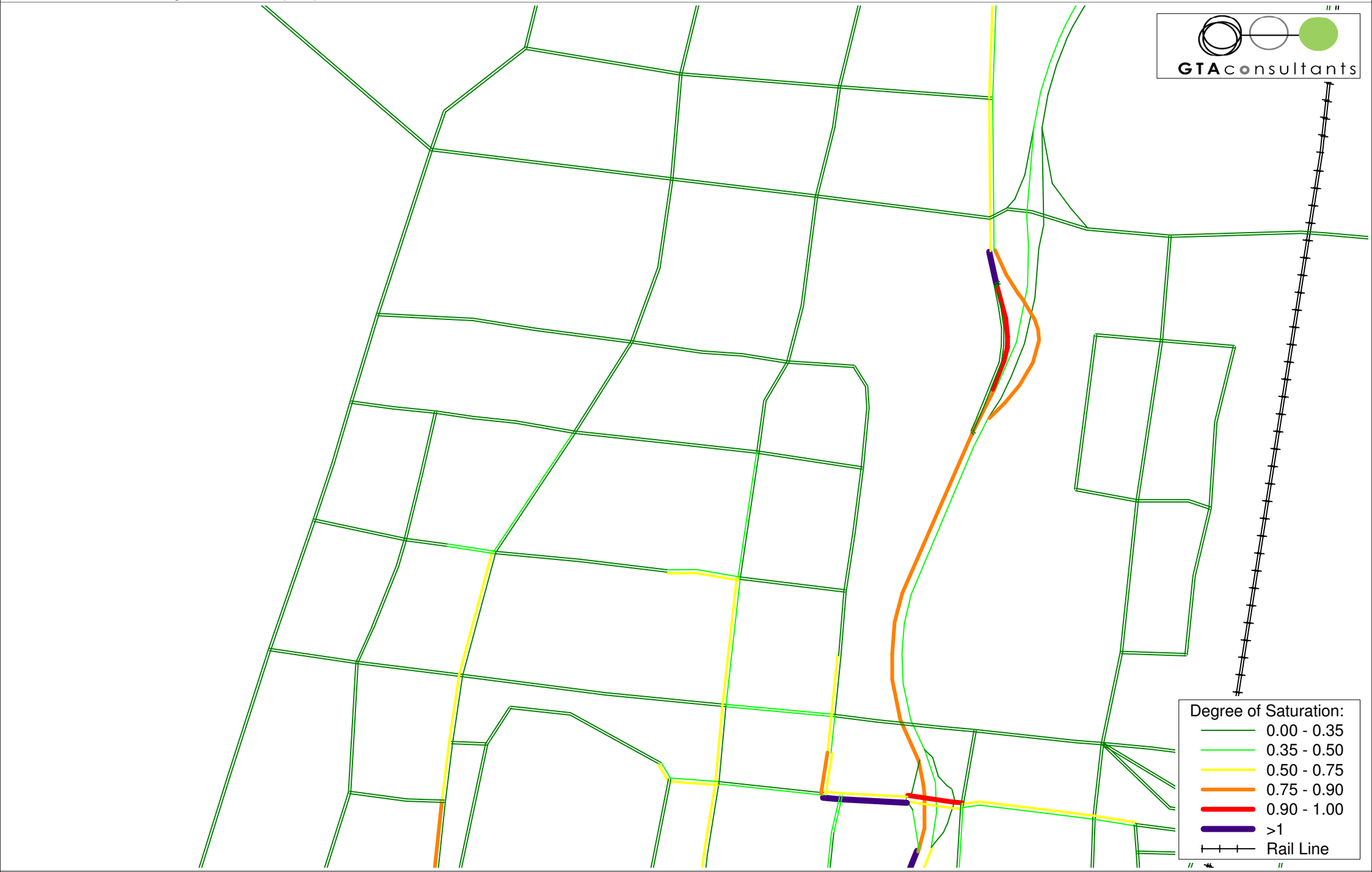
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 4



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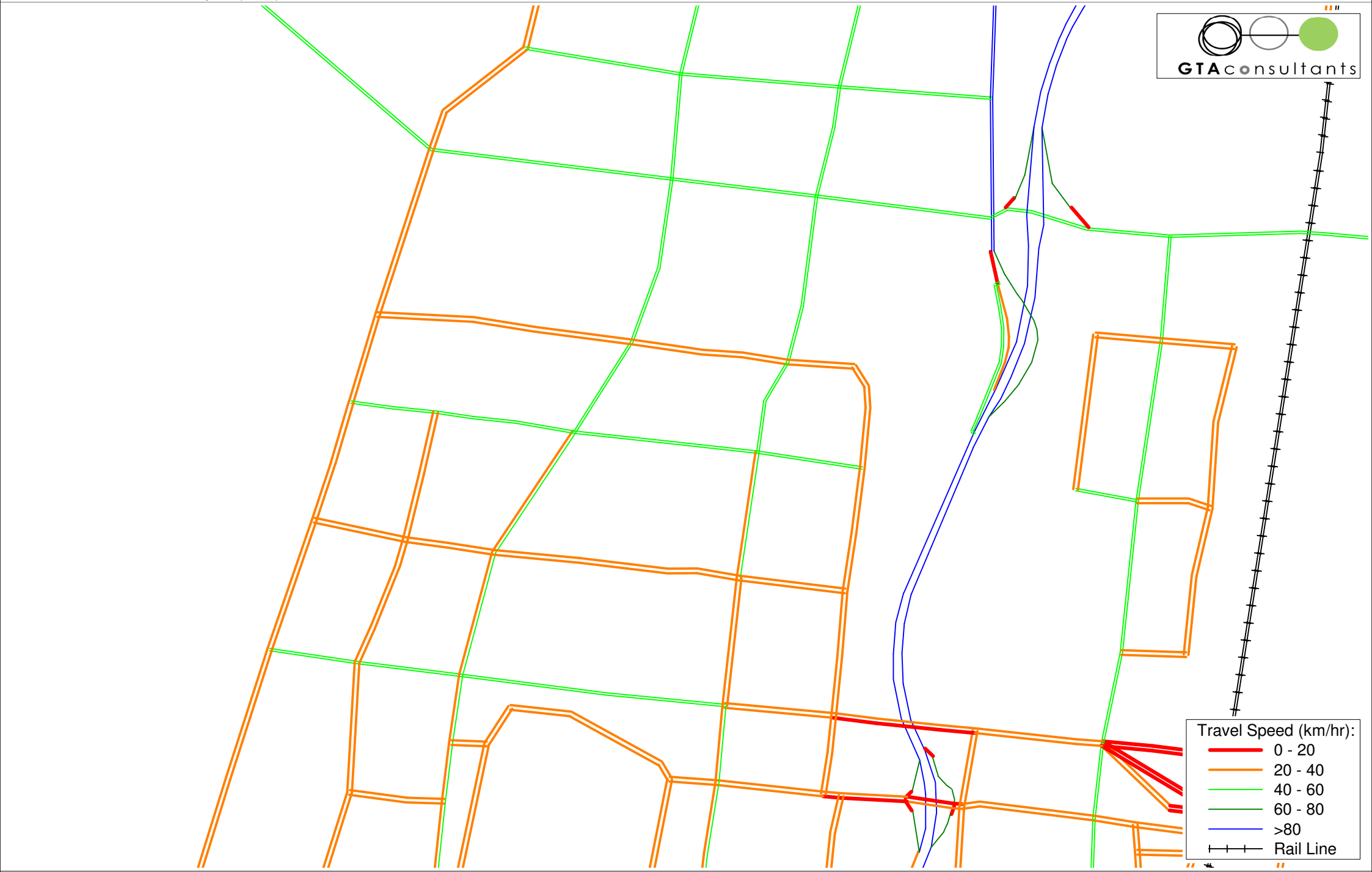
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 4



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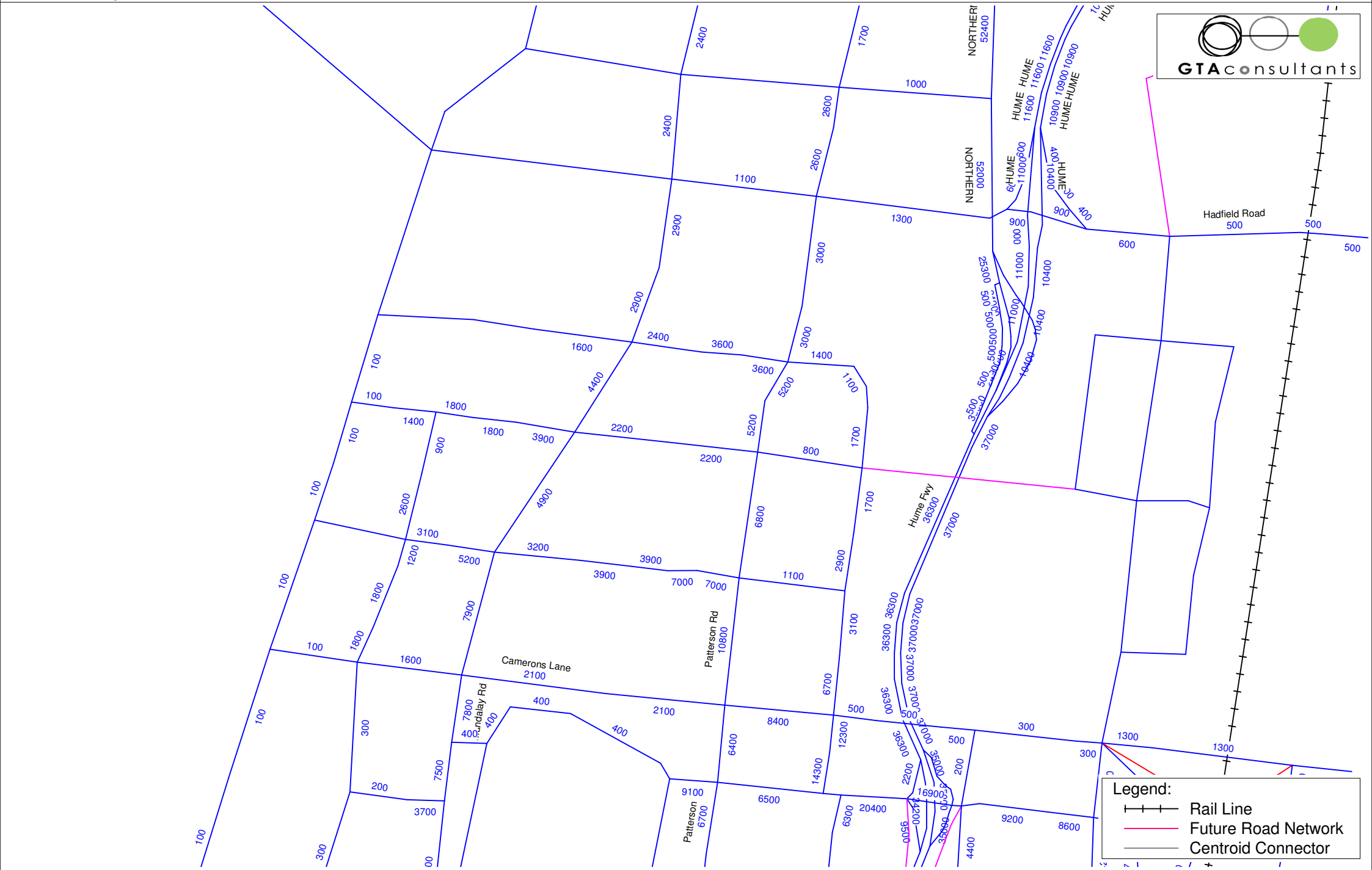
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 4



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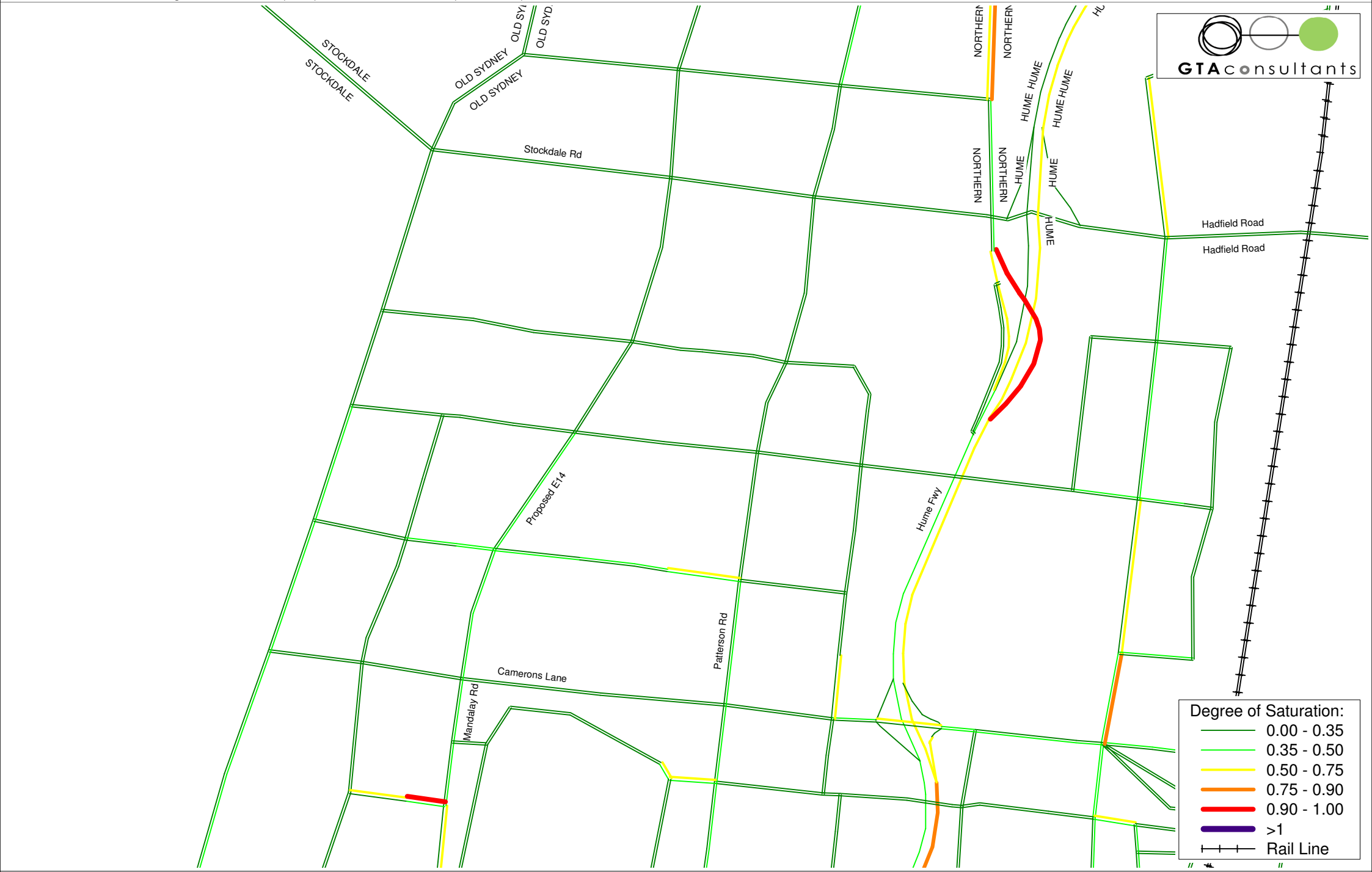
7/25/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2046 Scenario 1 (Base Case)



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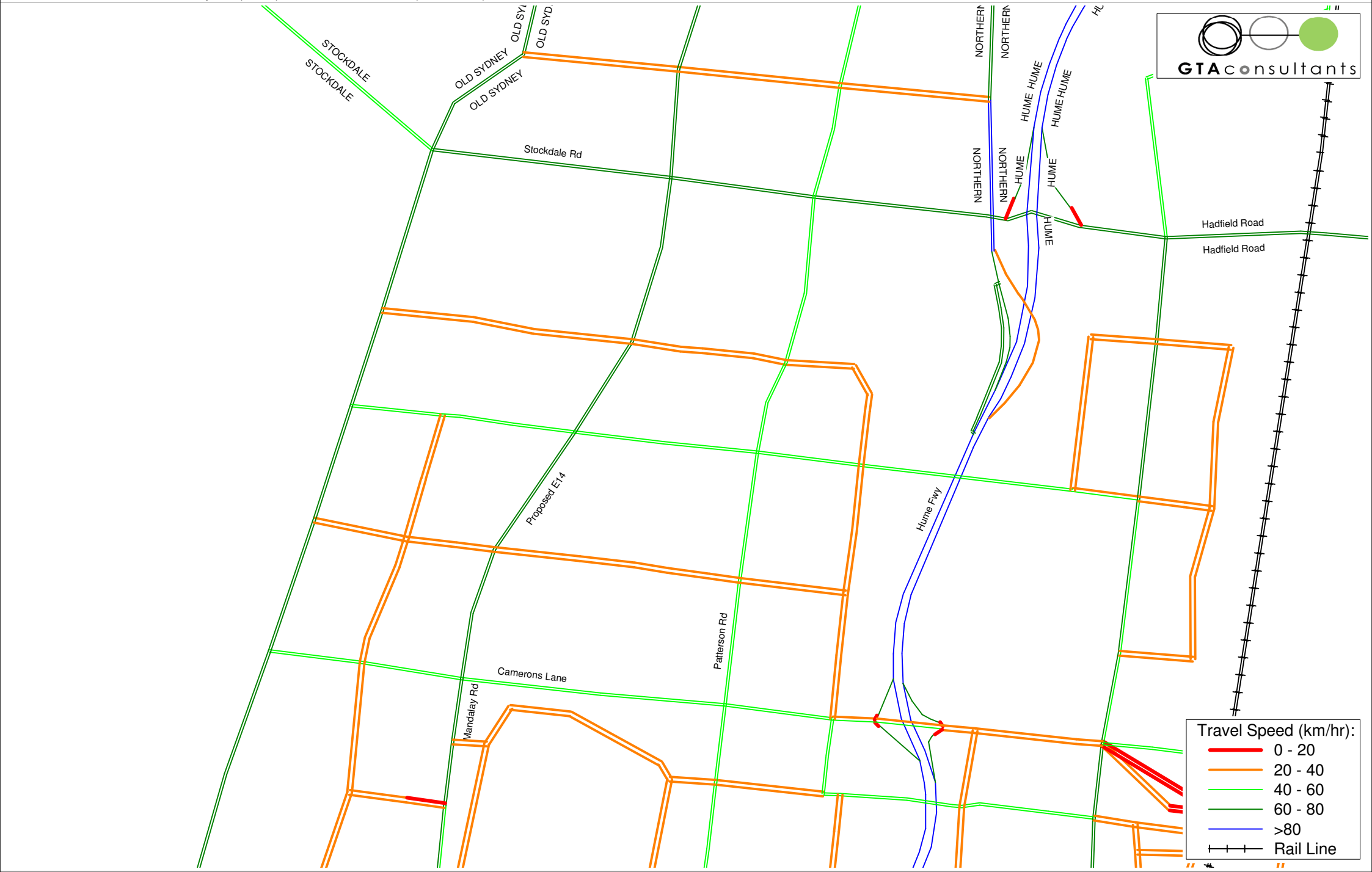
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2046 Scenario 1 (Base Case)



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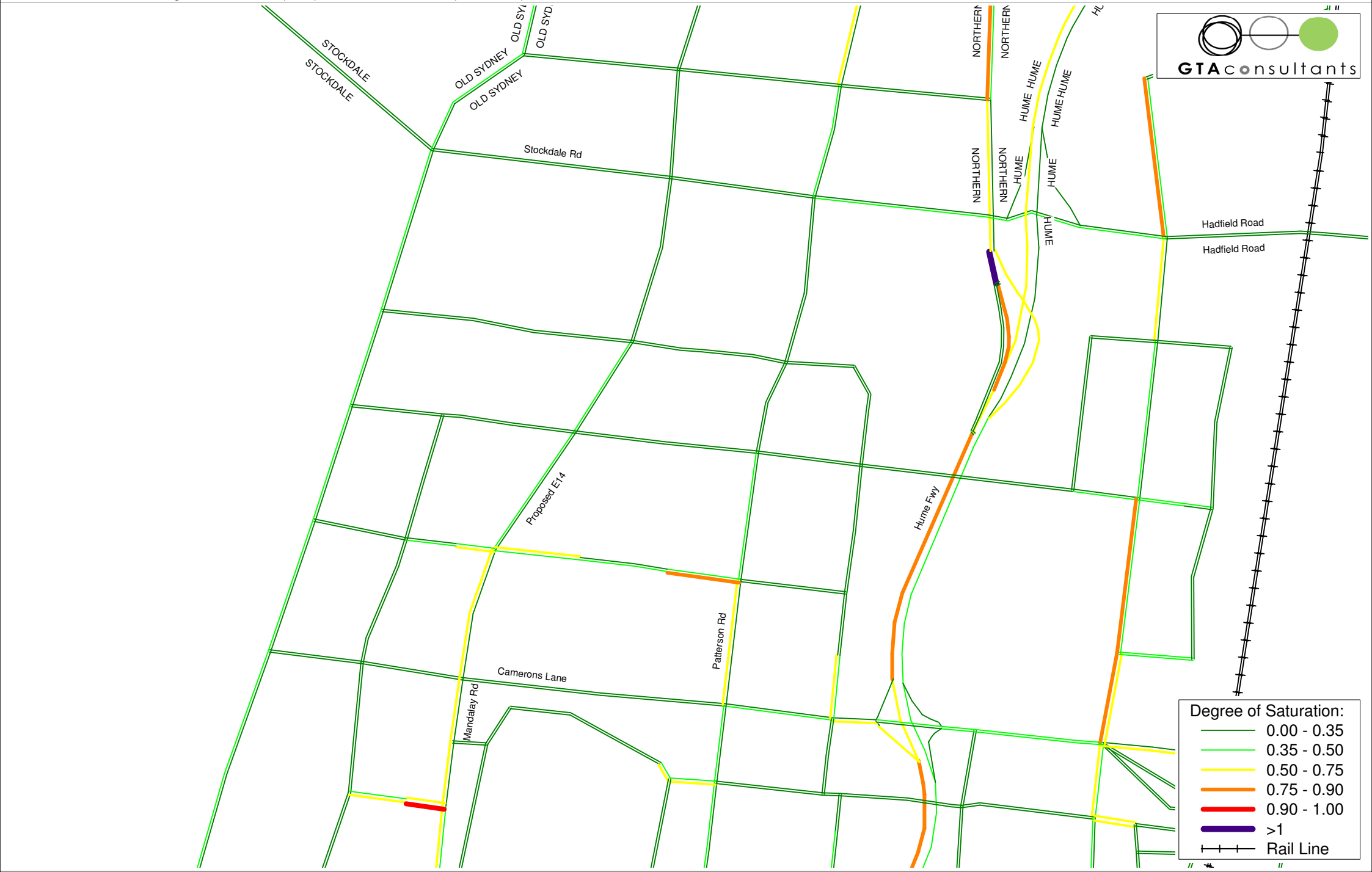
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2046 Scenario 1 (Base Case)



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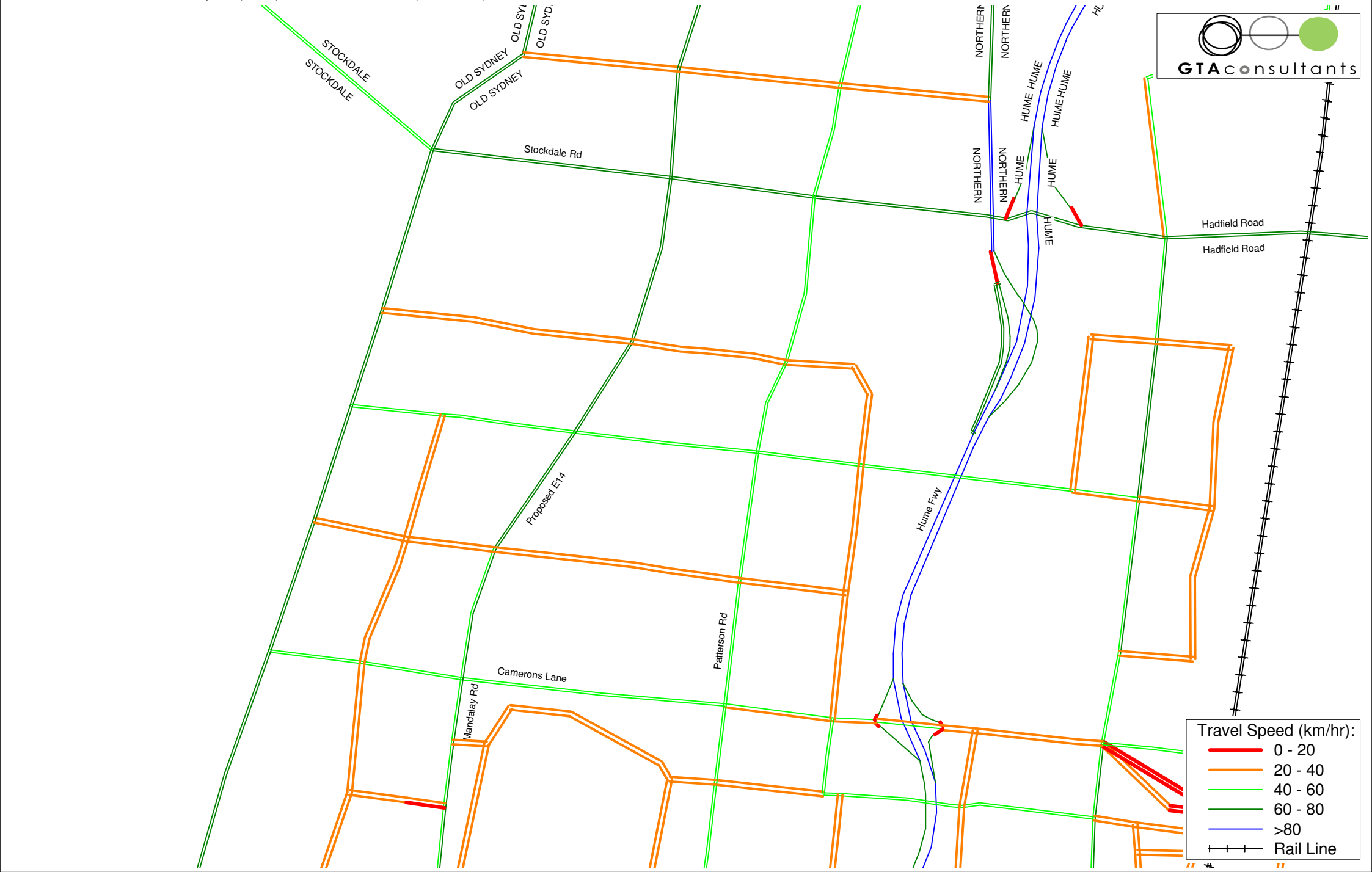
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2046 Scenario 1 (Base Case)



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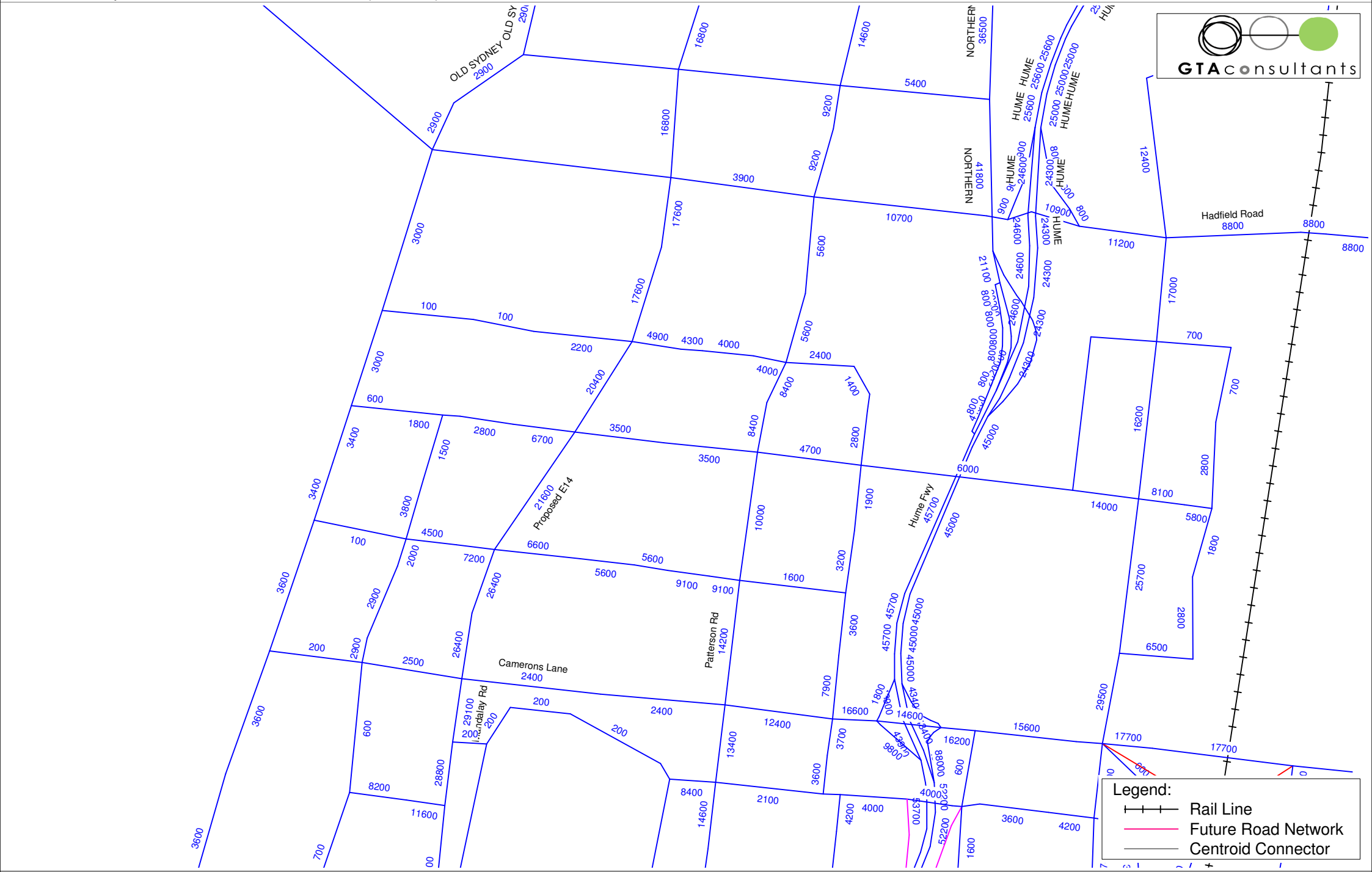
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2046 Scenario 1 (Base Case)



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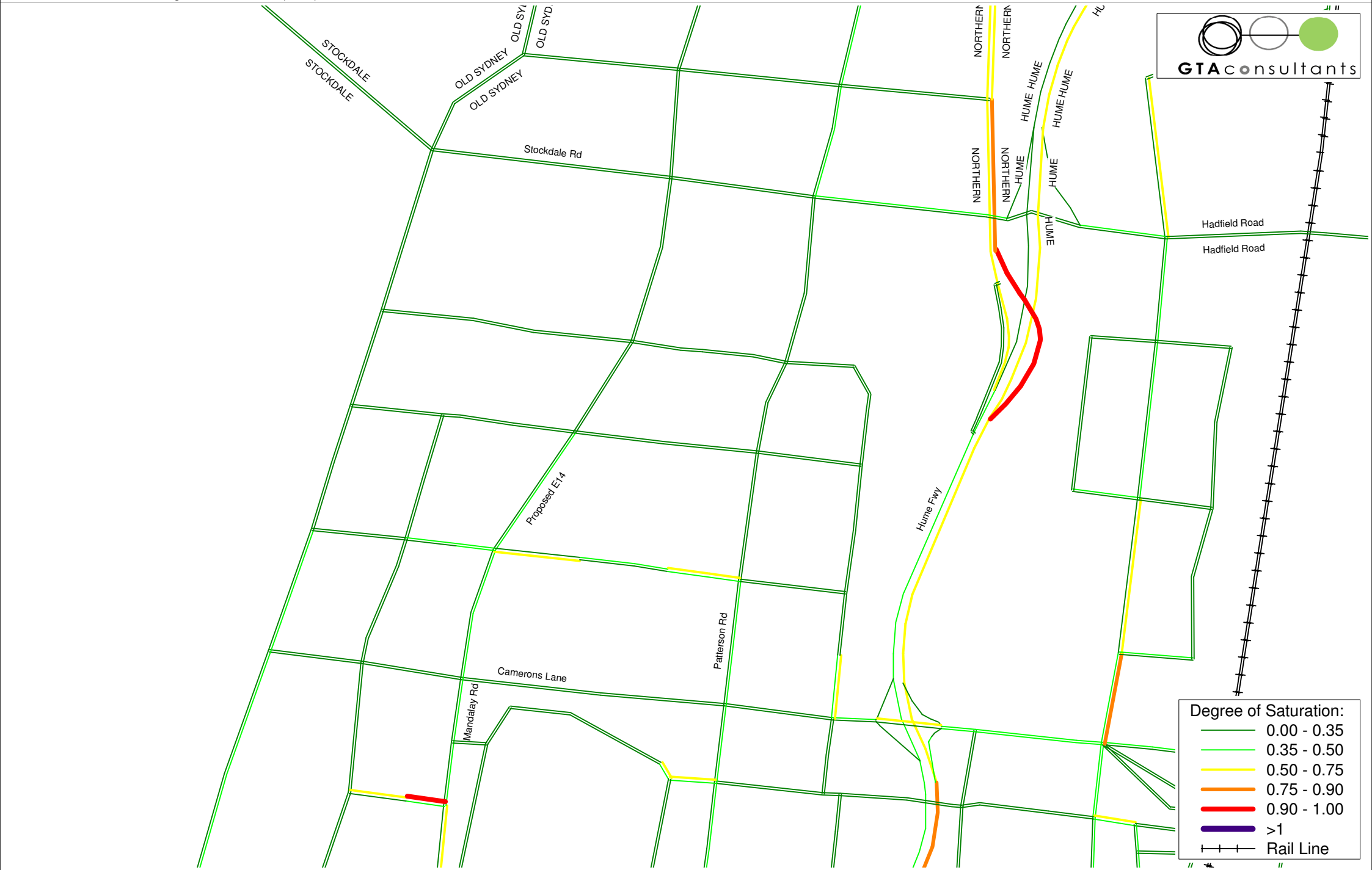
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2046 Scenario 2



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23/07/2014

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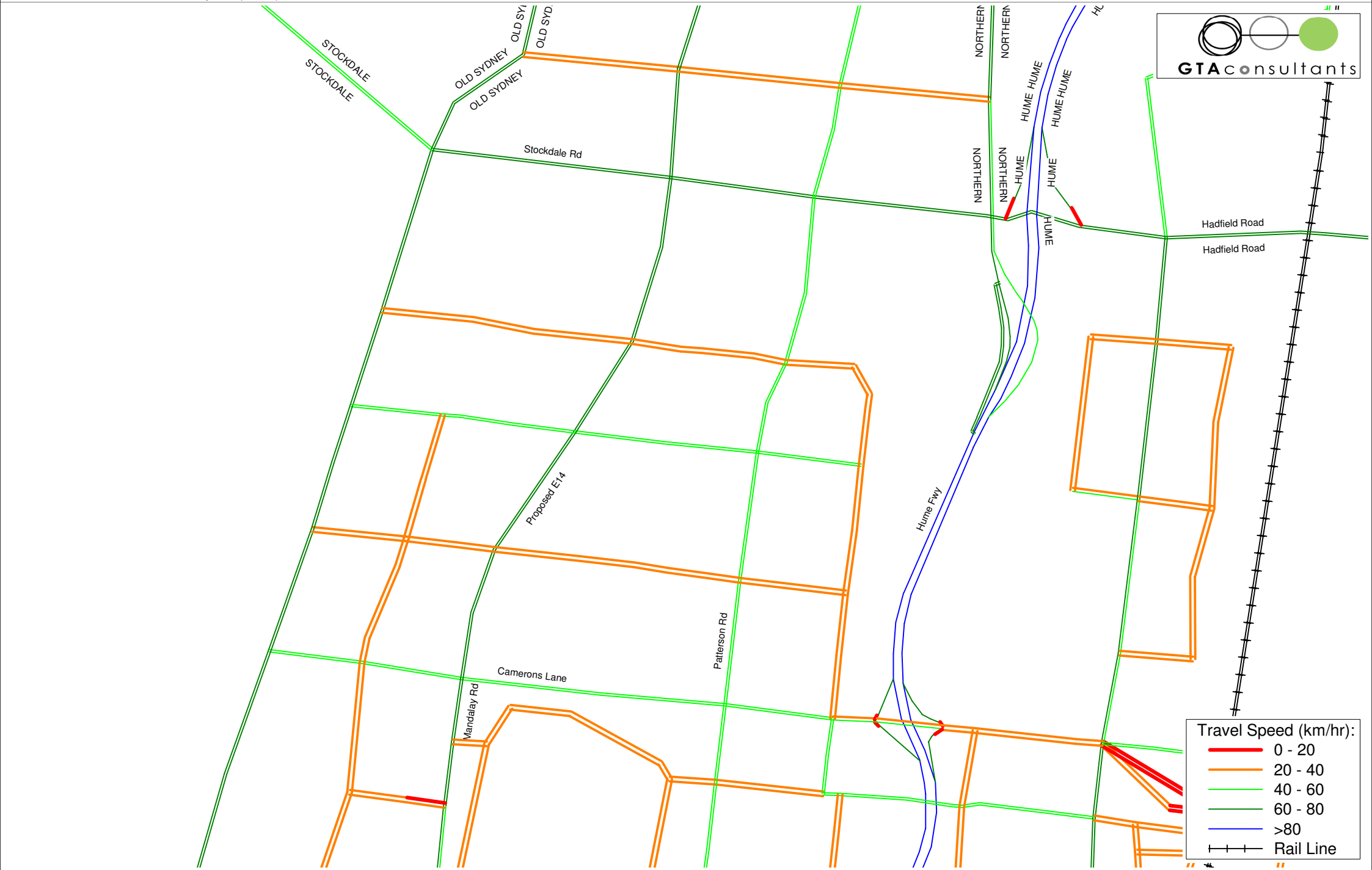
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2046 Scenario 2



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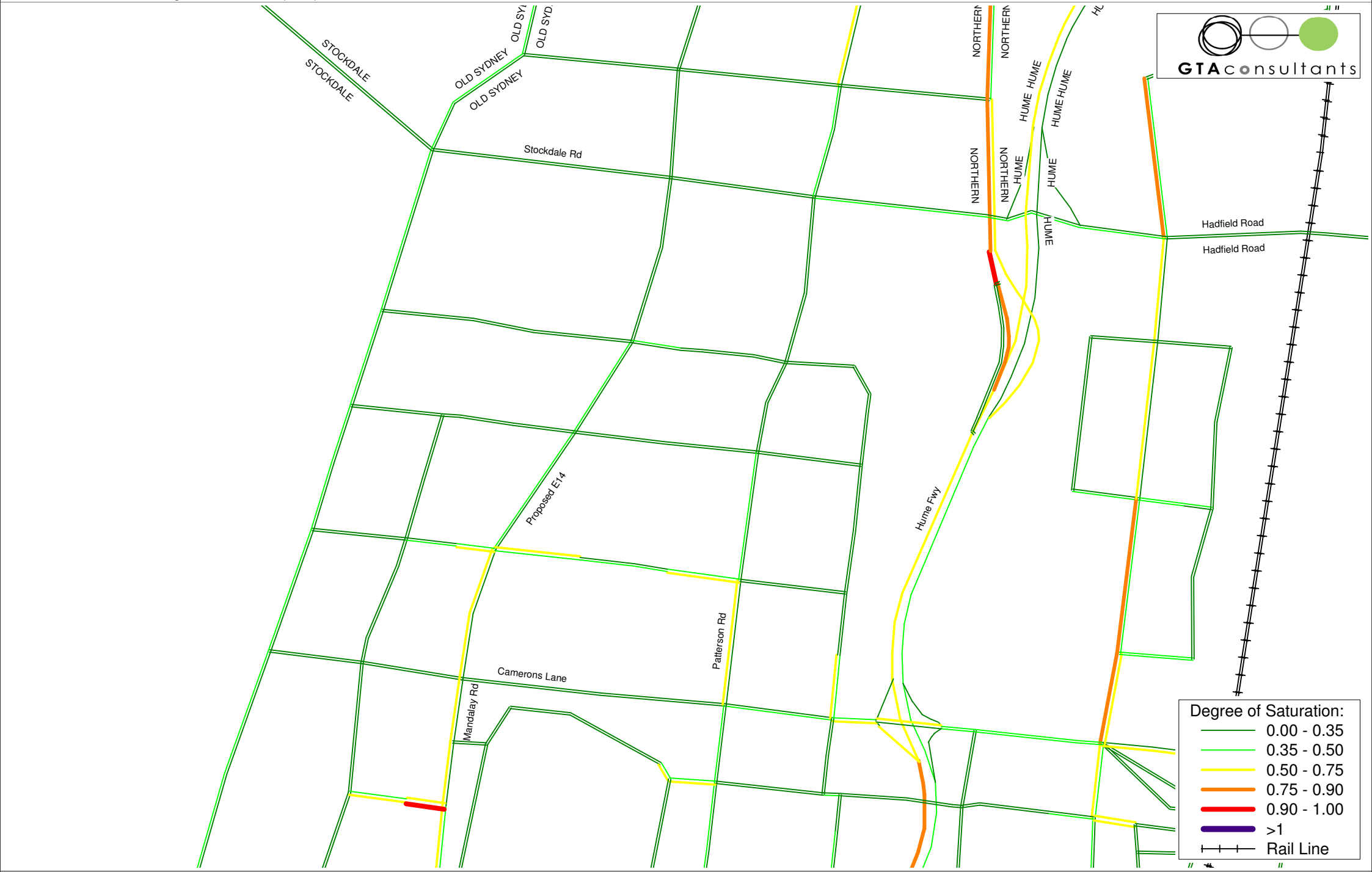
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2046 Scenario 2



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23/07/2014

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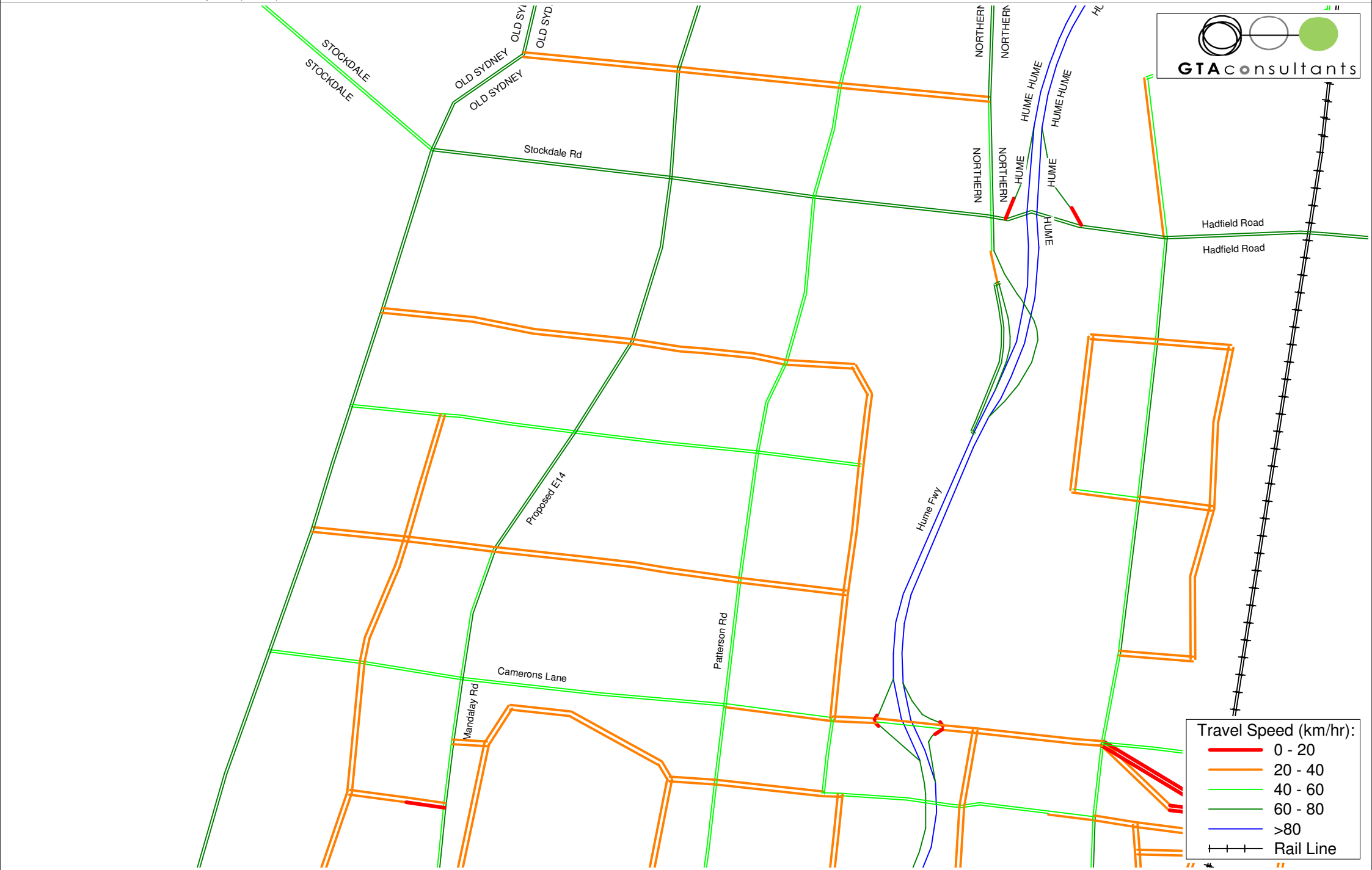
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2046 Scenario 2



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23/07/2014

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VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2046 Scenario 2

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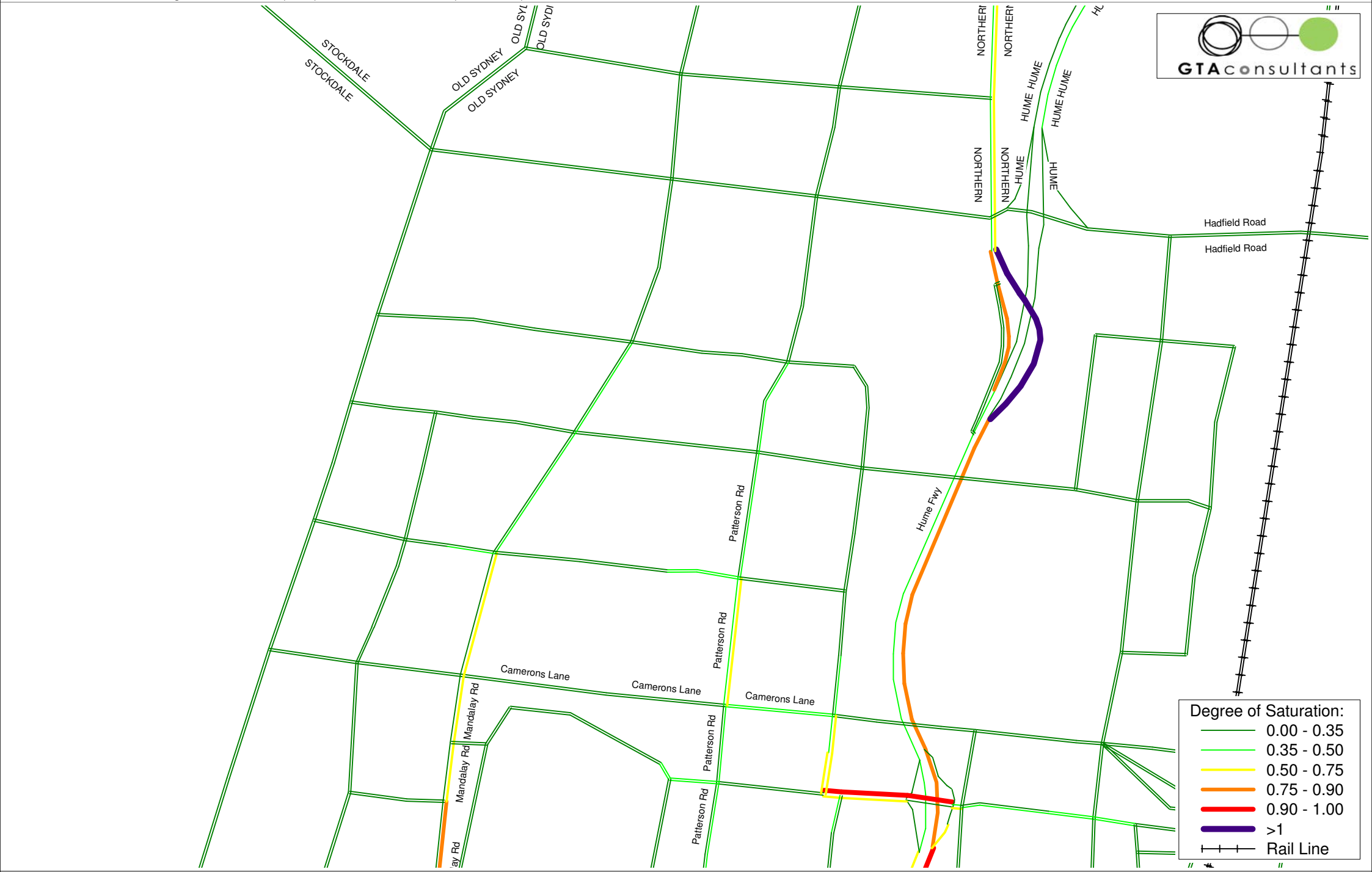
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 1 (Base Case)



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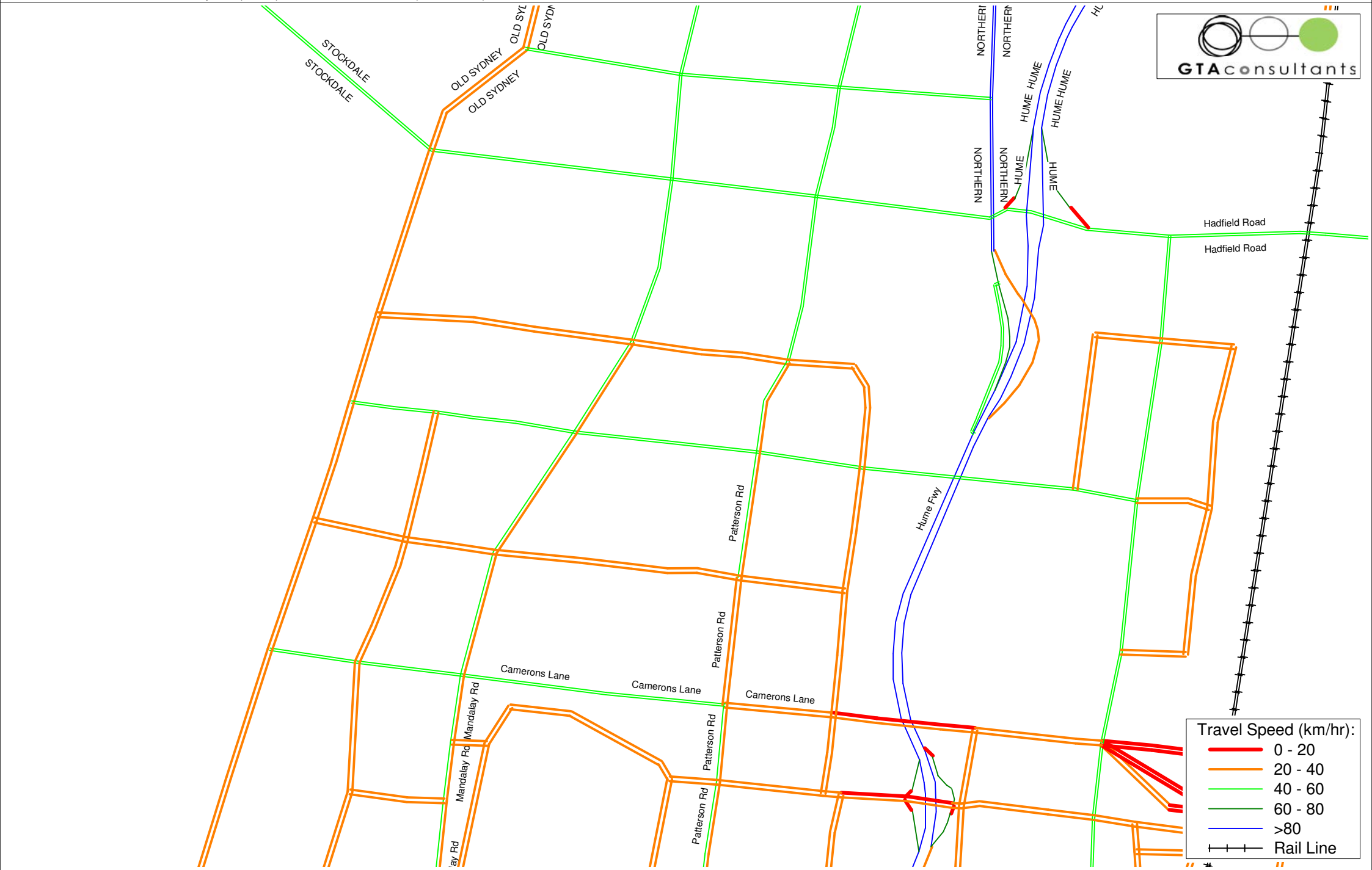
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 1 (Base Case)



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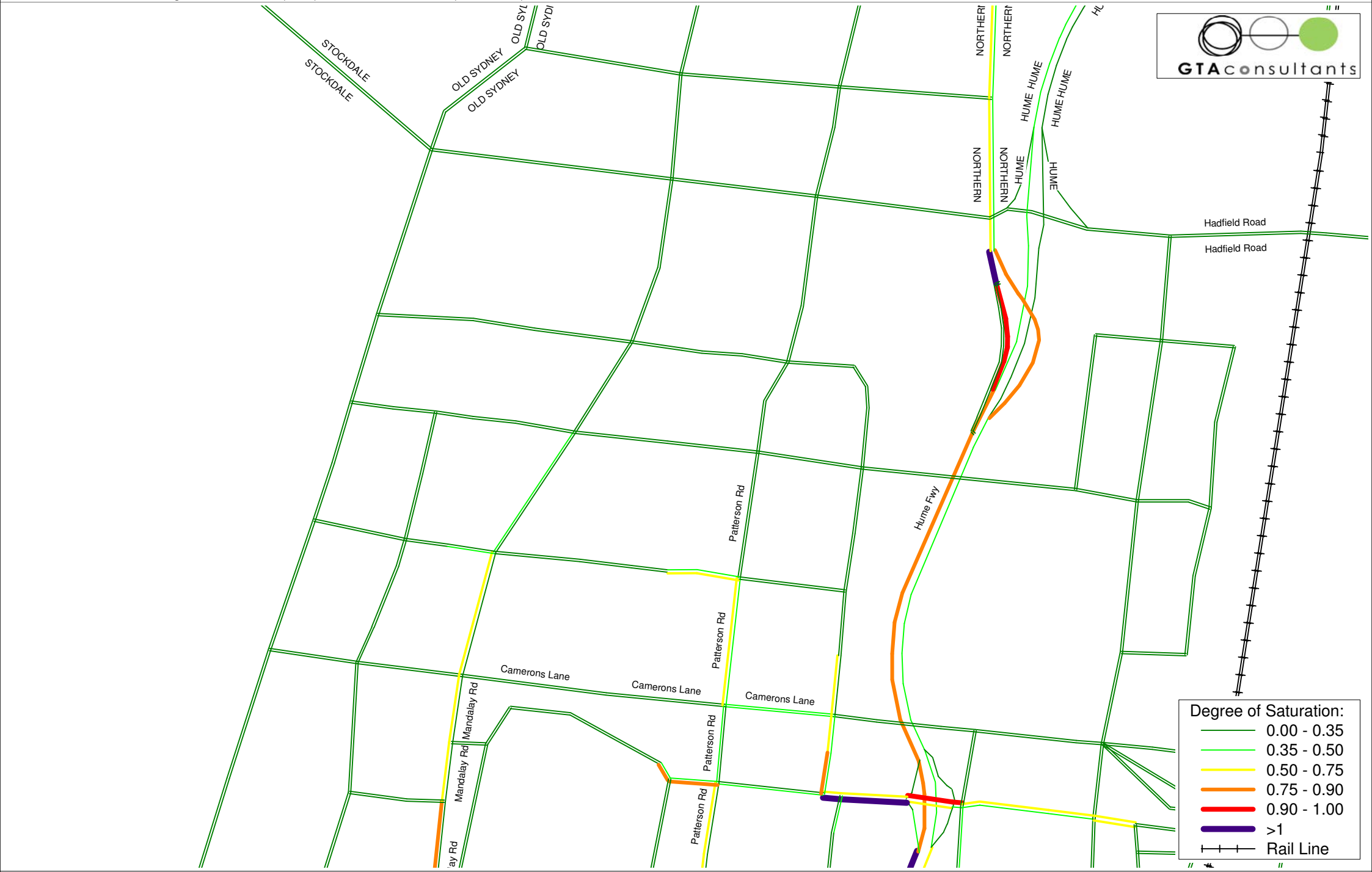
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 1 (Base Case)



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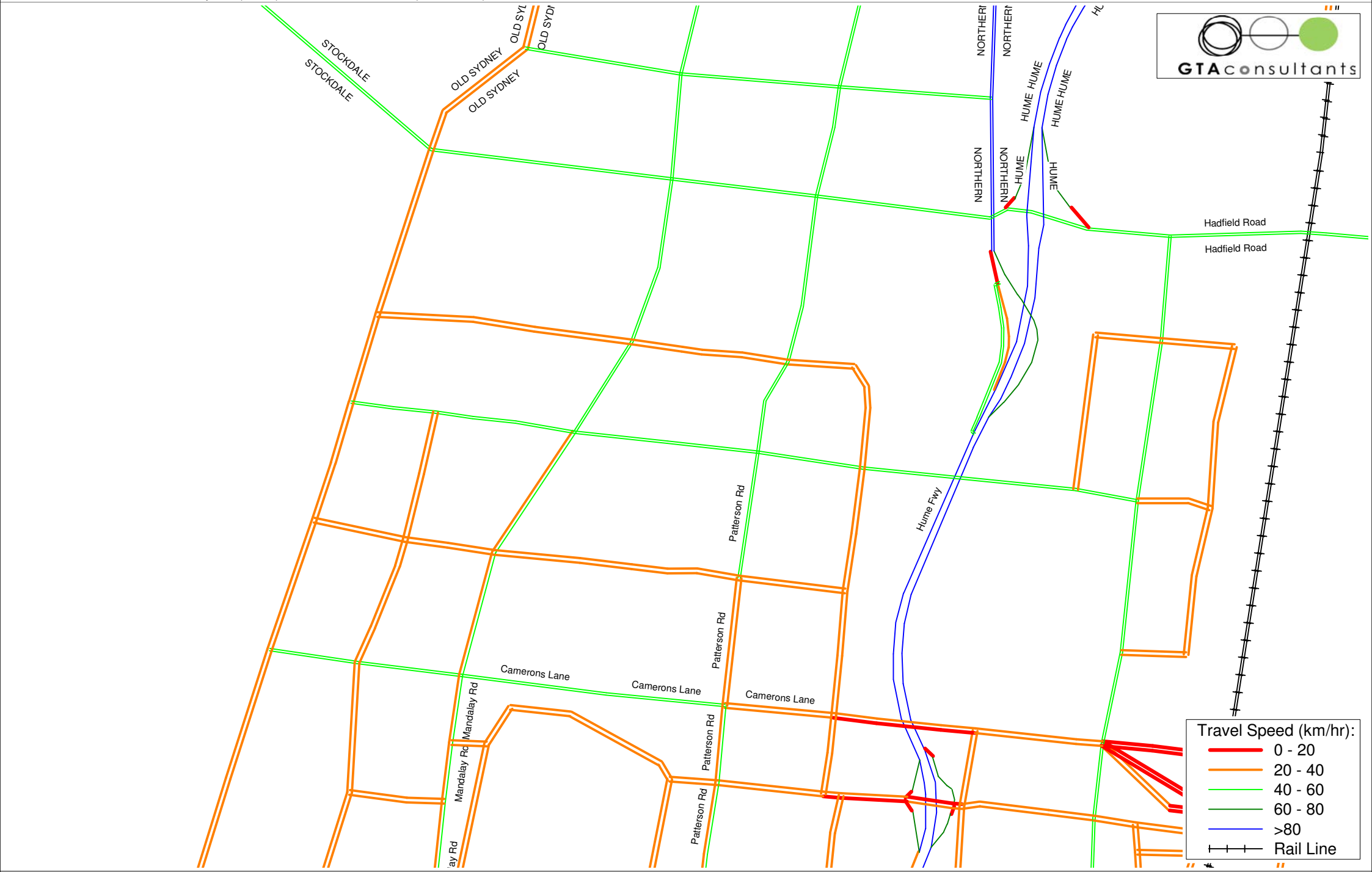
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 1 (Base Case)



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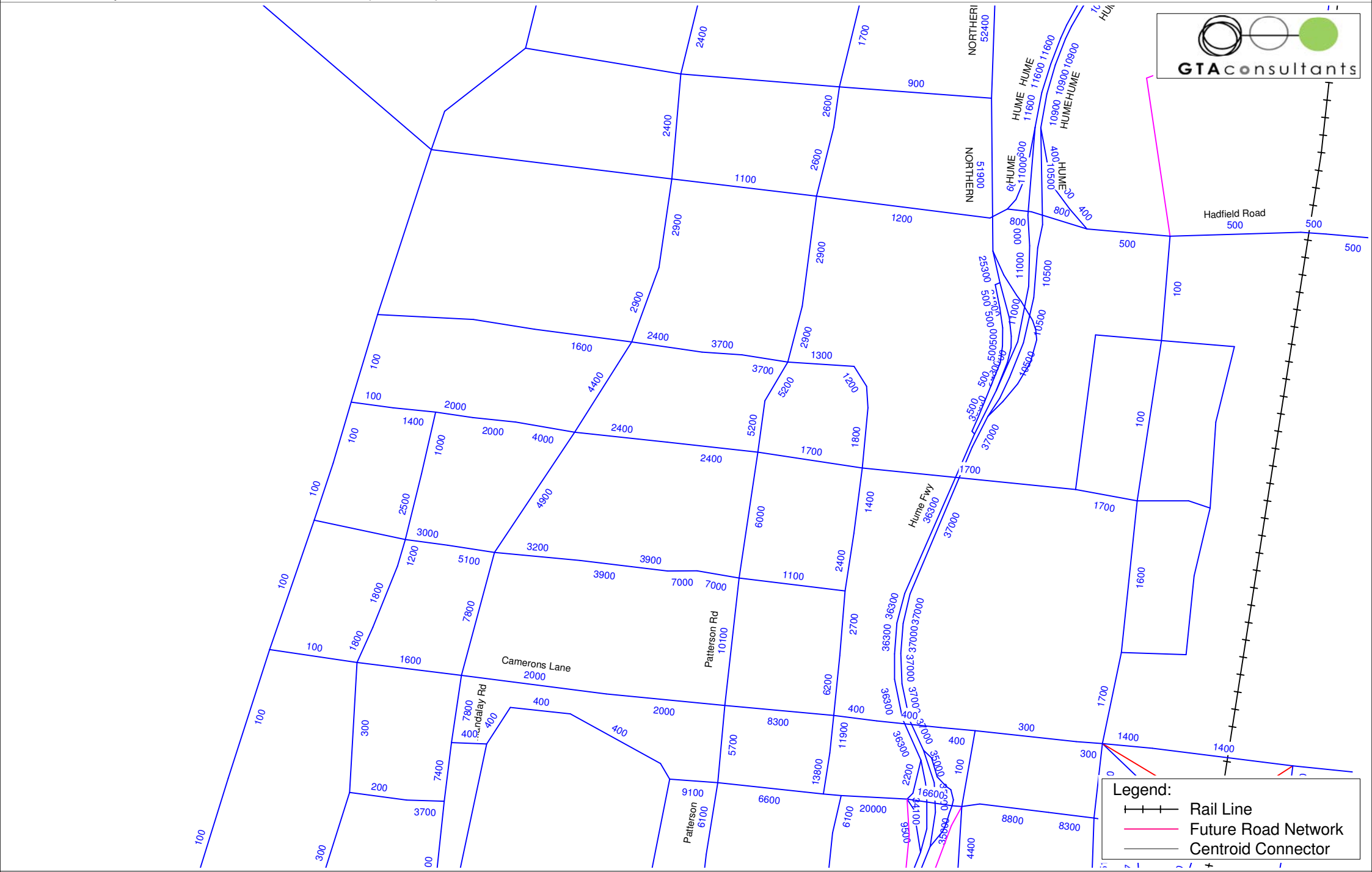
7/21/2014

VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 1 (Base Case)



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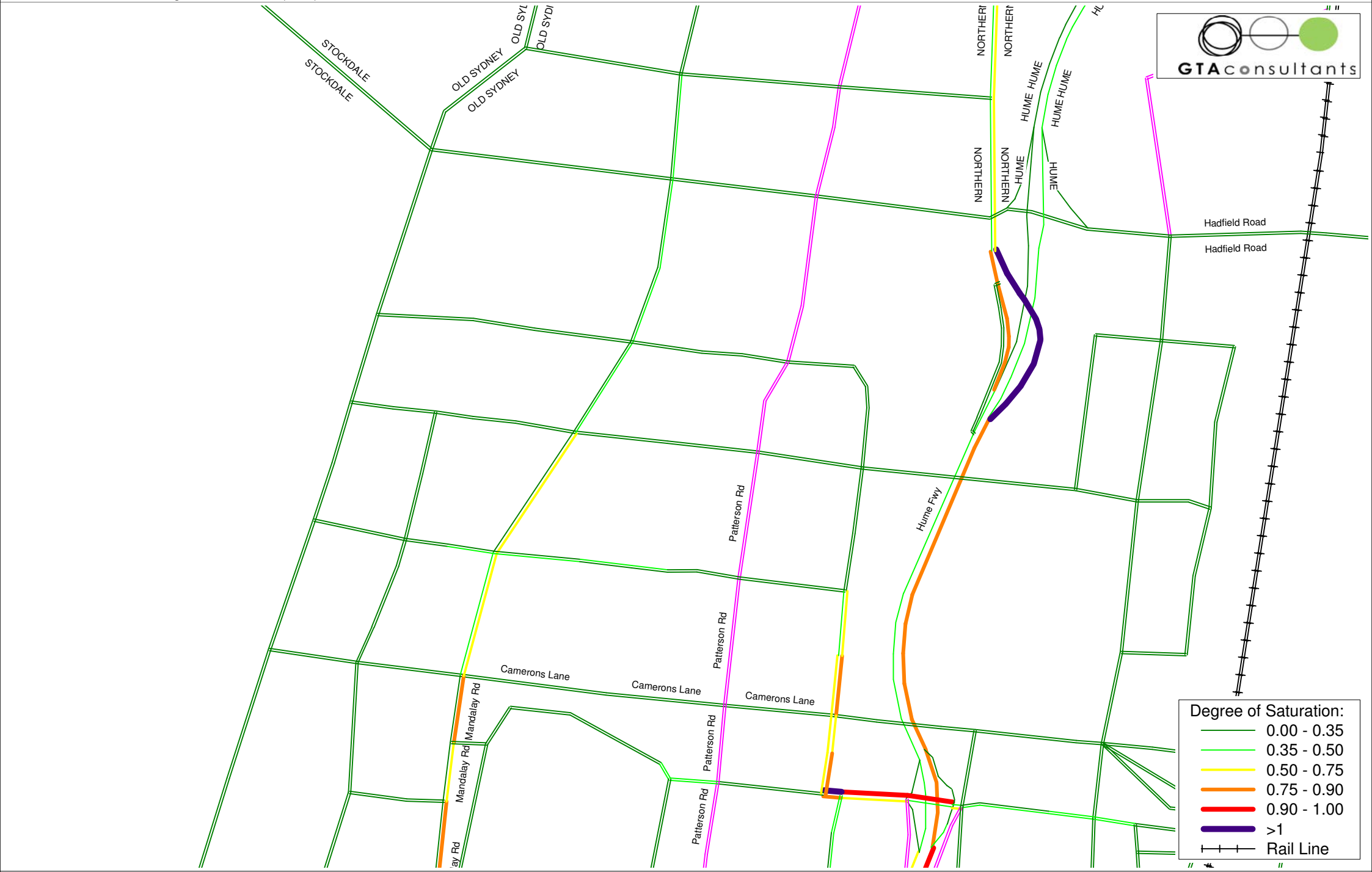
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 2



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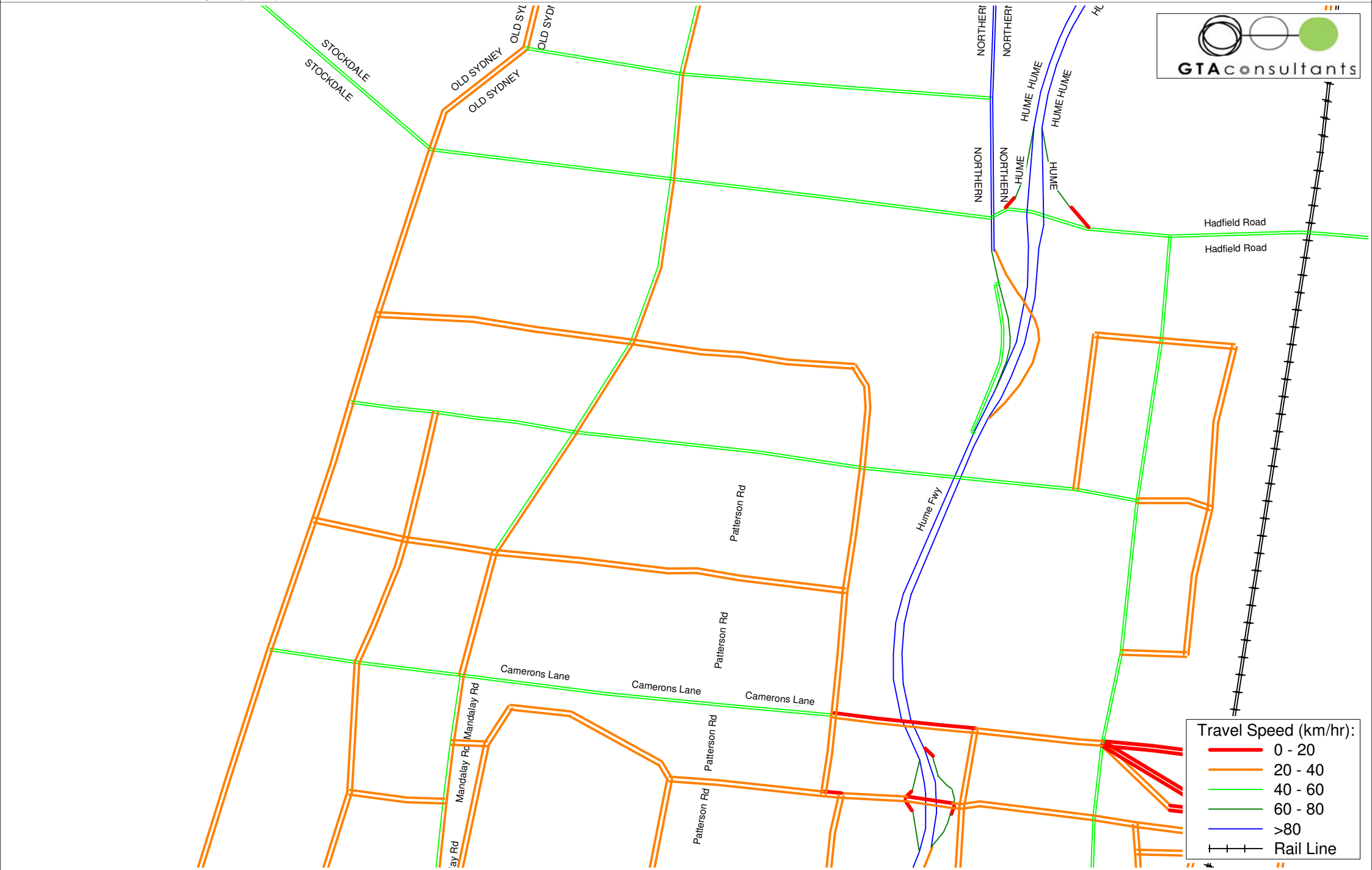
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 2



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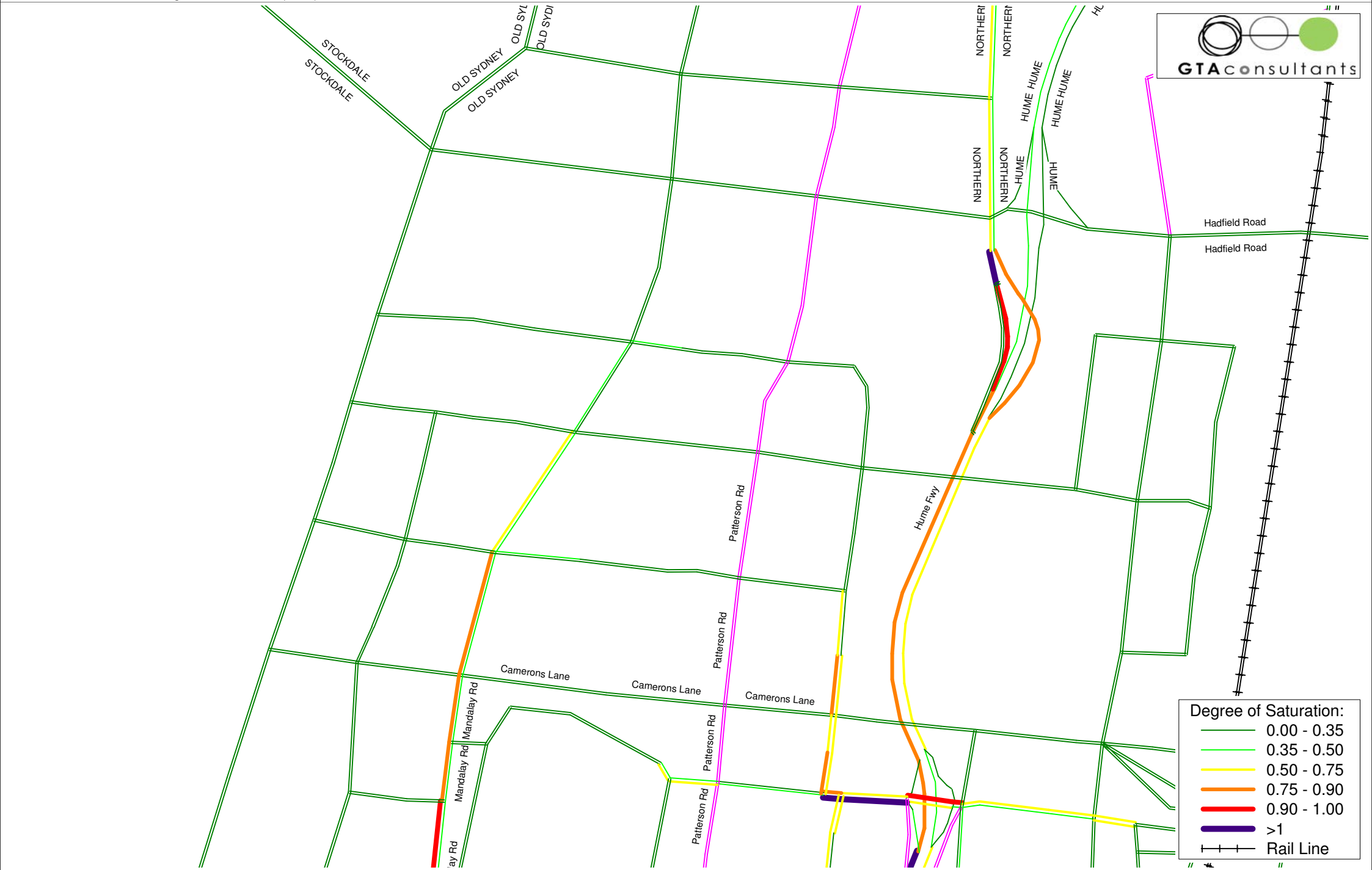
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 2



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23/07/2014

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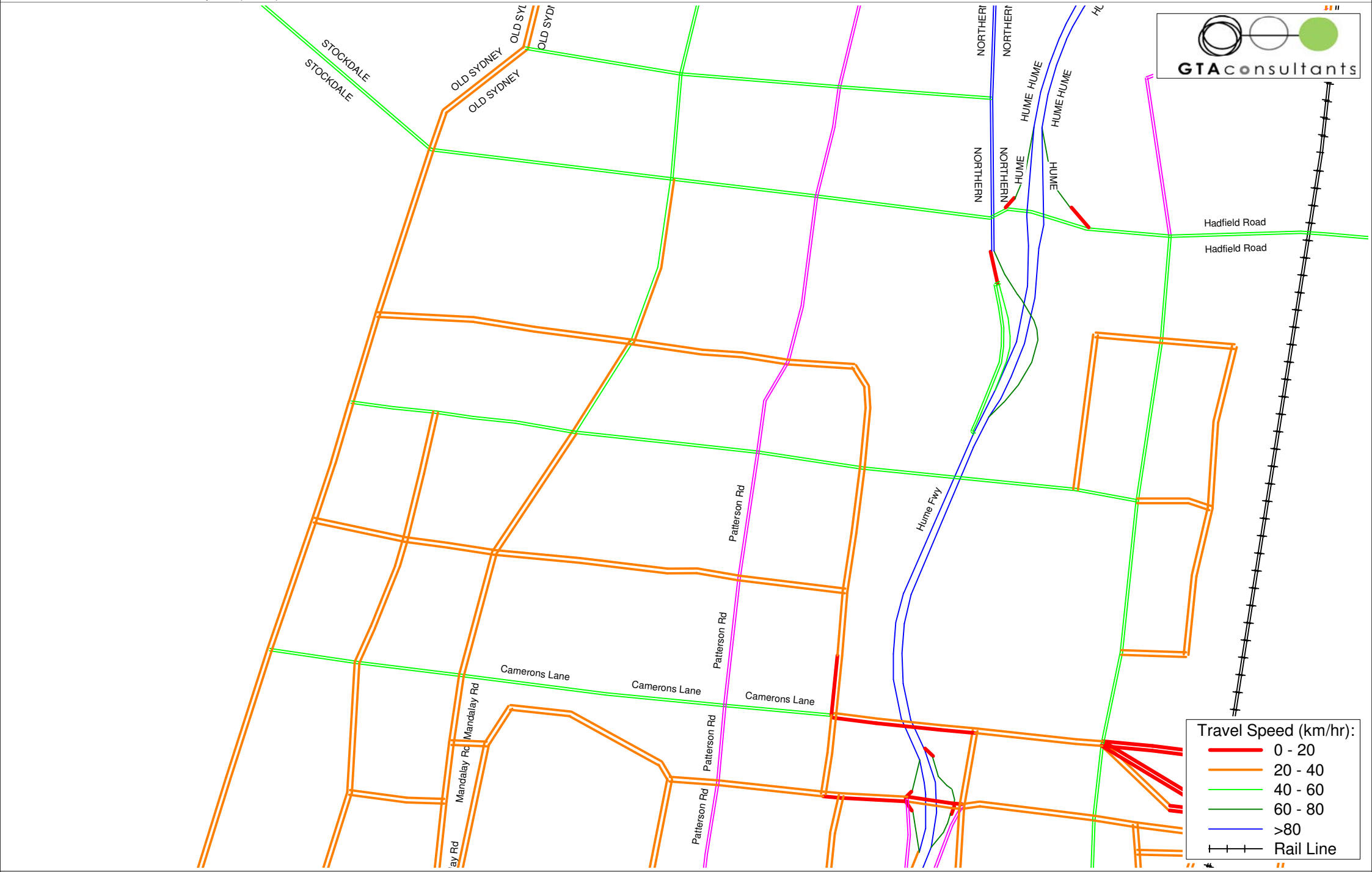
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 2



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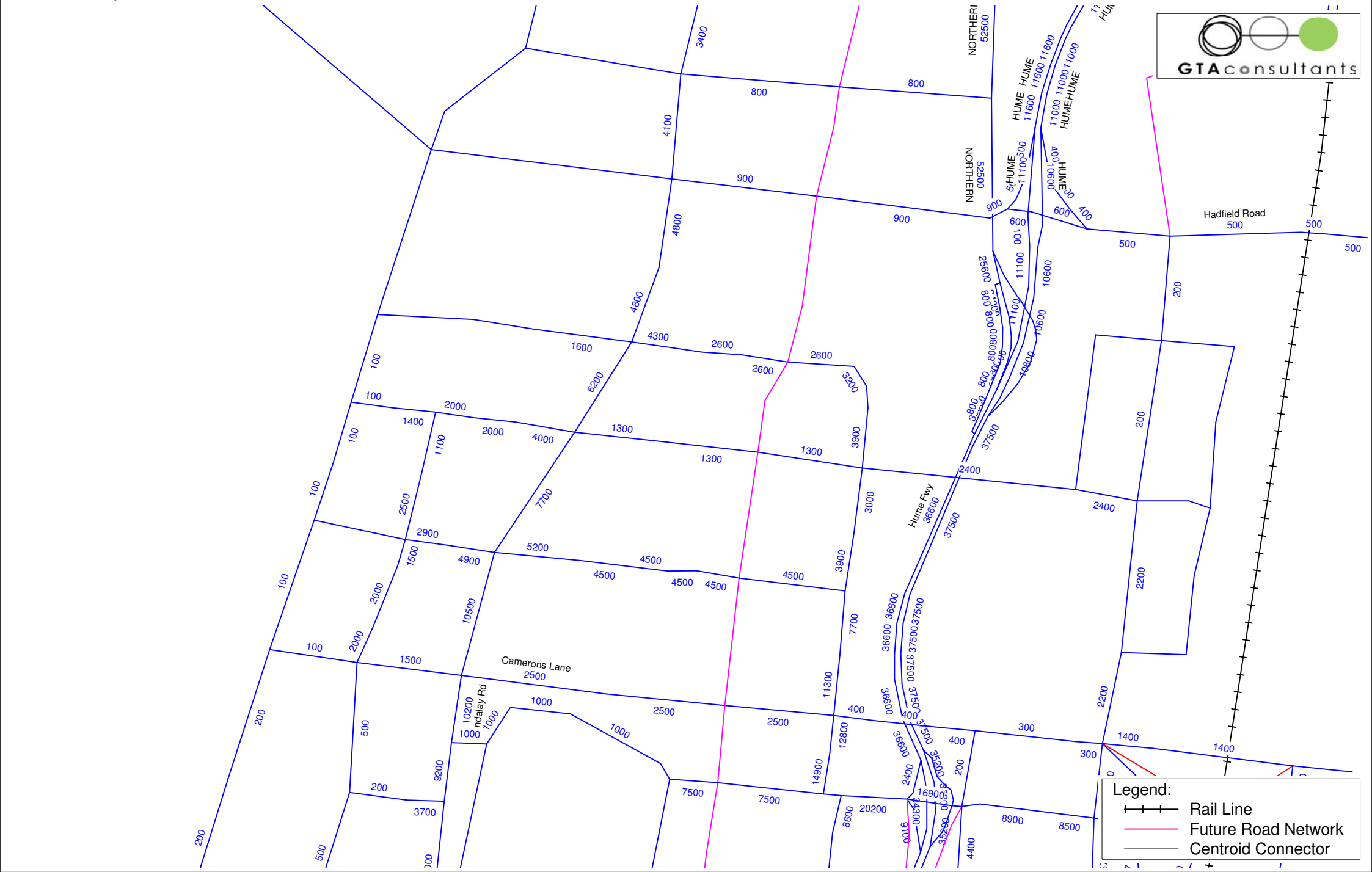
23/07/2014

VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 2



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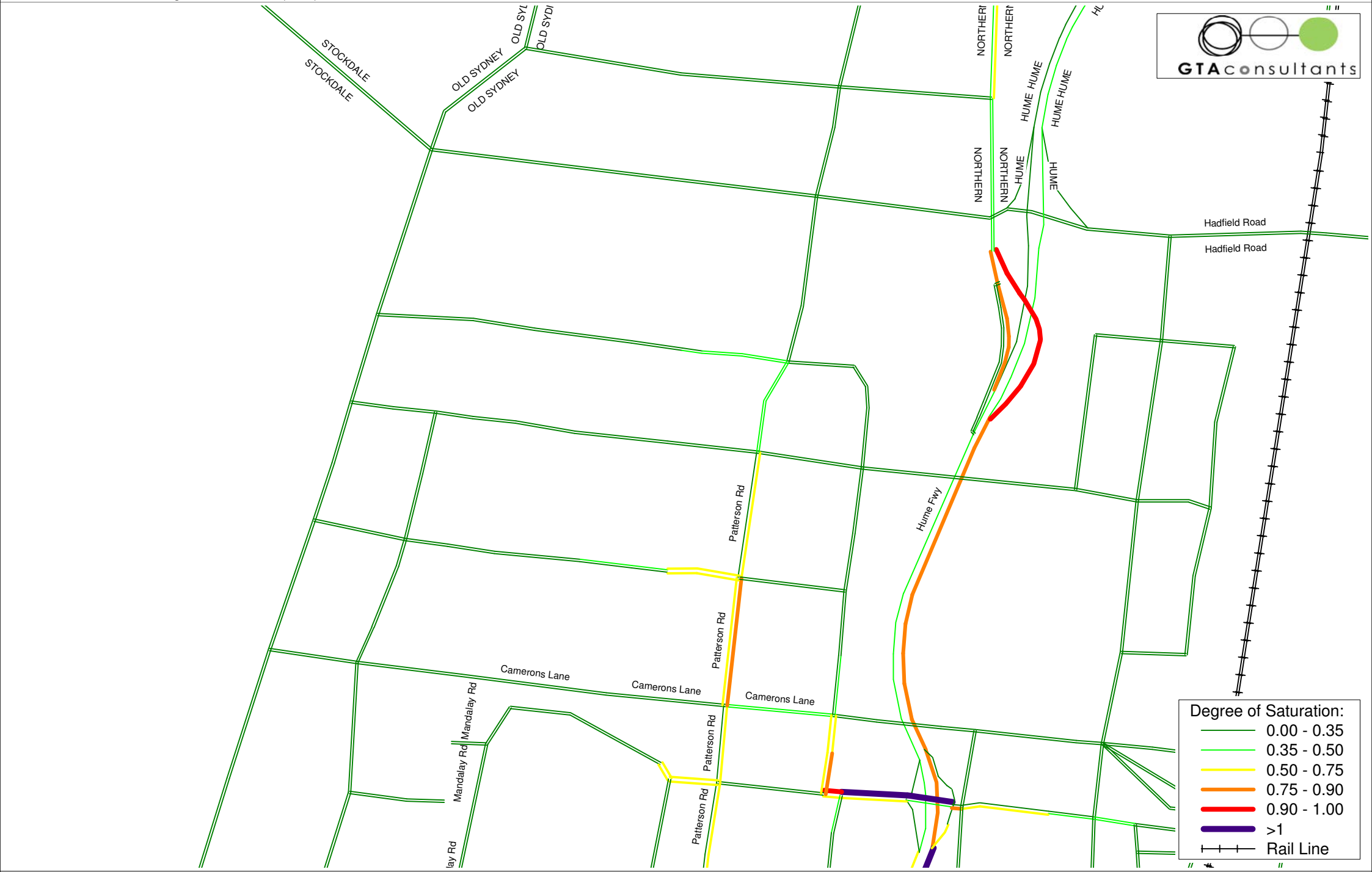
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 3



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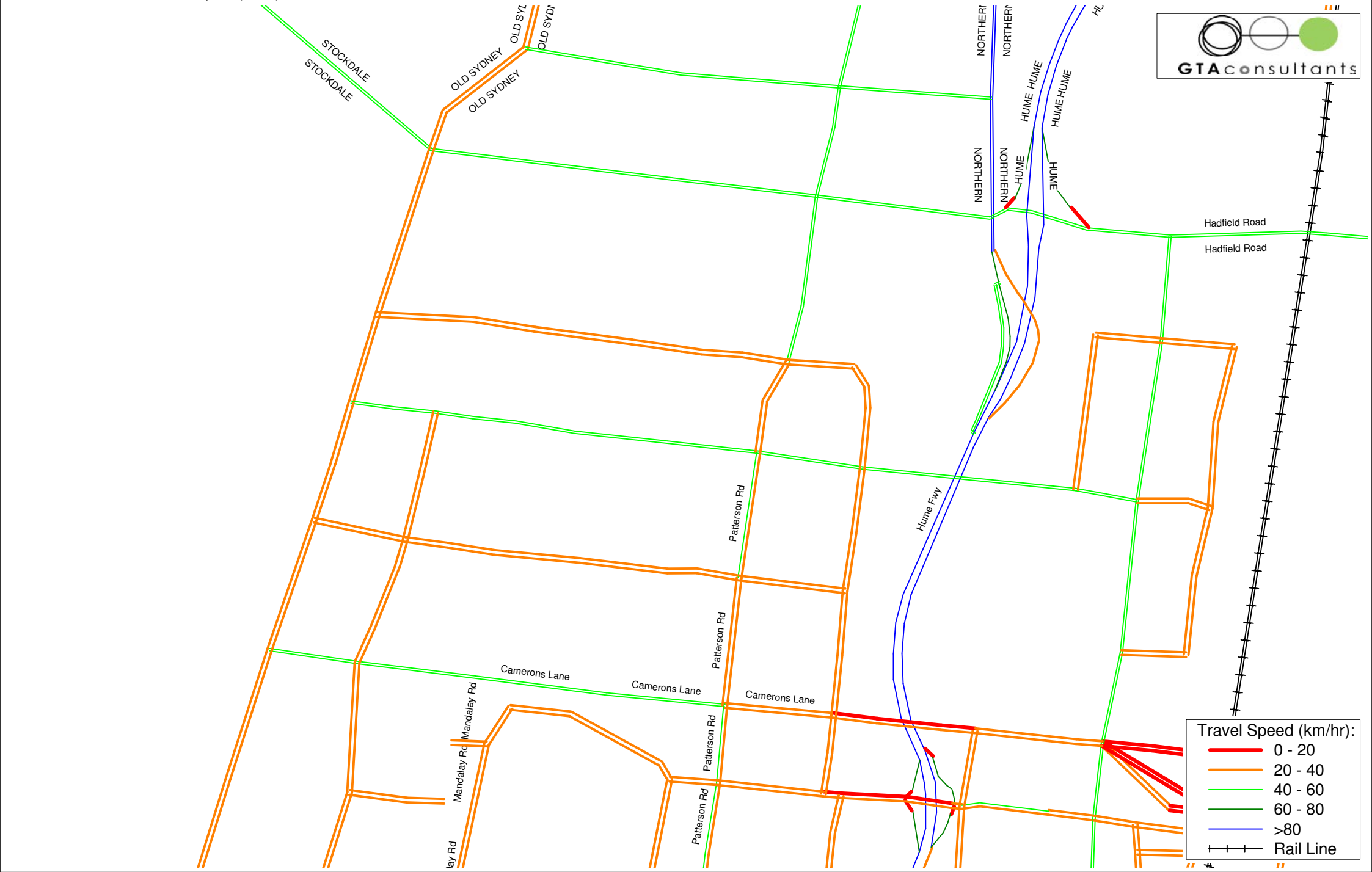
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 3



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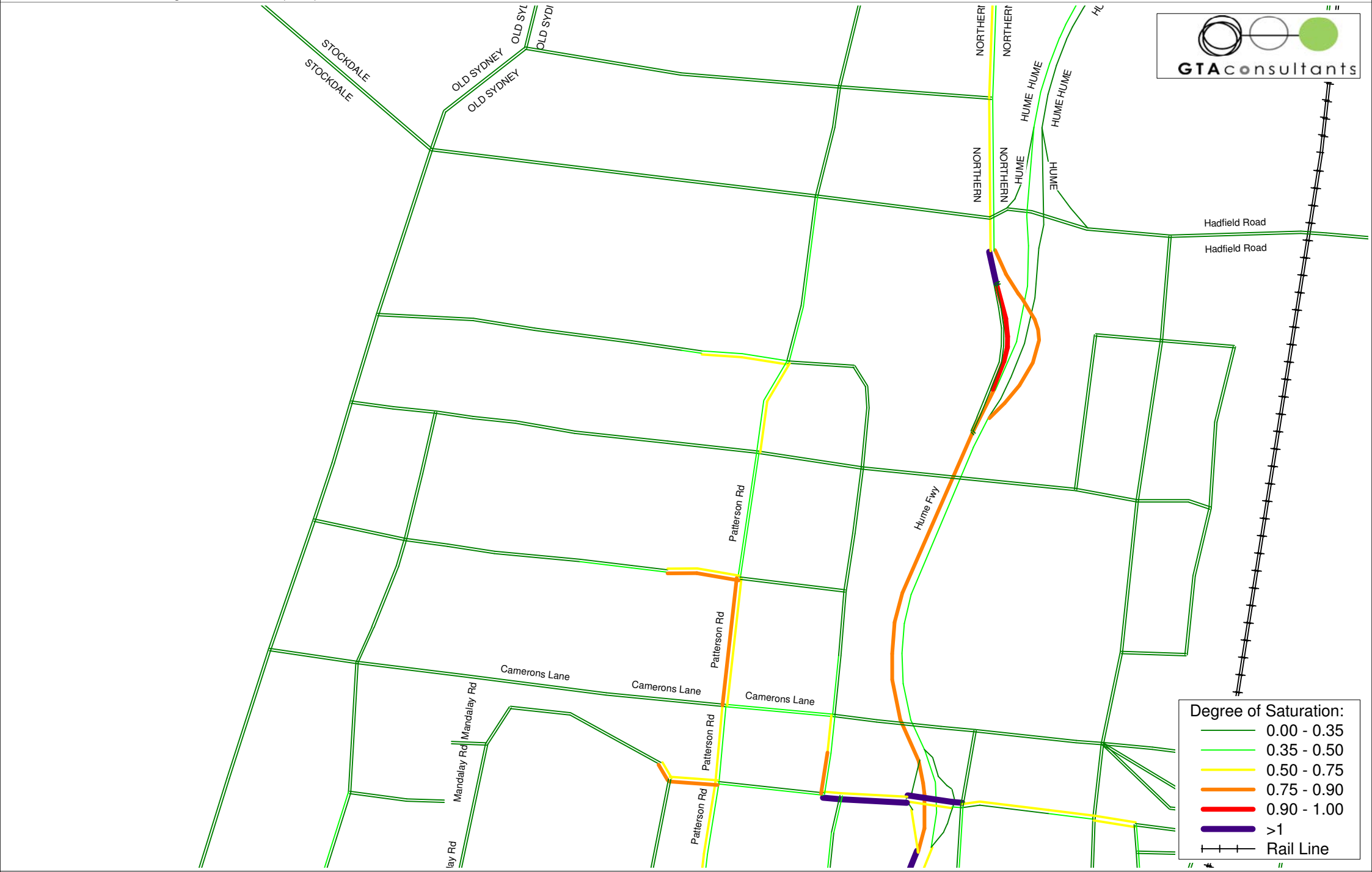
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 3



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7/21/2014

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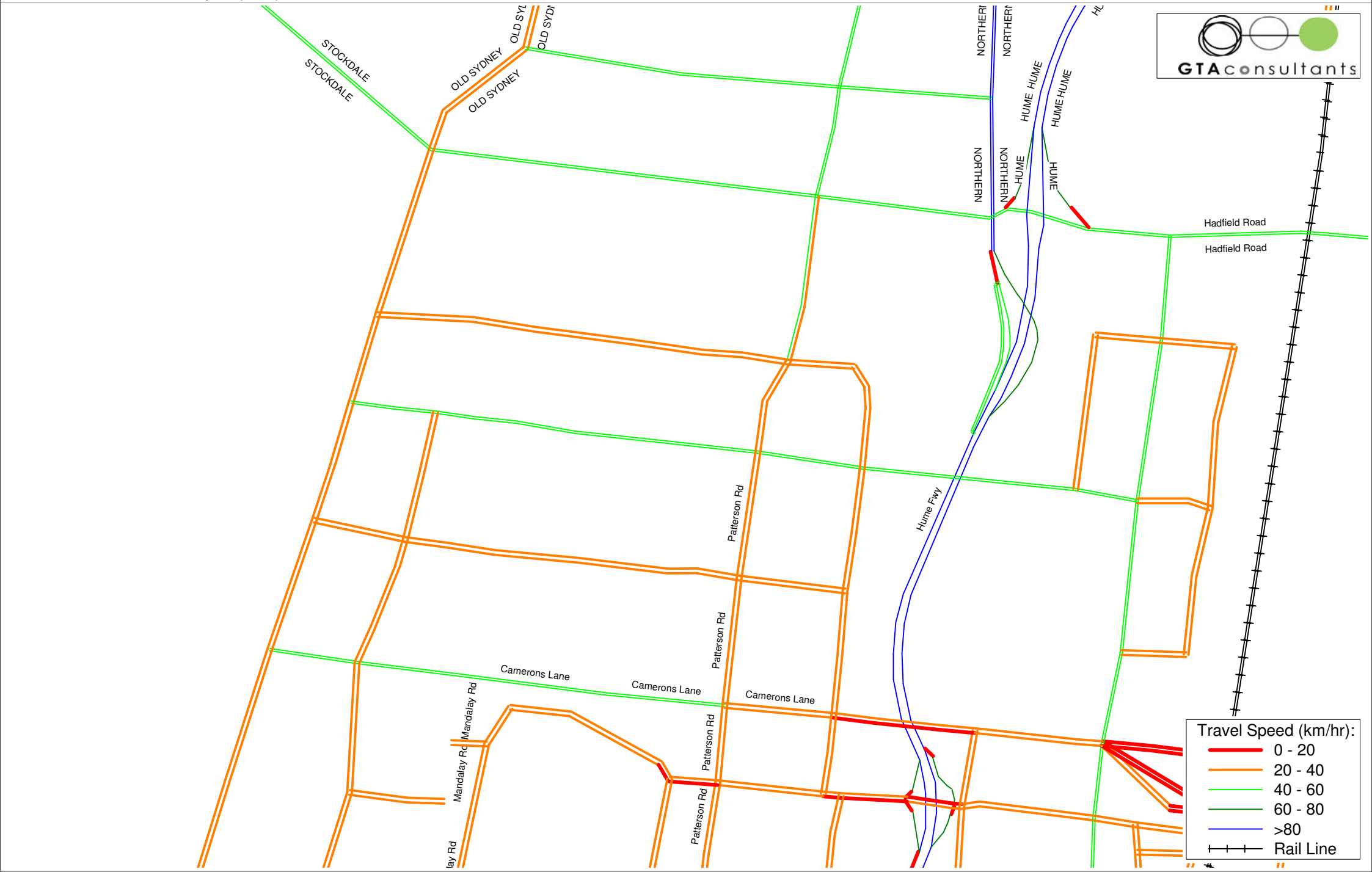
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 3



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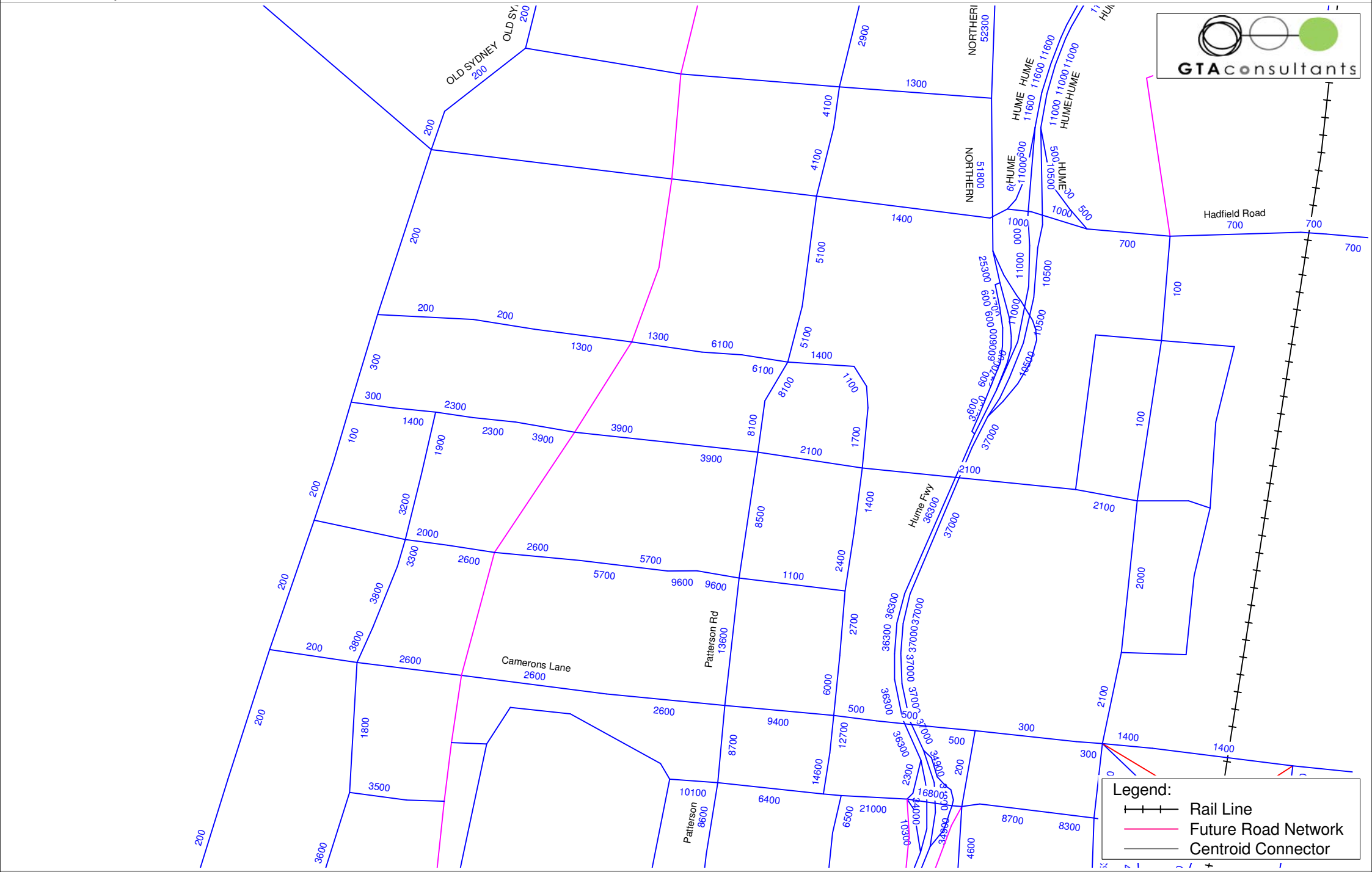
7/21/2014

VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 3



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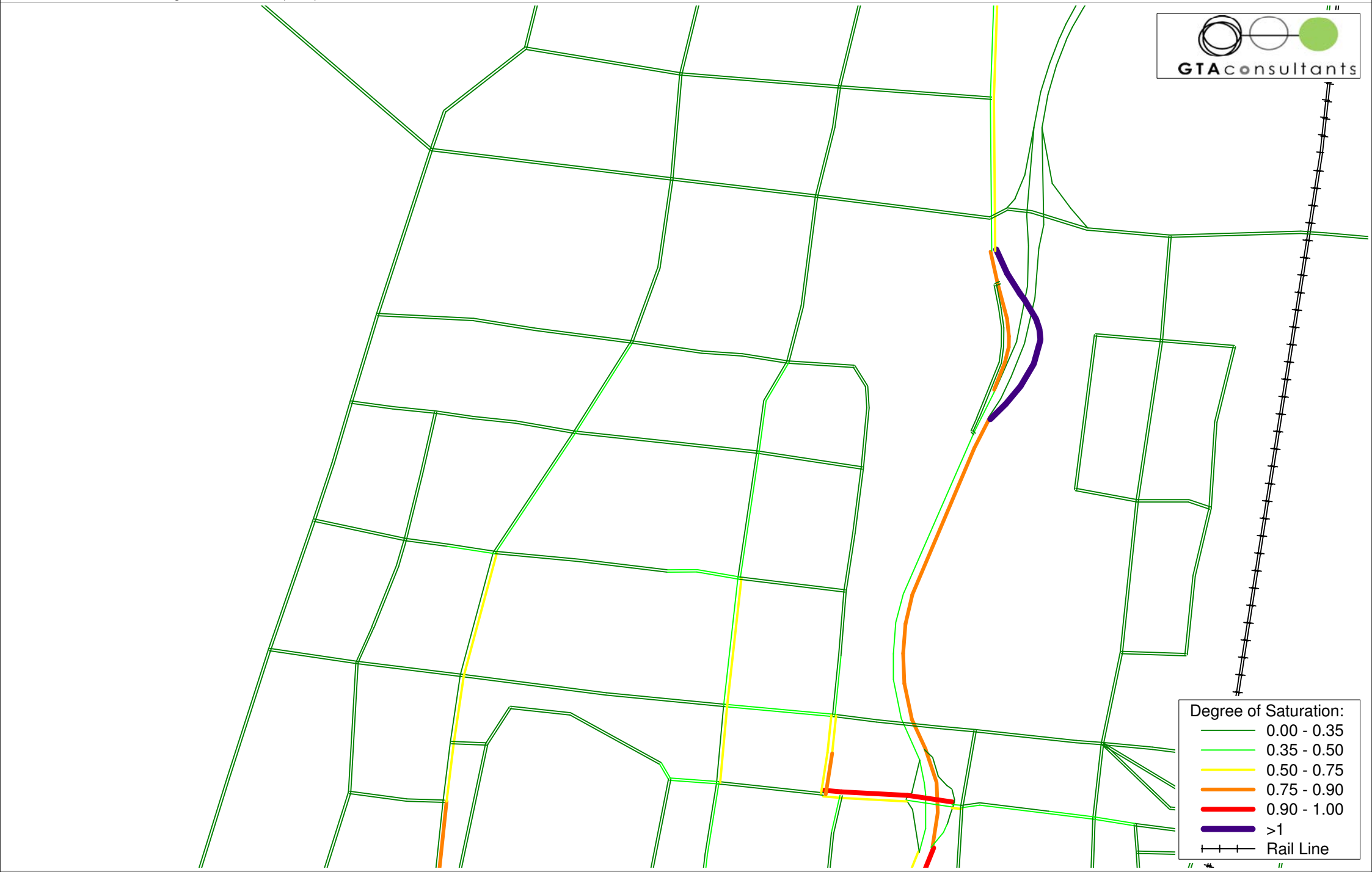
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2026 Scenario 4



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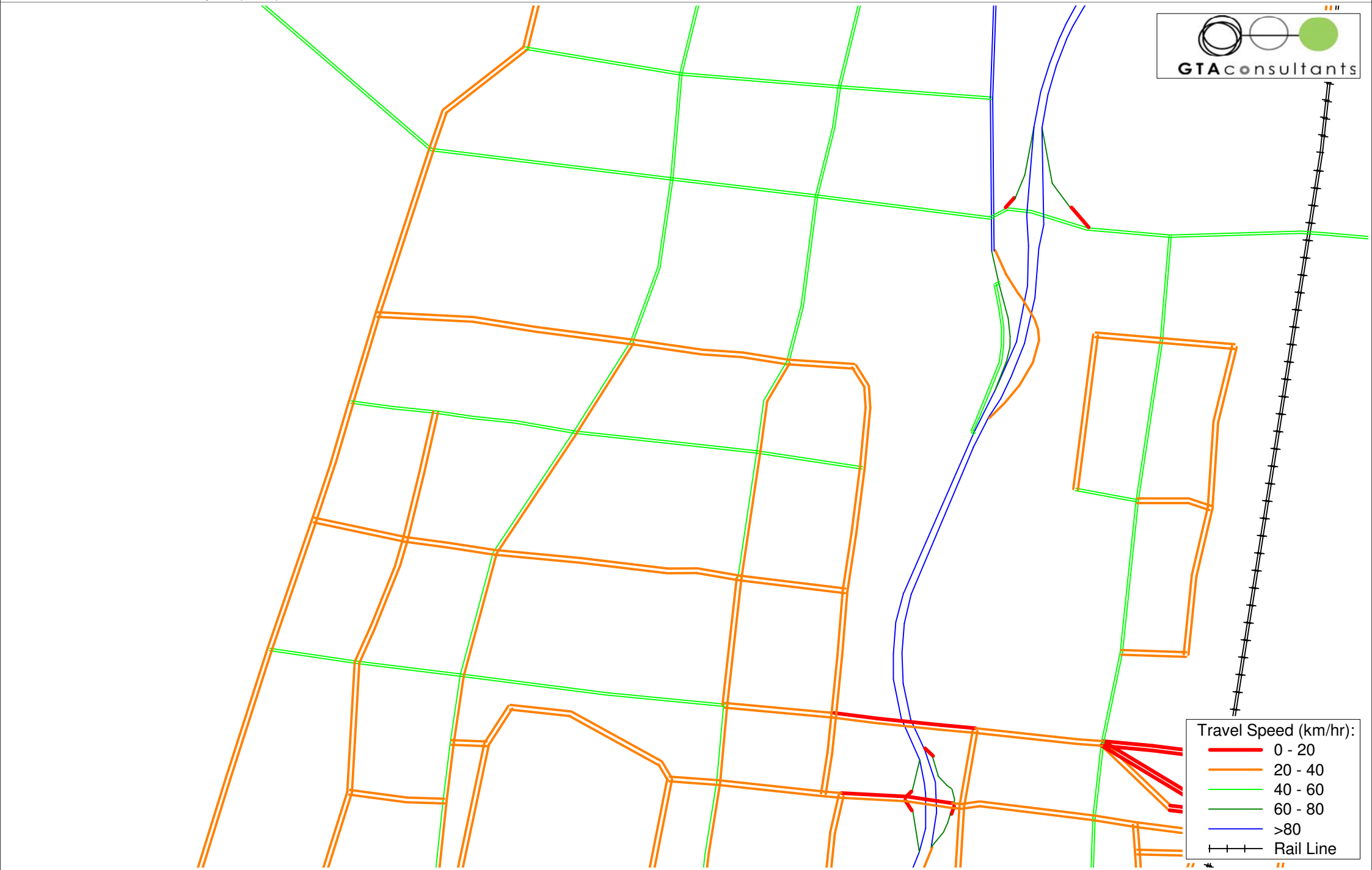
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2026 Scenario 4



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7/25/2014

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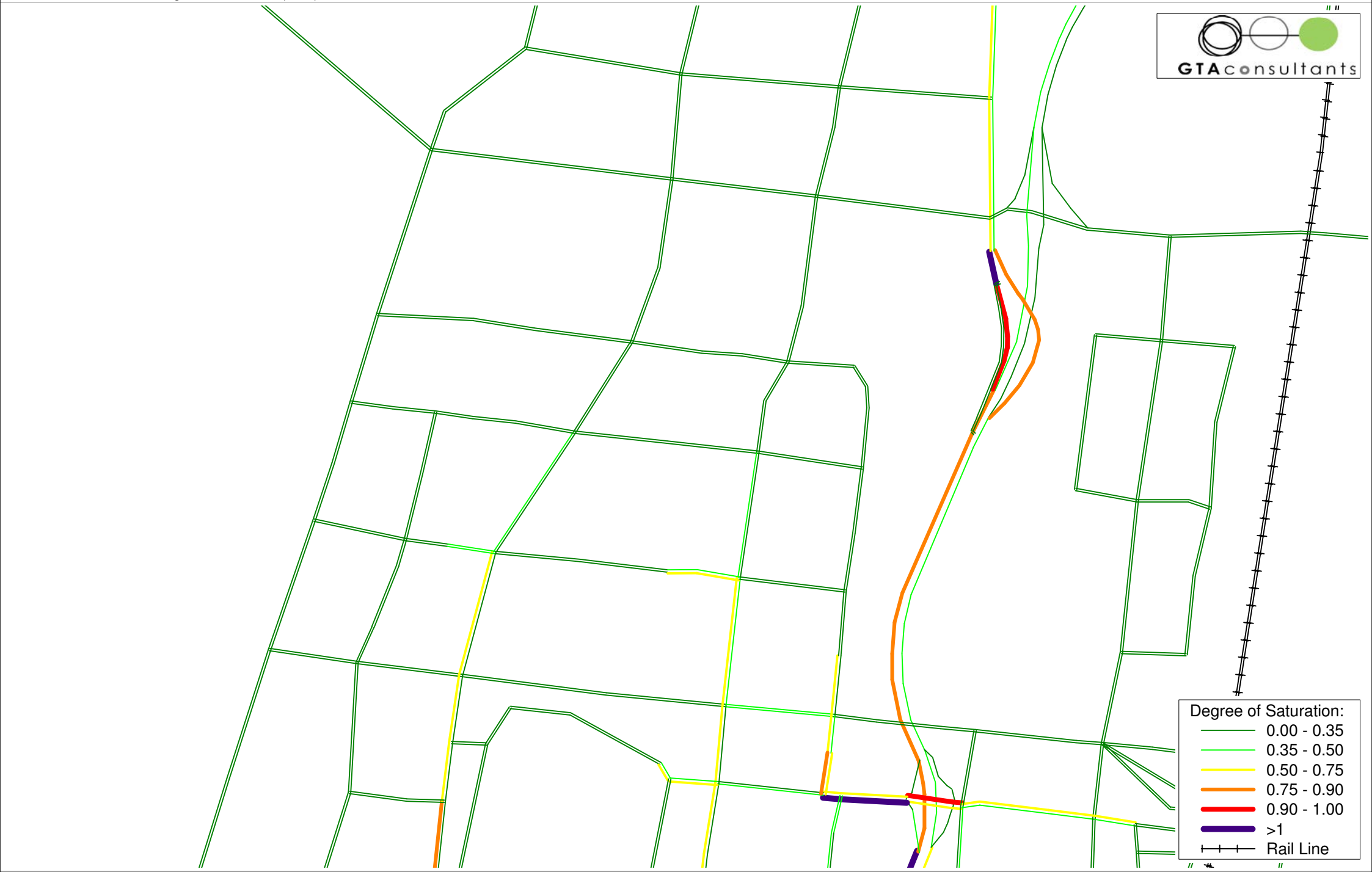
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2026 Scenario 4



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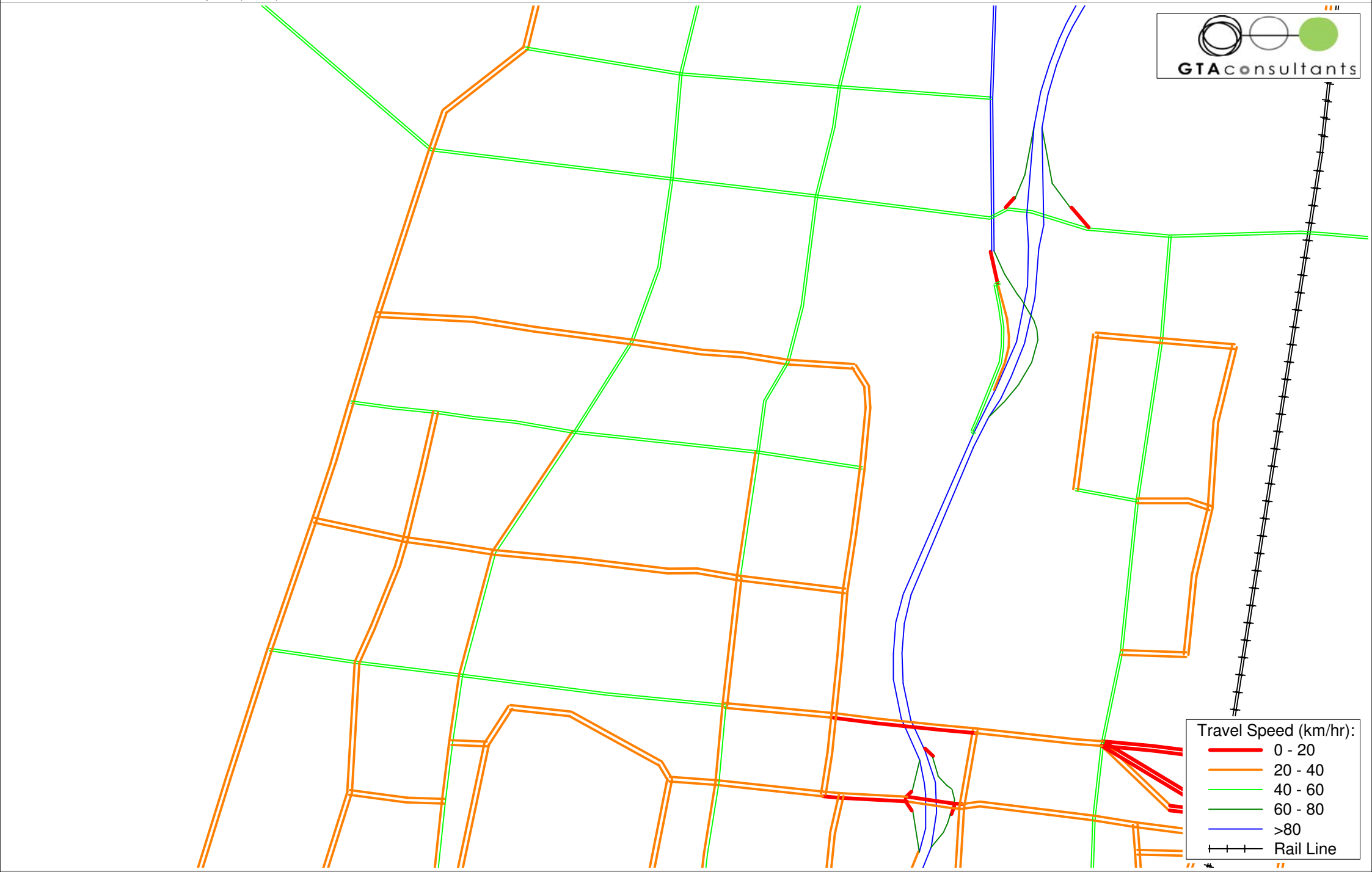
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2026 Scenario 4



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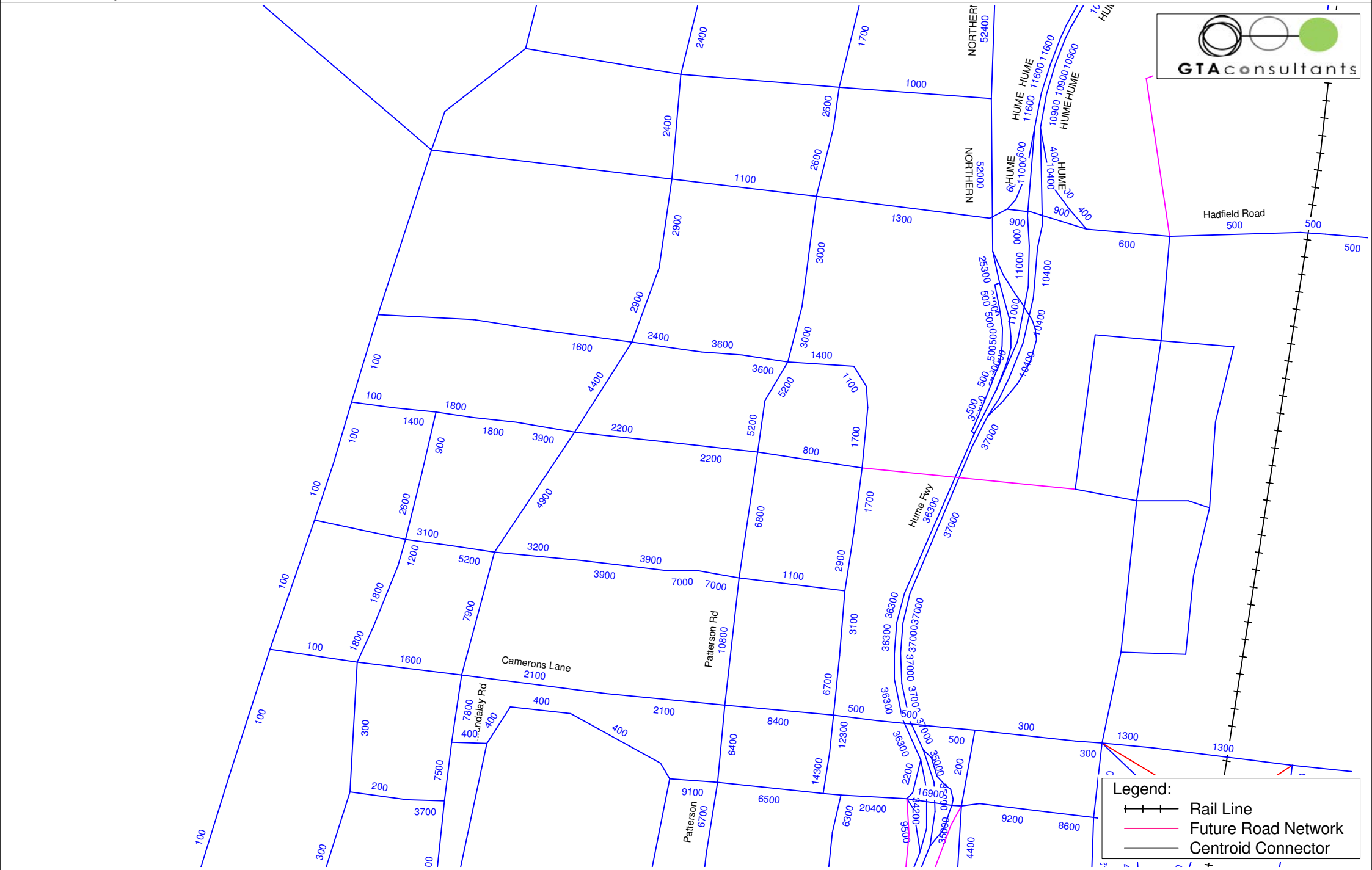
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2026 Scenario 4



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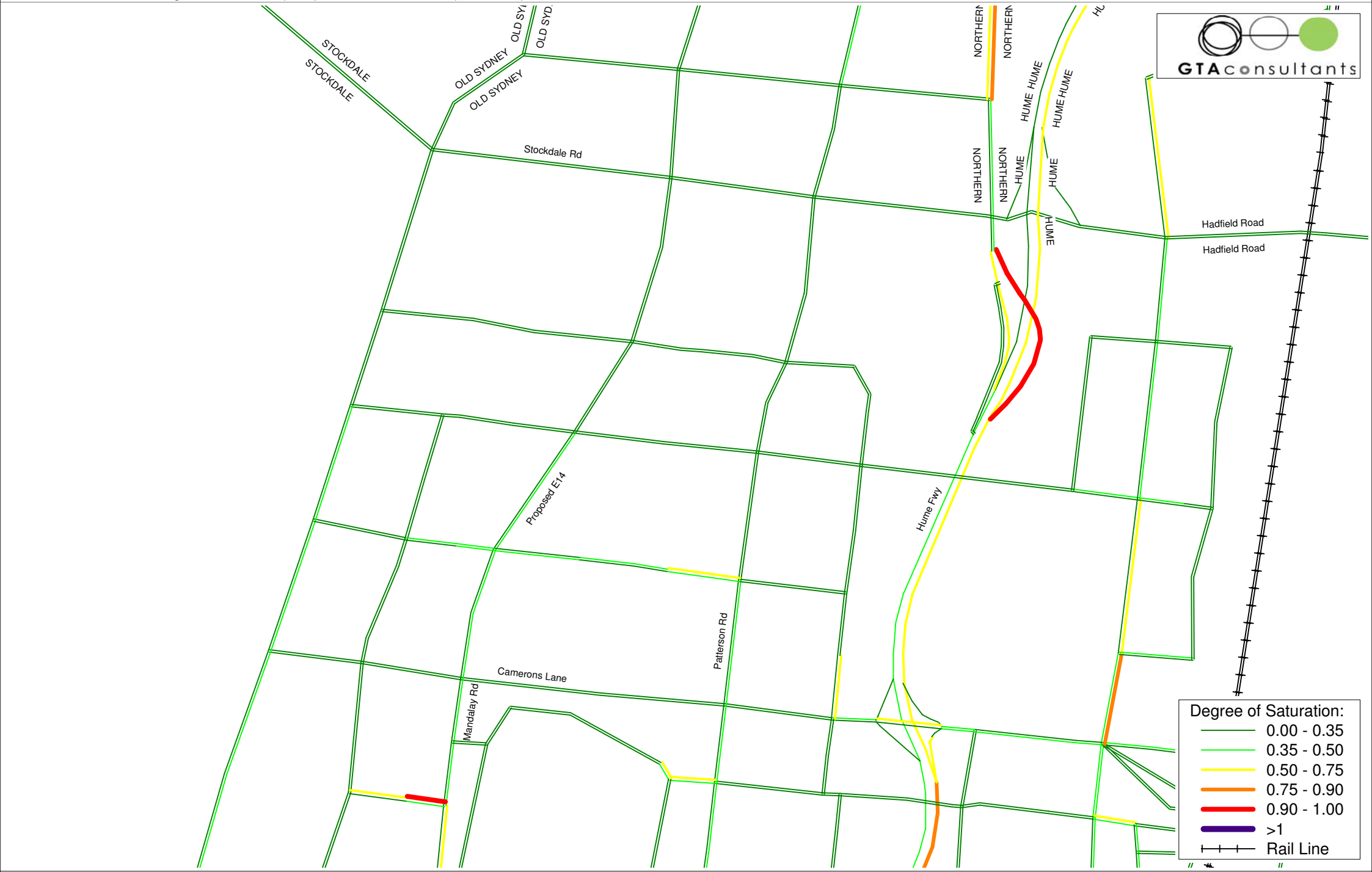
7/25/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2046 Scenario 1 (Base Case)



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24/07/2014

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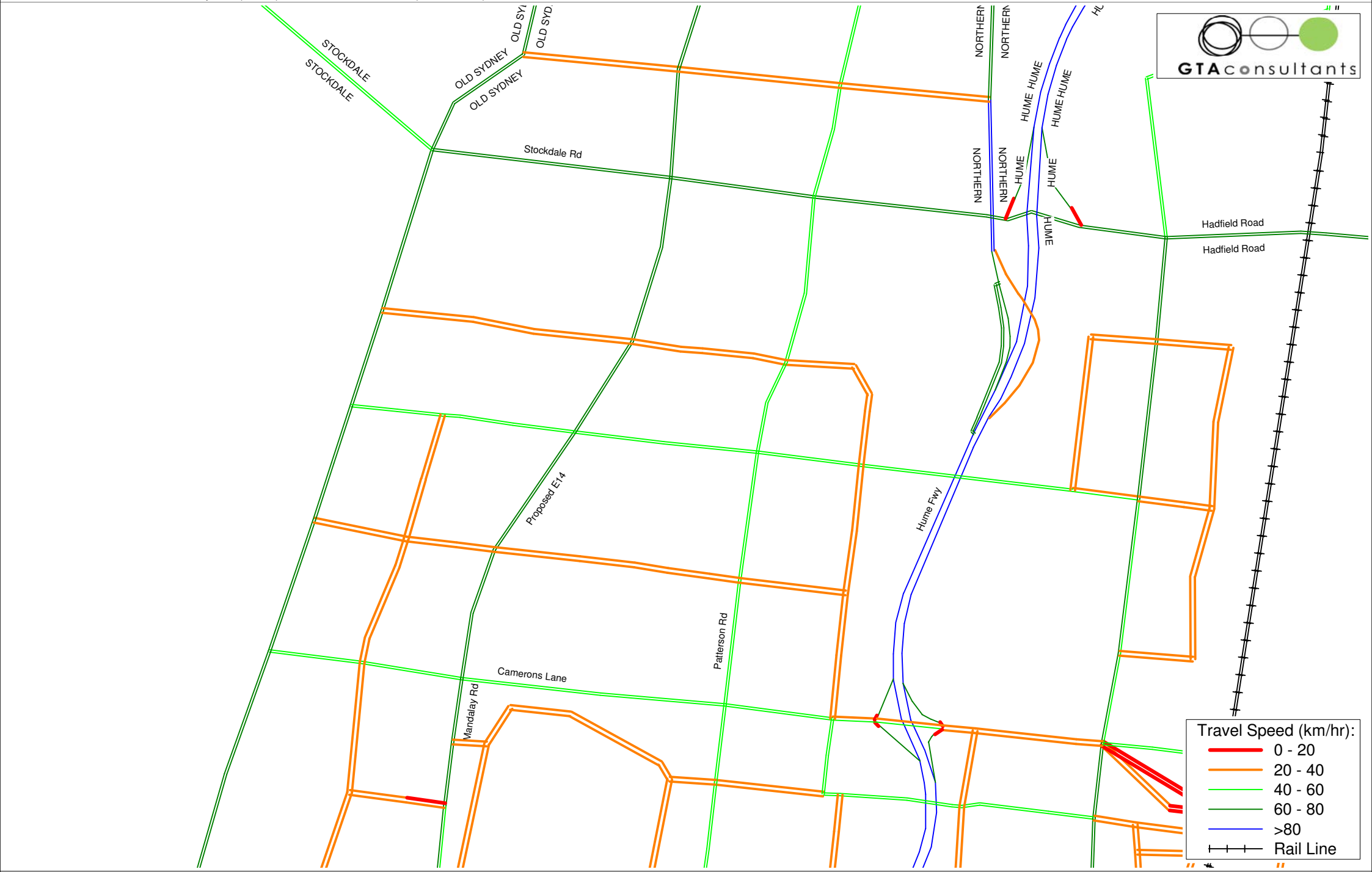
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2046 Scenario 1 (Base Case)



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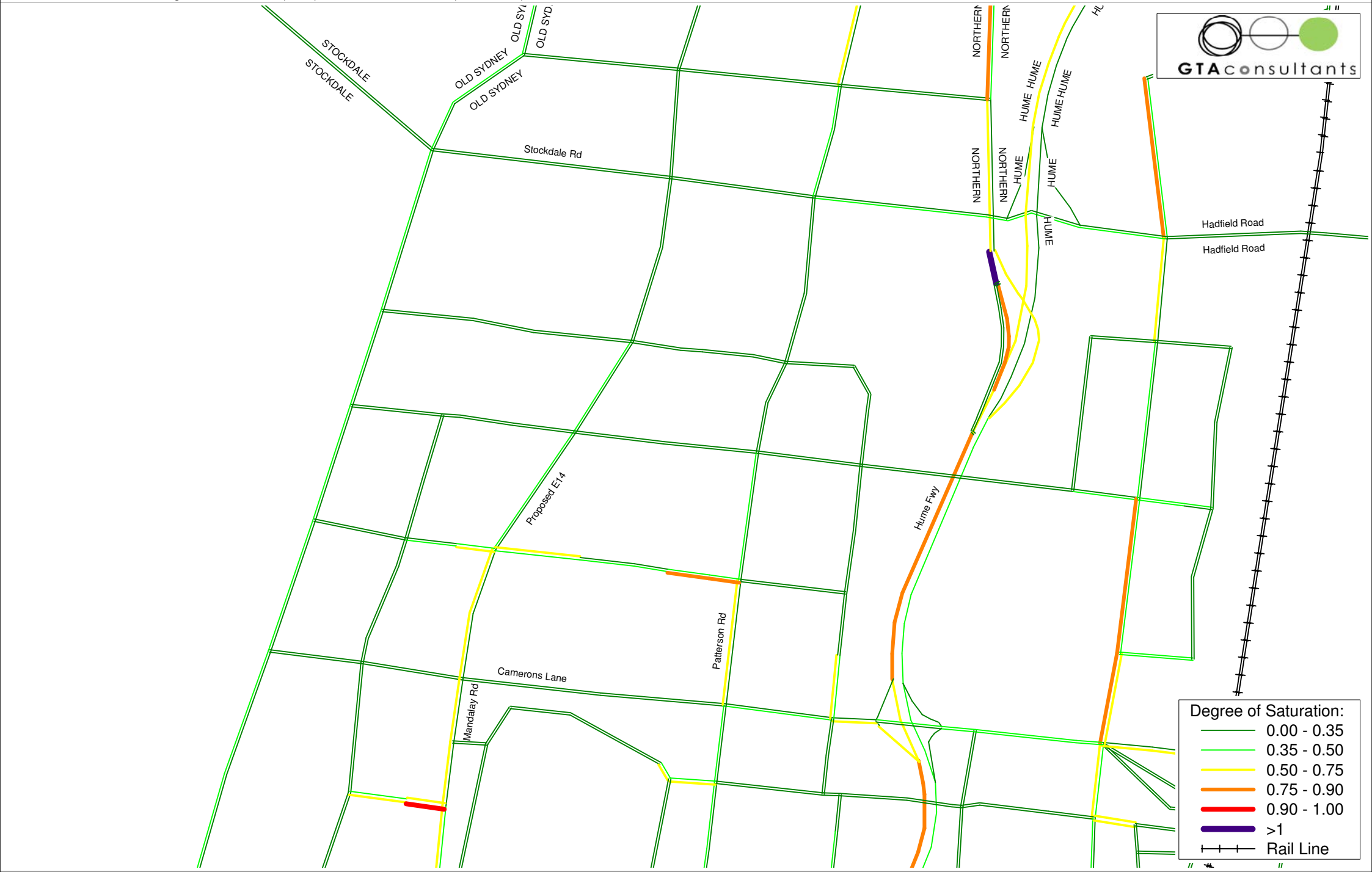
24/07/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2046 Scenario 1 (Base Case)



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24/07/2014

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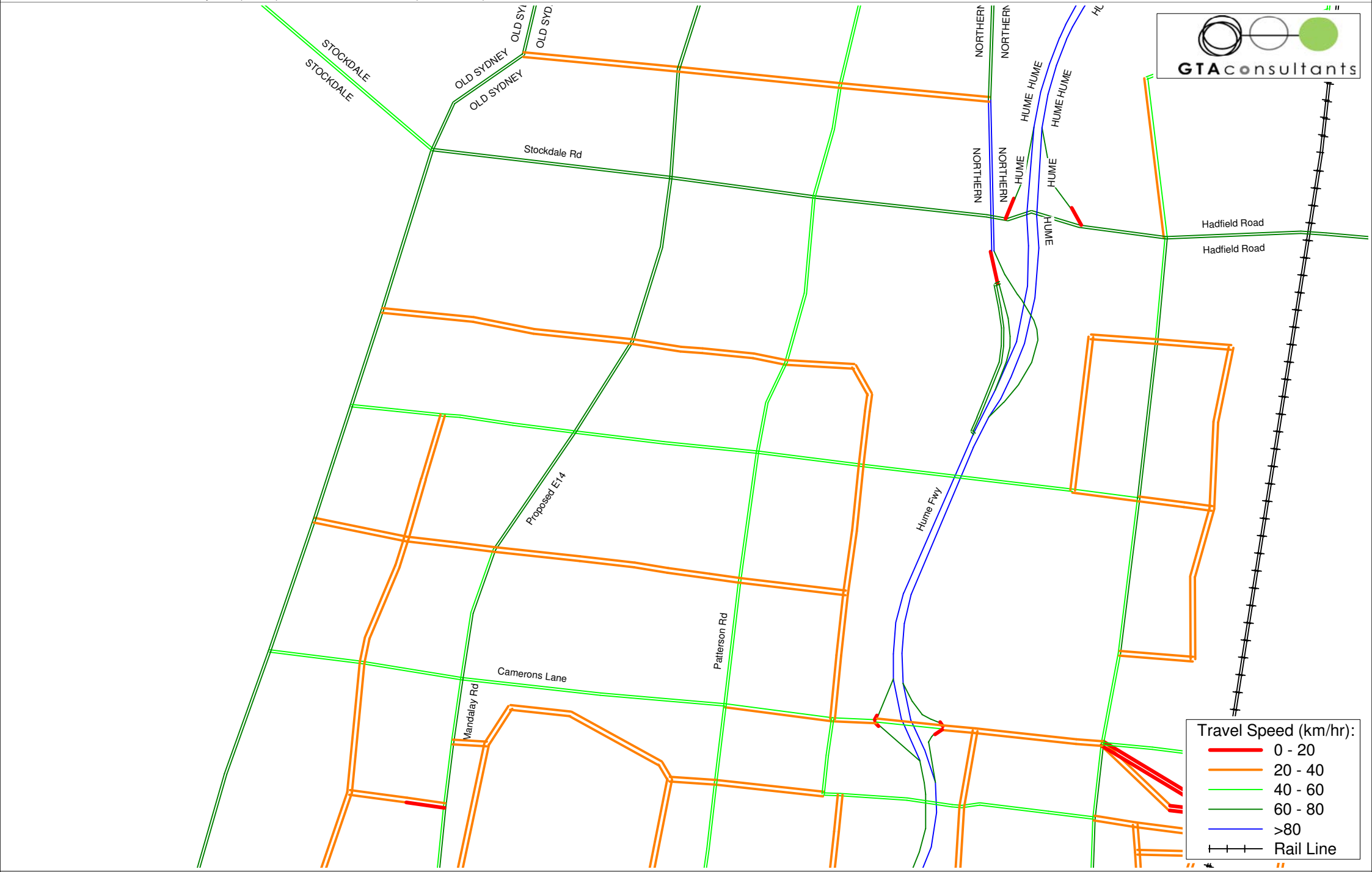
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2046 Scenario 1 (Base Case)



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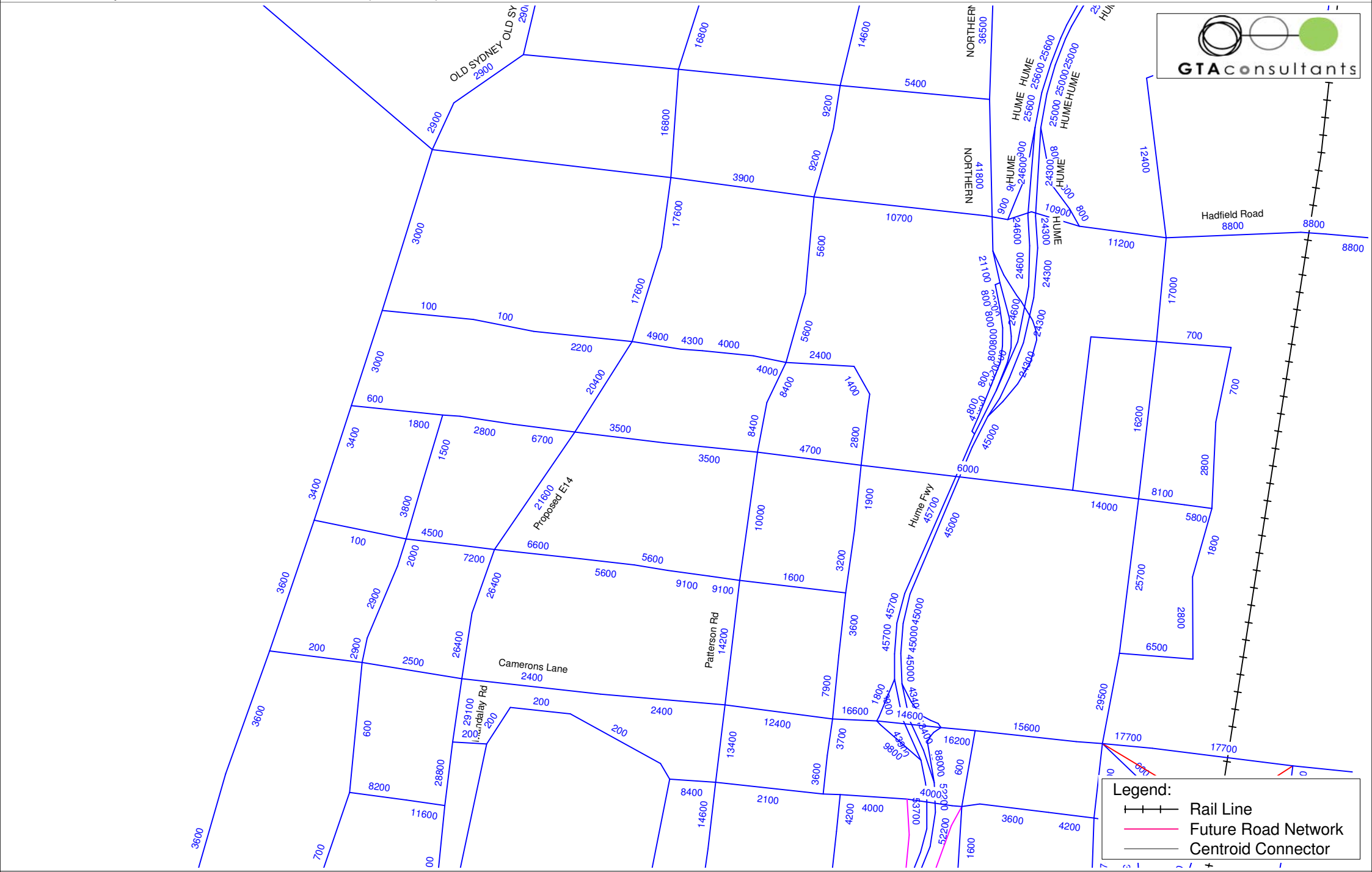
VITM Northern Growth Corridor Model
14M234000 - Daily Volume Total PCU Year 2046 Scenario 1 (Base Case)



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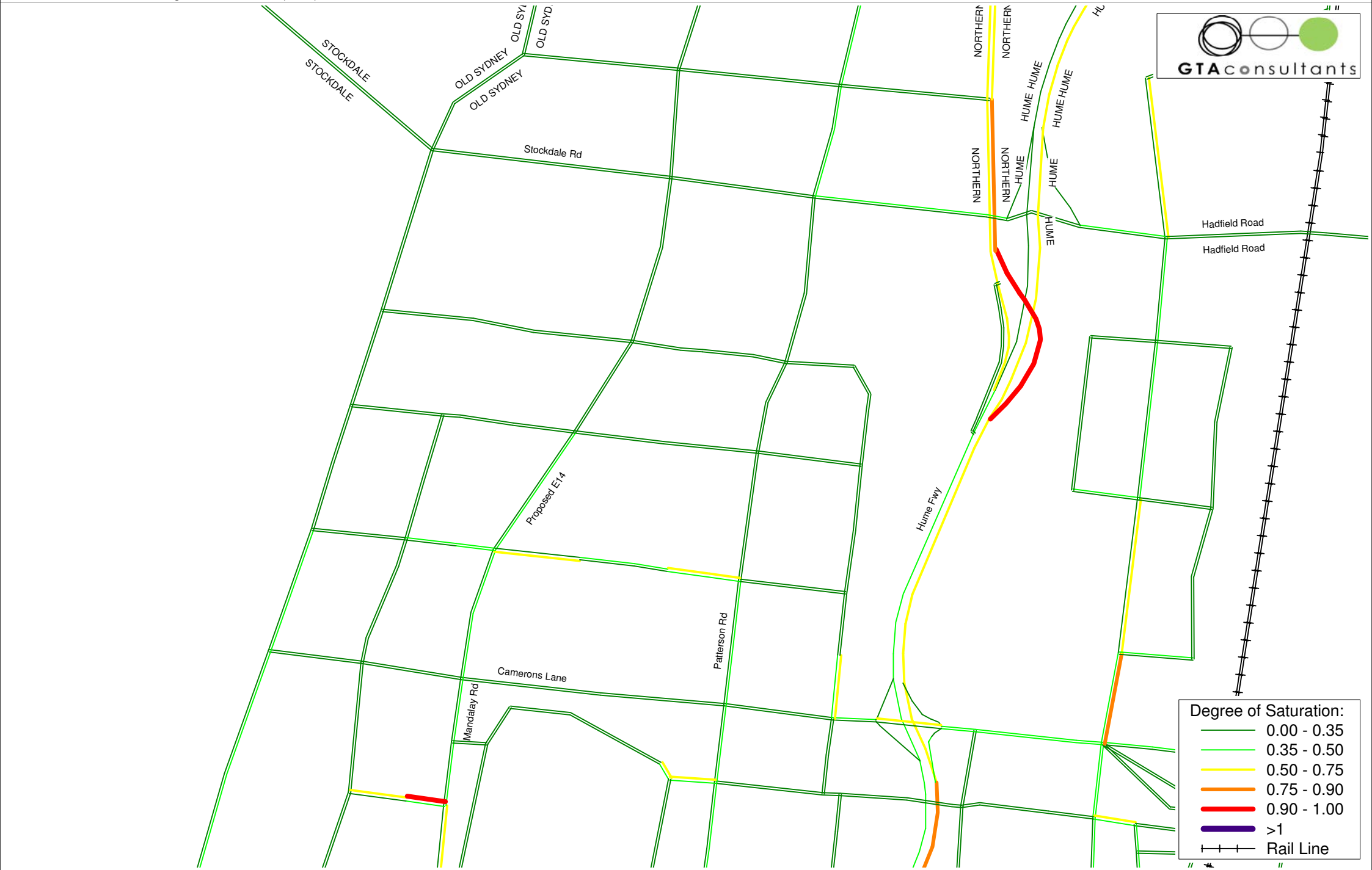
24/07/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Degree of Saturation (DOS) Year 2046 Scenario 2



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23/07/2014

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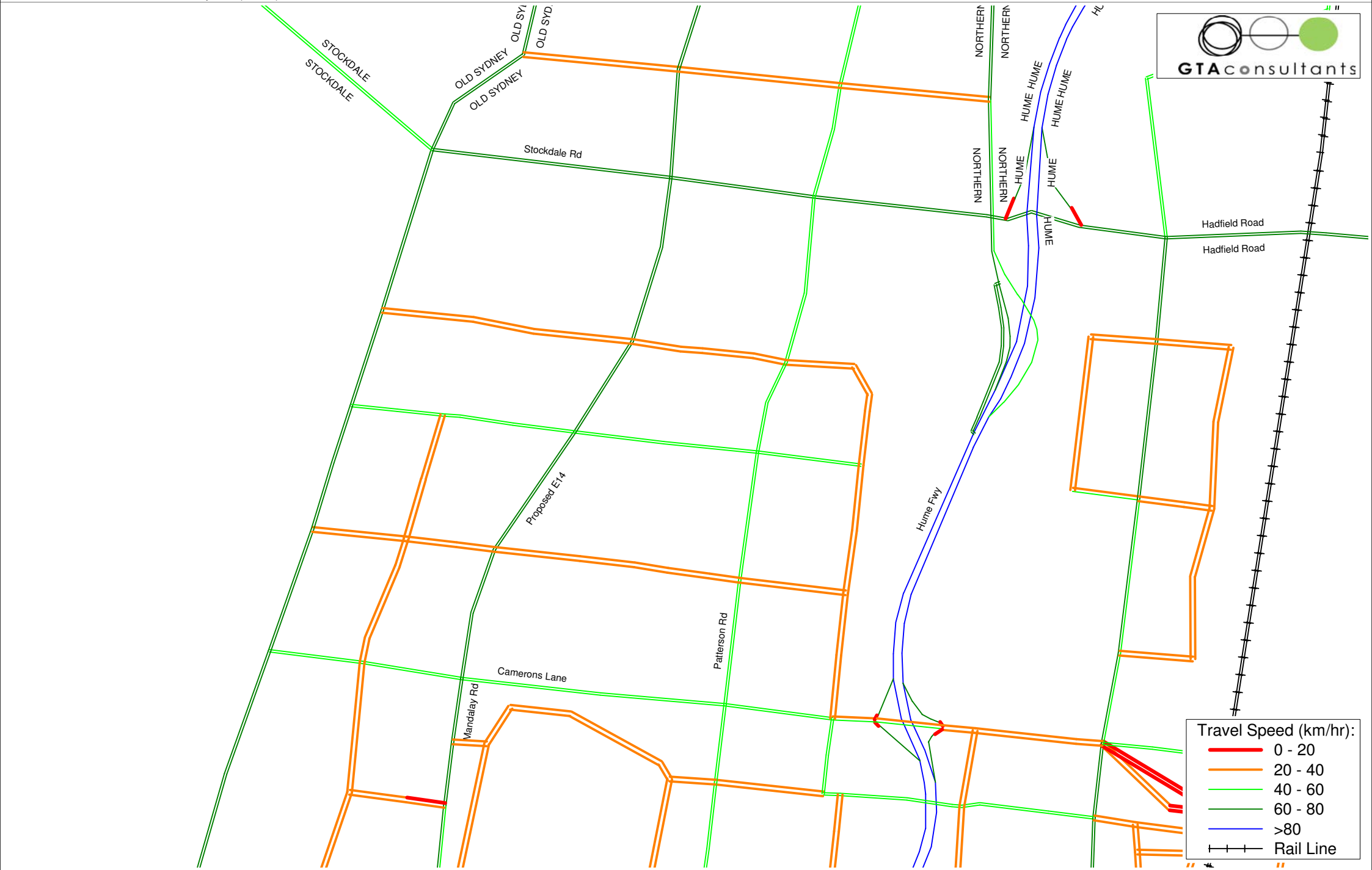
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs AM Travel Speed (km/hr) Year 2046 Scenario 2



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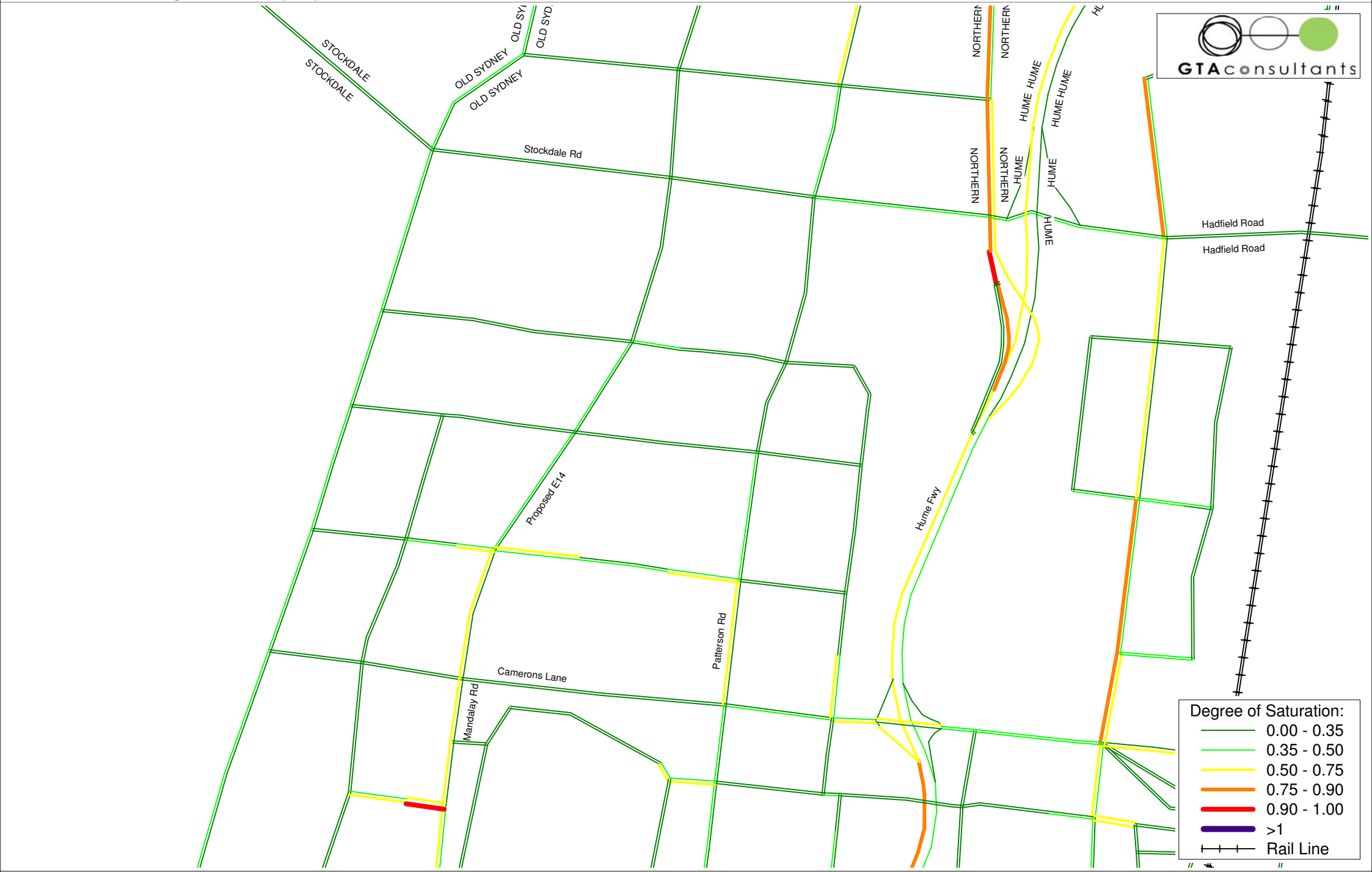
23/07/2014

VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Degree of Saturation (DOS) Year 2046 Scenario 2



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23/07/2014

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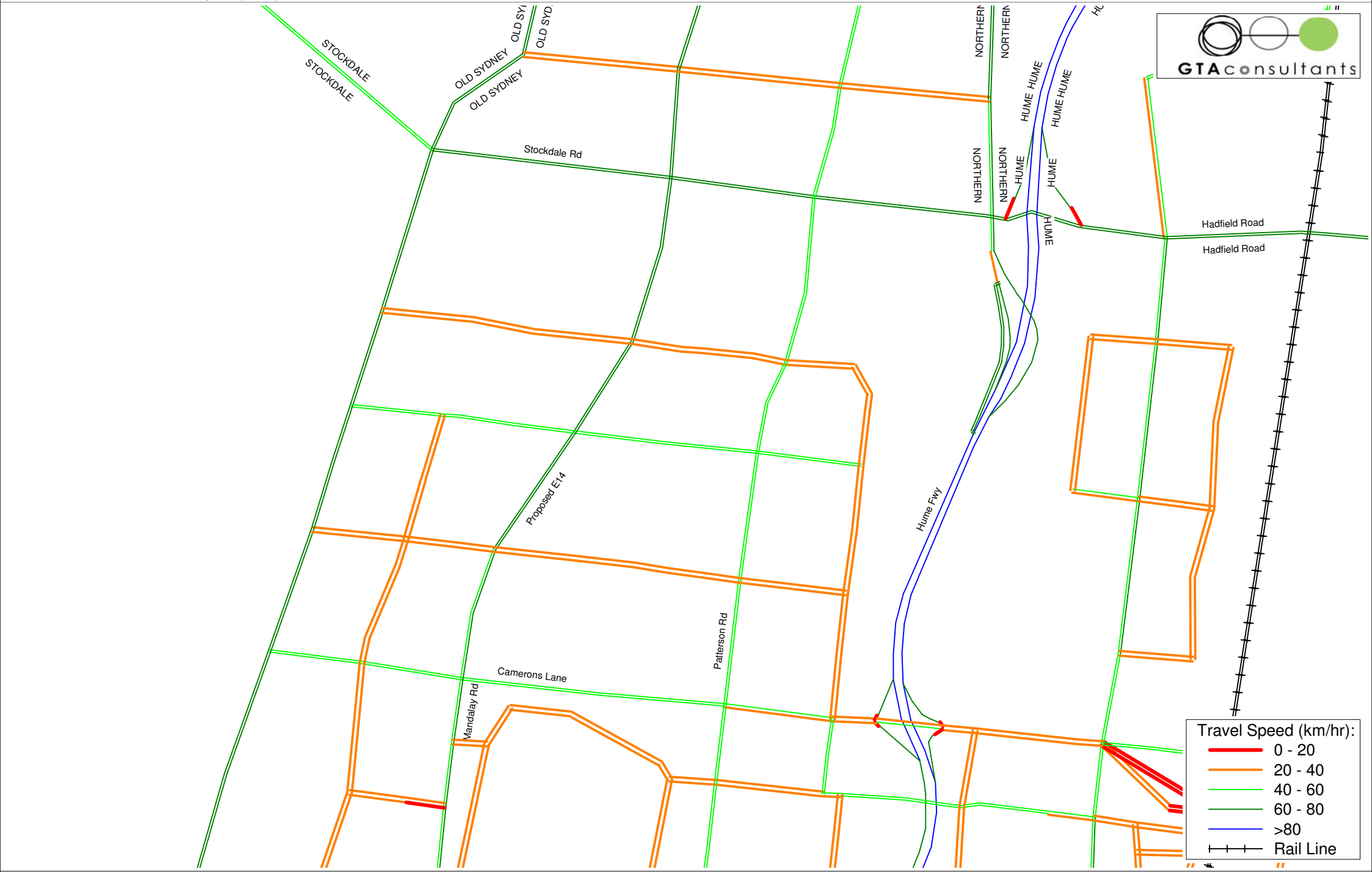
VITM Northern Growth Corridor Model
14M2340000 - 2 Hrs PM Travel Speed (km/hr) Year 2046 Scenario 2



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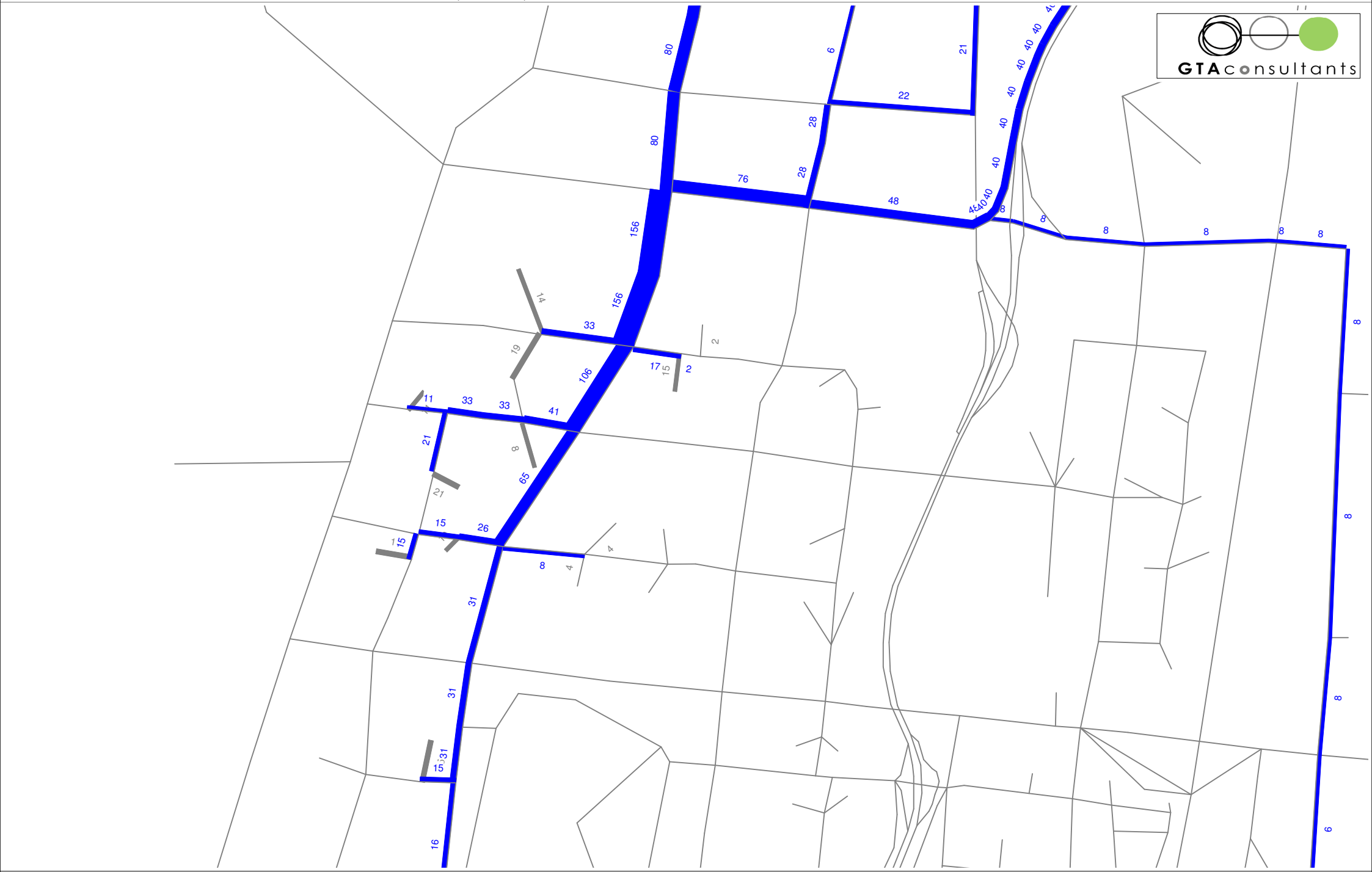
23/07/2014

Appendix C

Interim (2026) Select Link Analysis for Modelled Scenarios

VITM Northern Growth Corridor Model
14M2340000 - AM SLA E14 south of Stocdale Rd NB Year 2026 Scenario 1 (Base Case)



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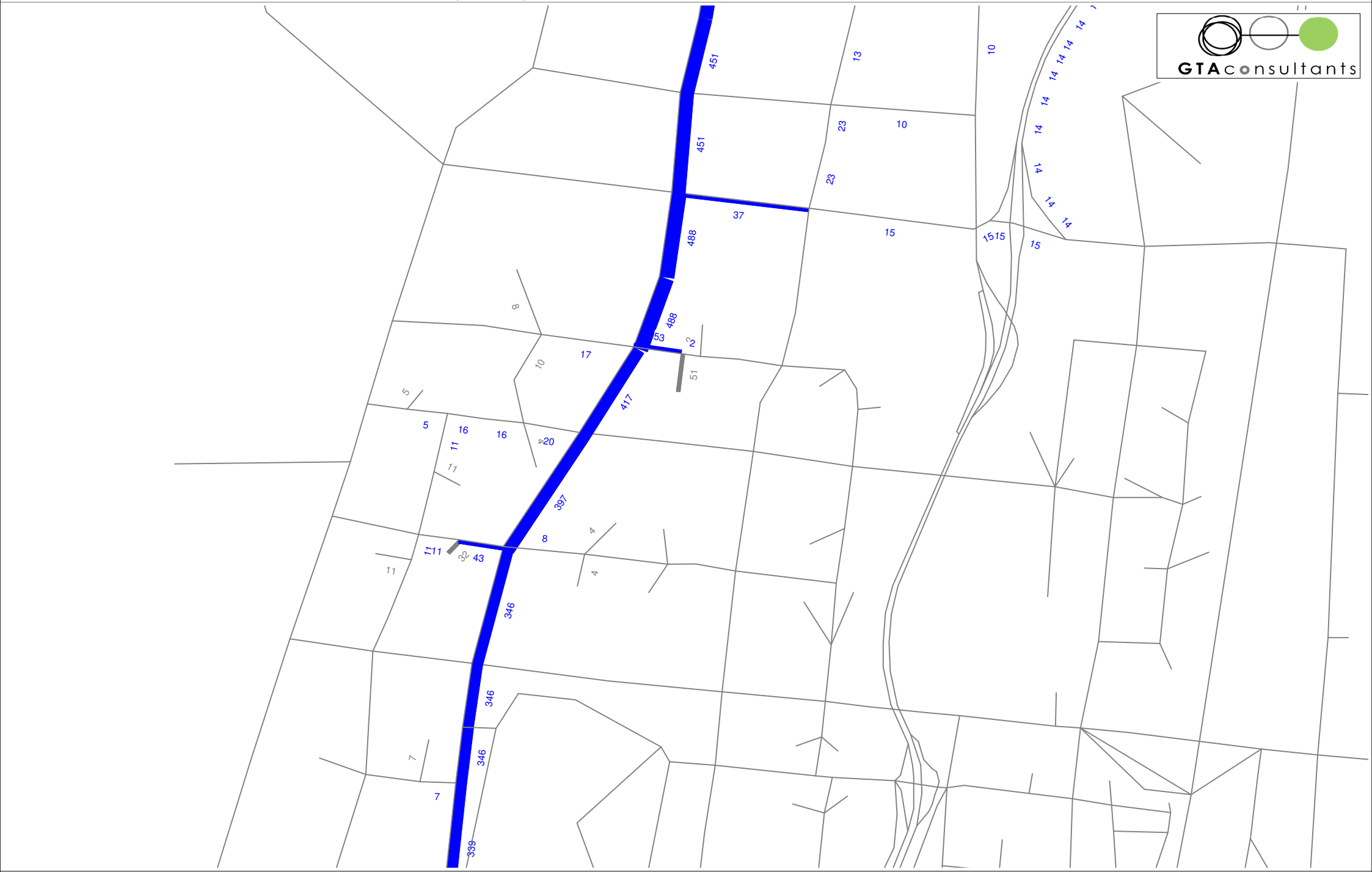
VITM Northern Growth Corridor Model
14M2340000 - AM SLA E14 south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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21/07/2014

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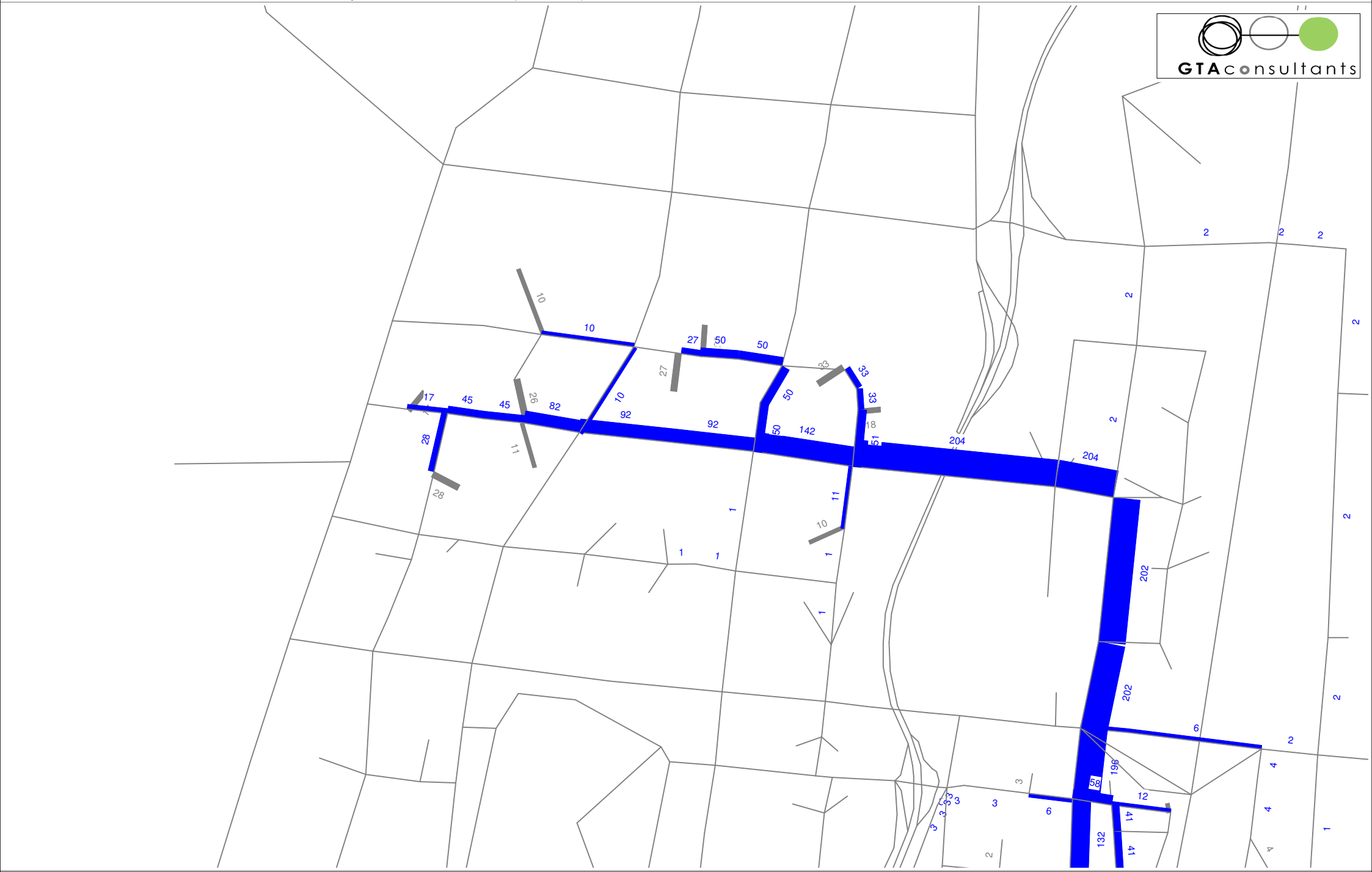
VITM Northern Growth Corridor Model
14M2340000 - AM SLA East West Connector at Hume Hwy EB Year 2026 Scenario 1 (Base Case)



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21/07/2014

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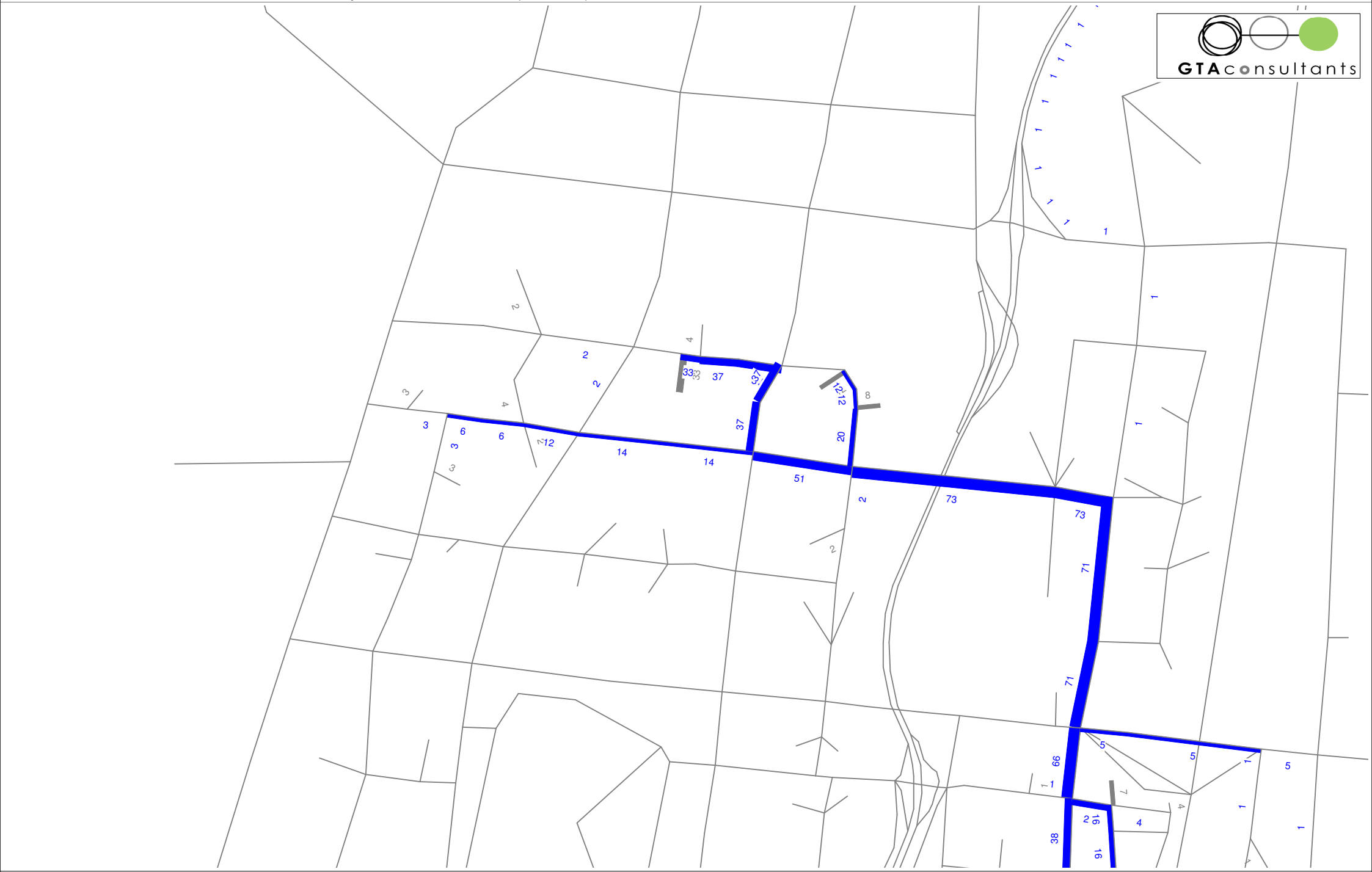
VITM Northern Growth Corridor Model
14M2340000 - AM SLA East West Connector at Hume Hwy WB Year 2026 Scenario 1 (Base Case)



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21/07/2014

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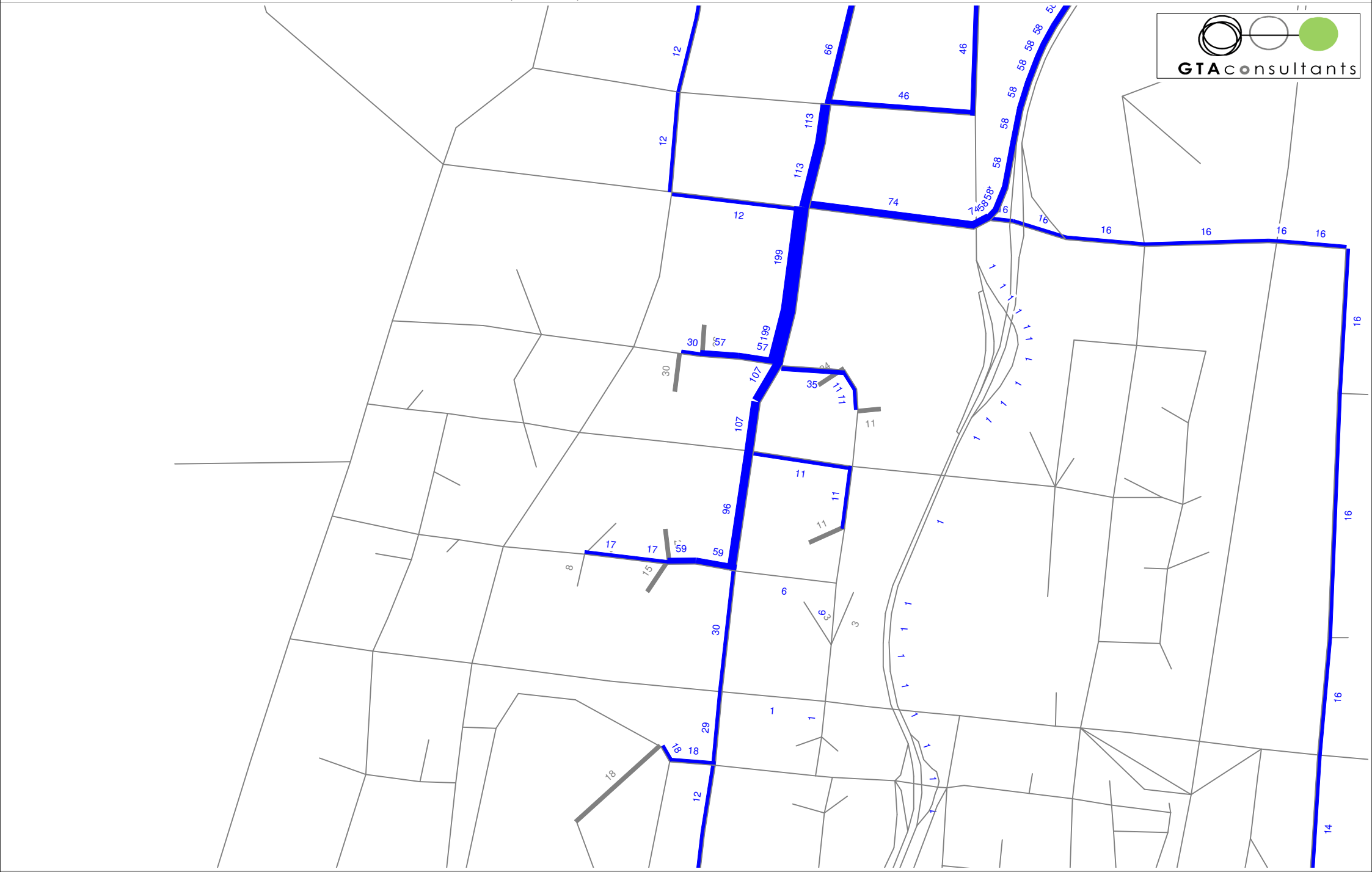
VITM Northern Growth Corridor Model
14M2340000 - AM SLA Patterson Rd south of Stocdale Rd NB Year 2026 Scenario 1 (Base Case)



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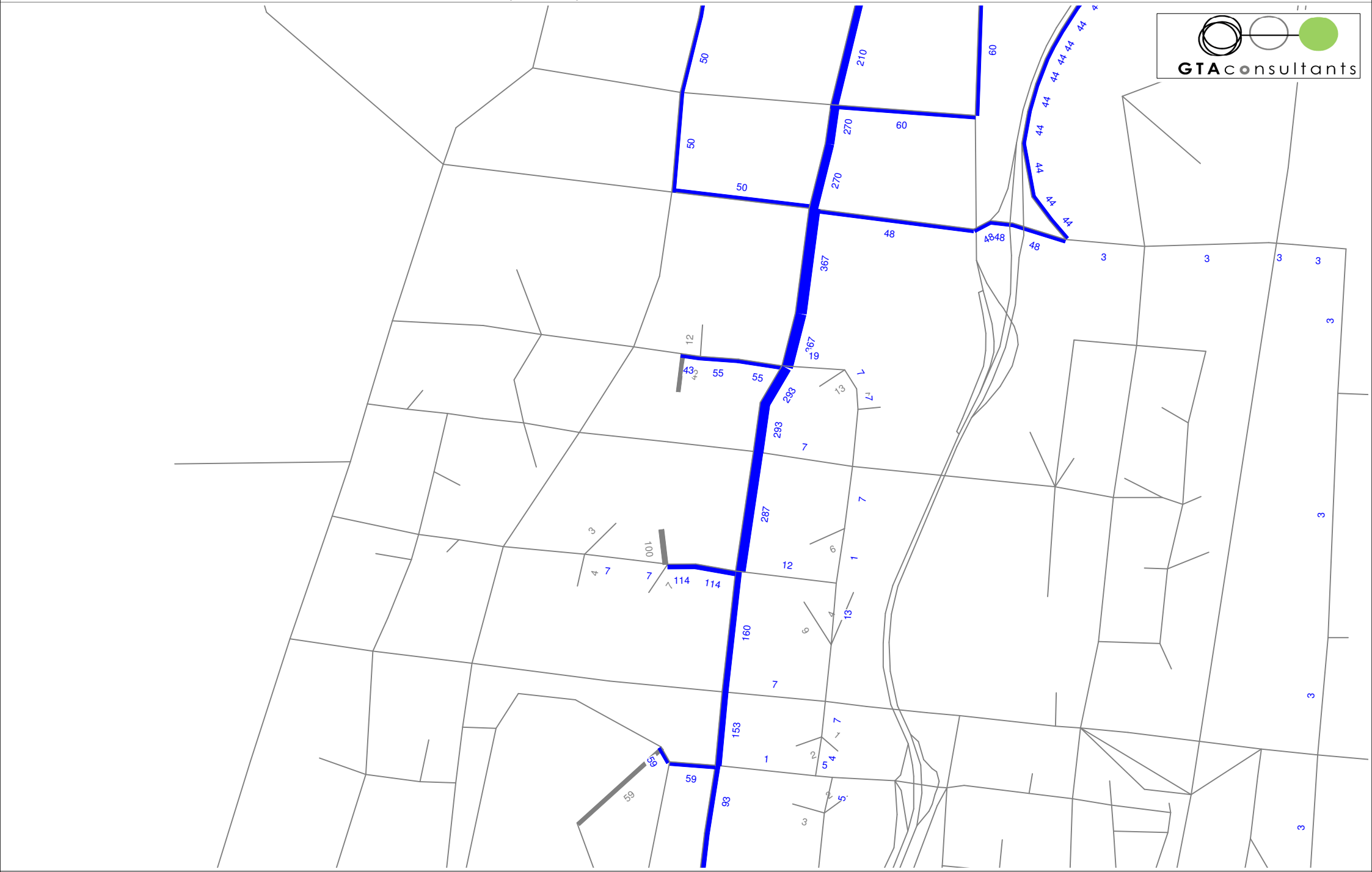
VITM Northern Growth Corridor Model
14M2340000 - AM SLA Patterson Rd south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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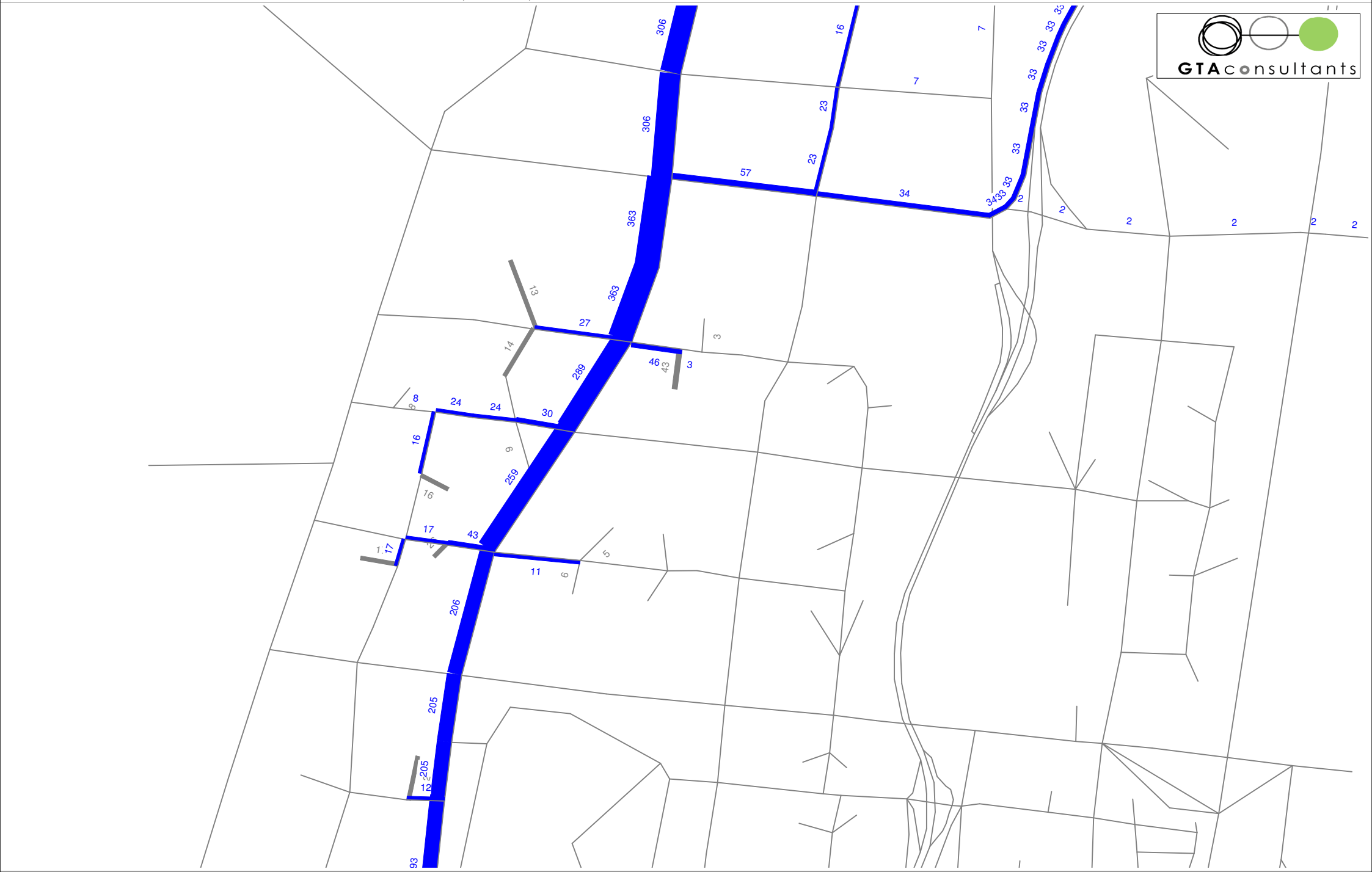
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of E14 NB Year 2026 Scenario 1 (Base Case)



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25/07/2014

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VITM Northern Growth Corridor Model
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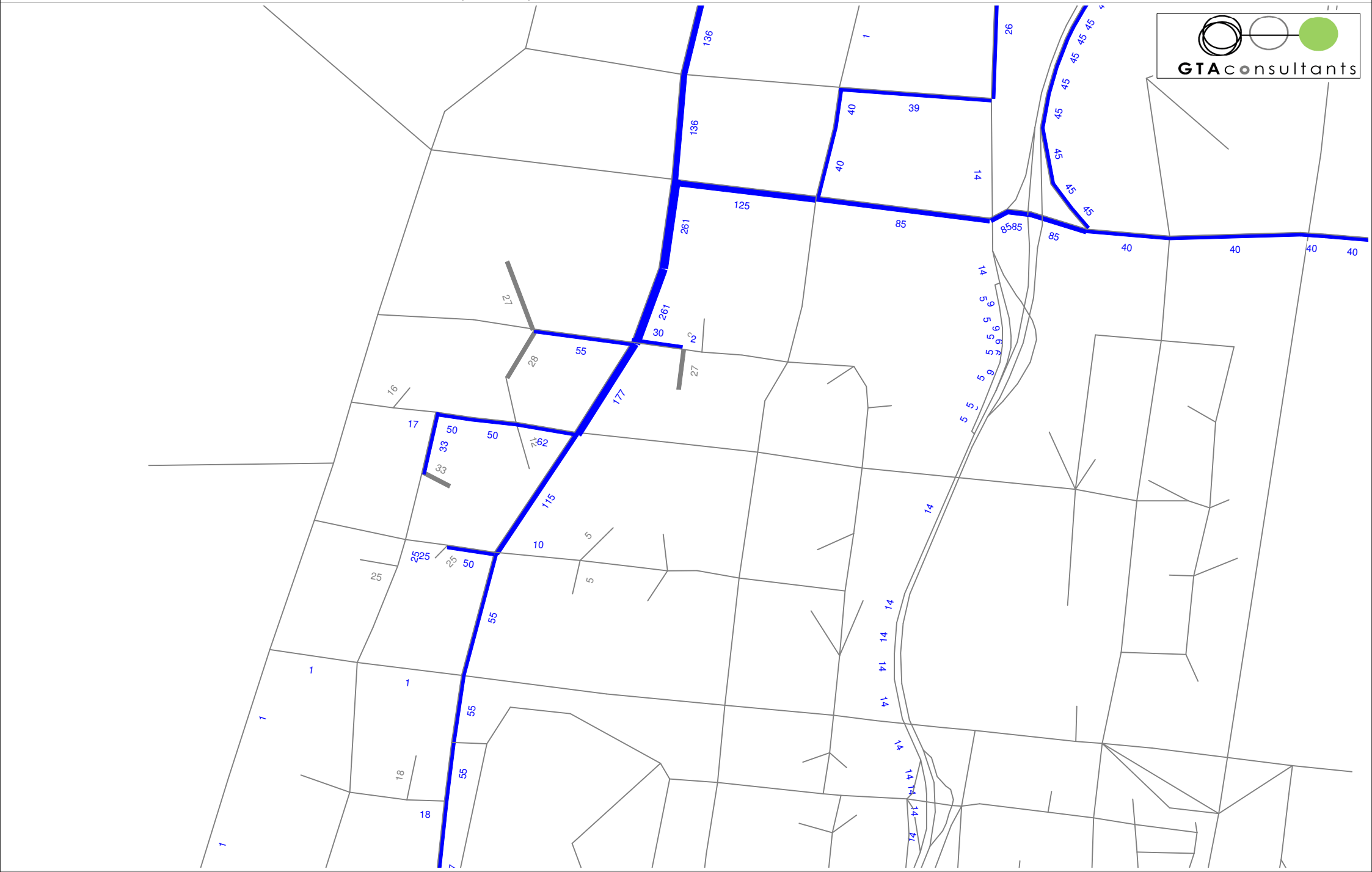

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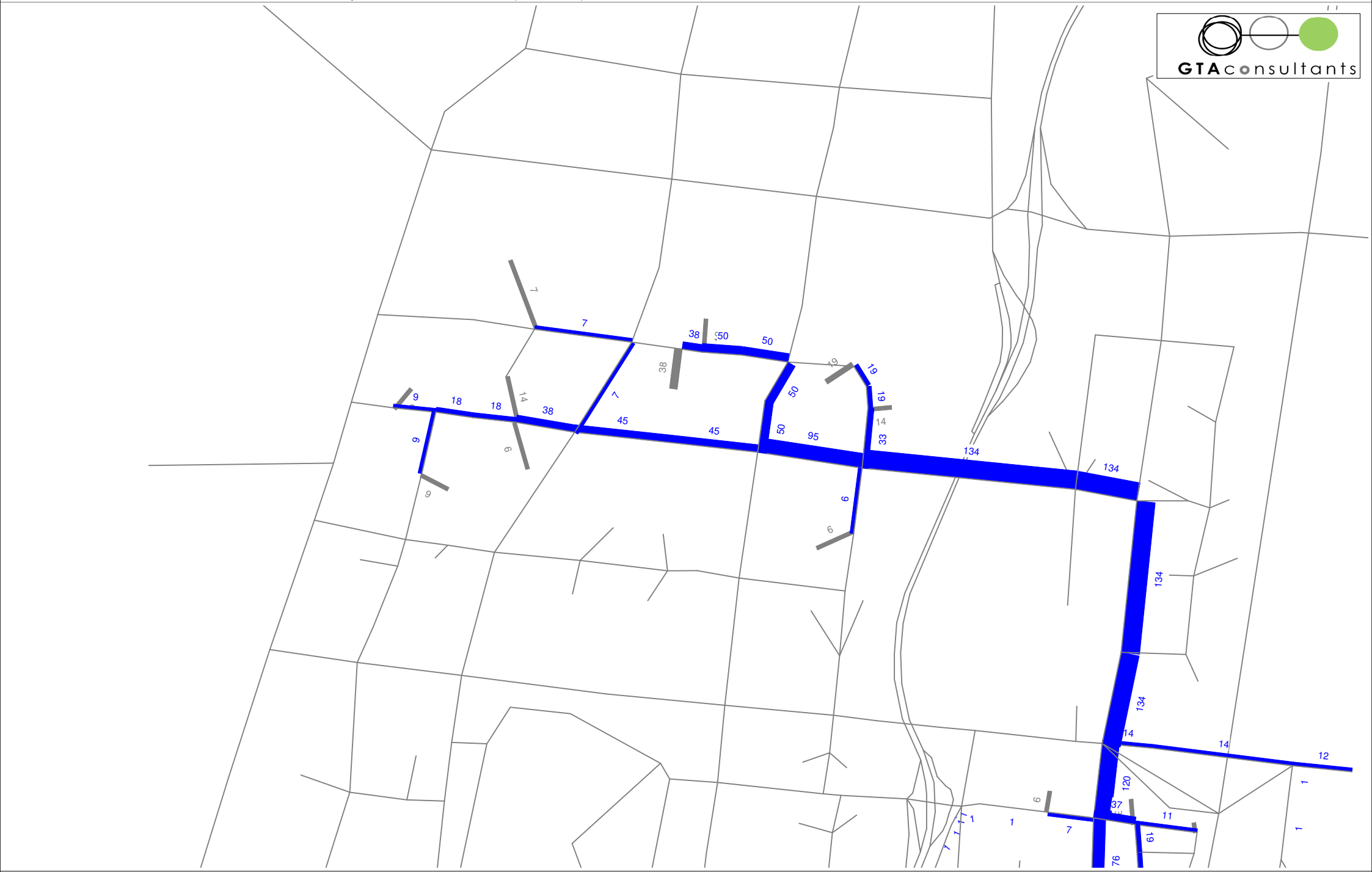
VITM Northern Growth Corridor Model
14M2340000 - PM SLA East West Connector at Hume Hwy EB Year 2026 Scenario 1 (Base Case)



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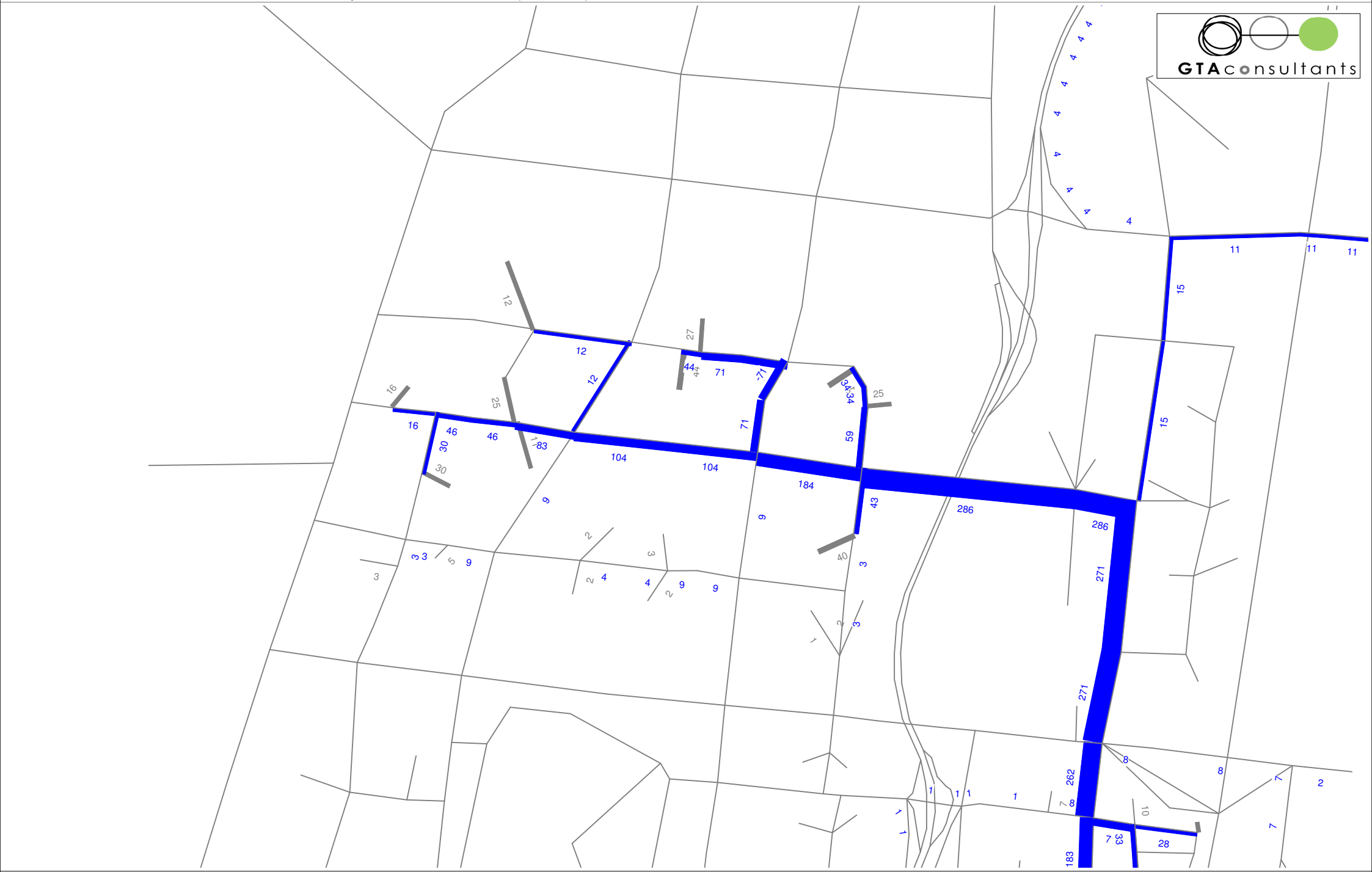
VITM Northern Growth Corridor Model
14M2340000 - PM SLA East West Connector at Hume Hwy WB Year 2026 Scenario 1 (Base Case)



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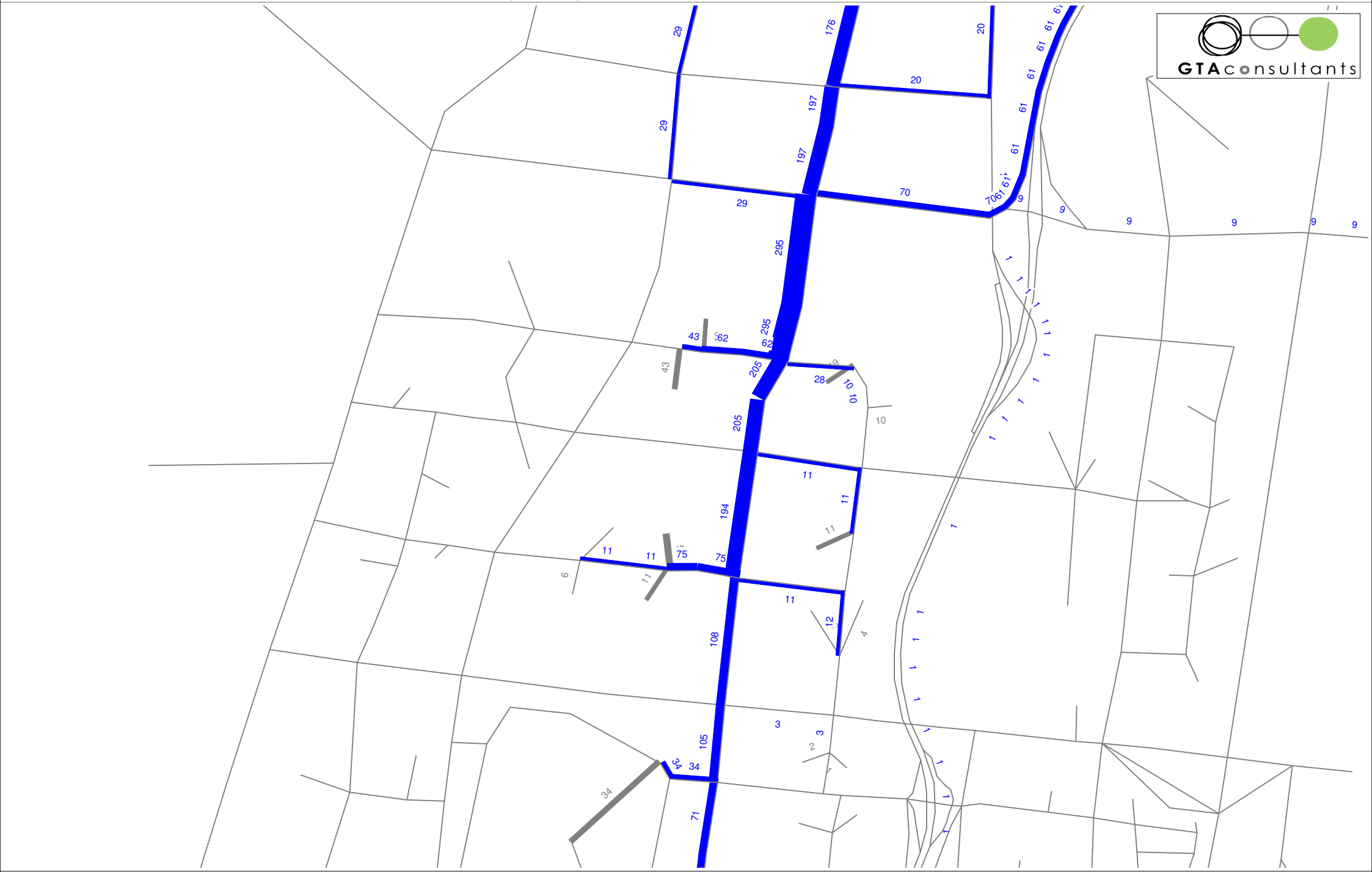
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of Stocdale Rd NB Year 2026 Scenario 1 (Base Case)



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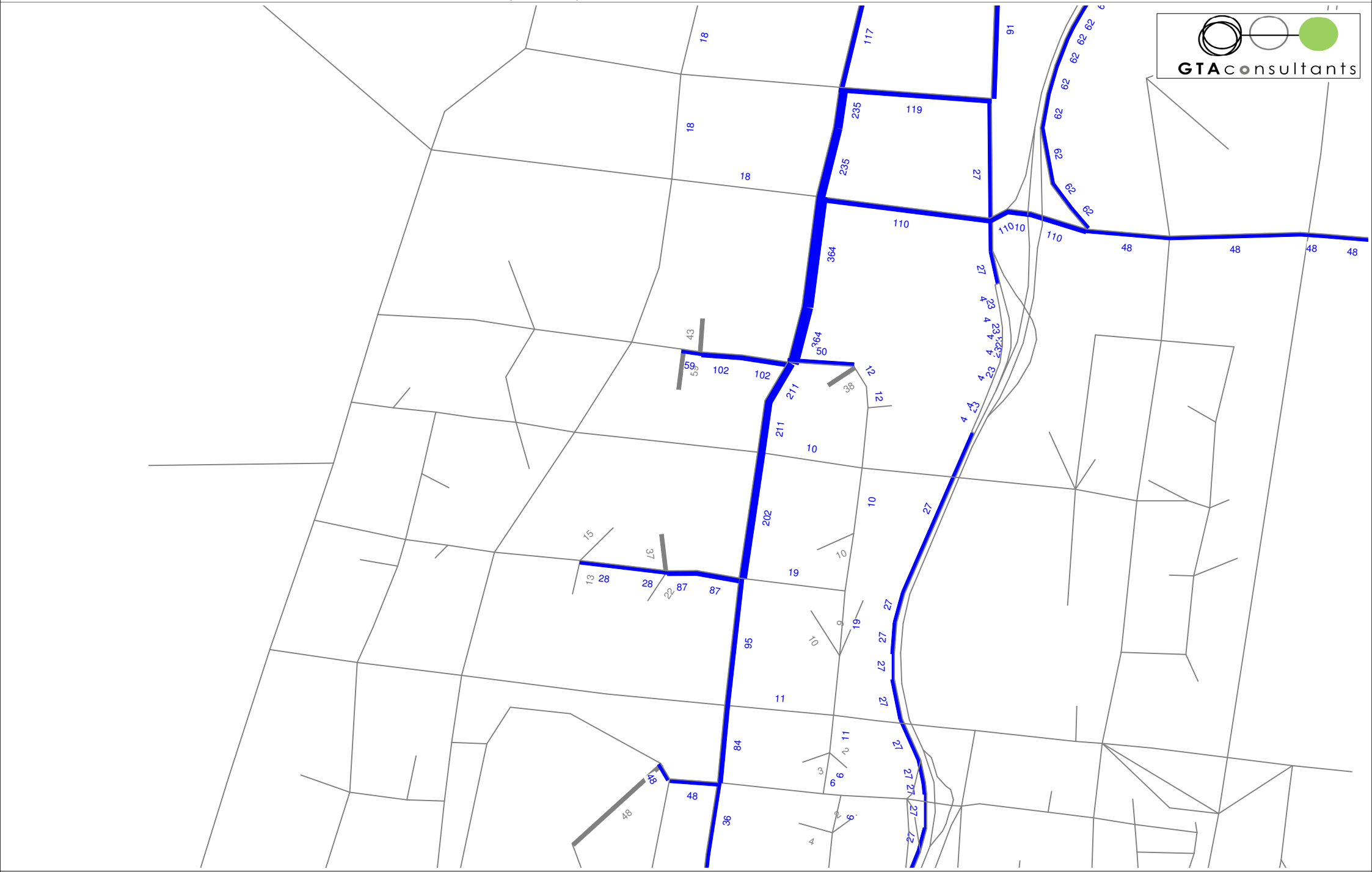
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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25/07/2014
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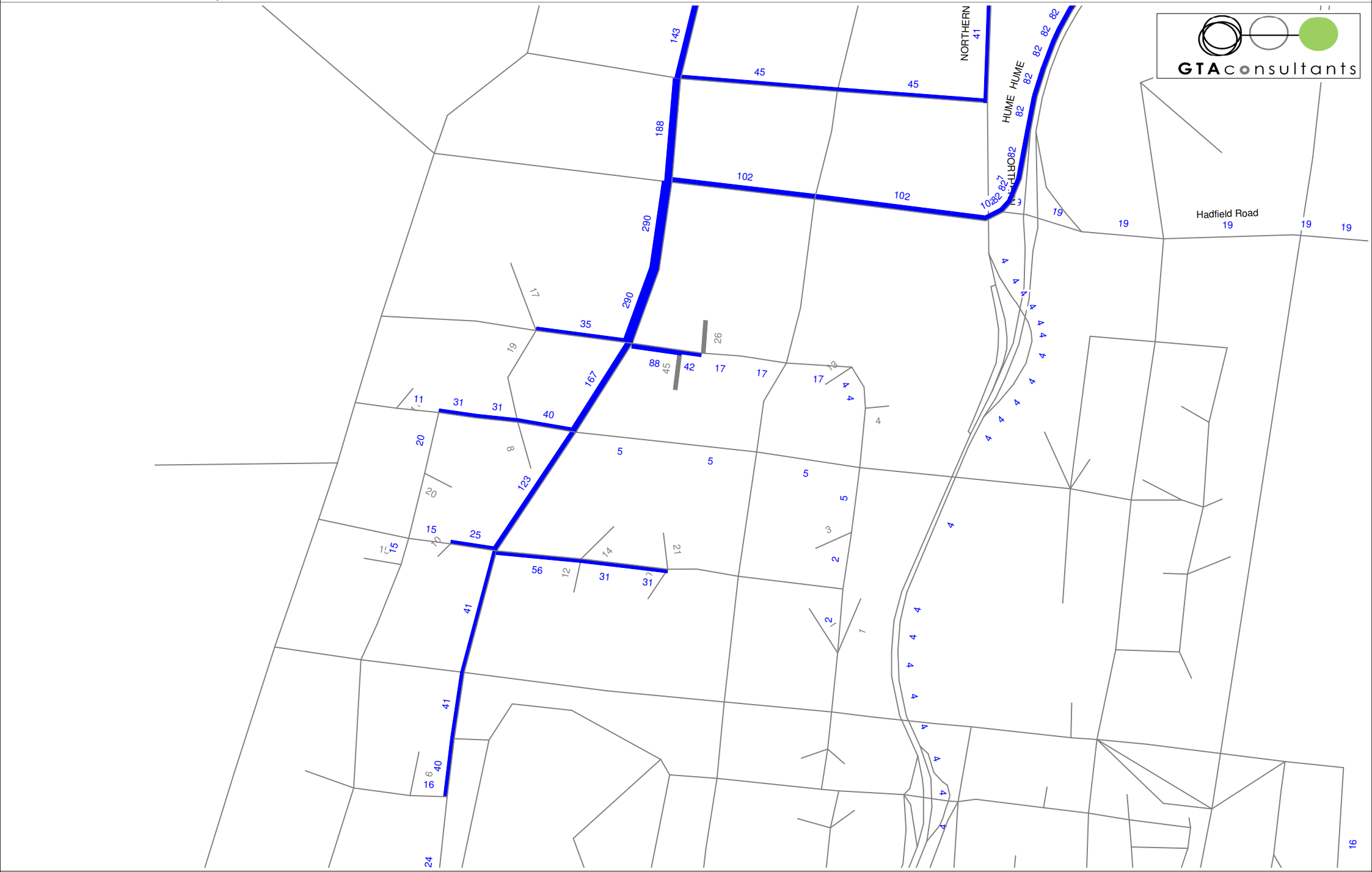
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 2



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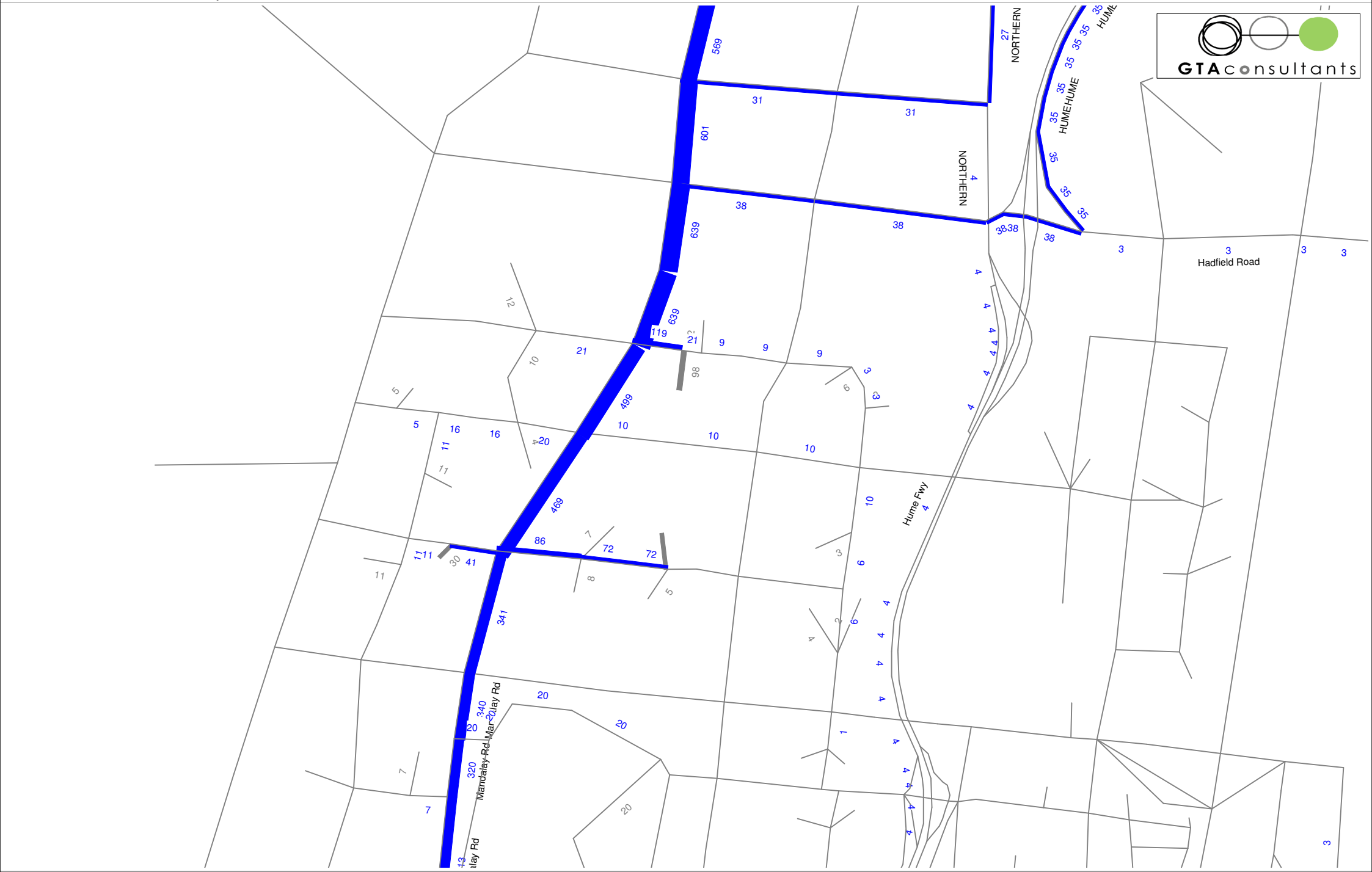
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 2



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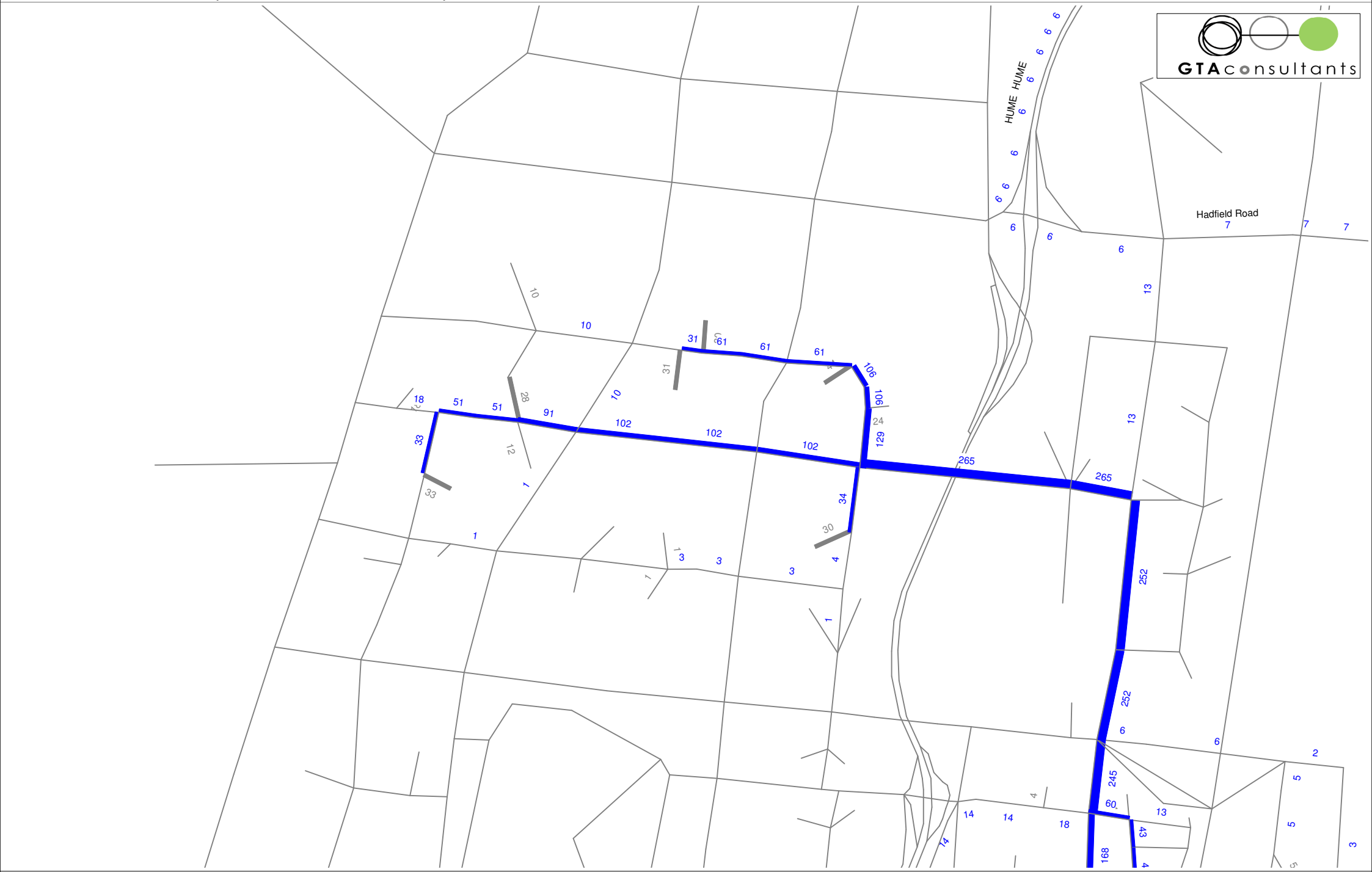
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 2



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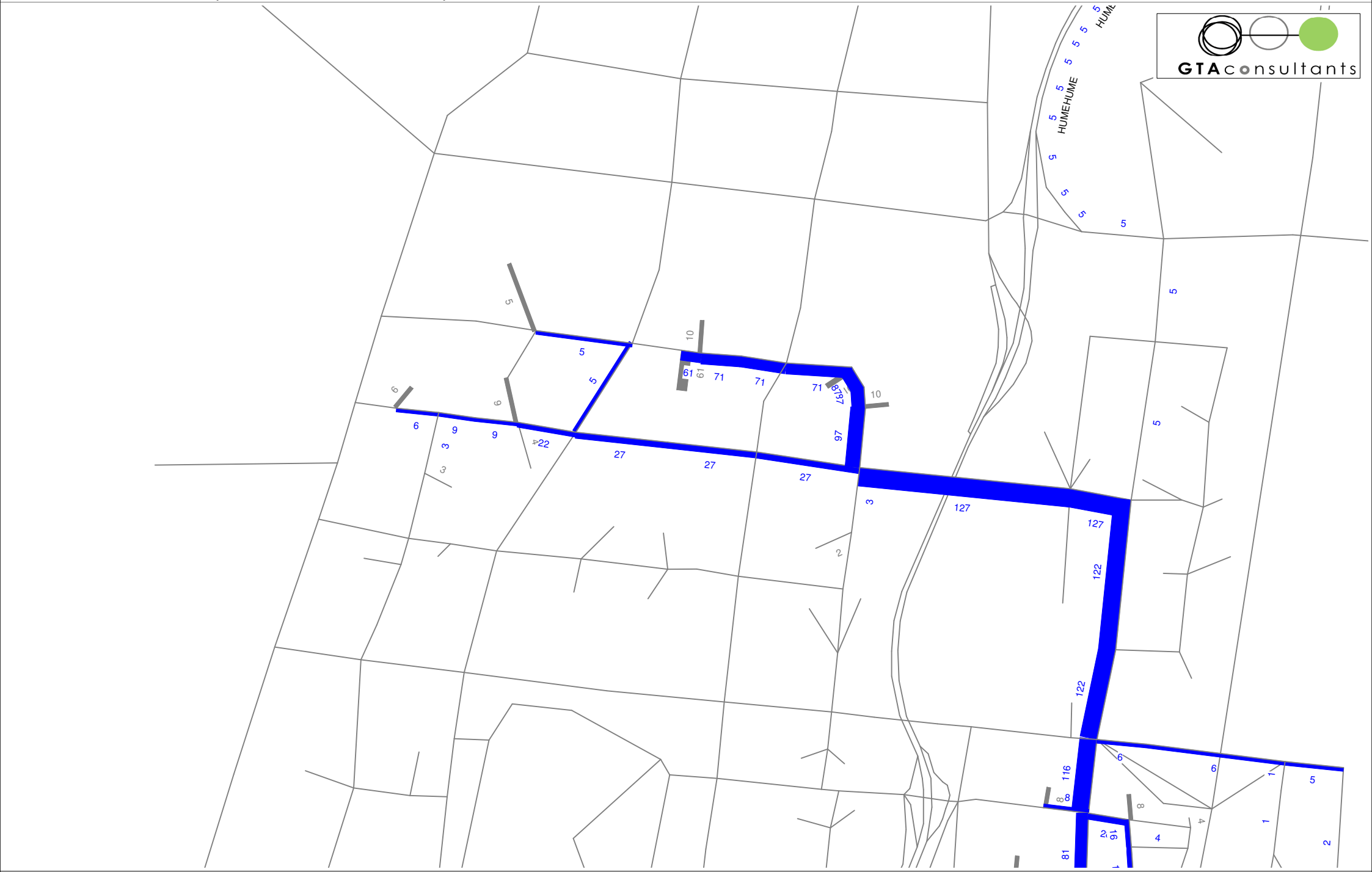
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 2



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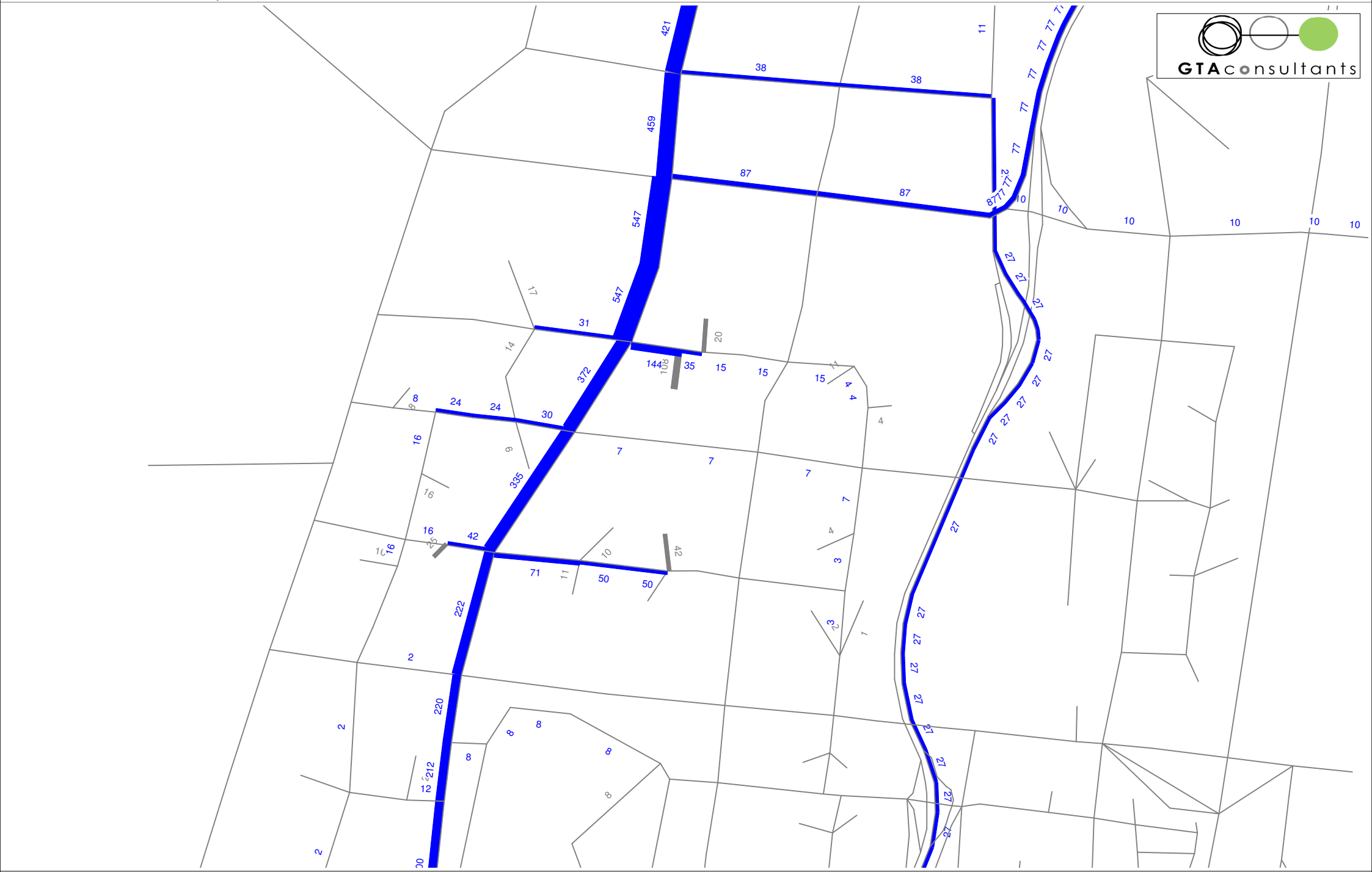
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 2



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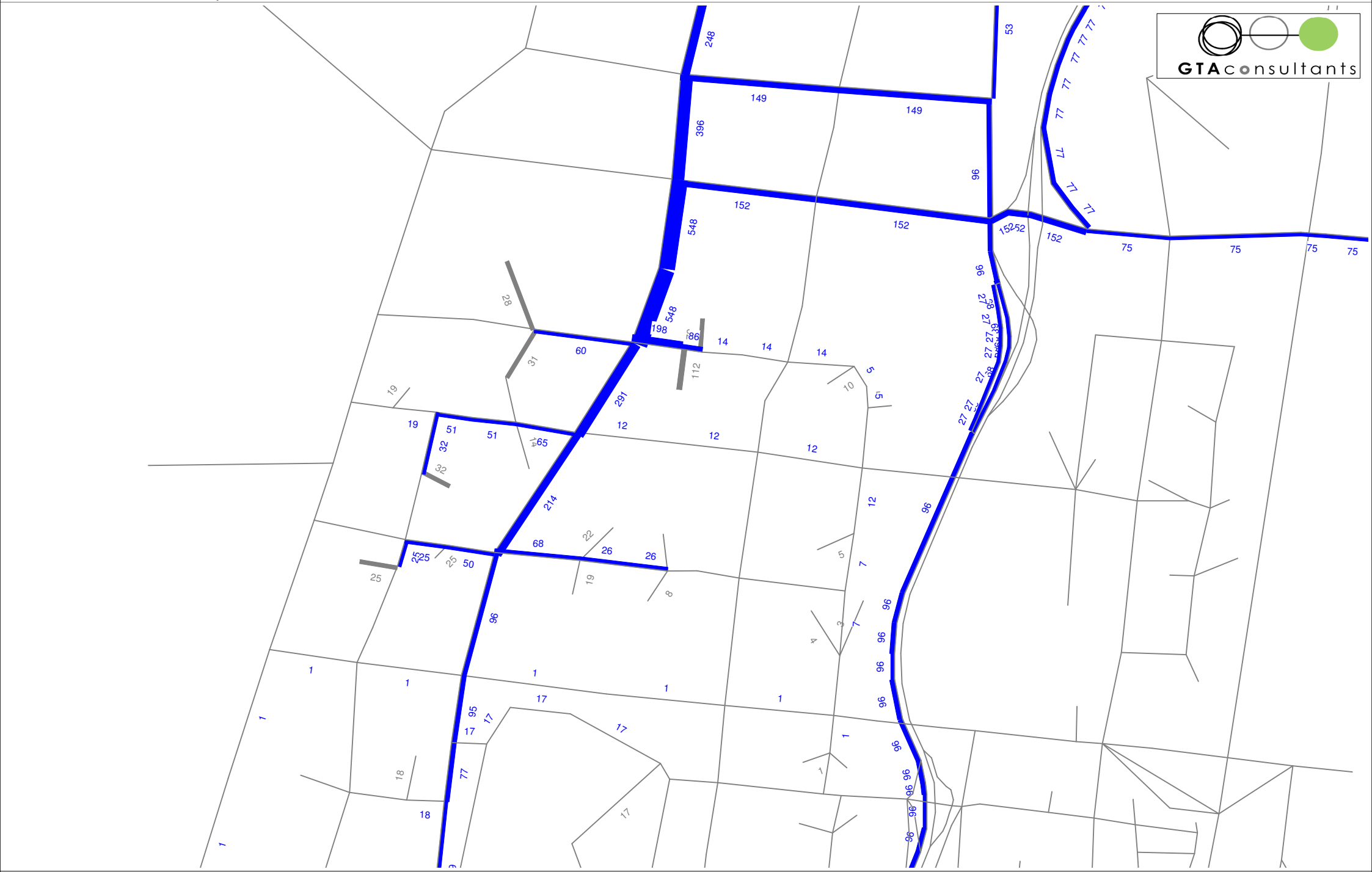
26/07/2014

VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 2



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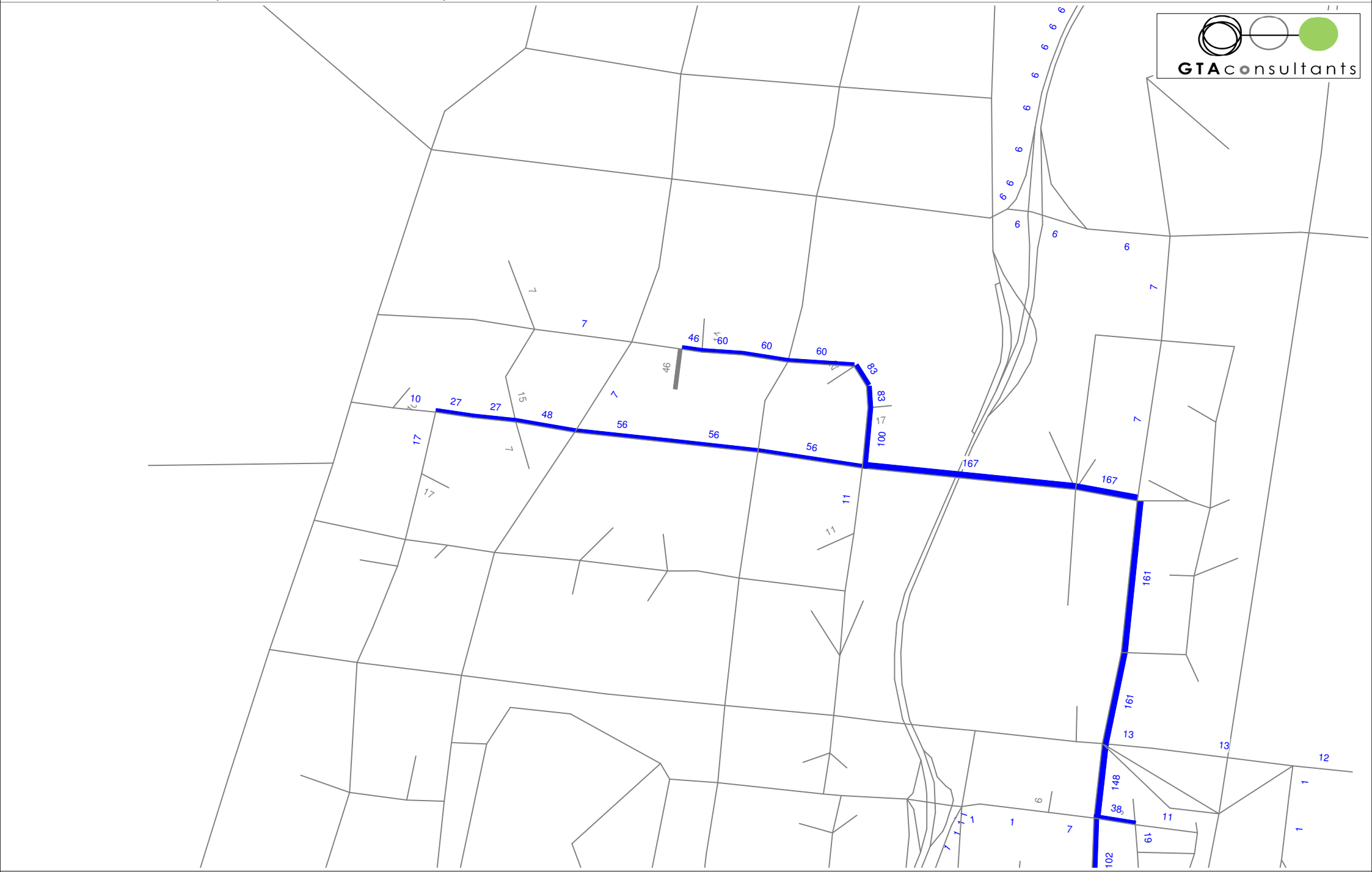
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 2



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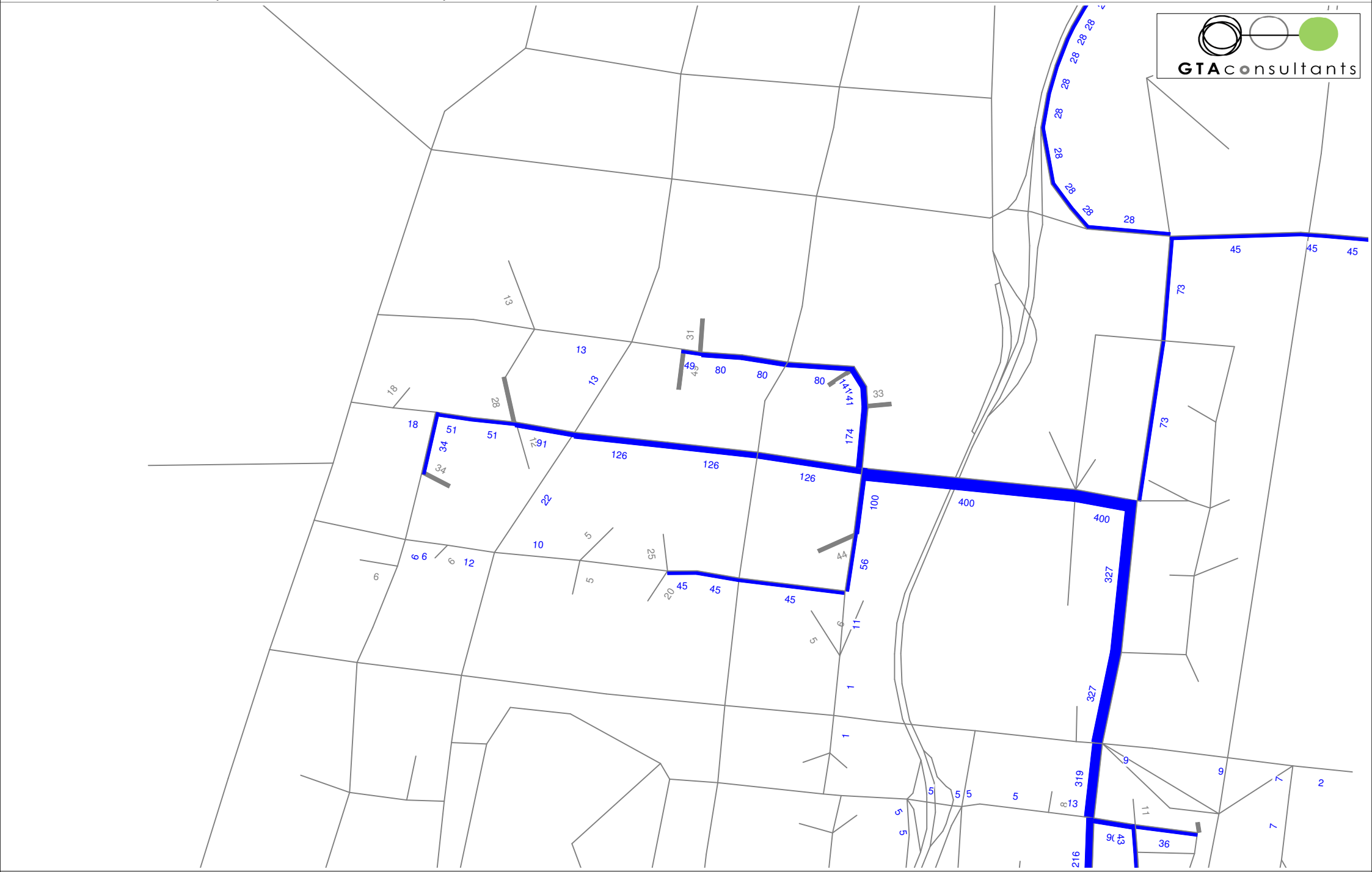
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 2



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26/07/2014

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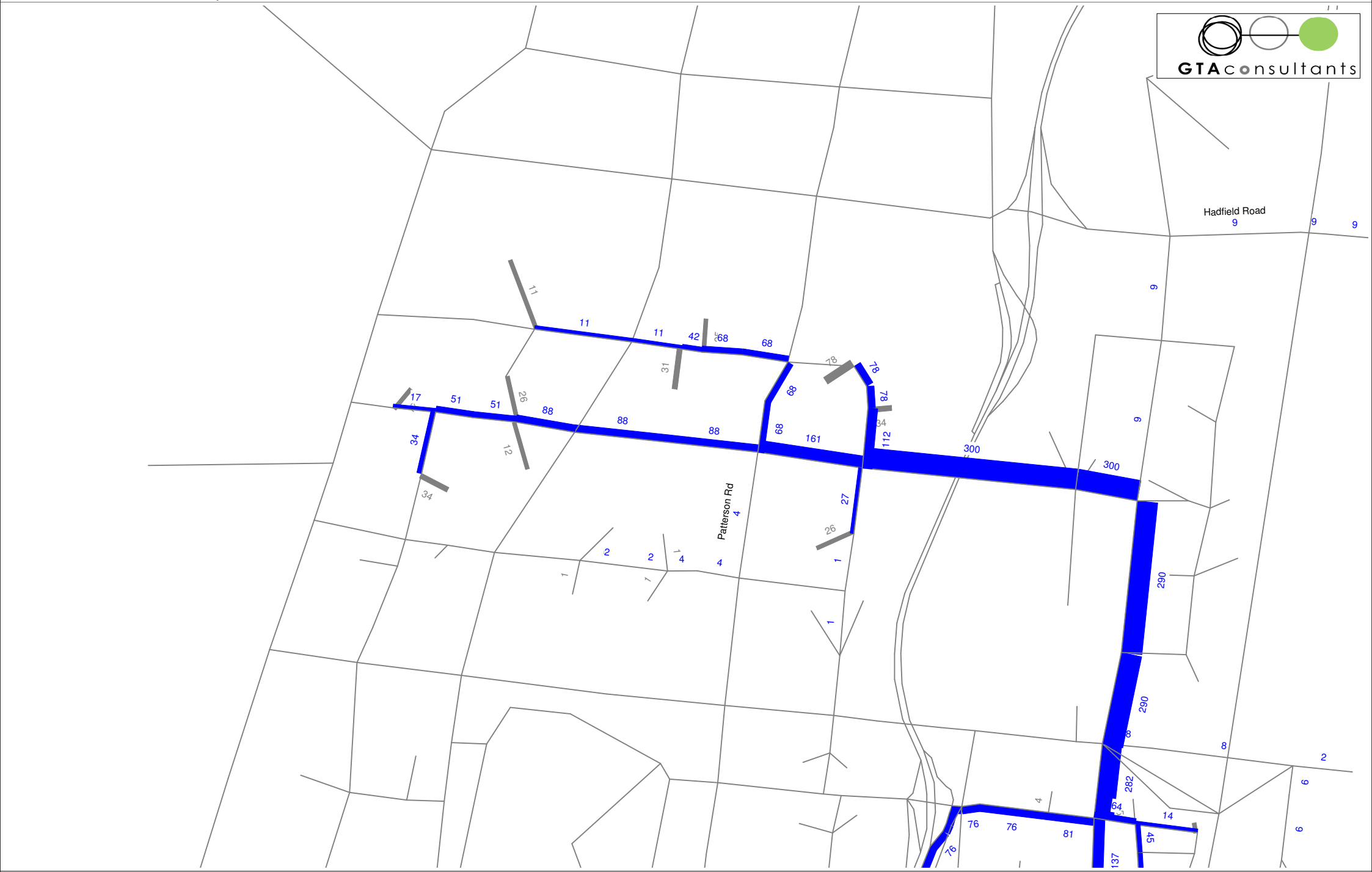
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector EB Year 2026 Scenario 3



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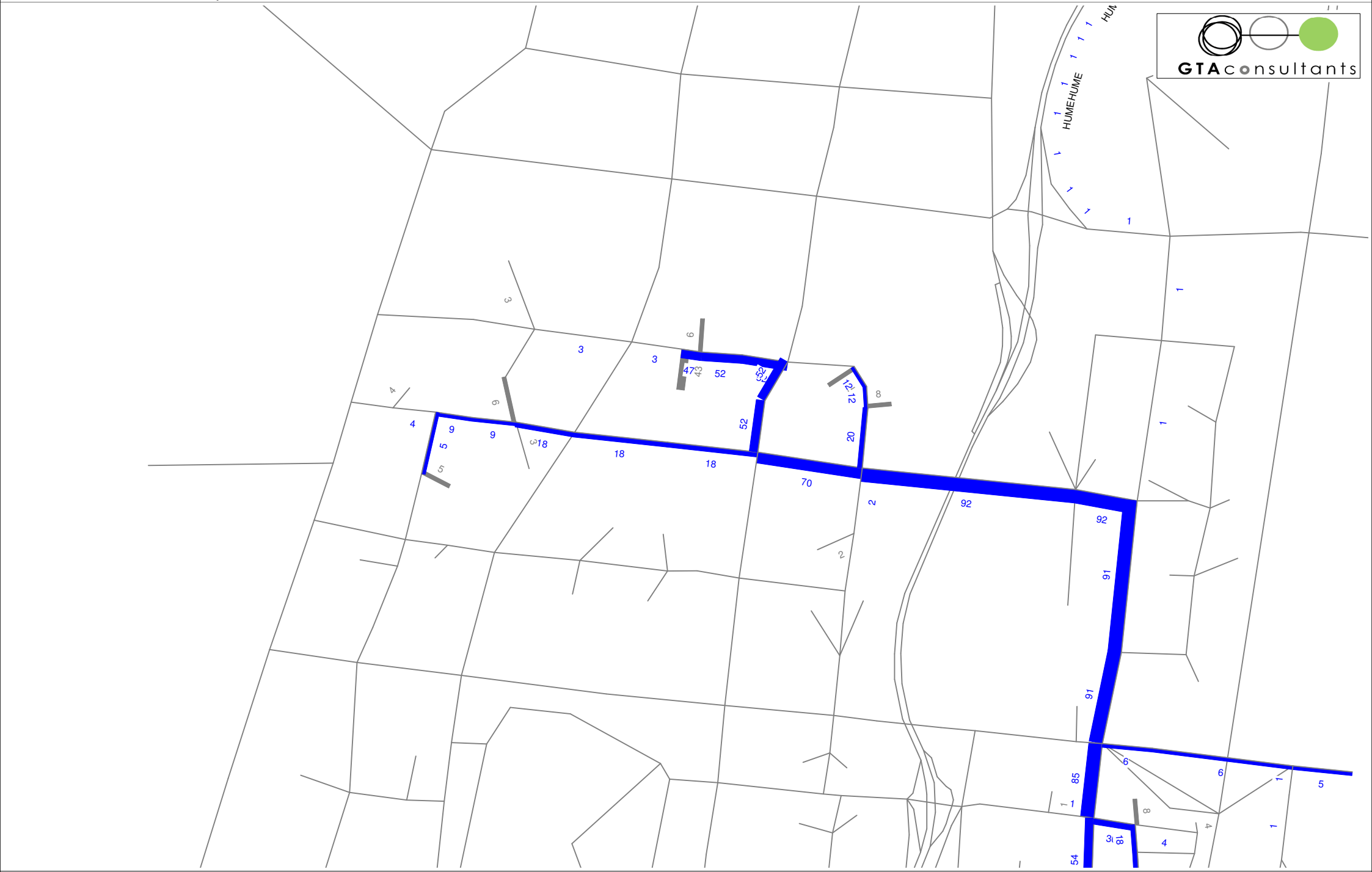
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector WB Year 2026 Scenario 3



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7/21/2014

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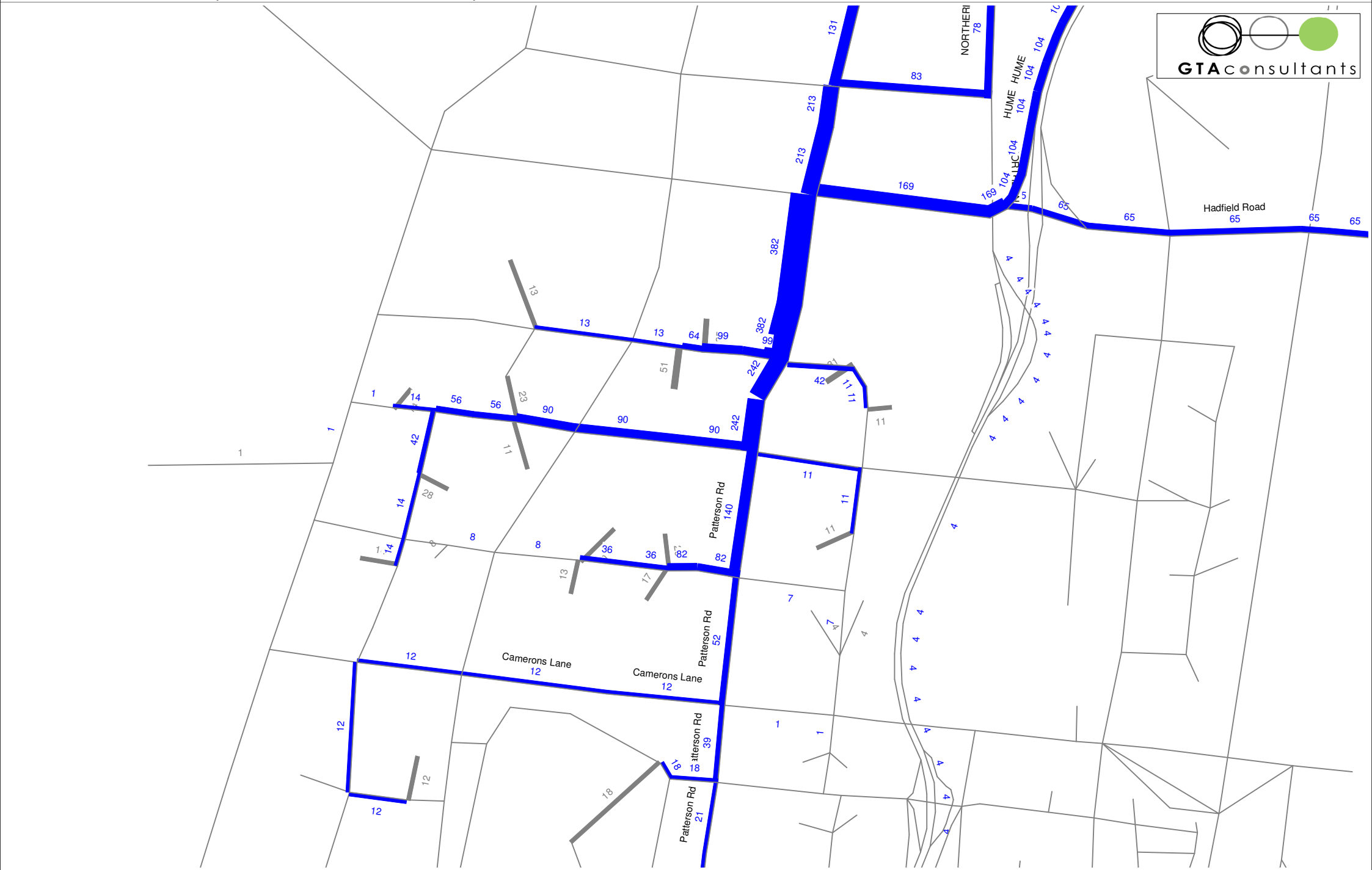
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson St south of Stockdale Rd NB year 2026 Scenario 3



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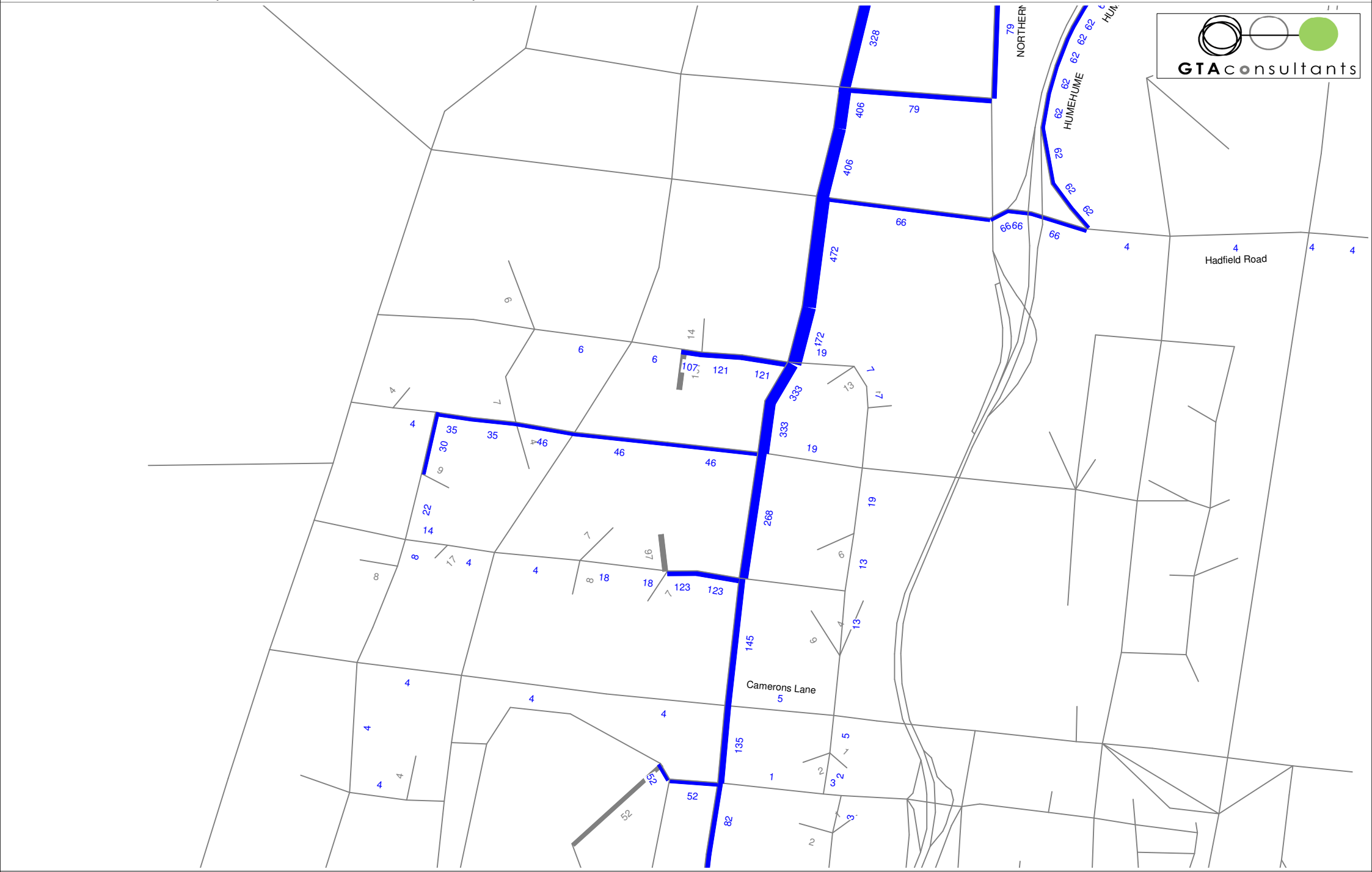
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson St south of Stockdale Rd SB year 2026 Scenario 3



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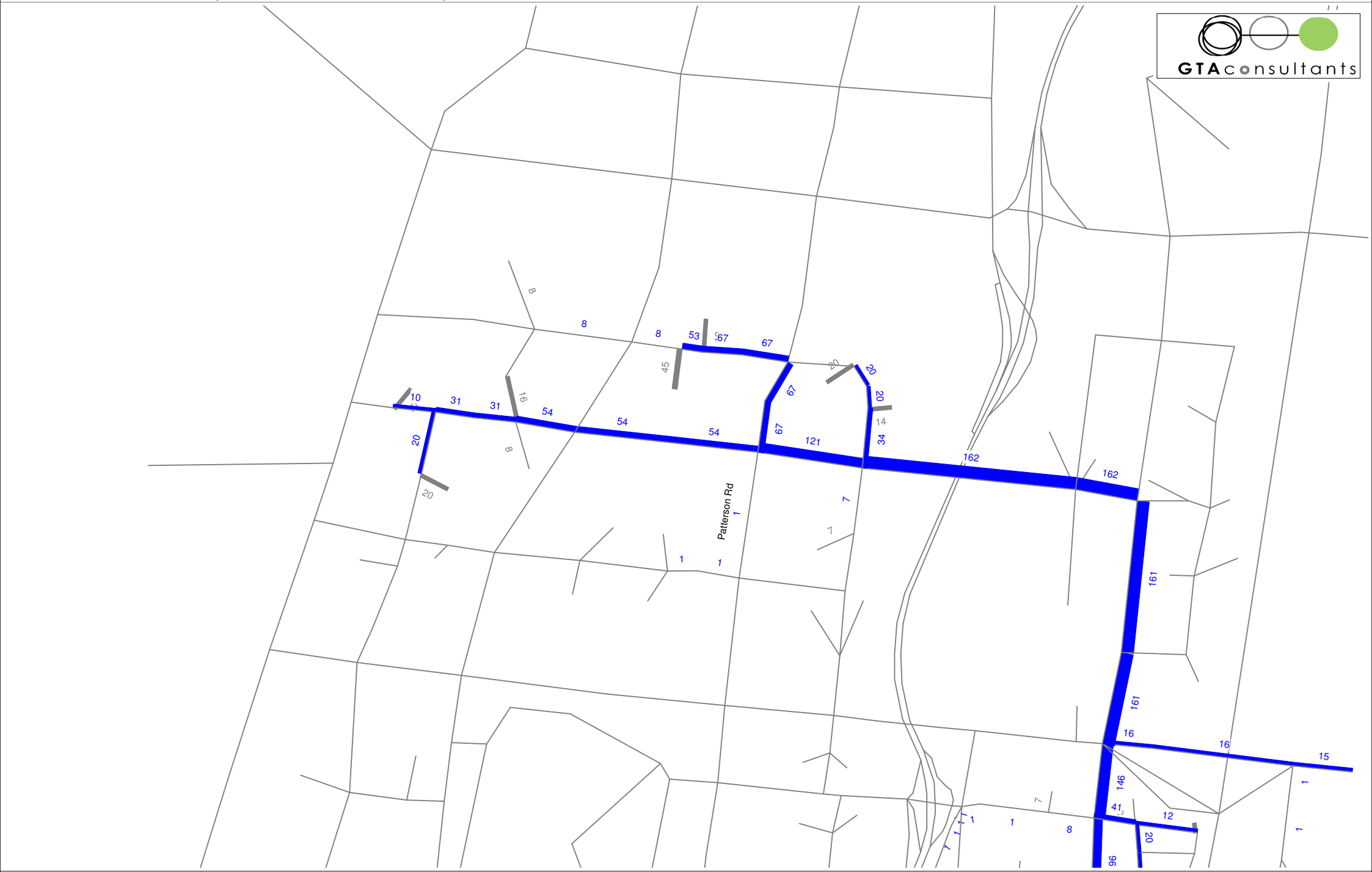
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 3



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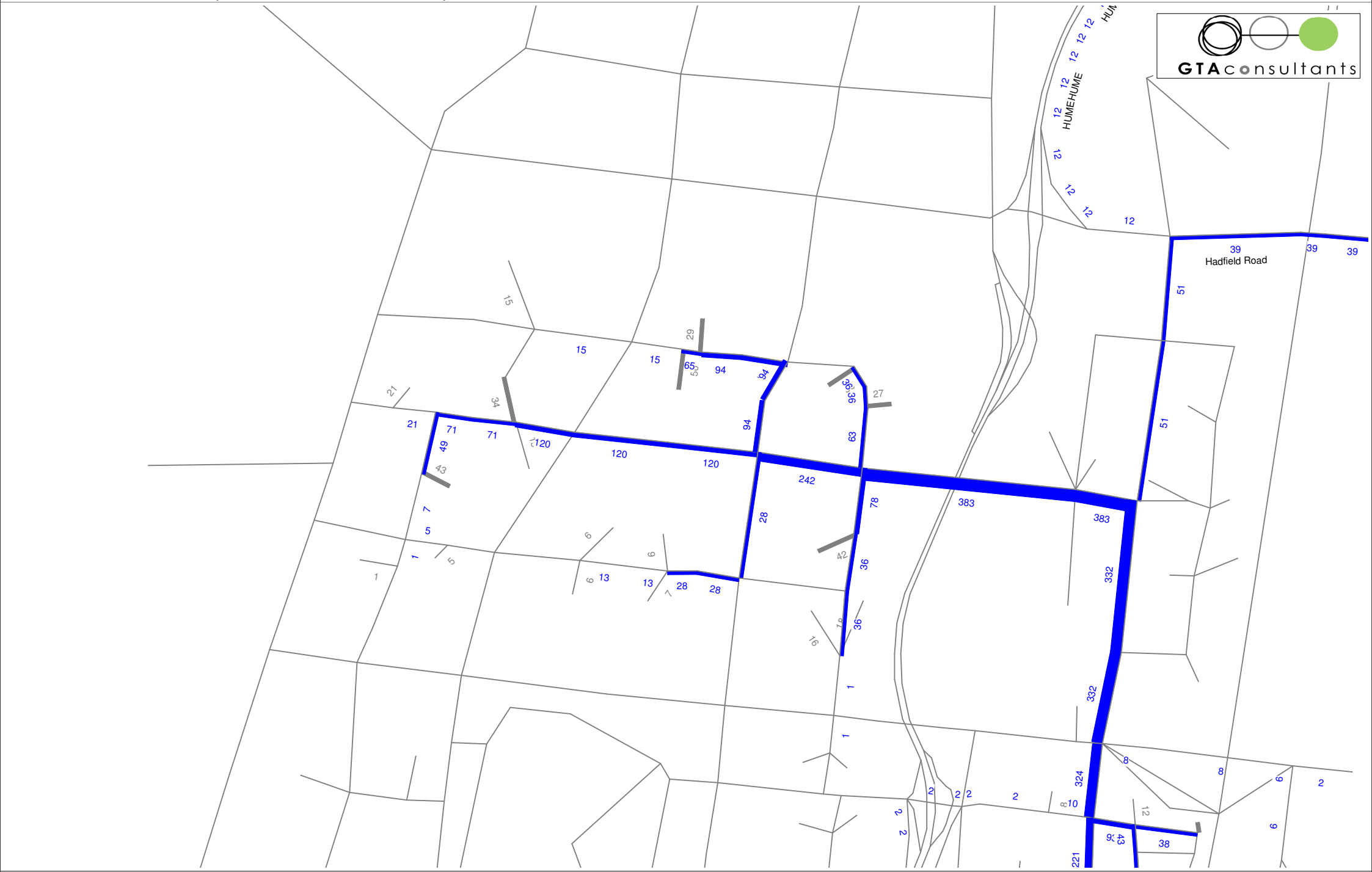
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 3



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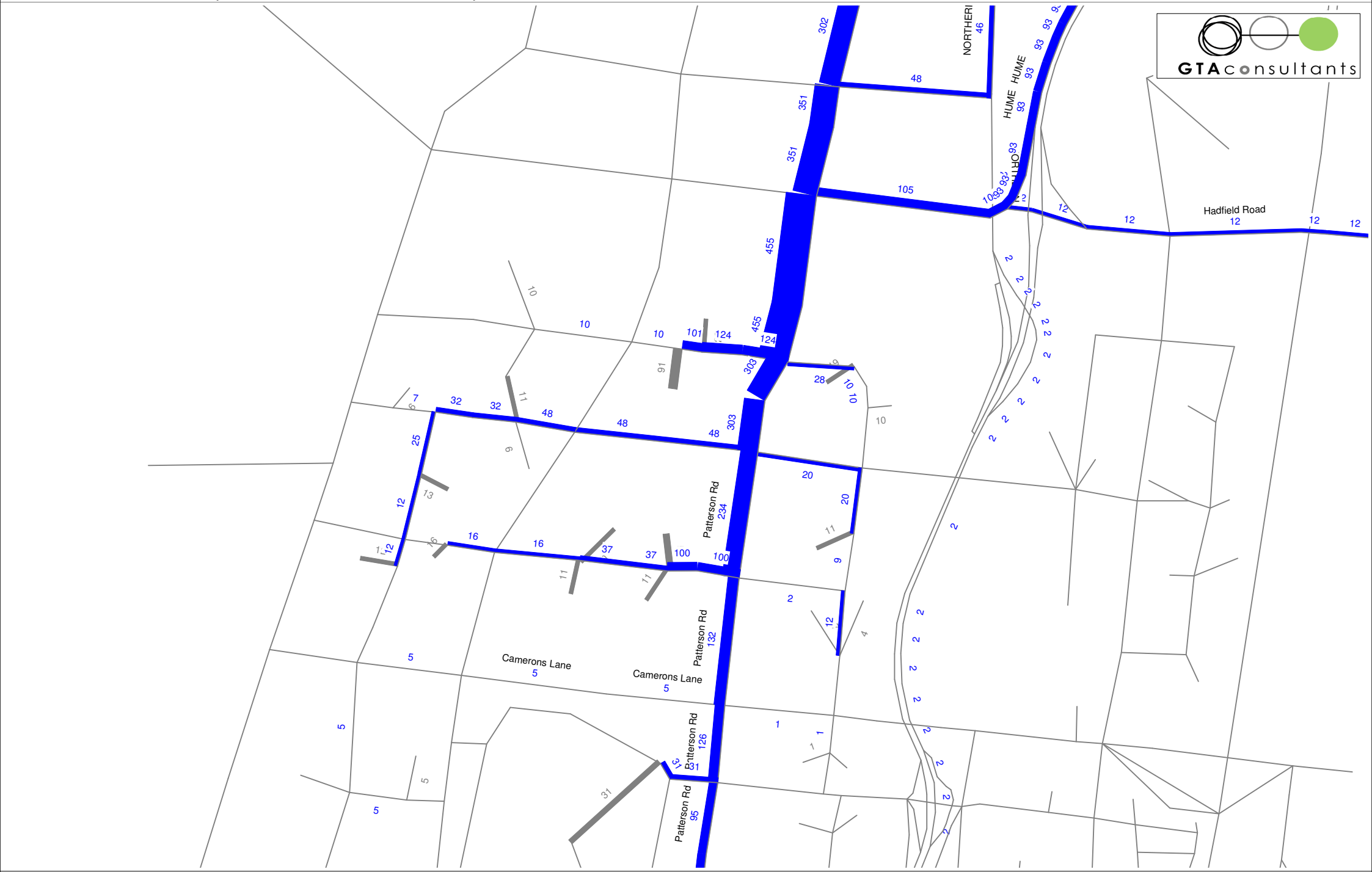
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd NB year 2026 Scenario 3



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VITM Northern Growth Corridor Model
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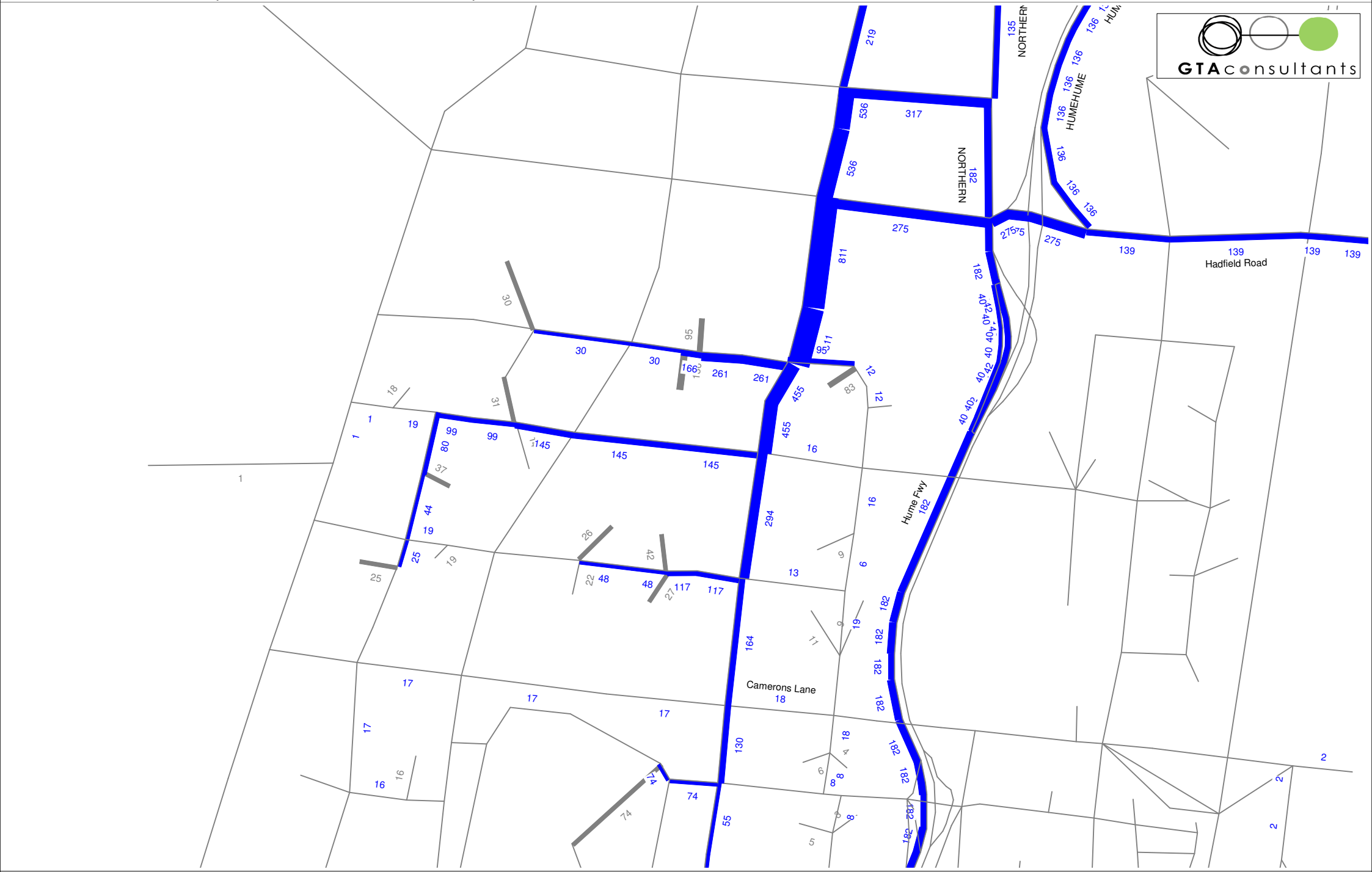

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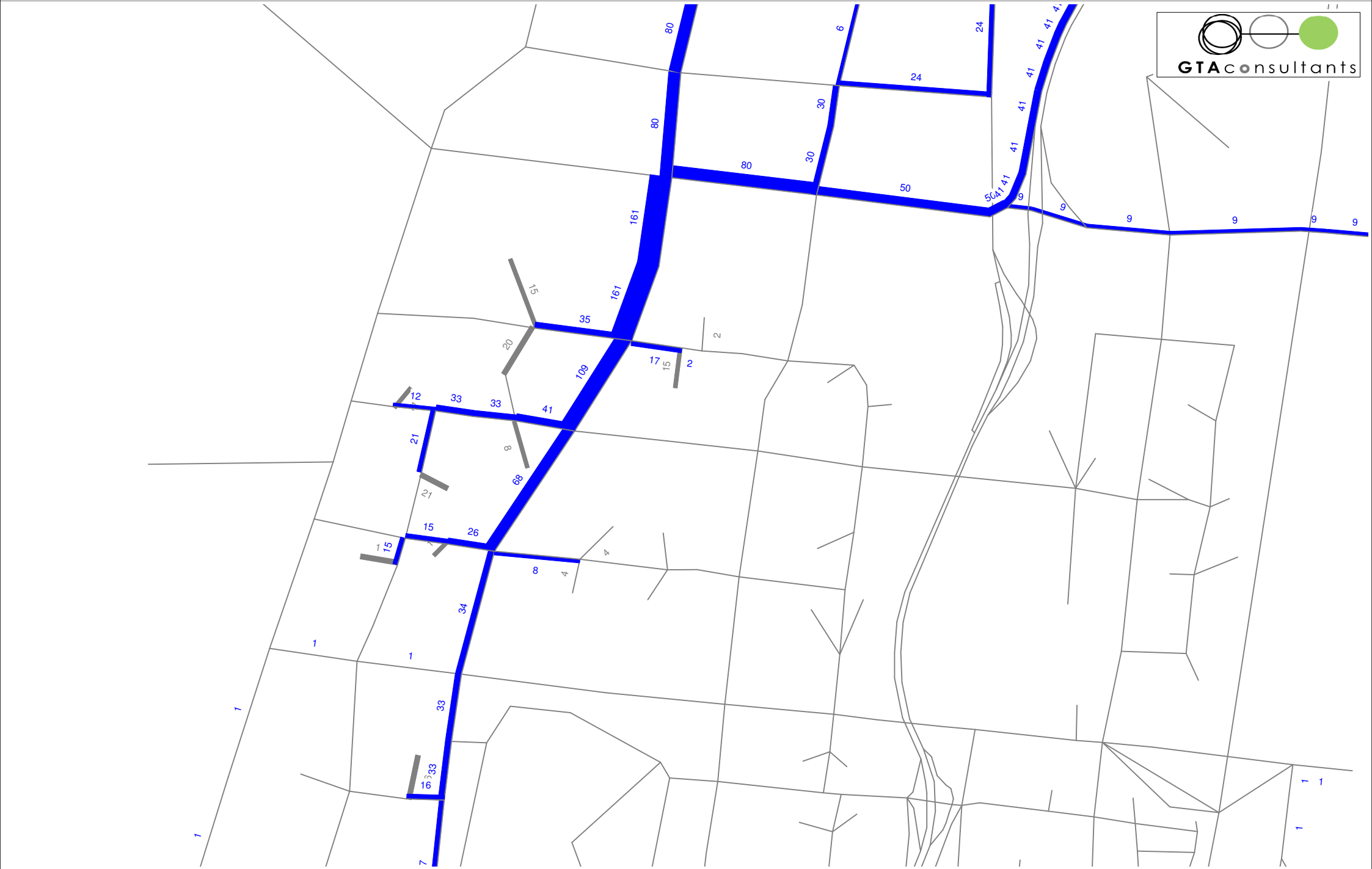
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 4



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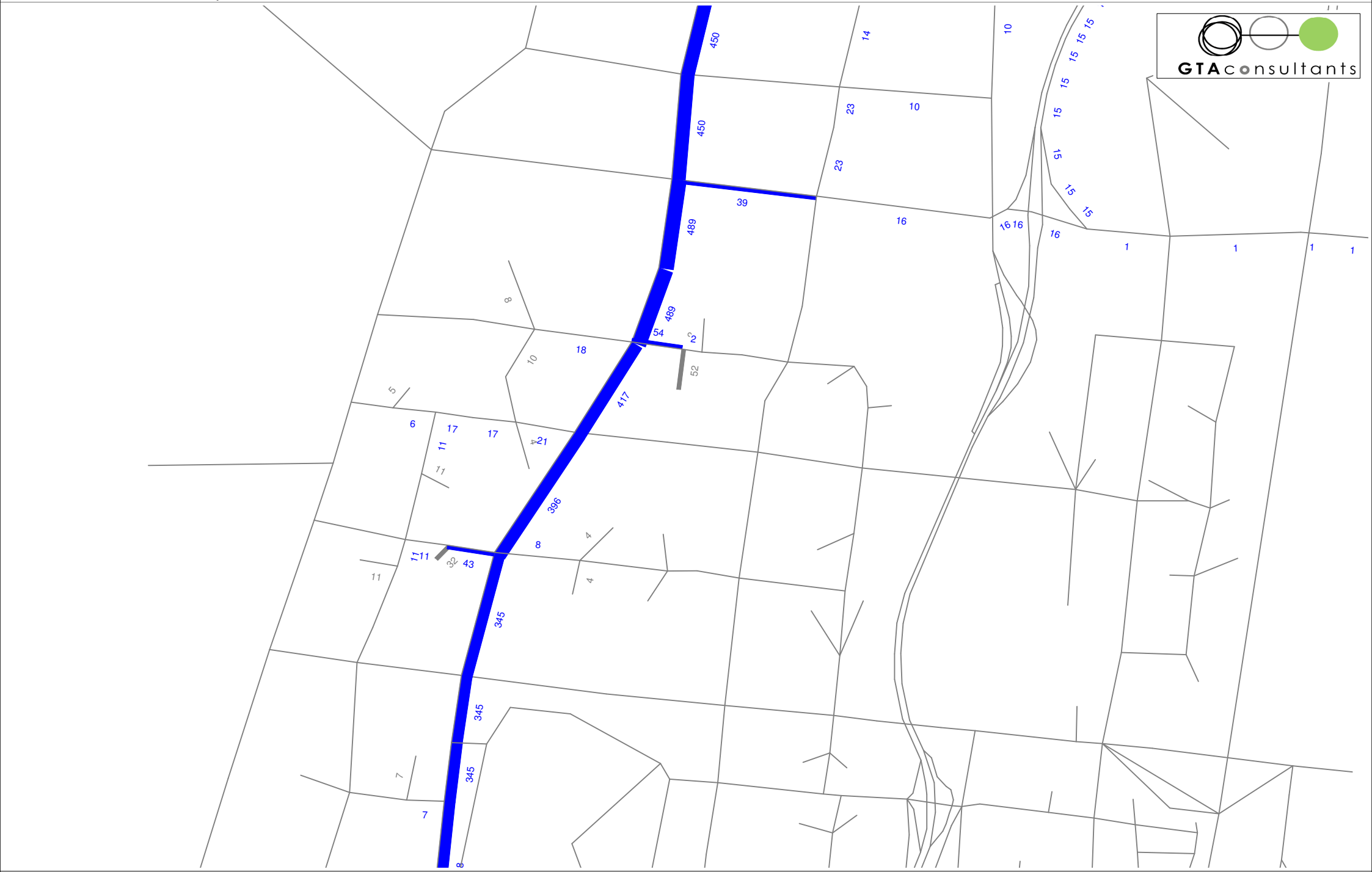
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 4



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7/25/2014

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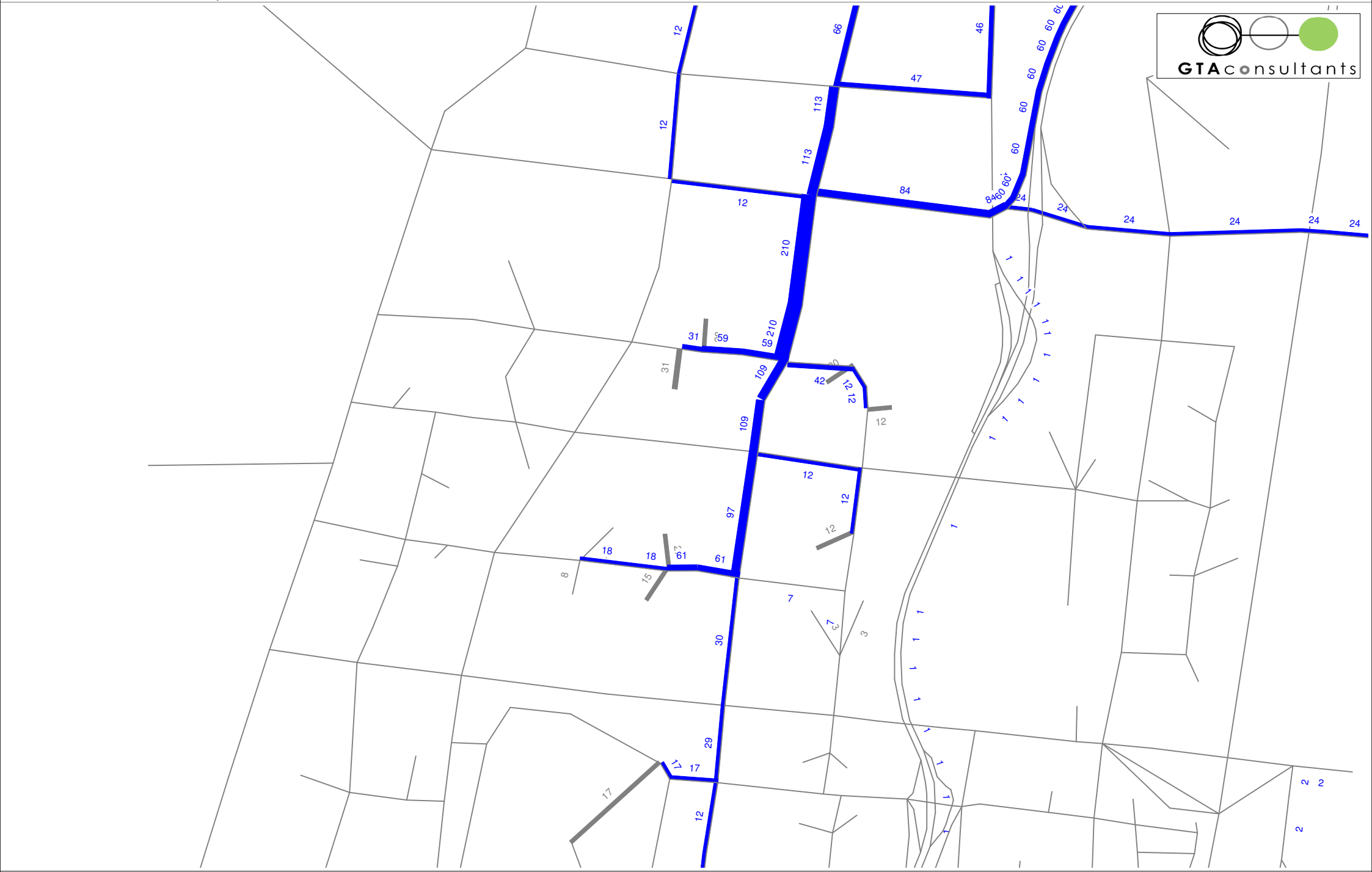
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2026 Scenario 4



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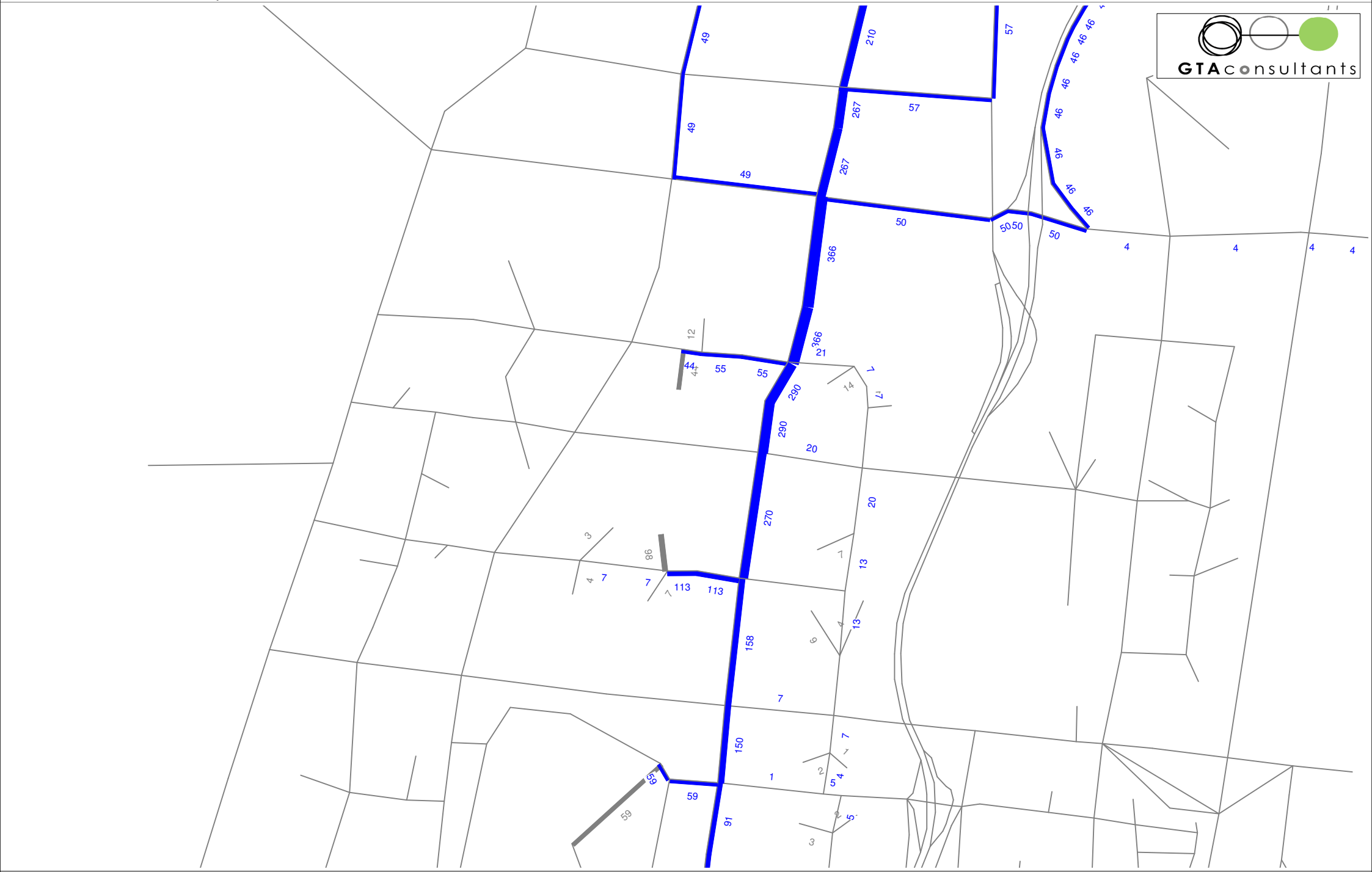
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2026 Scenario 4



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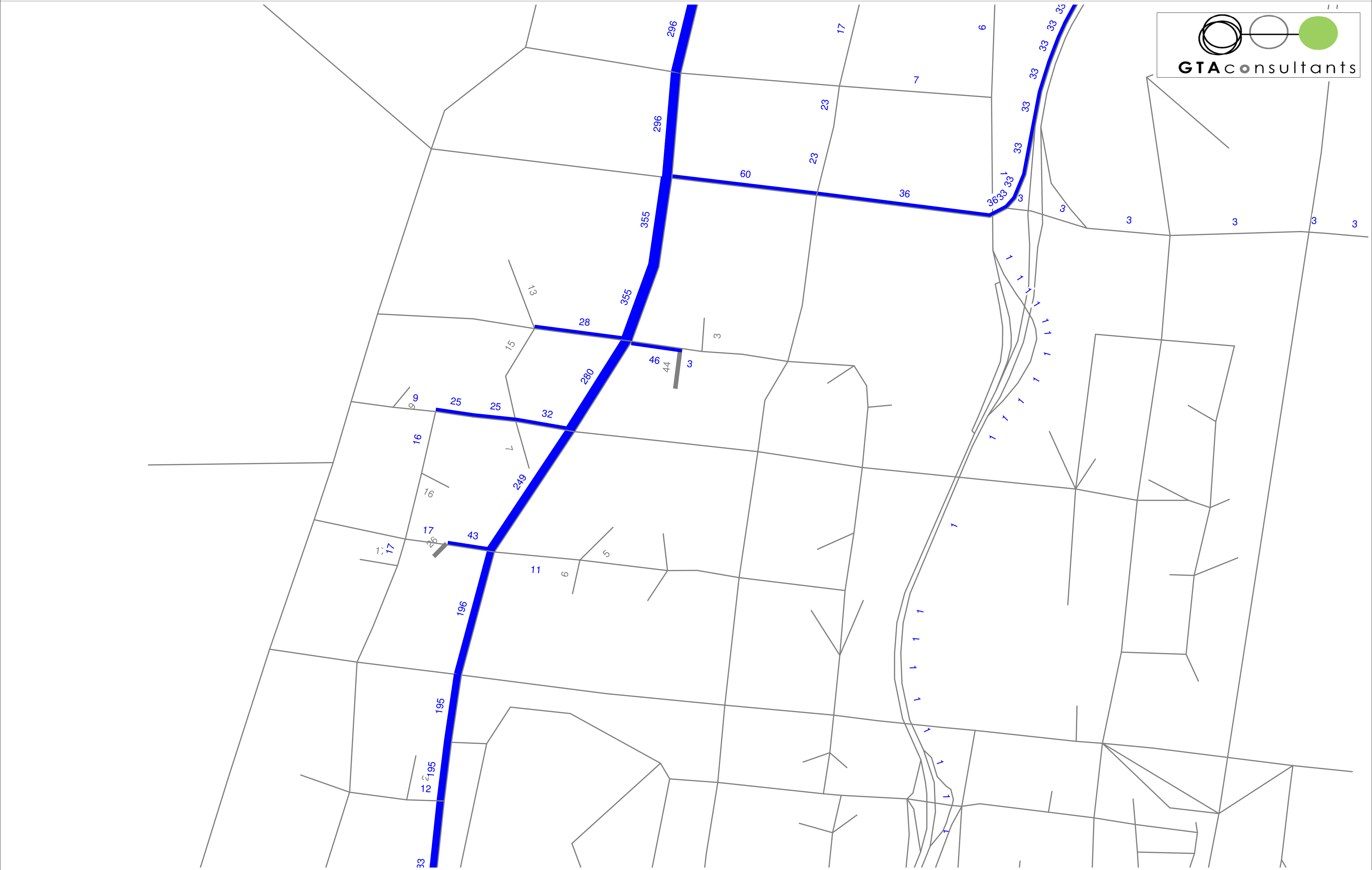
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 4



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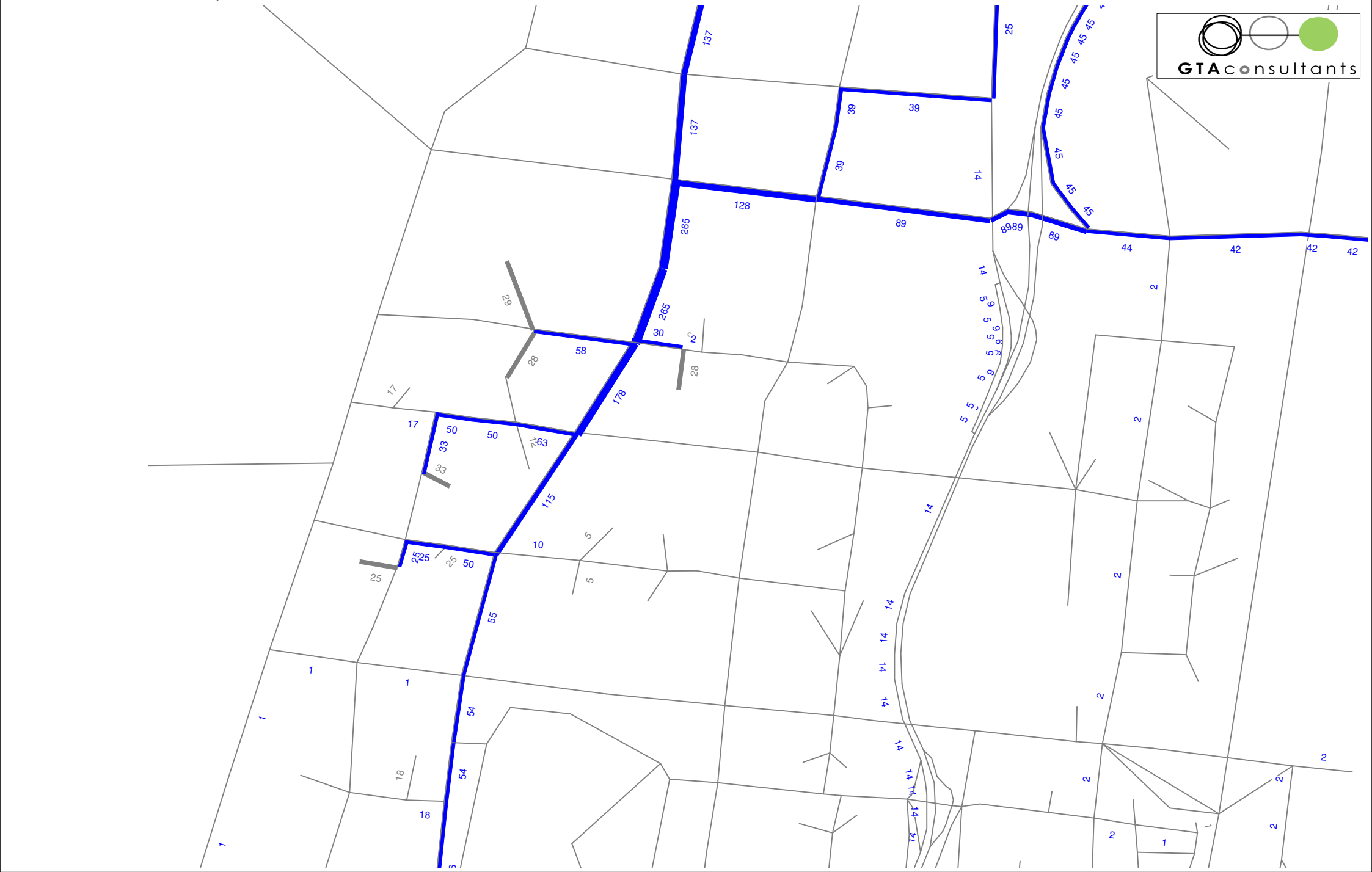
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 4



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26/07/2014

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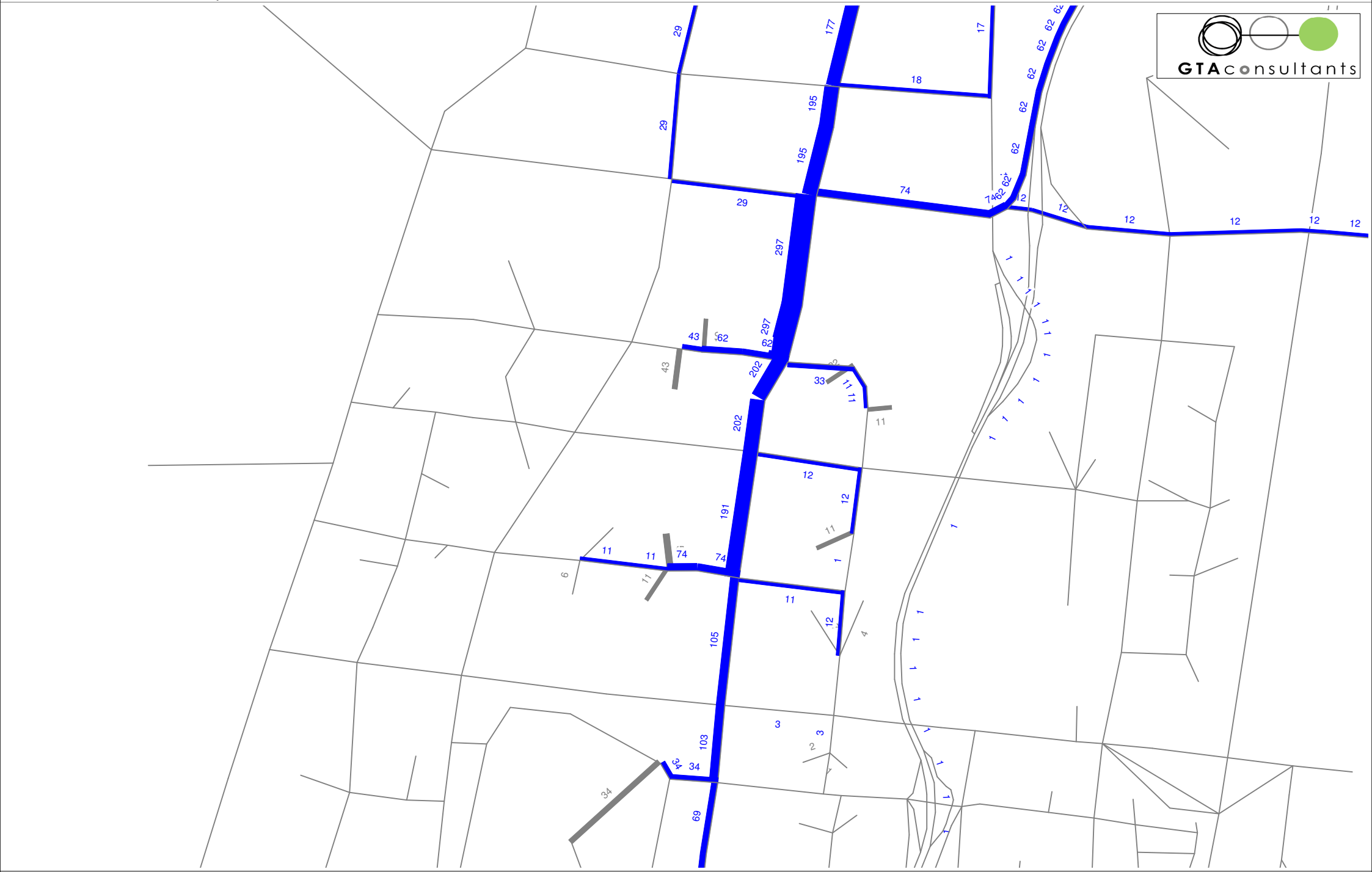
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd NB Year 2026 Scenario 4



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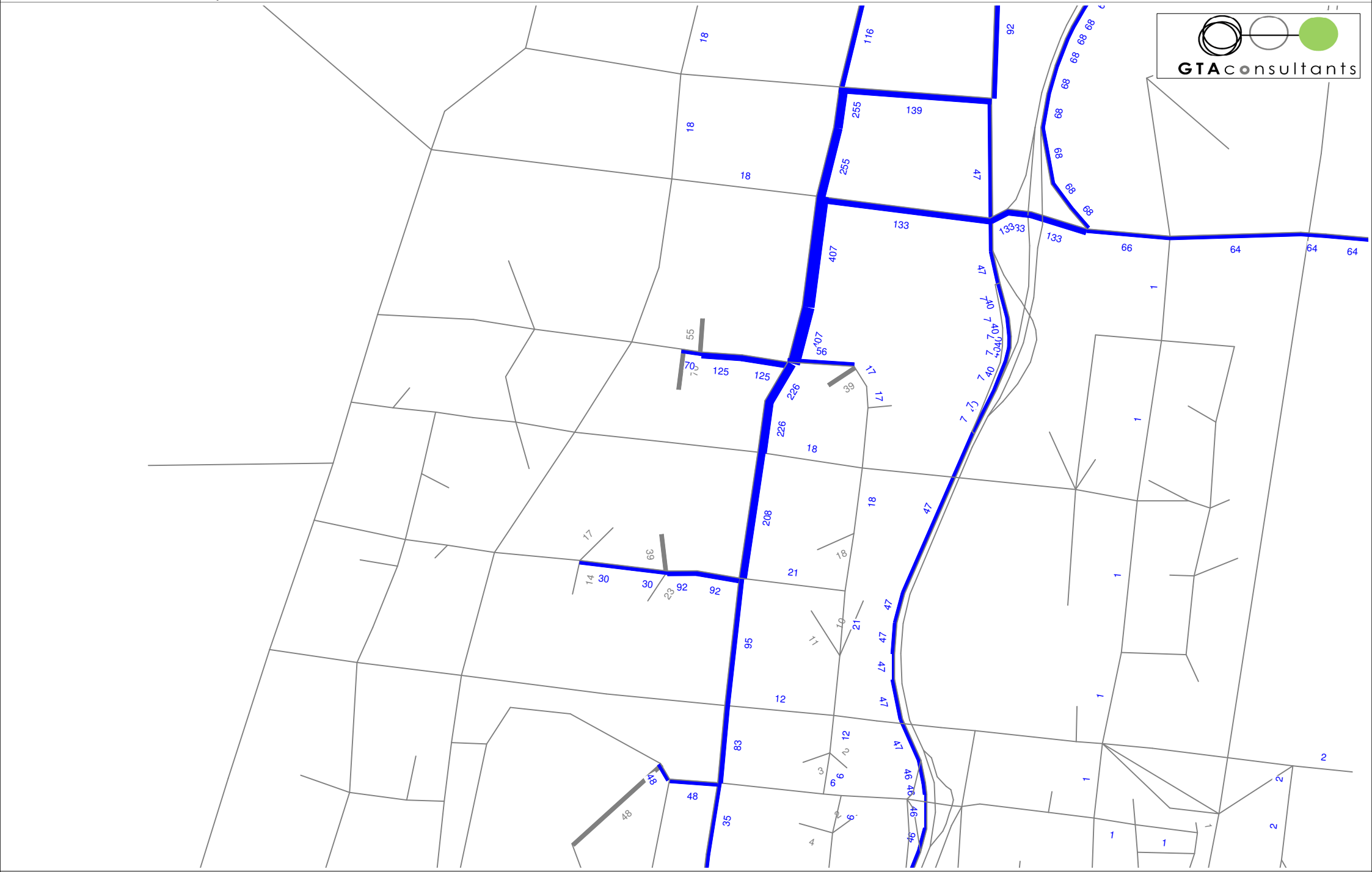
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd SB Year 2026 Scenario 4



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VITM Northern Growth Corridor Model
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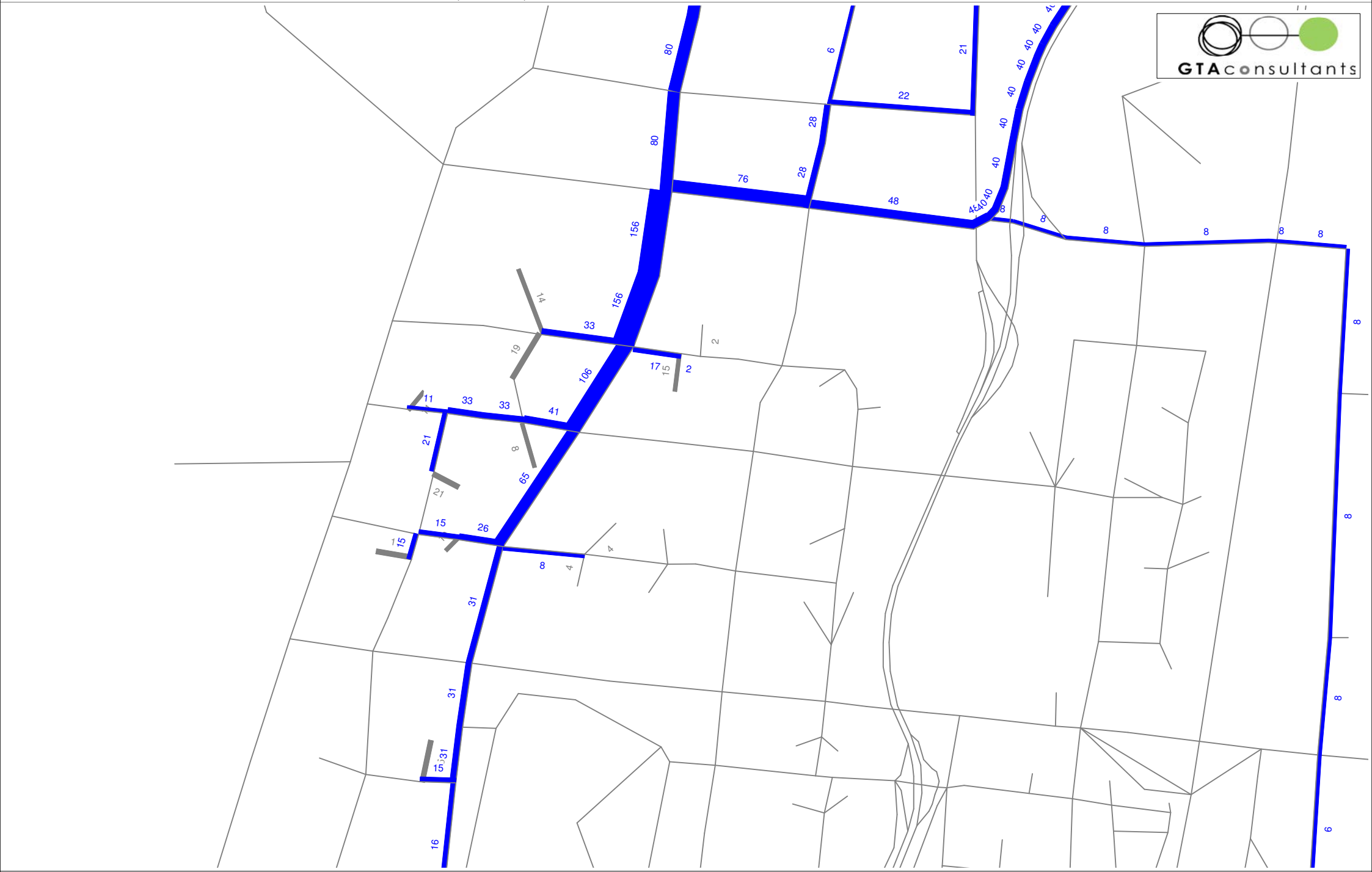

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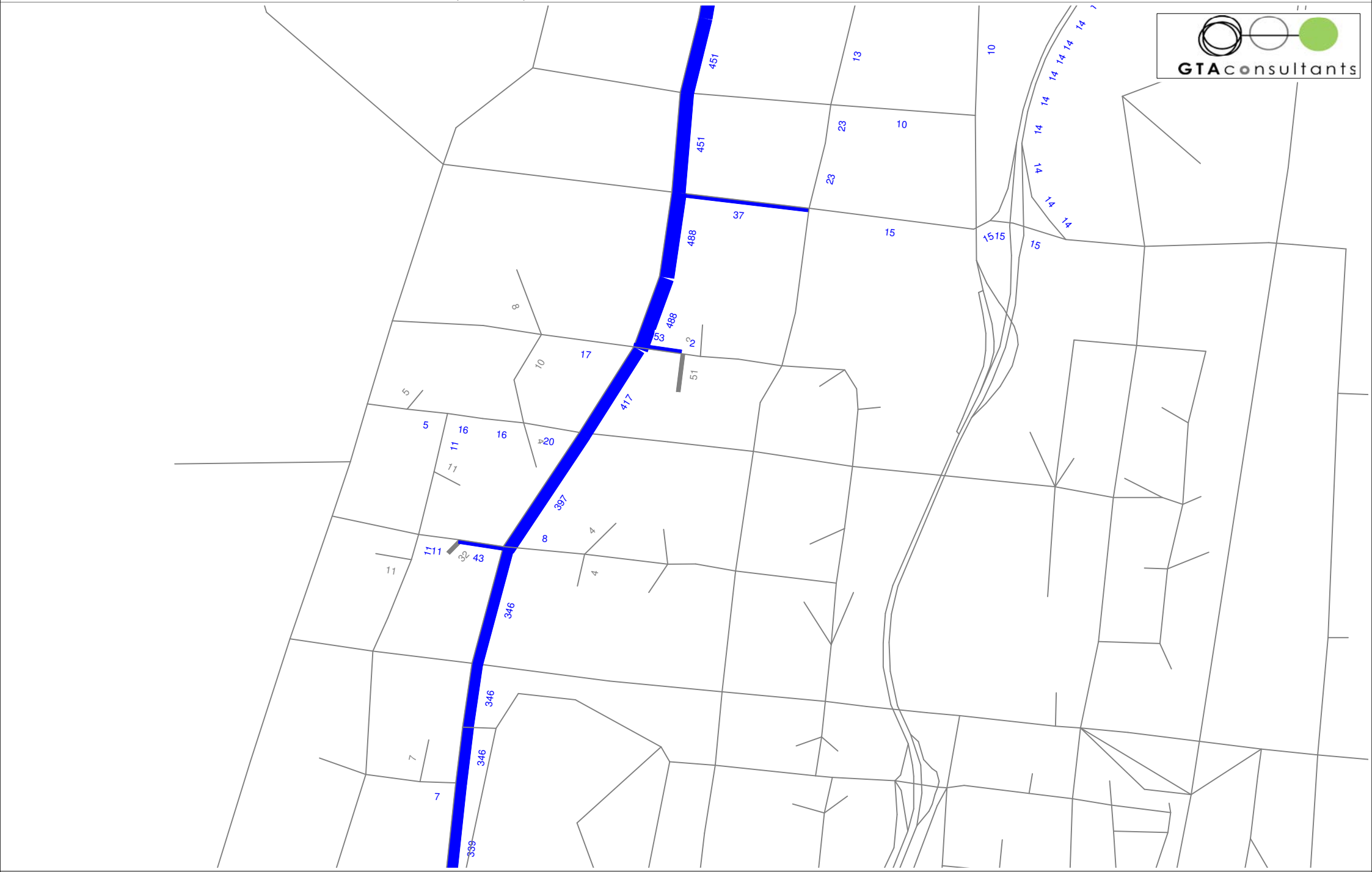
VITM Northern Growth Corridor Model
14M2340000 - AM SLA E14 south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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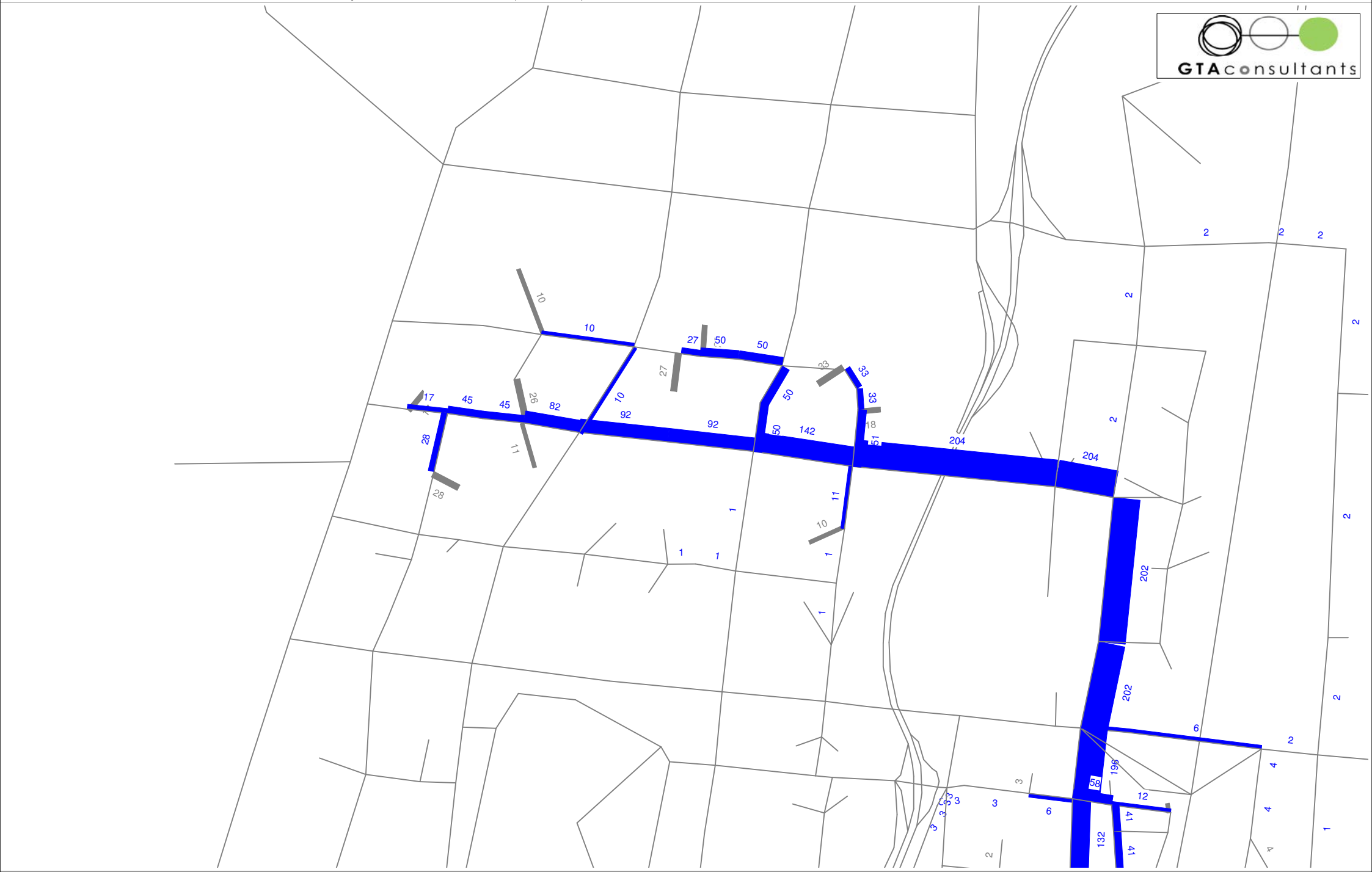
VITM Northern Growth Corridor Model
14M2340000 - AM SLA East West Connector at Hume Hwy EB Year 2026 Scenario 1 (Base Case)



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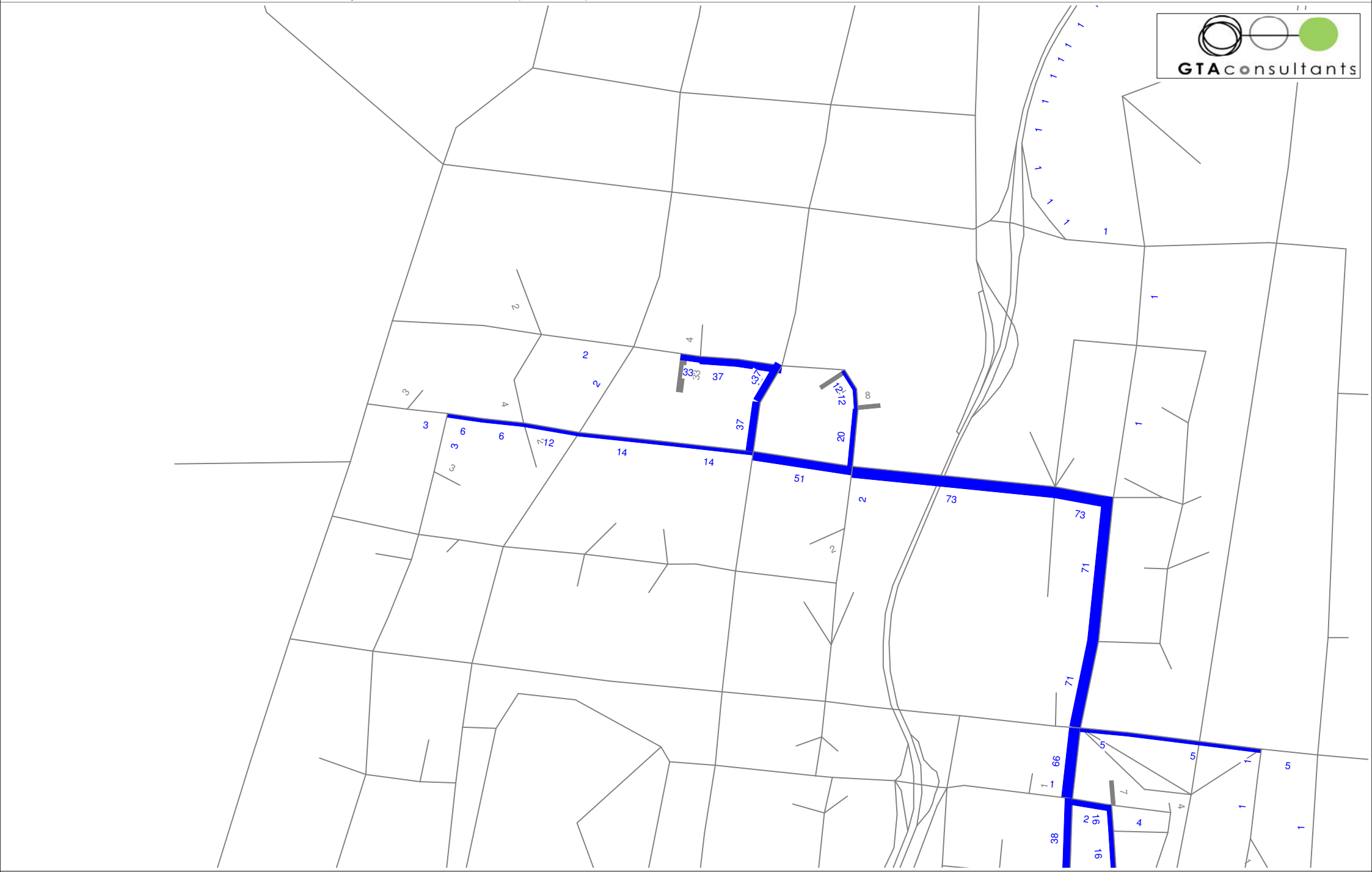
21/07/2014

VITM Northern Growth Corridor Model
14M2340000 - AM SLA East West Connector at Hume Hwy WB Year 2026 Scenario 1 (Base Case)



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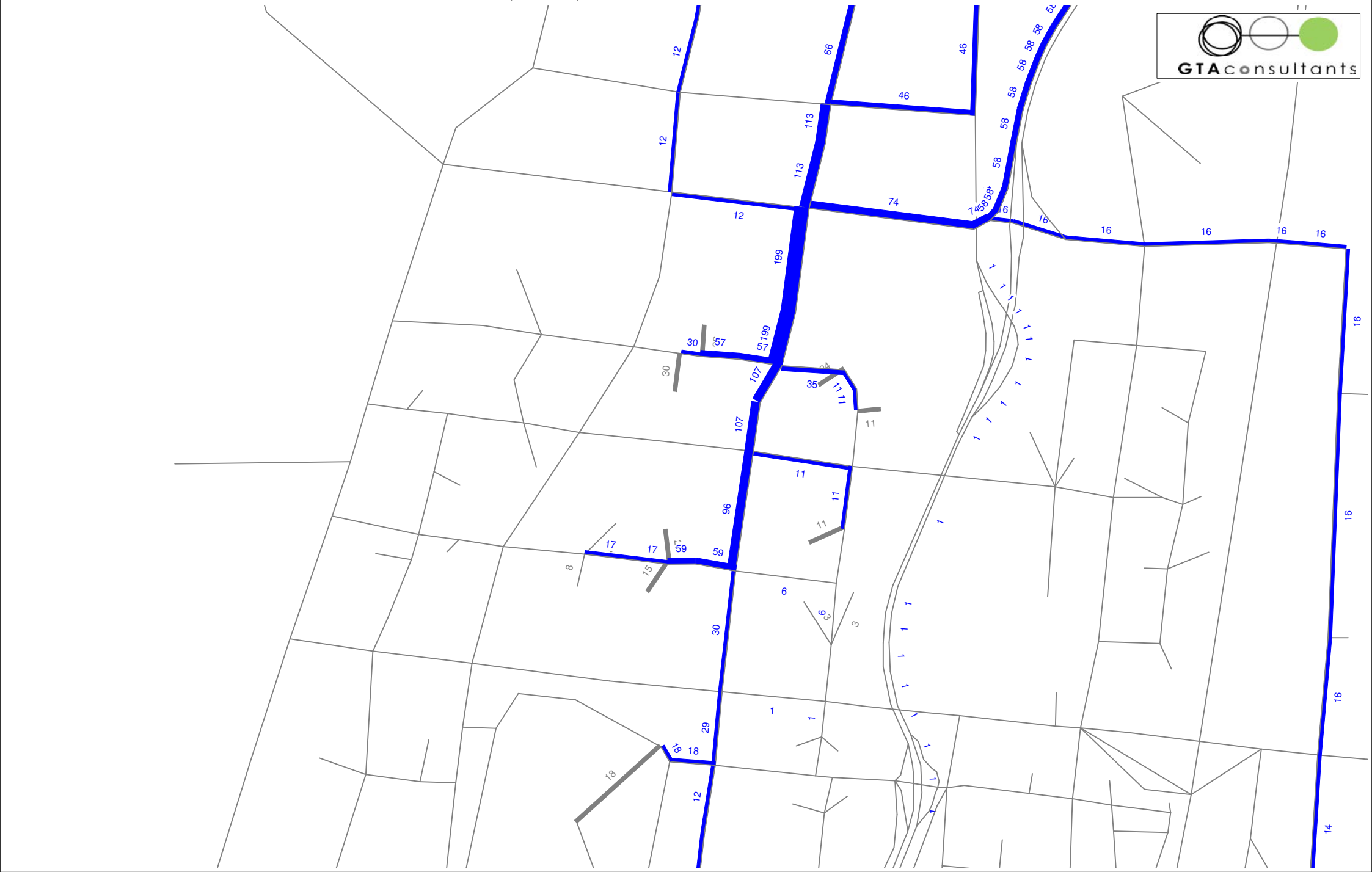
VITM Northern Growth Corridor Model
14M2340000 - AM SLA Patterson Rd south of Stocdale Rd NB Year 2026 Scenario 1 (Base Case)



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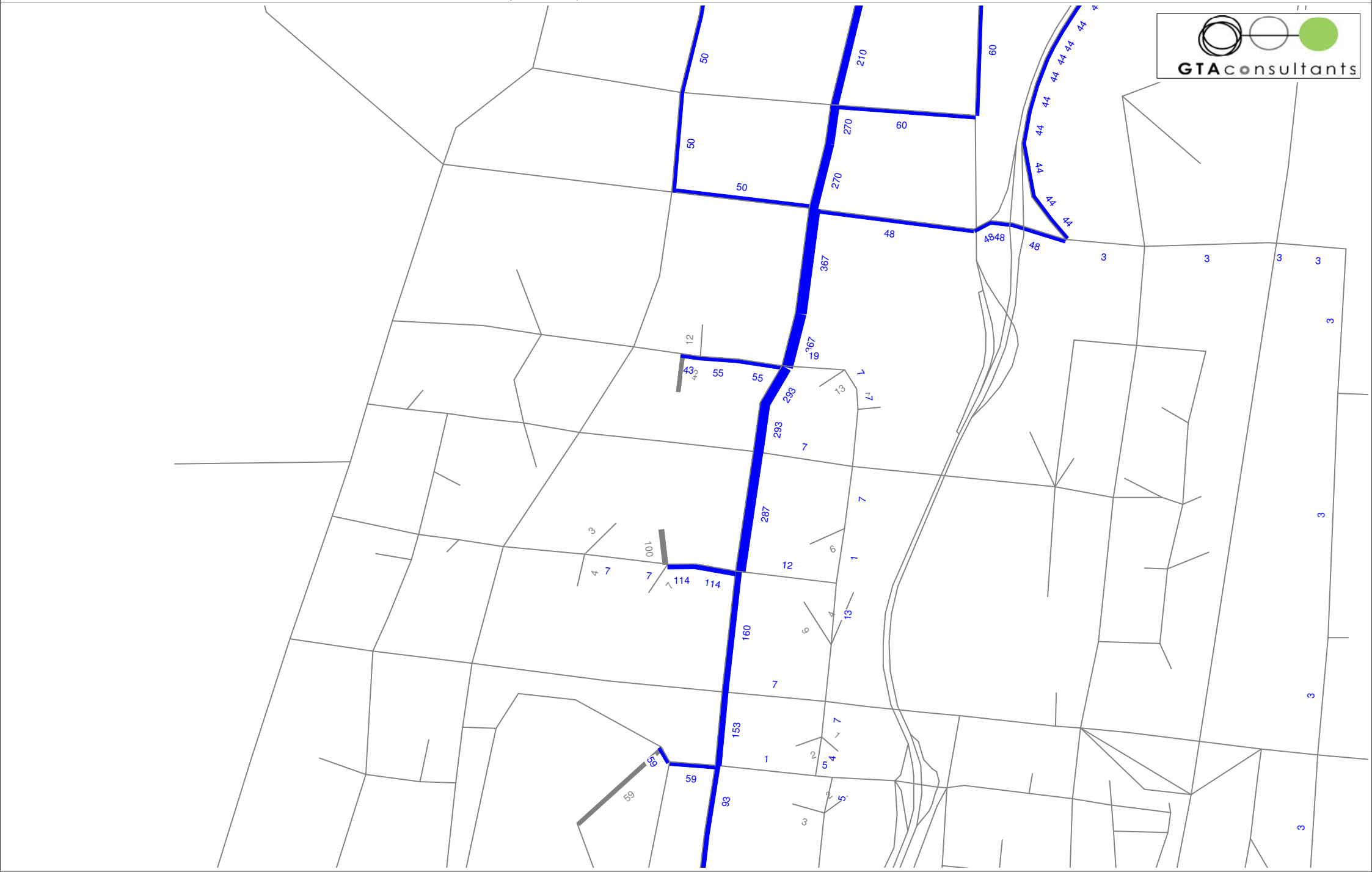
VITM Northern Growth Corridor Model
14M2340000 - AM SLA Patterson Rd south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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21/07/2014

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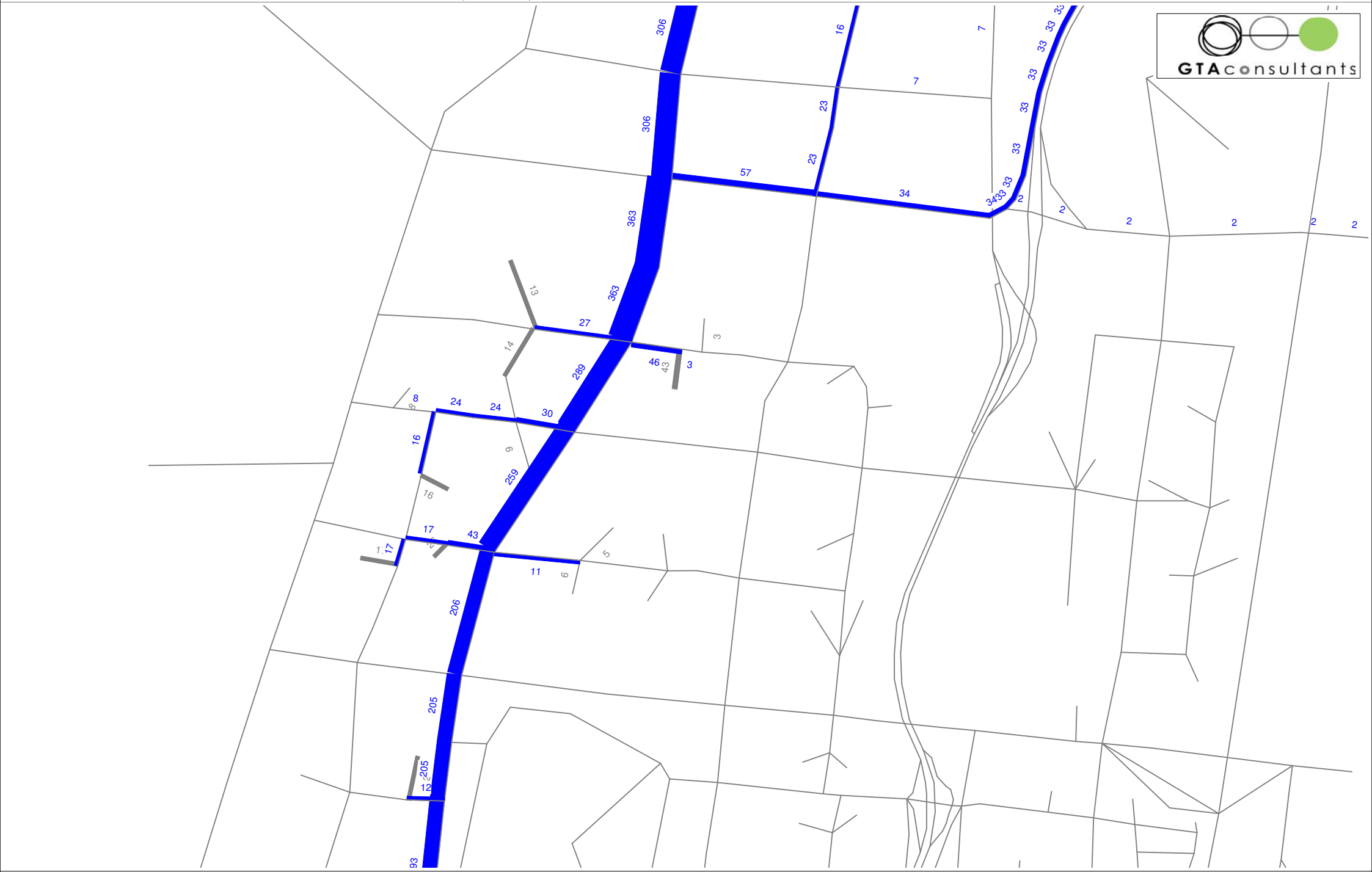
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of E14 NB Year 2026 Scenario 1 (Base Case)



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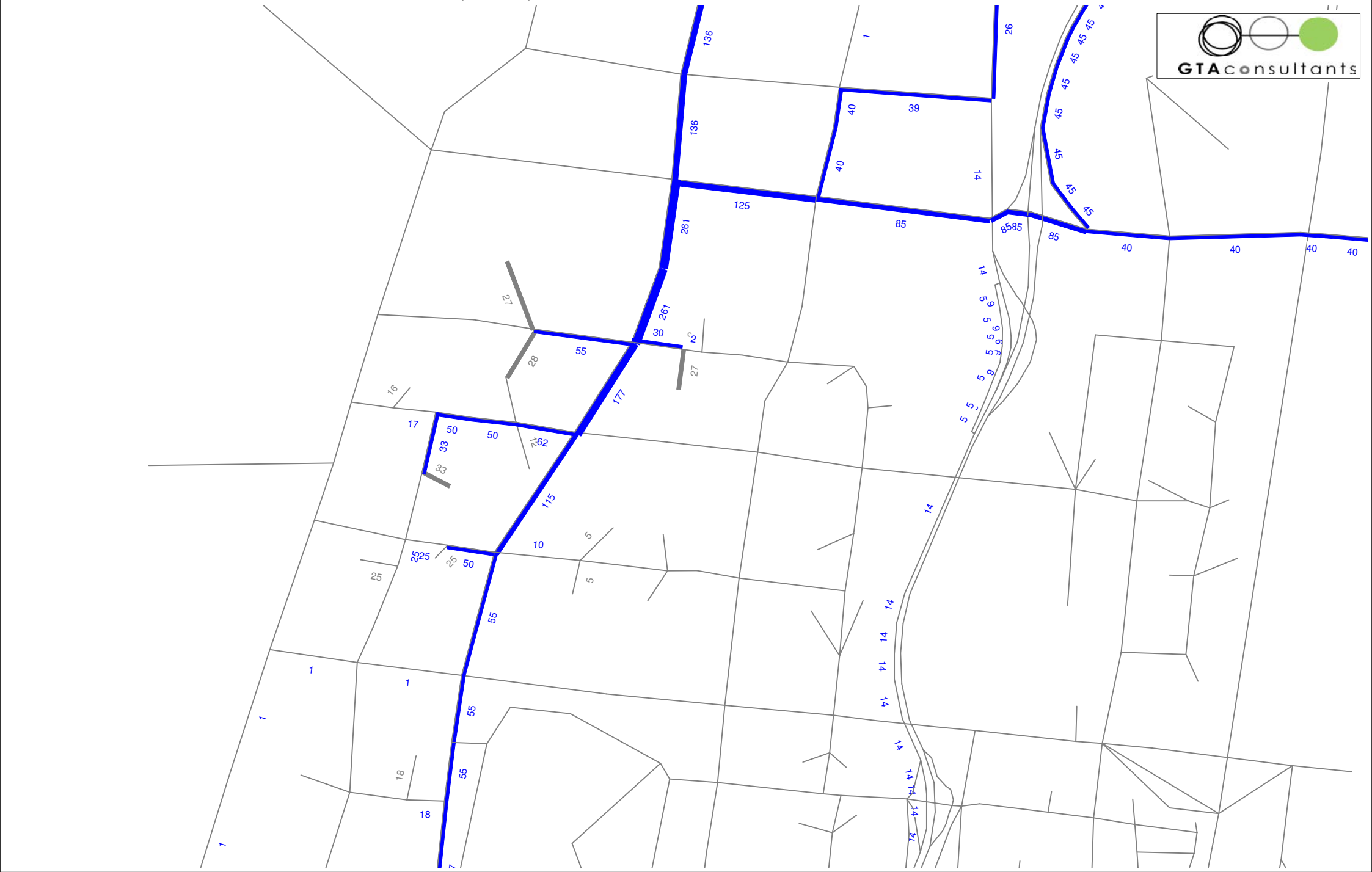
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of E14 SB Year 2026 Scenario 1 (Base Case)



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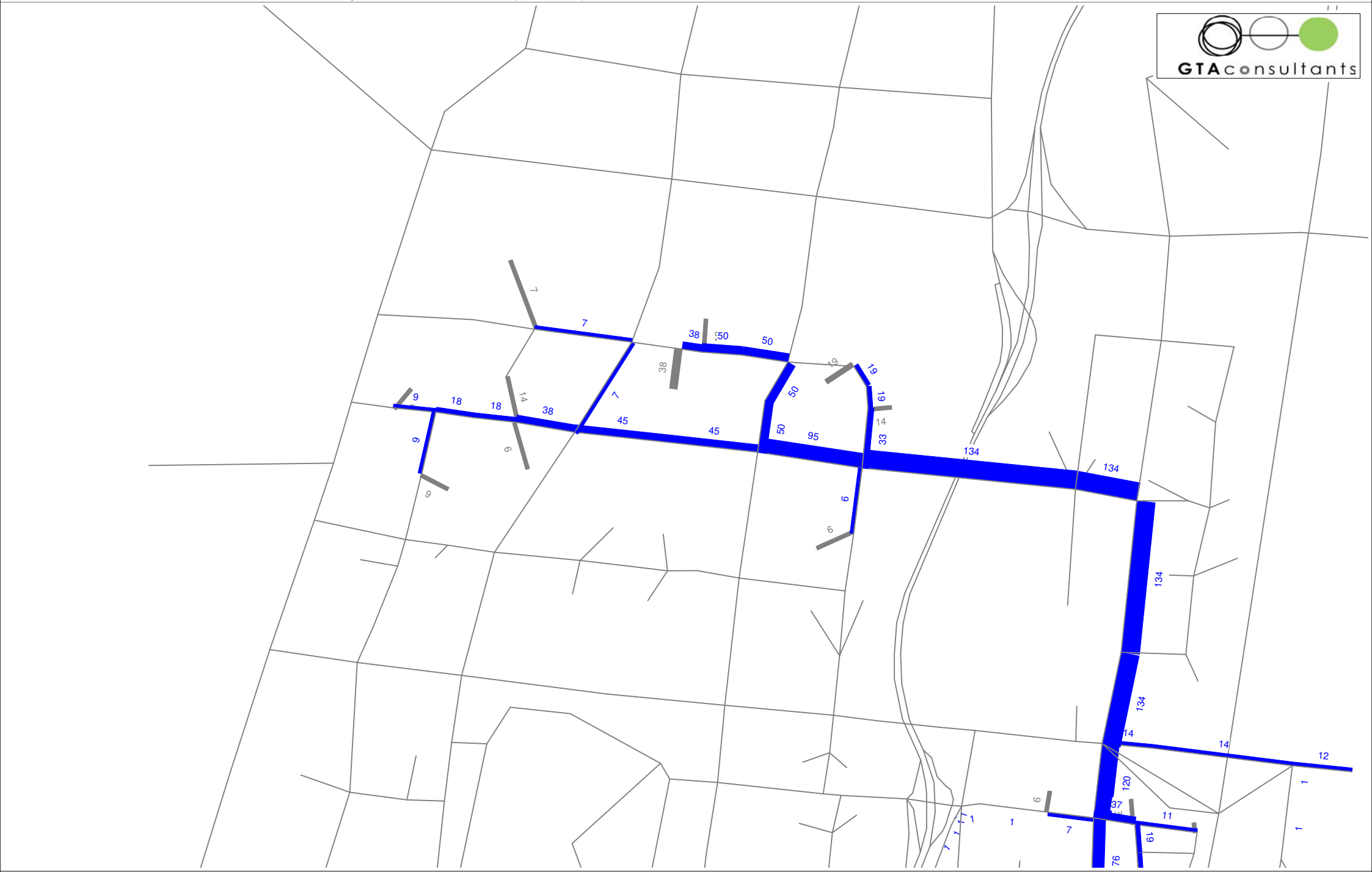
VITM Northern Growth Corridor Model
14M2340000 - PM SLA East West Connector at Hume Hwy EB Year 2026 Scenario 1 (Base Case)



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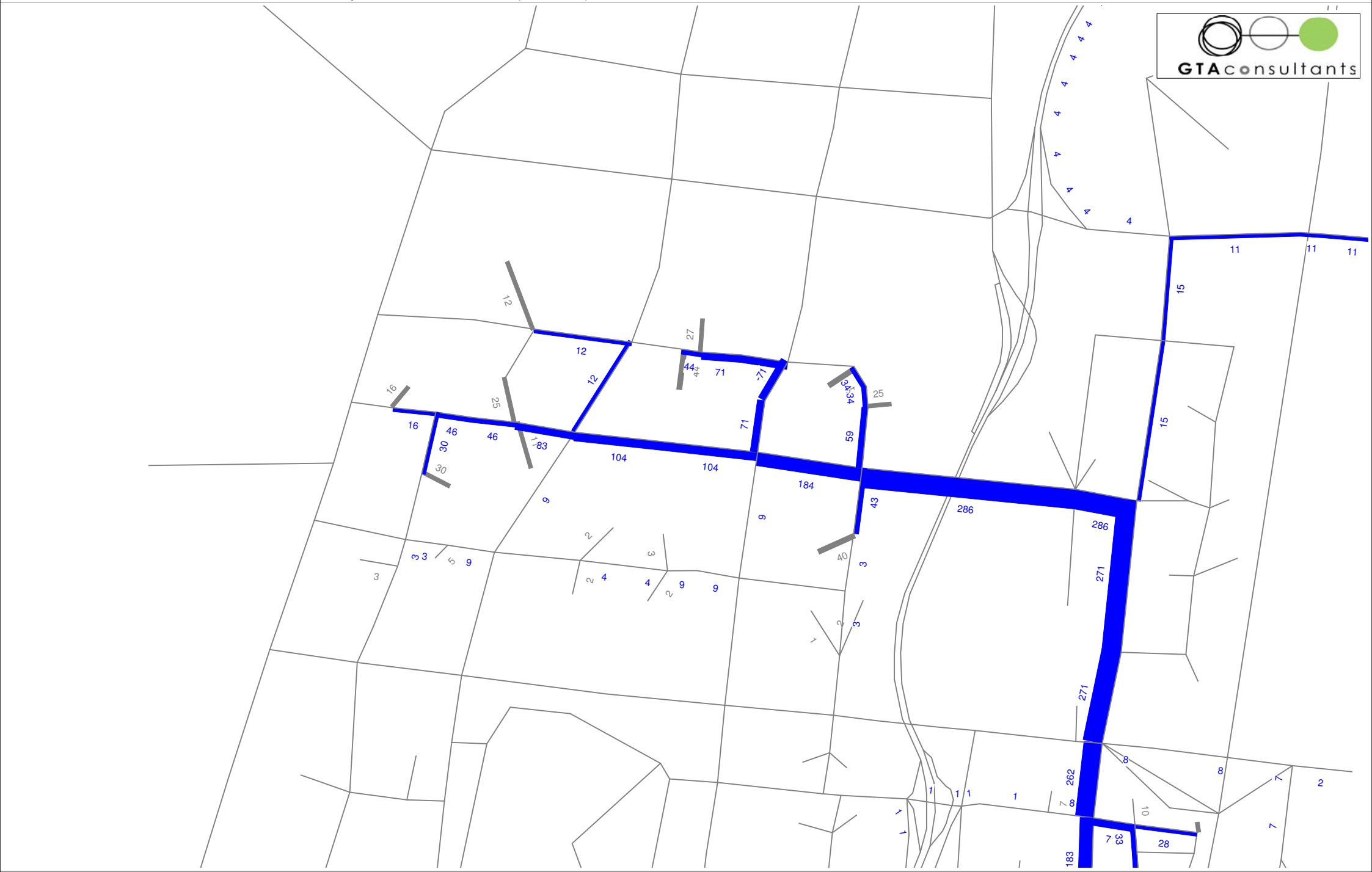
VITM Northern Growth Corridor Model
14M2340000 - PM SLA East West Connector at Hume Hwy WB Year 2026 Scenario 1 (Base Case)



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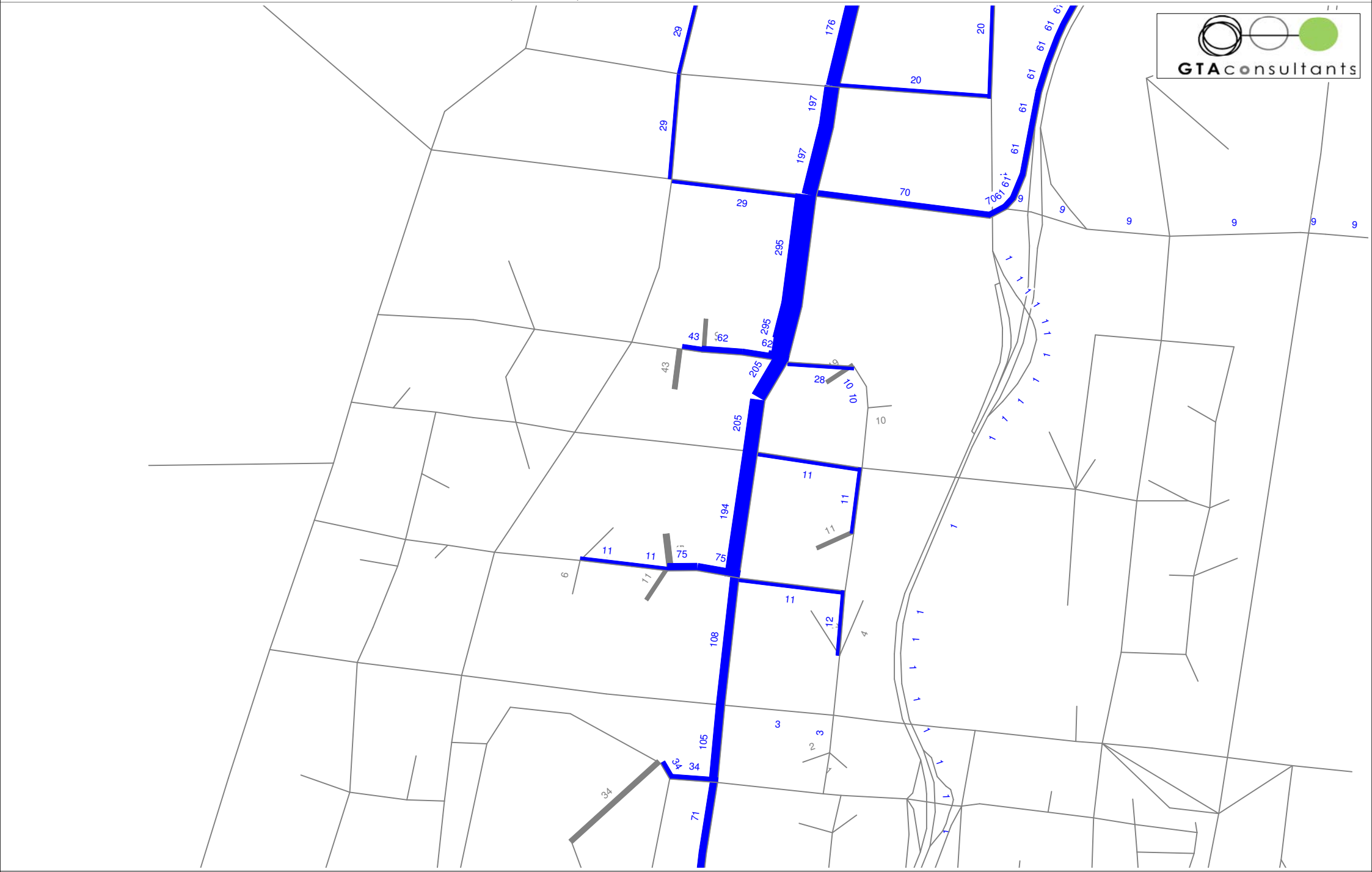
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of Stocdale Rd NB Year 2026 Scenario 1 (Base Case)



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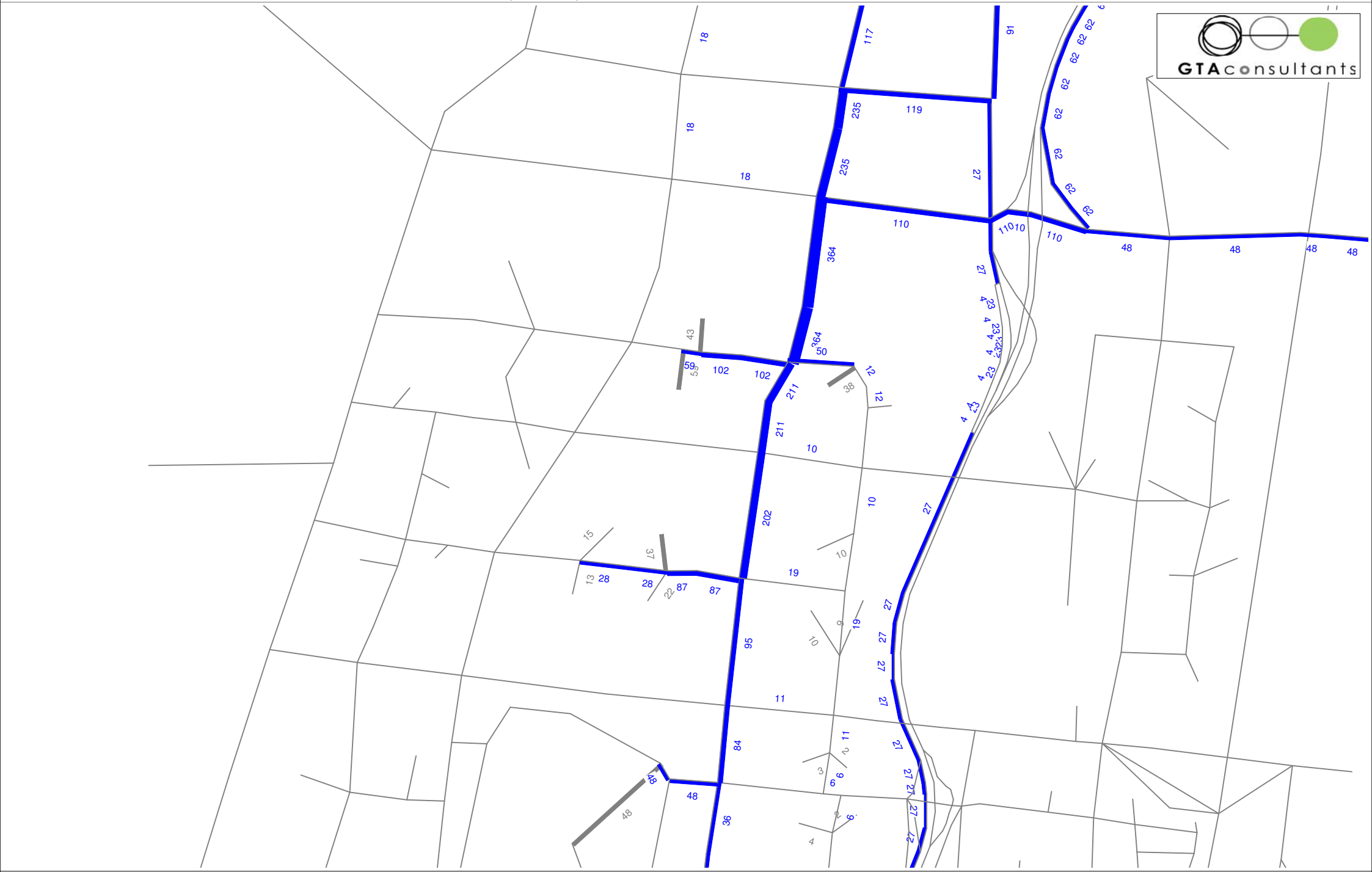
VITM Northern Growth Corridor Model
14M2340000 - PM SLA Patterson Rd south of Stocdale Rd SB Year 2026 Scenario 1 (Base Case)



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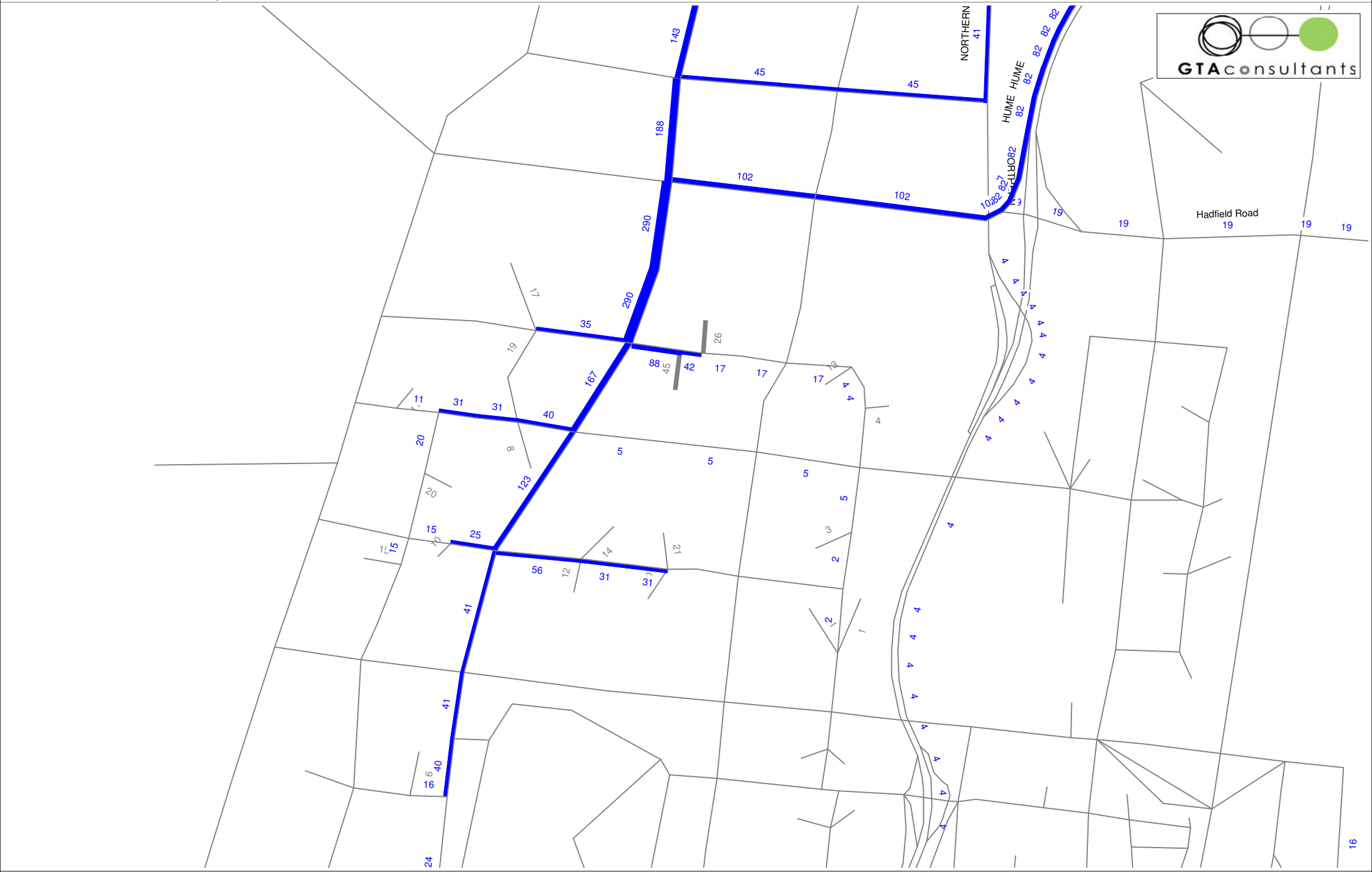
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 2



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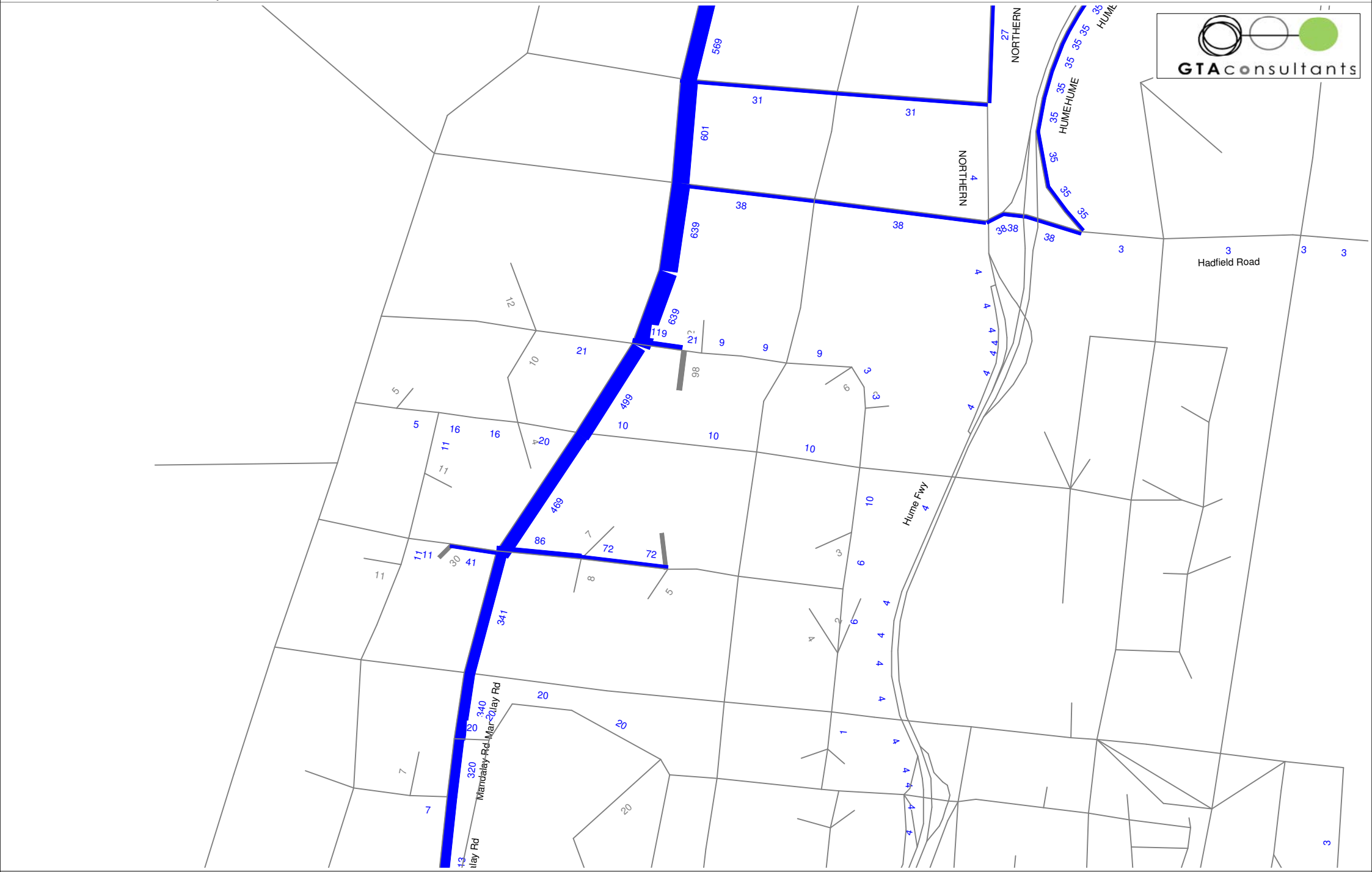
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 2



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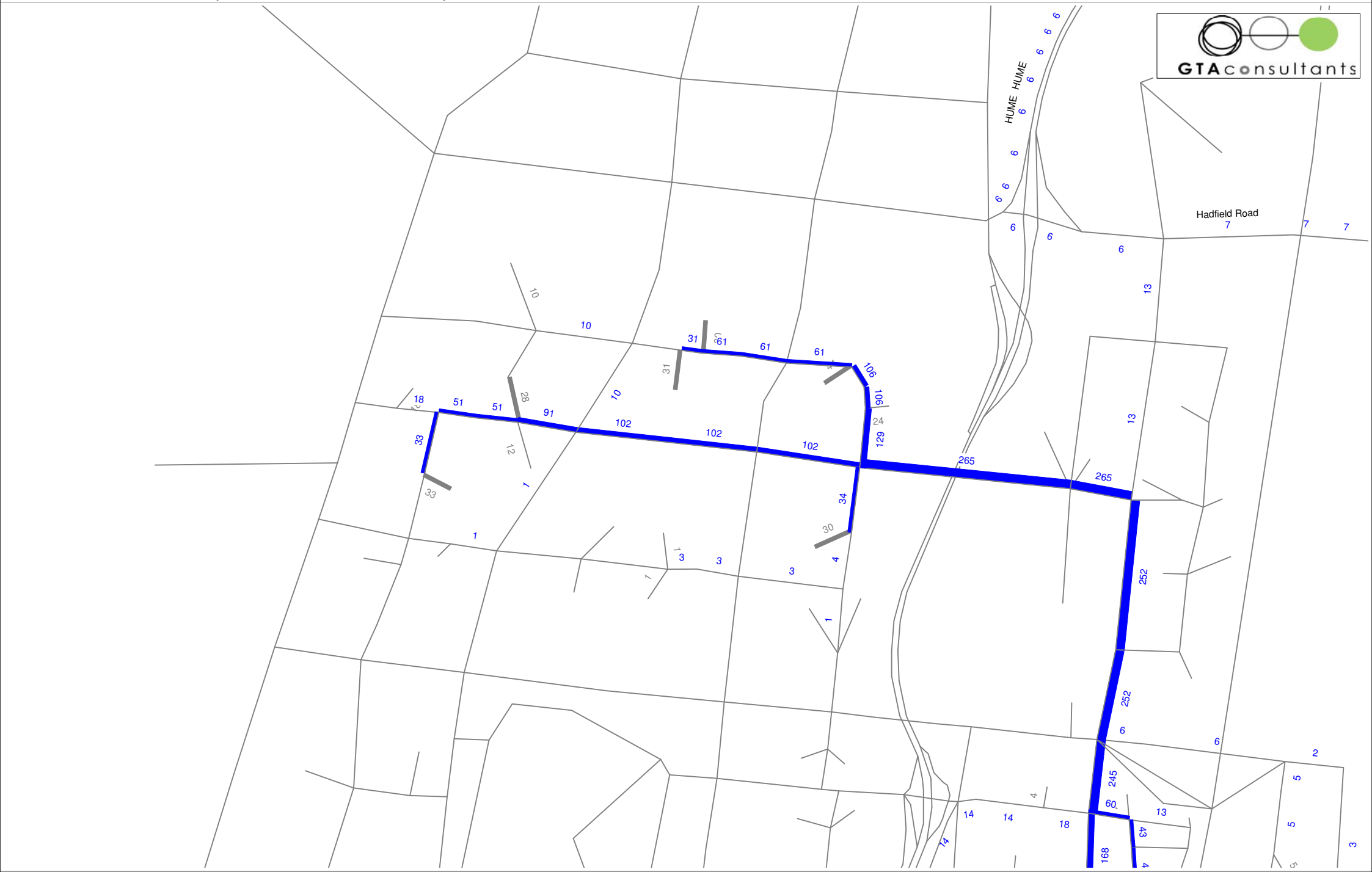
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 2



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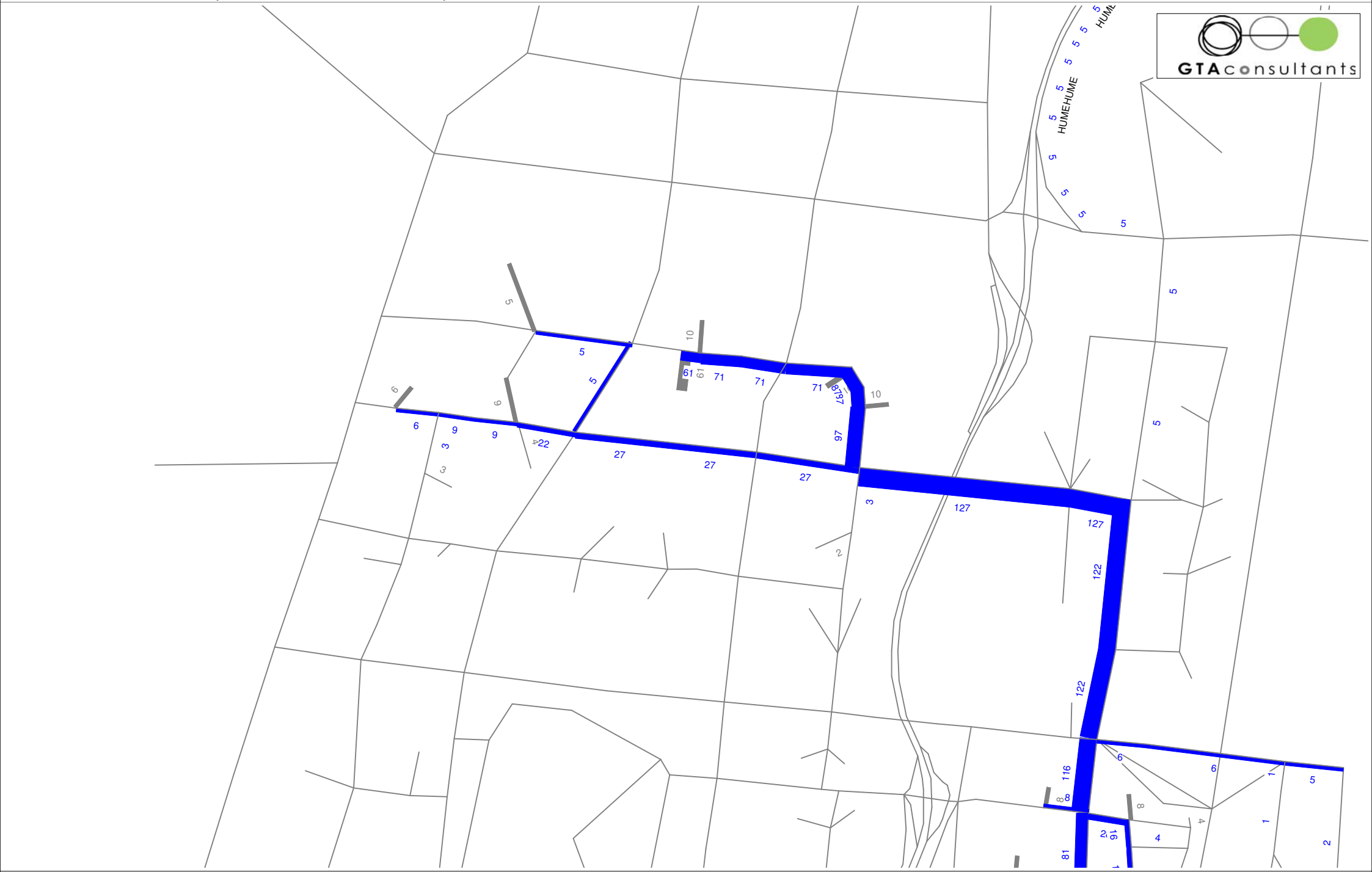
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 2



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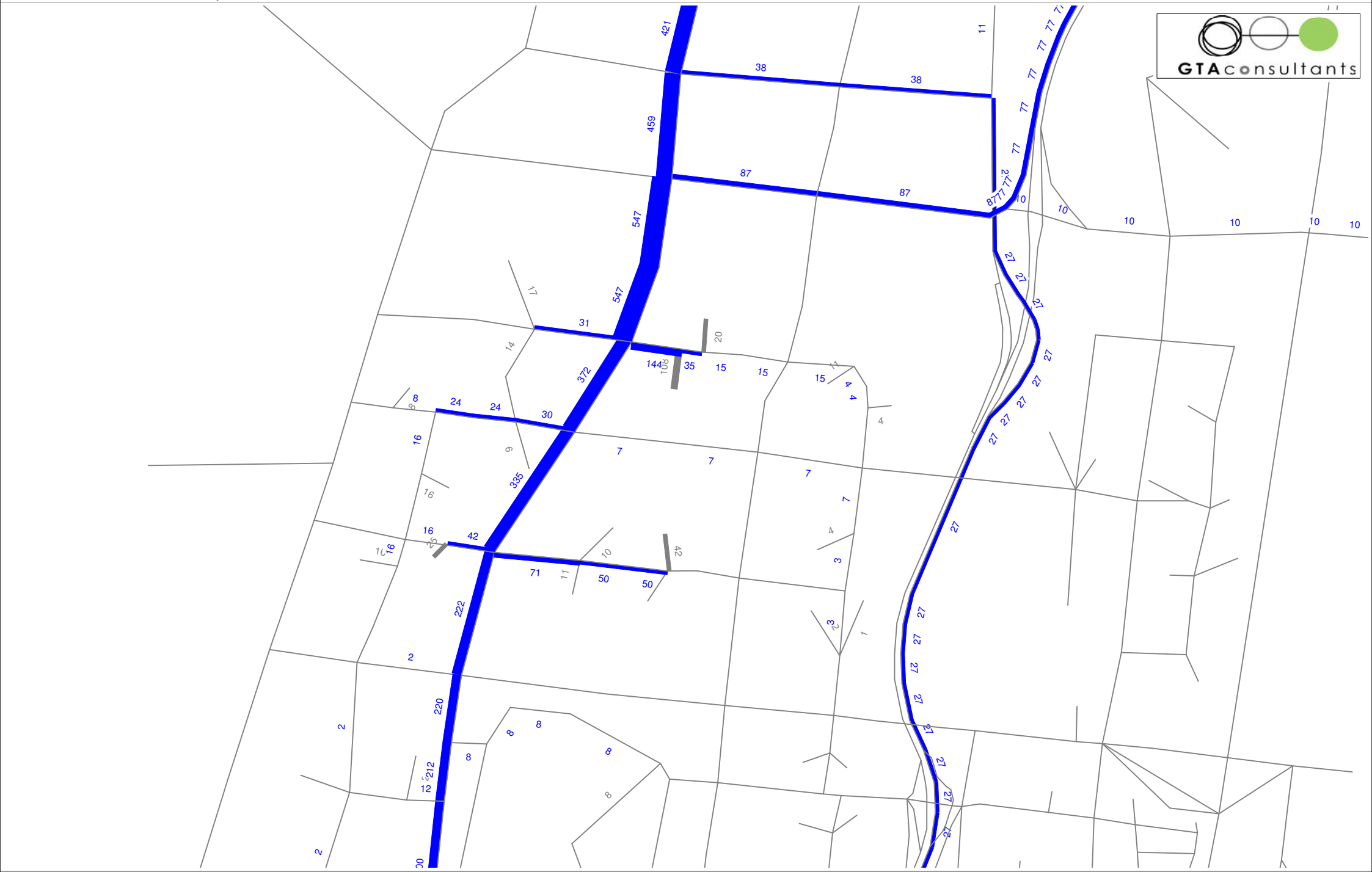
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 2



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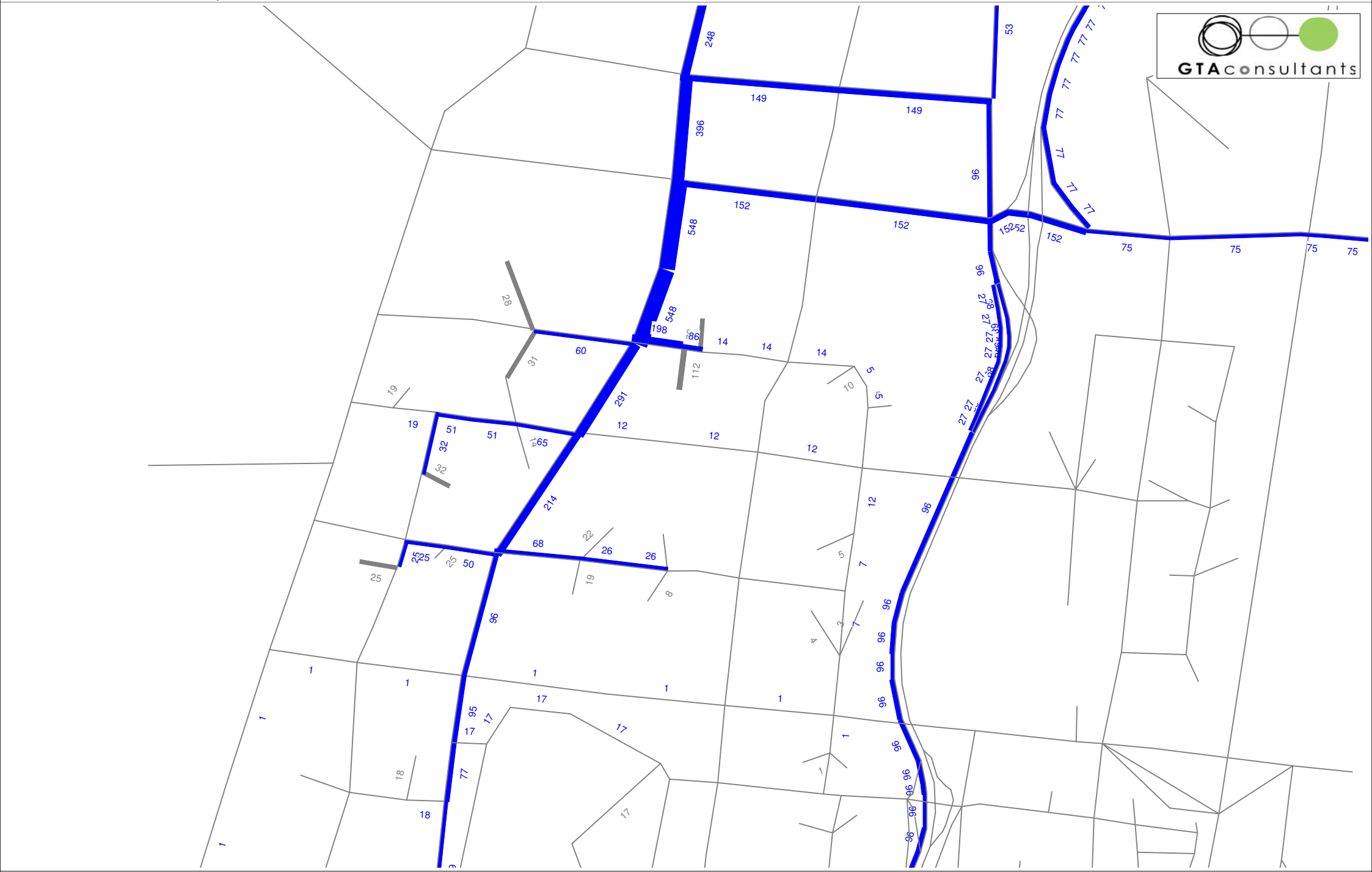
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 2



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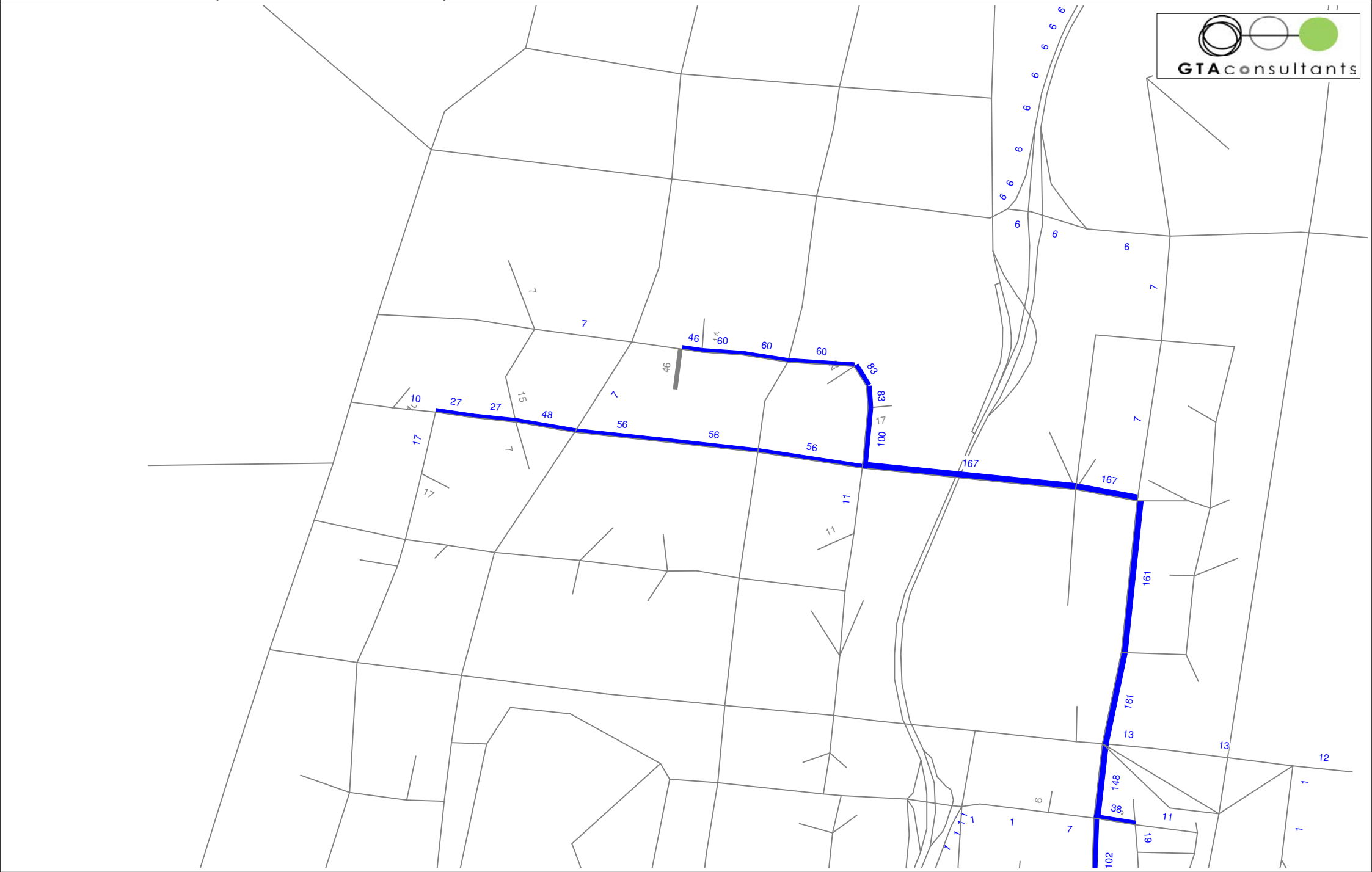
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 2



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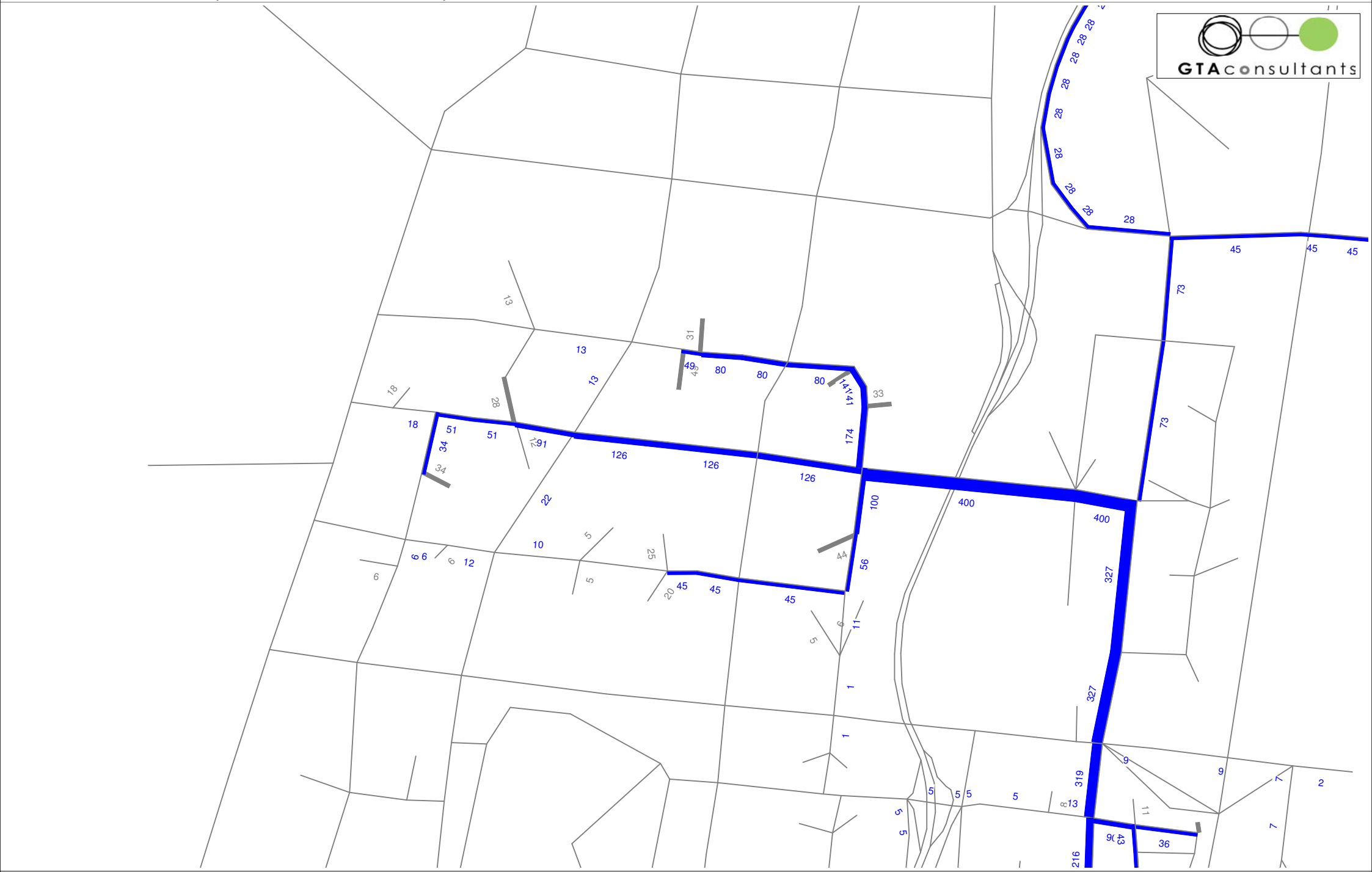
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 2



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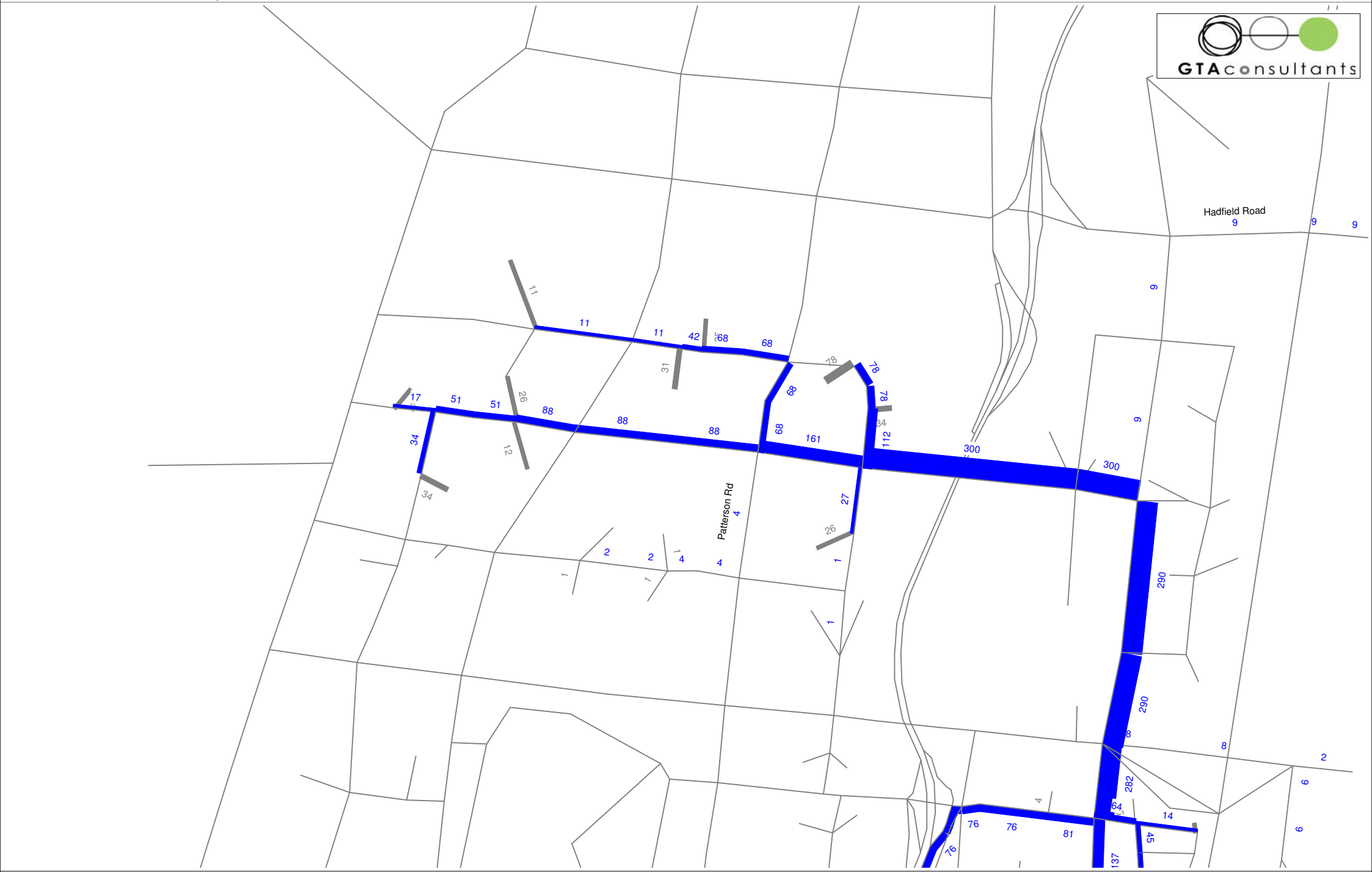
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector EB Year 2026 Scenario 3



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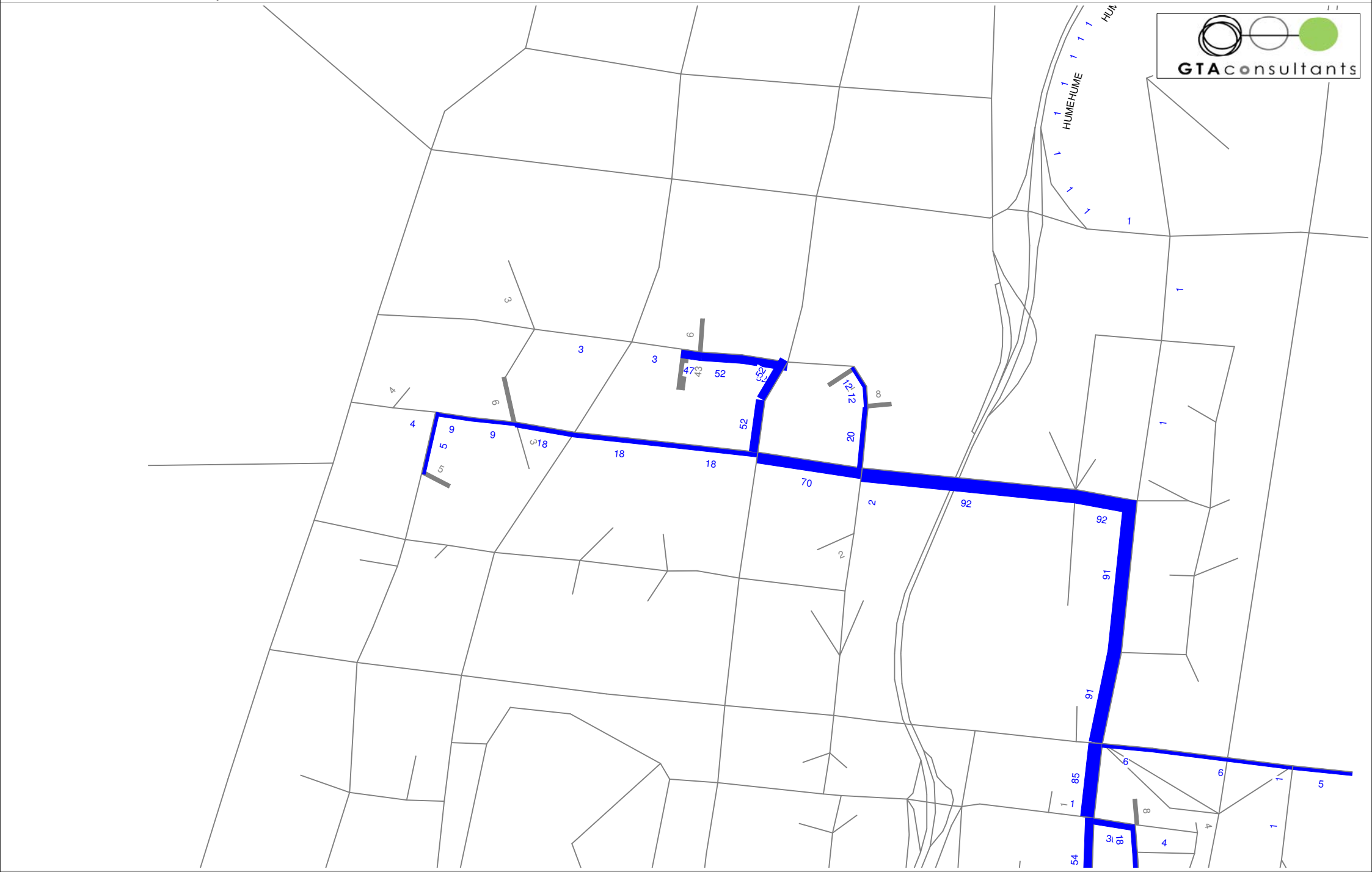
7/21/2014

VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector WB Year 2026 Scenario 3



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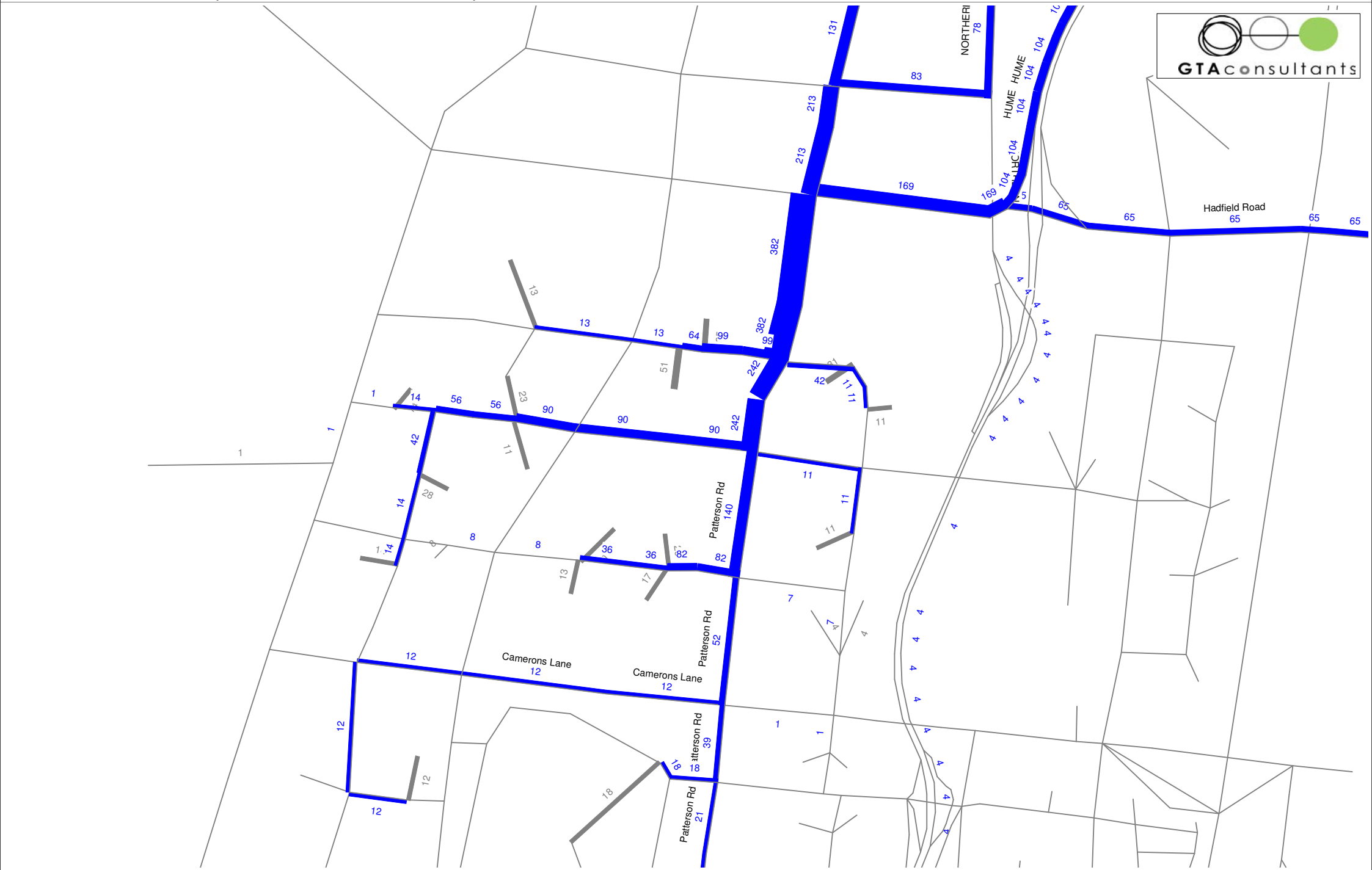
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson St south of Stockdale Rd NB year 2026 Scenario 3



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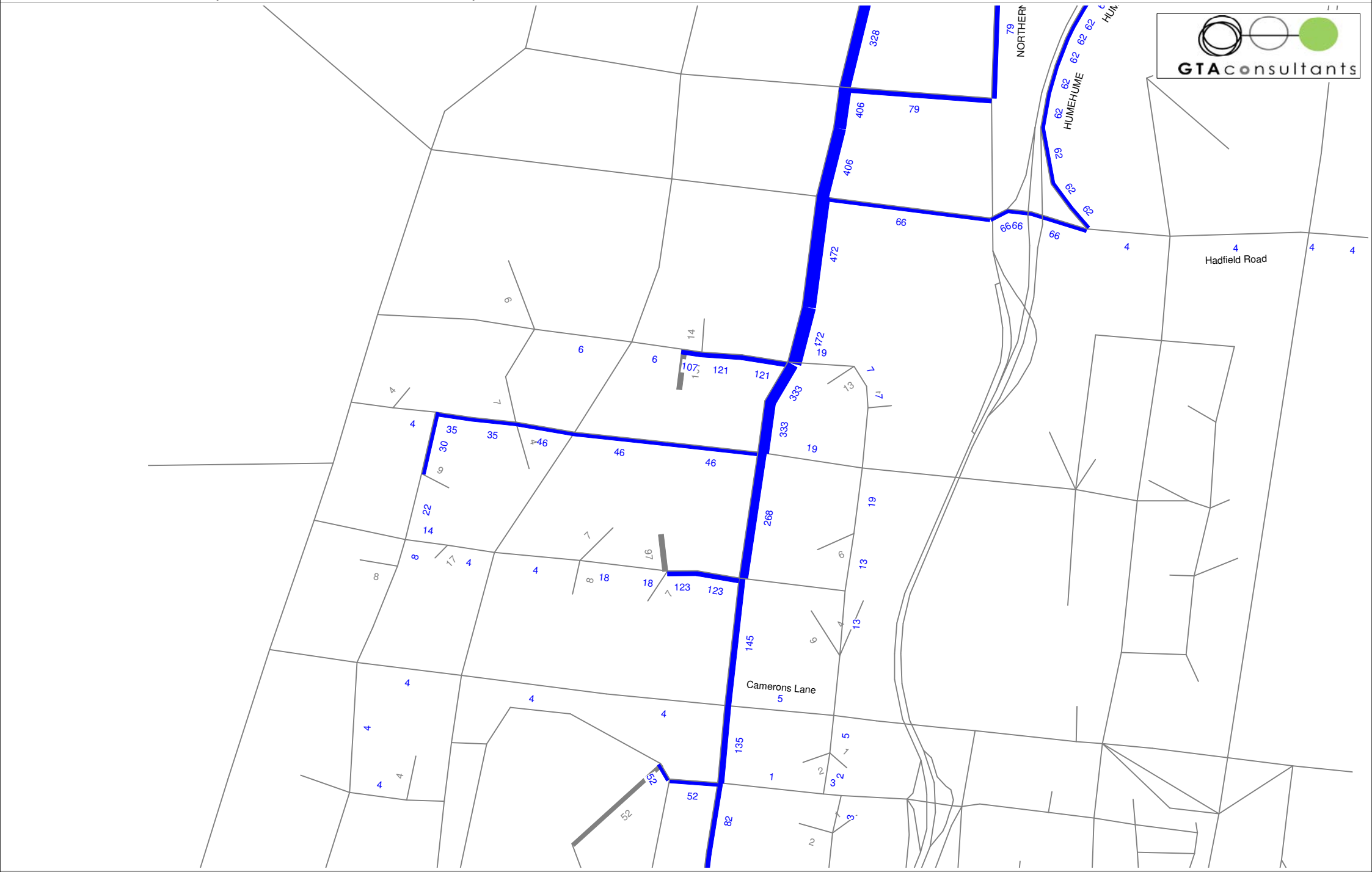
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson St south of Stockdale Rd SB year 2026 Scenario 3



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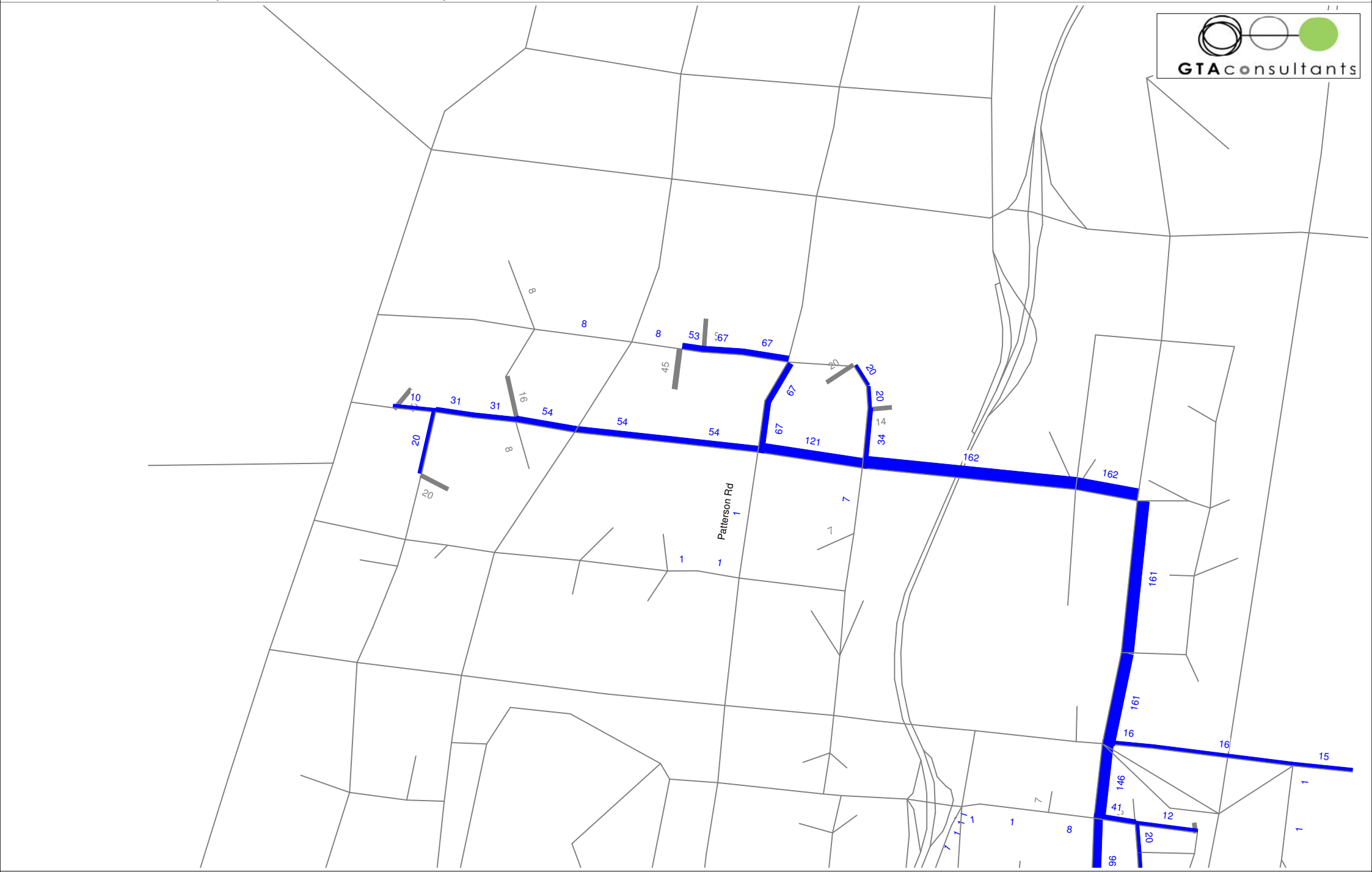
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy EB Year 2026 Scenario 3



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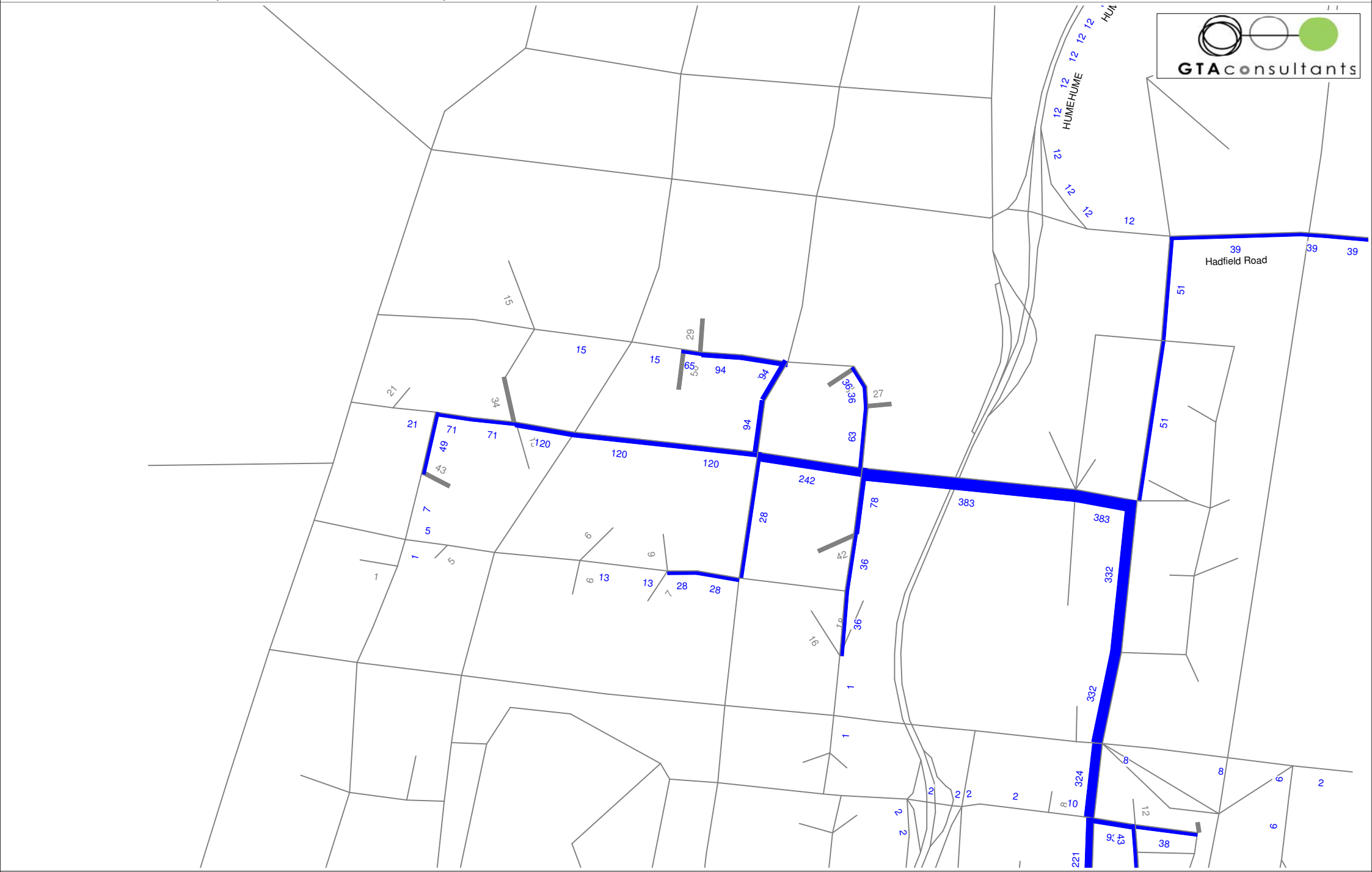
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East West Connector at Hume Hwy WB Year 2026 Scenario 3



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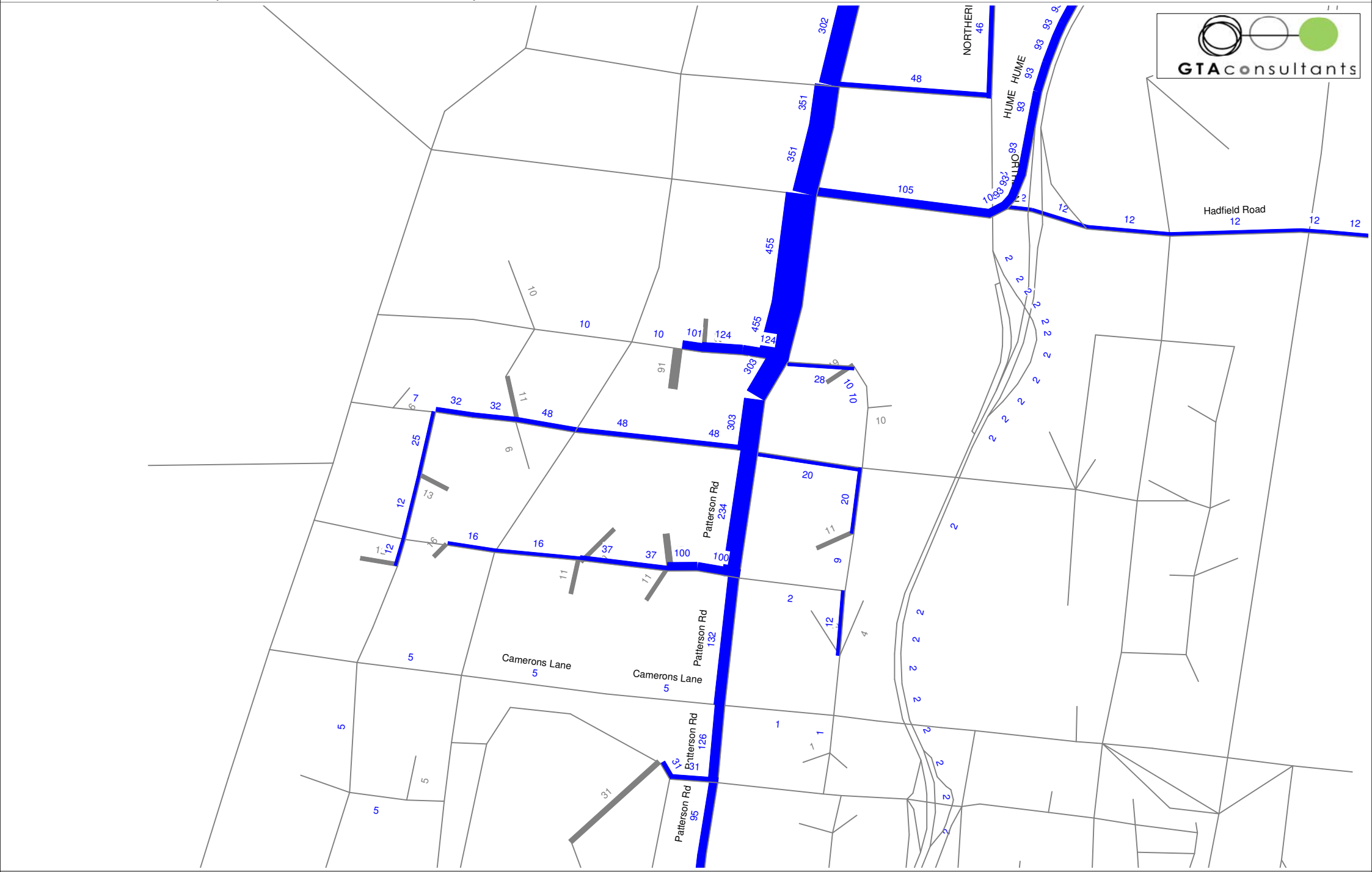
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd NB year 2026 Scenario 3



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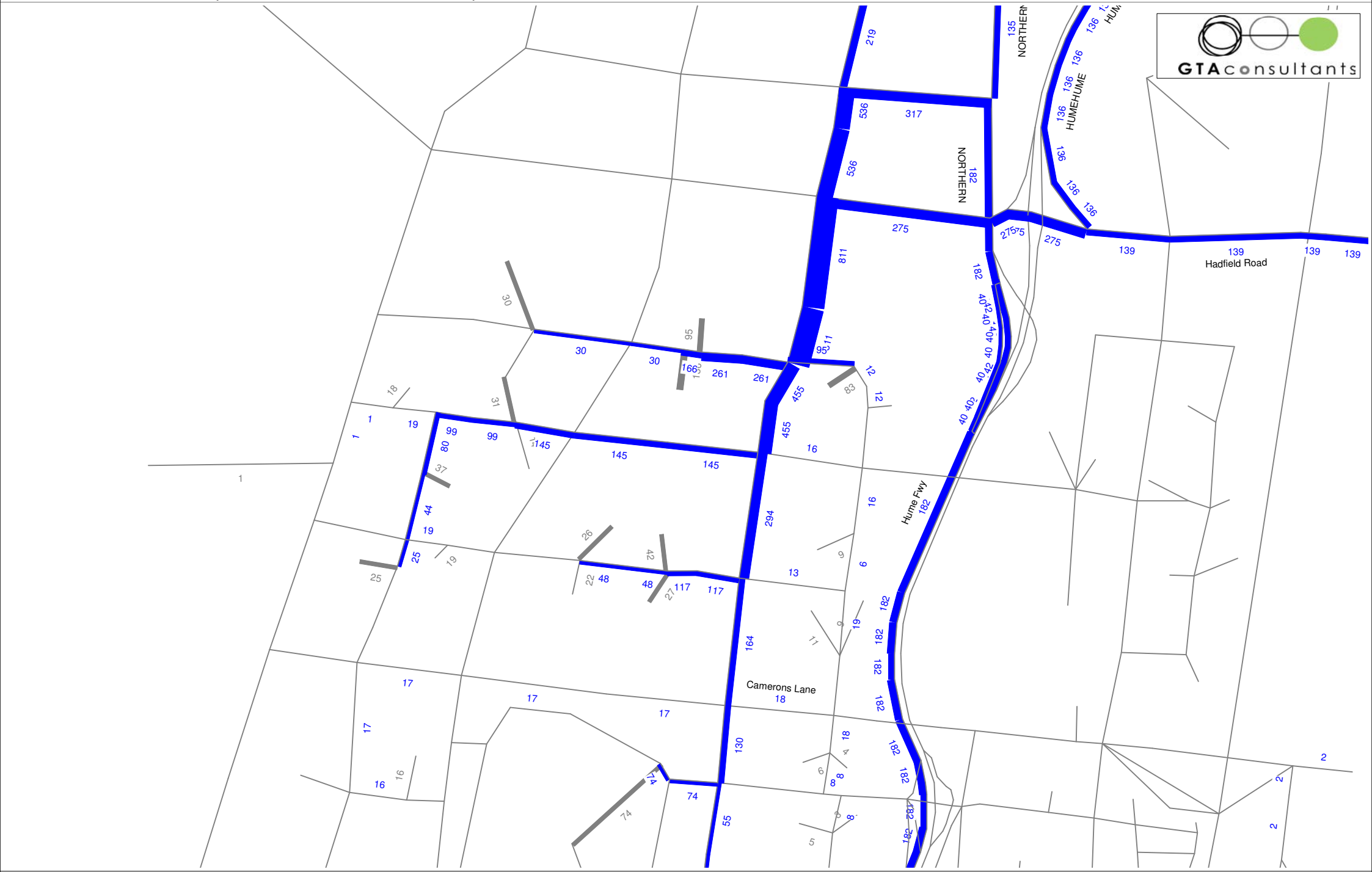
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd SB year 2026 Scenario 3



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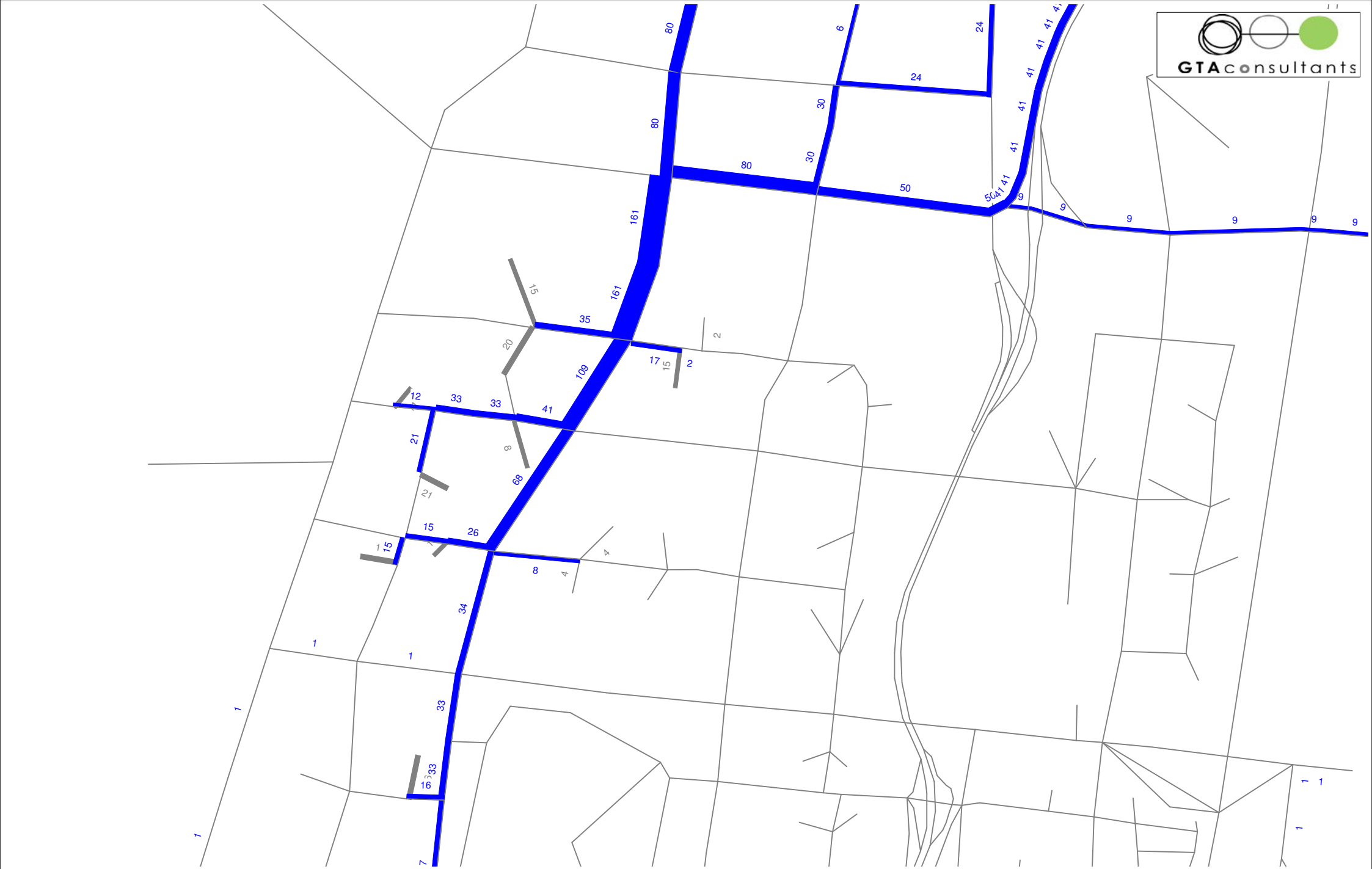
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 4



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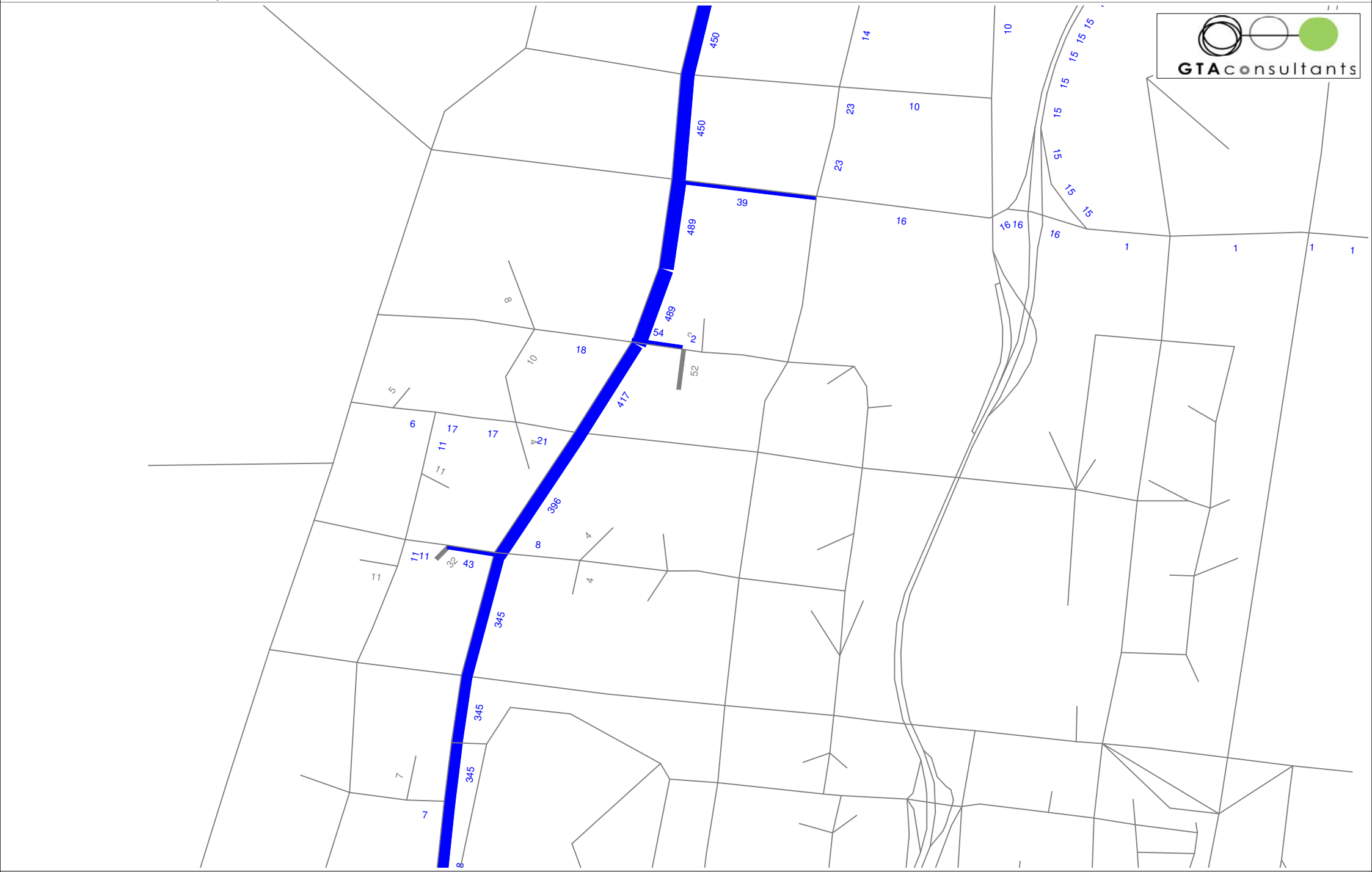
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 4



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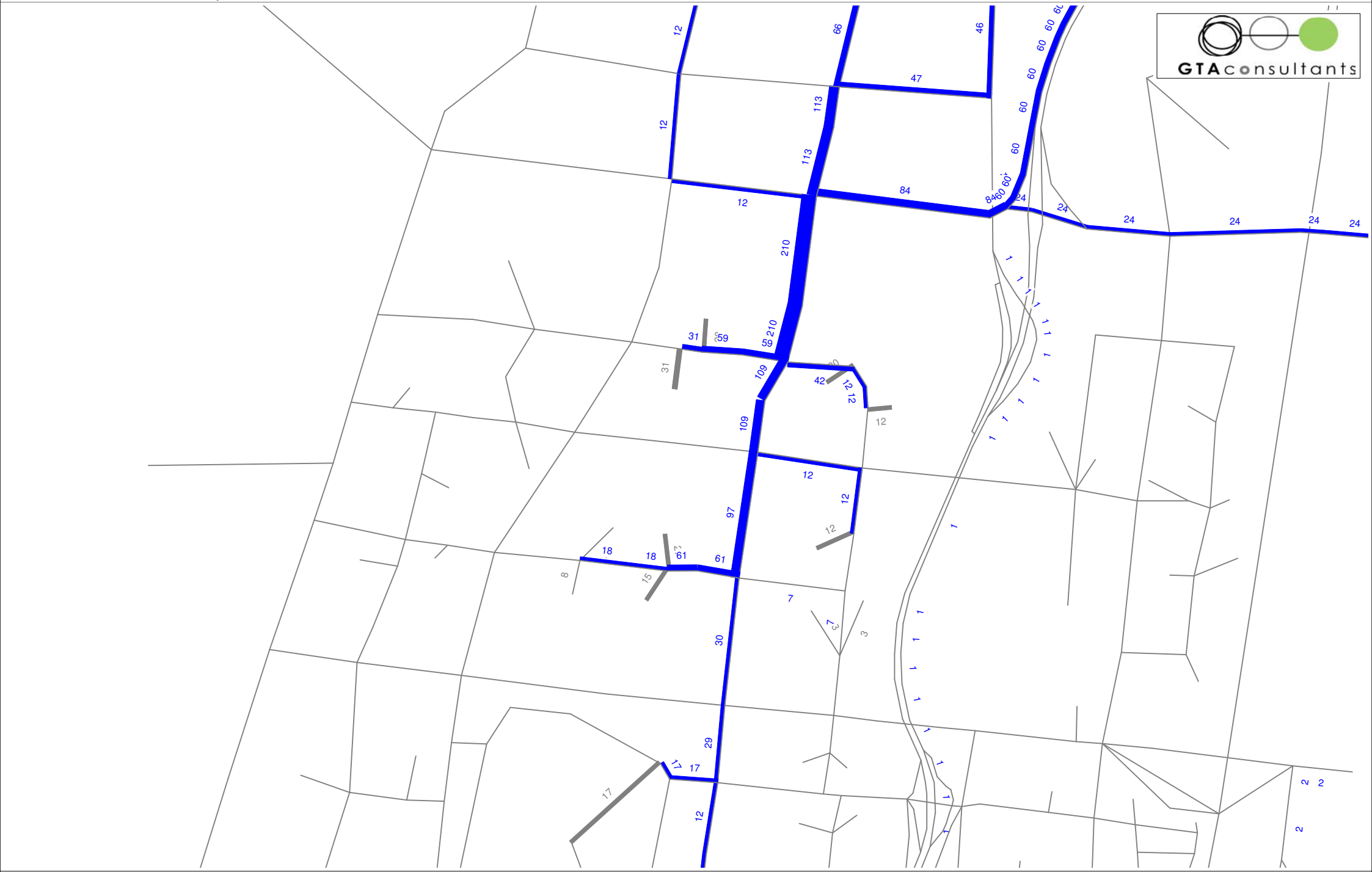
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2026 Scenario 4



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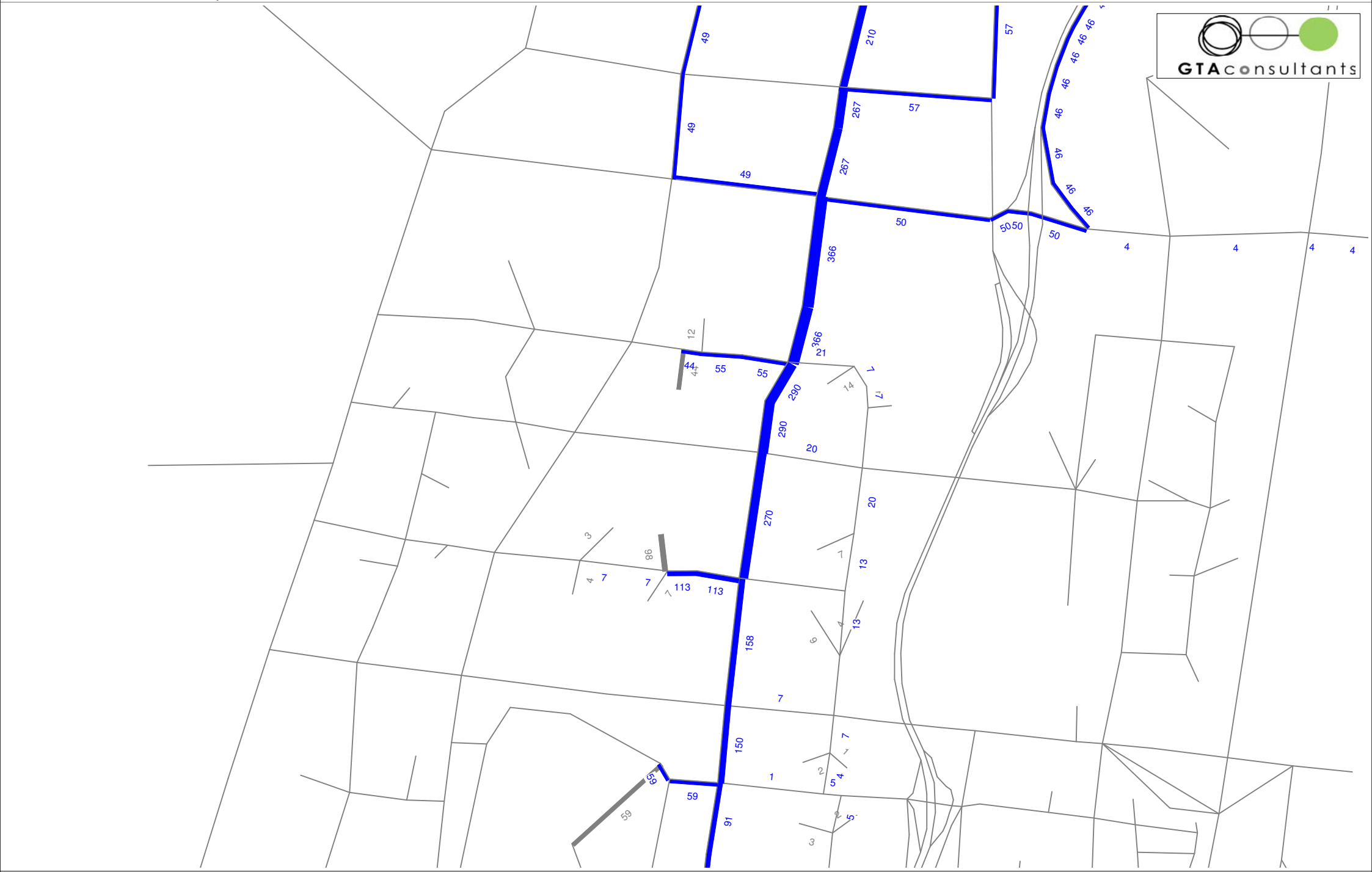
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2026 Scenario 4



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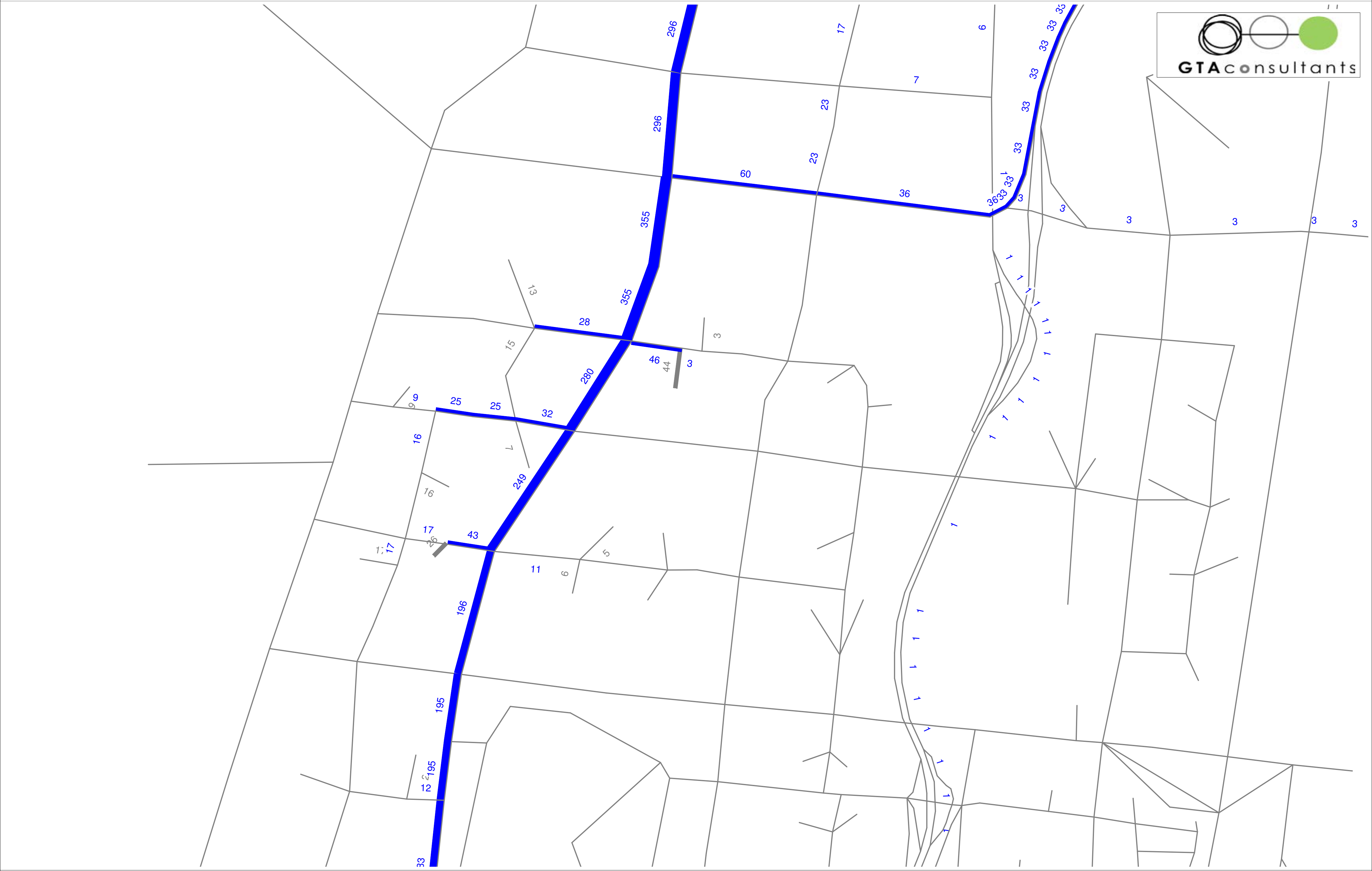
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd NB Year 2026 Scenario 4



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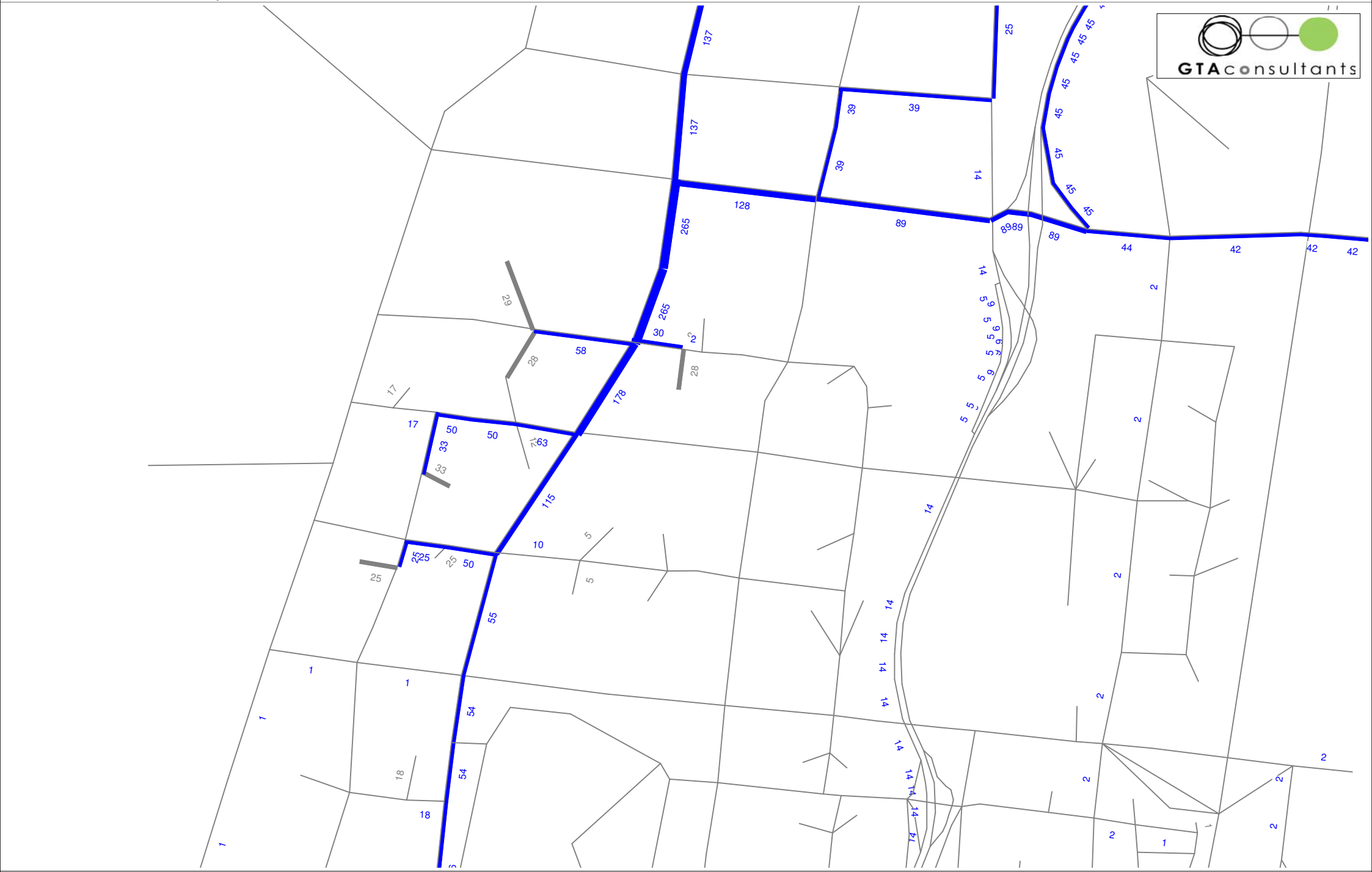
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd SB Year 2026 Scenario 4



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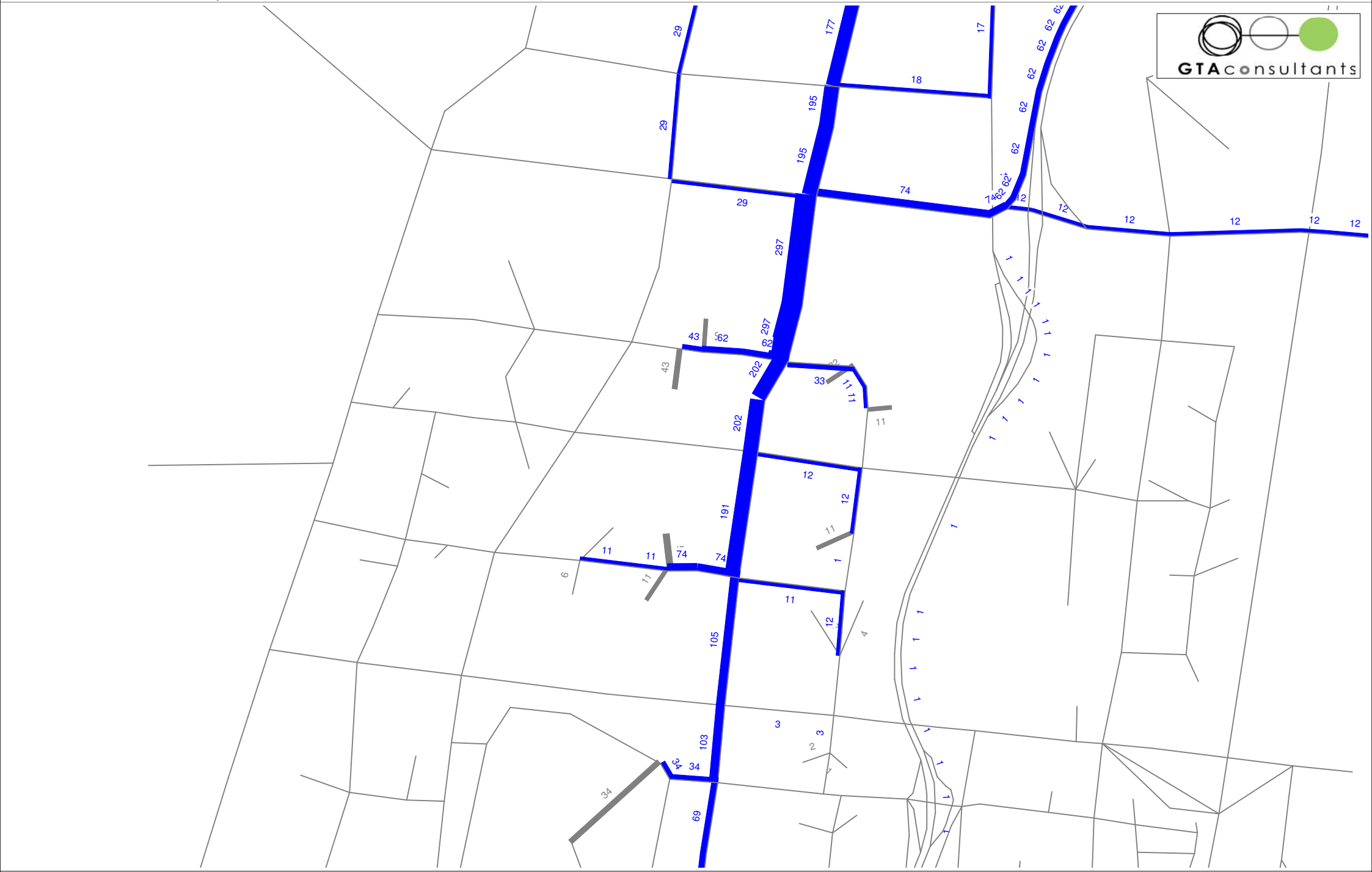
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd NB Year 2026 Scenario 4



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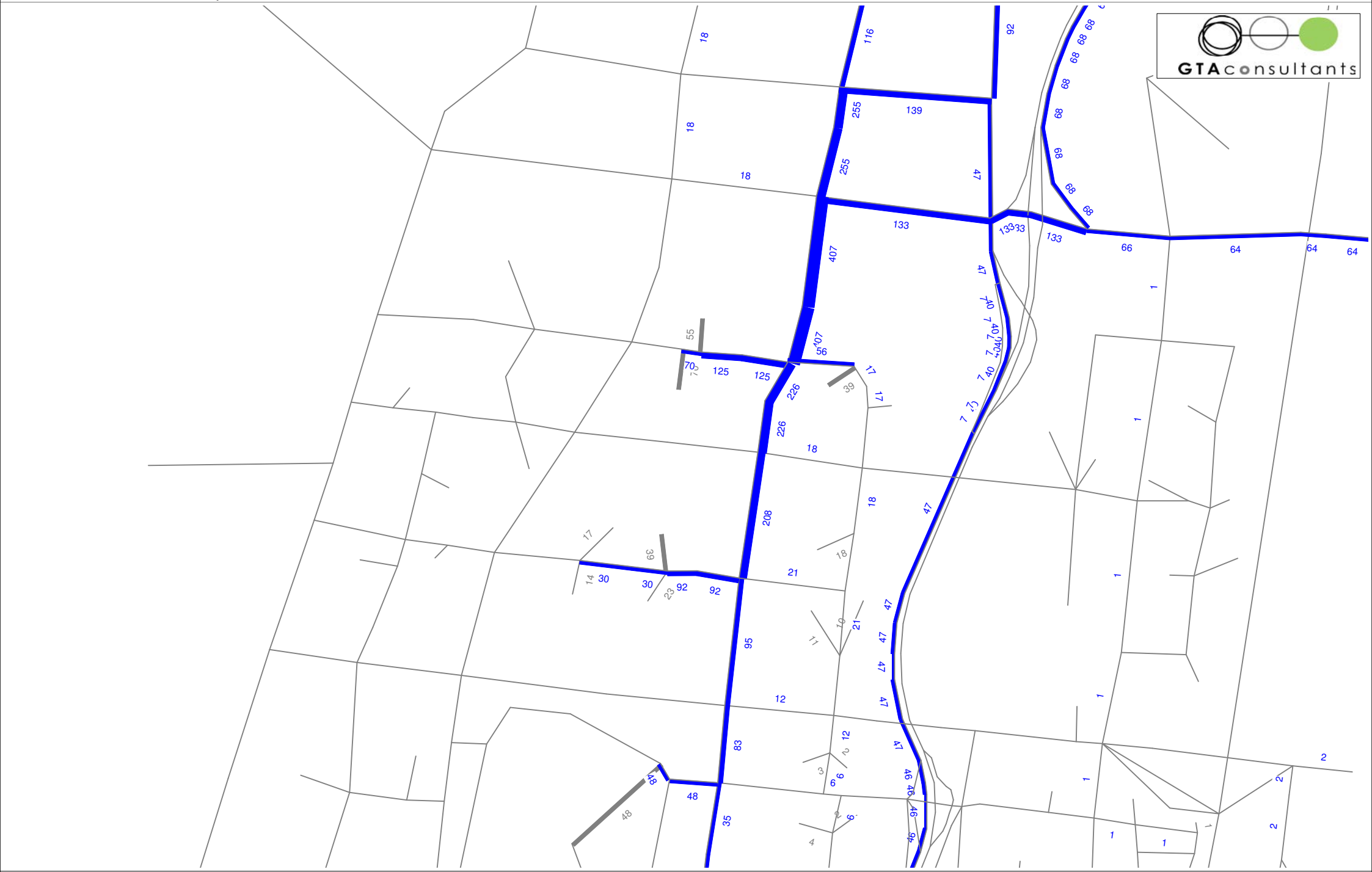
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson St south of Stockdale Rd SB Year 2026 Scenario 4



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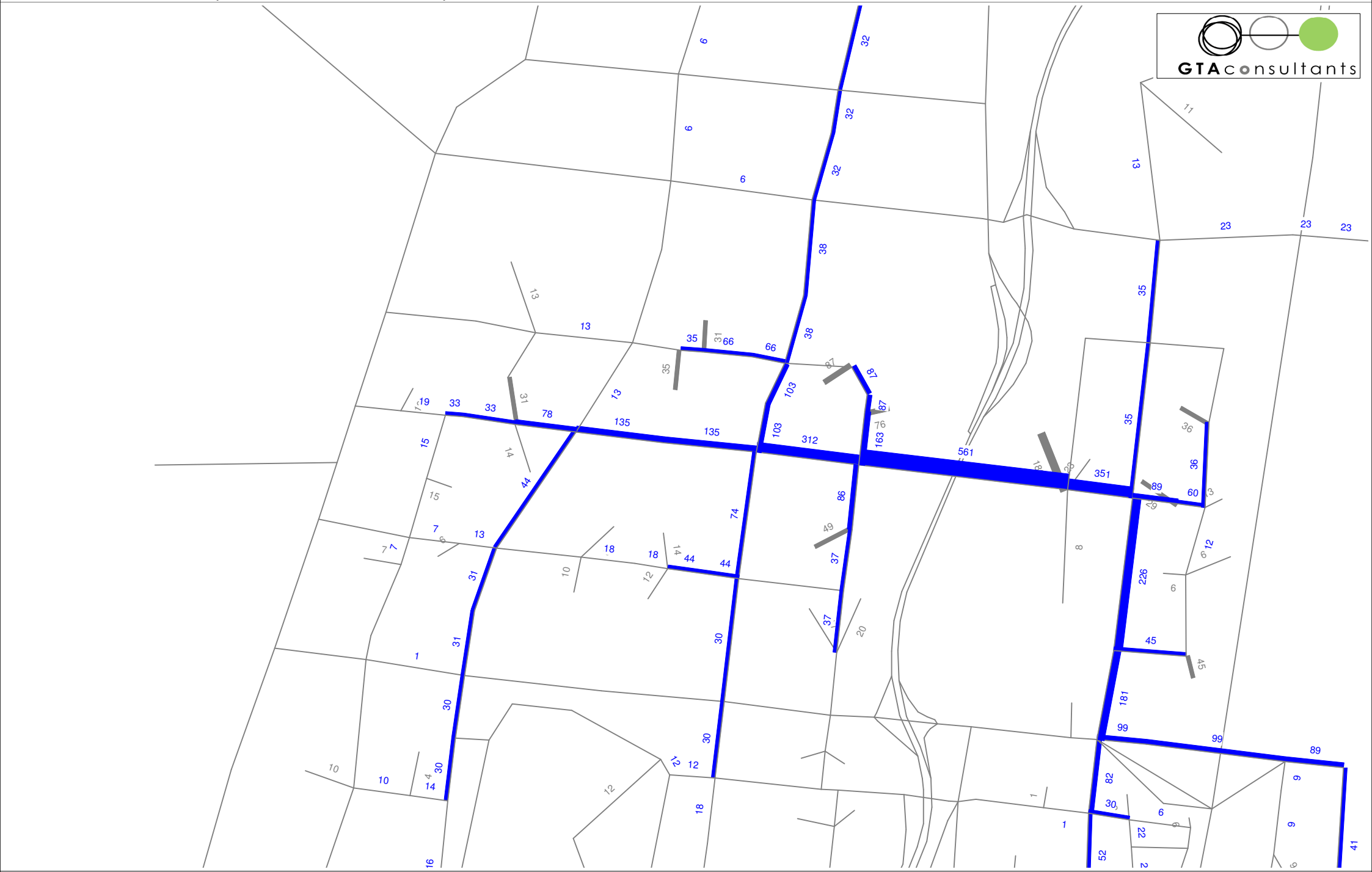
Appendix D

Ultimate (2046) Select Link Analysis for Modelled Scenarios

VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy EB Year 2046 Scenario 1



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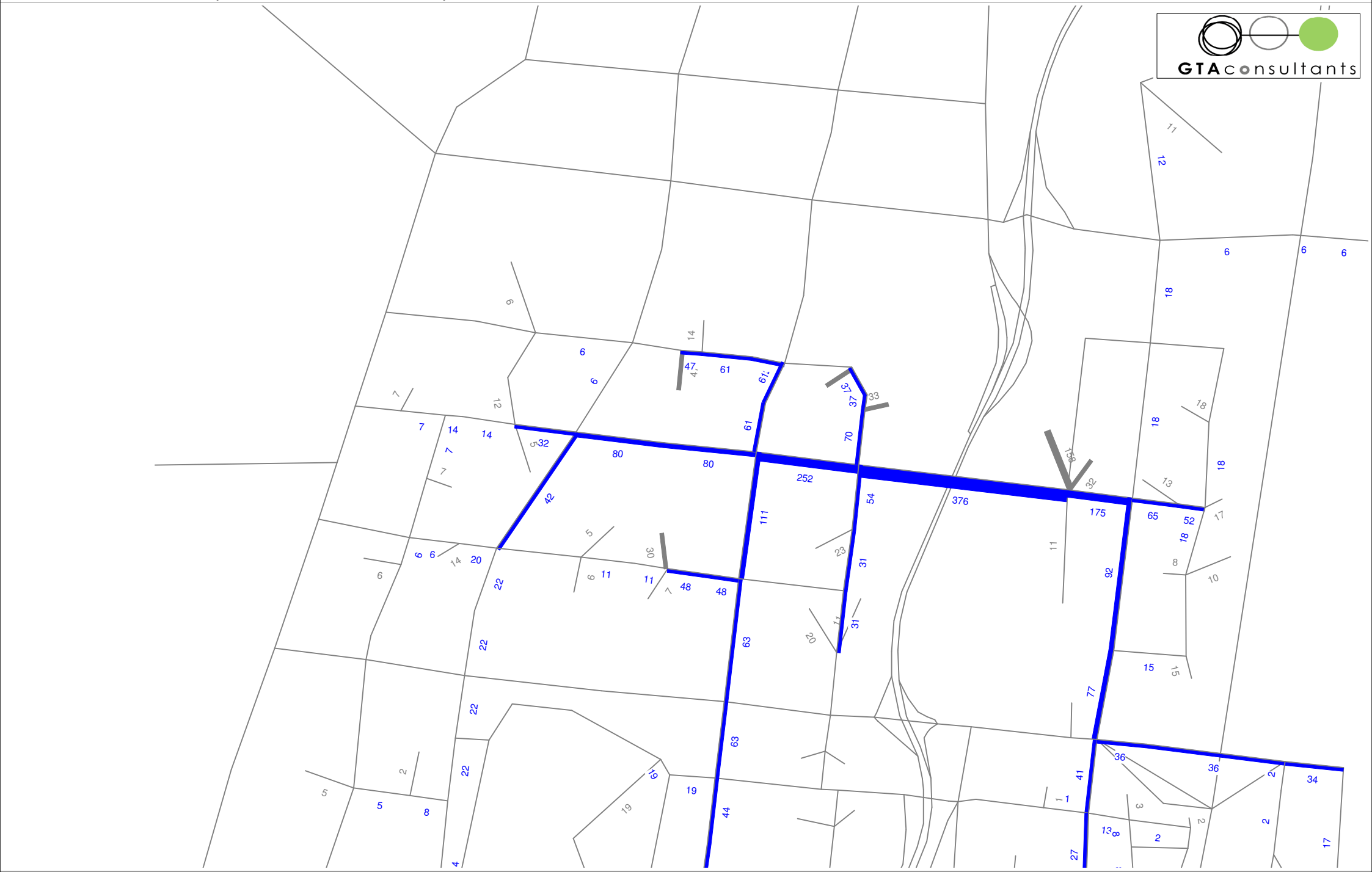
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy WB Year 2046 Scenario 1



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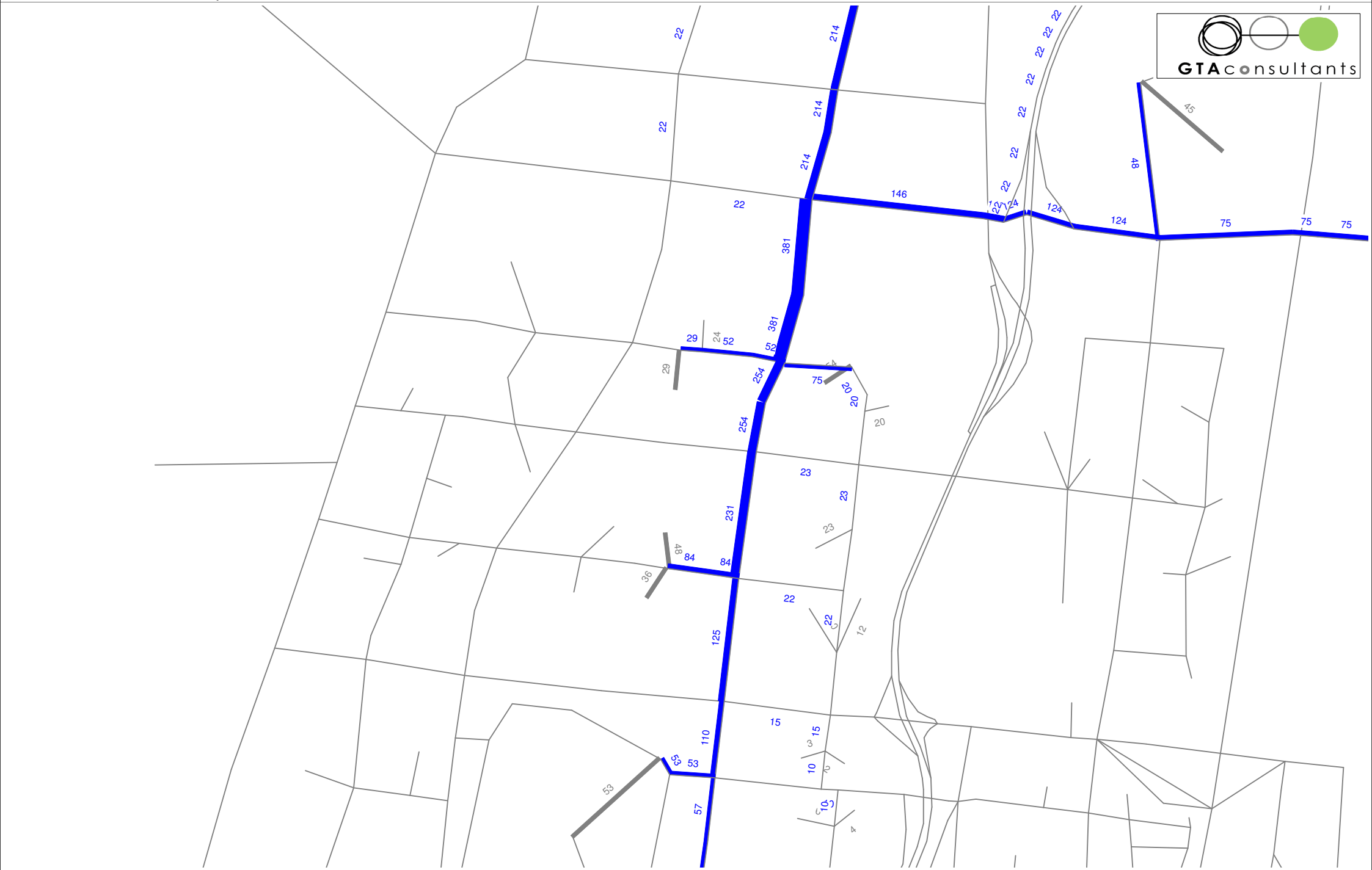
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2046 Scenario 1



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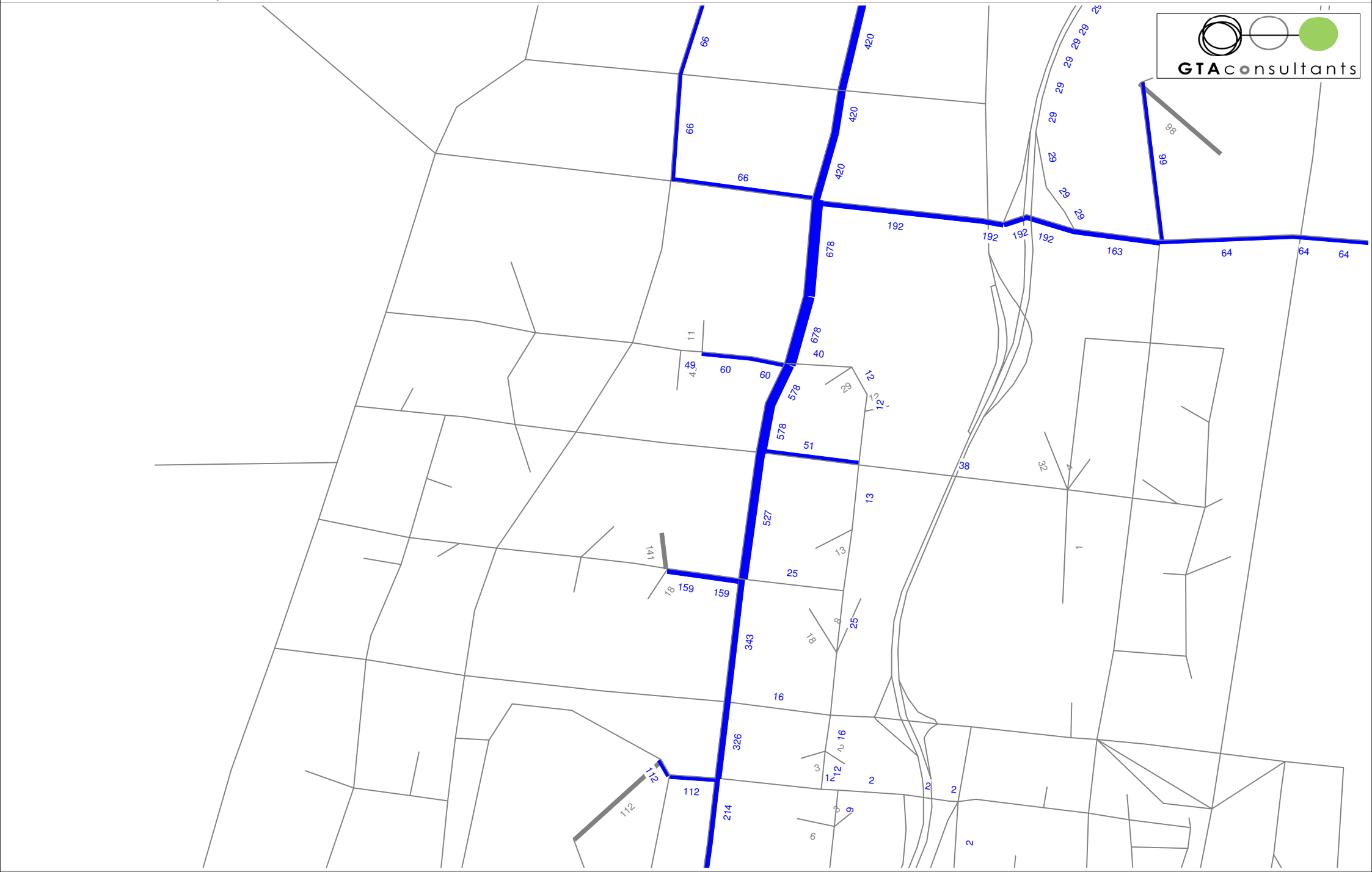
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2046 Scenario 1



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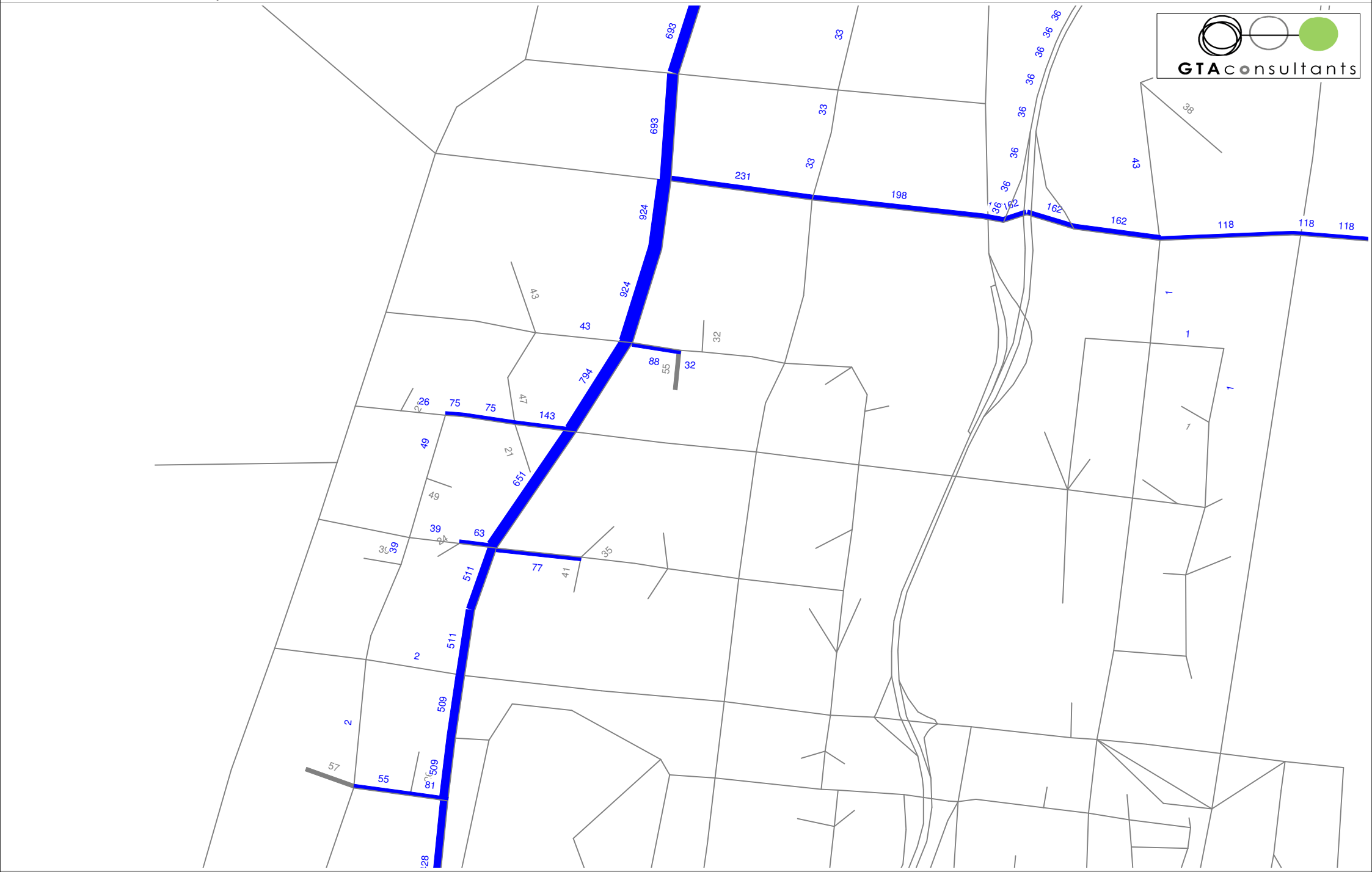
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2046 Scenario 1



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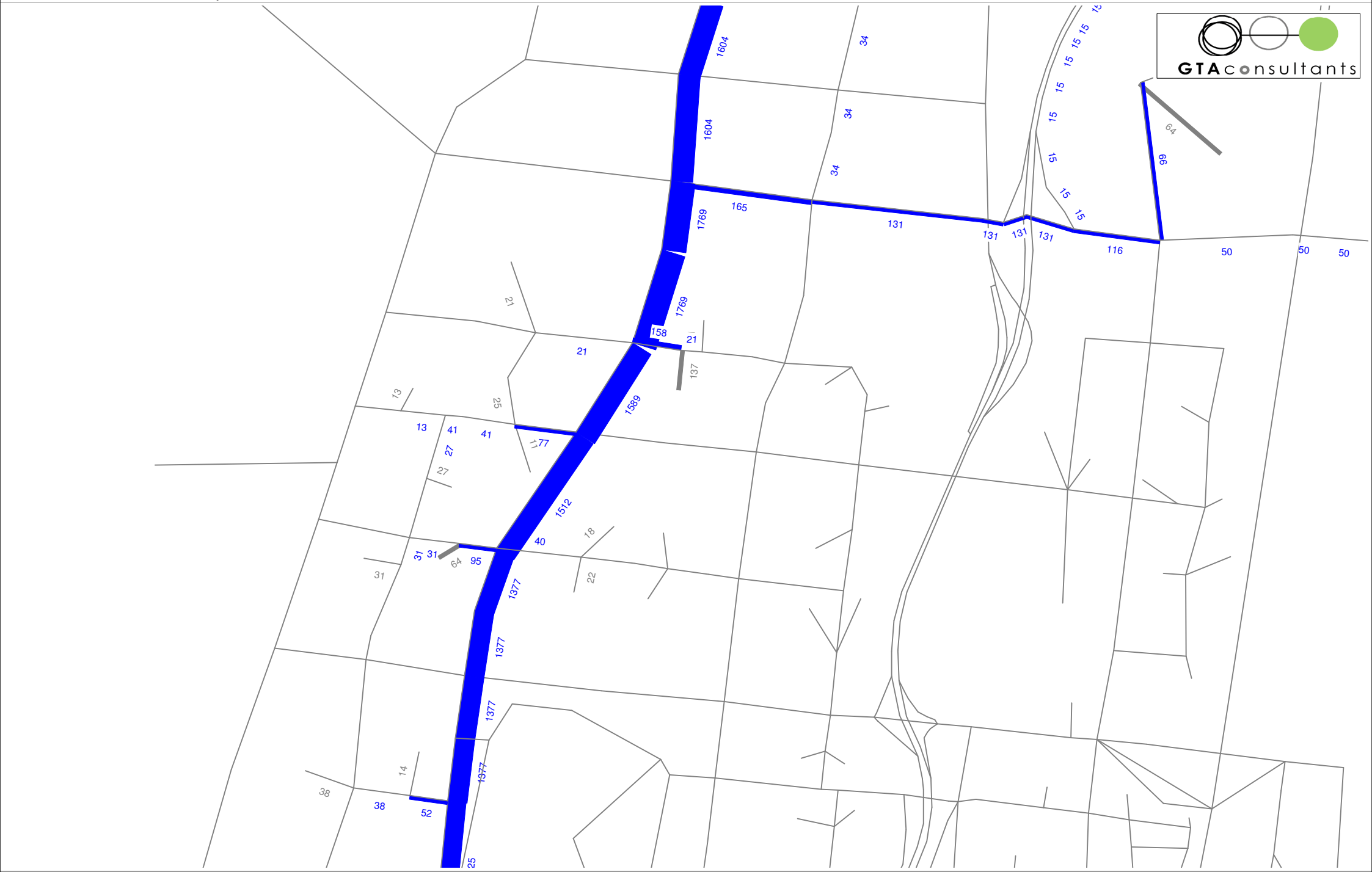
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2046 Scenario 1



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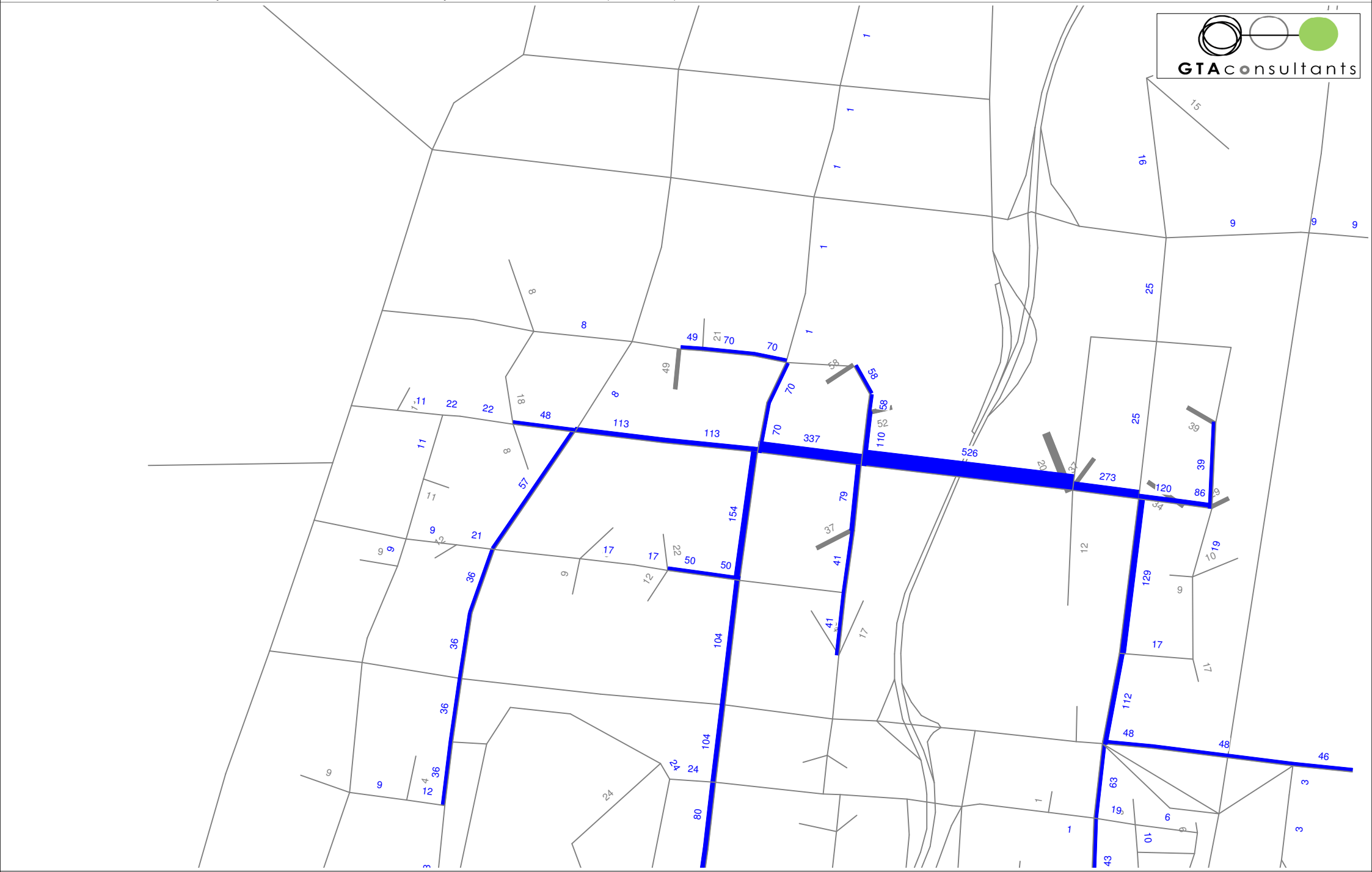
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East-West Connector at Hume Hwy EB Year 2046 Scenario 1 (Base Case)



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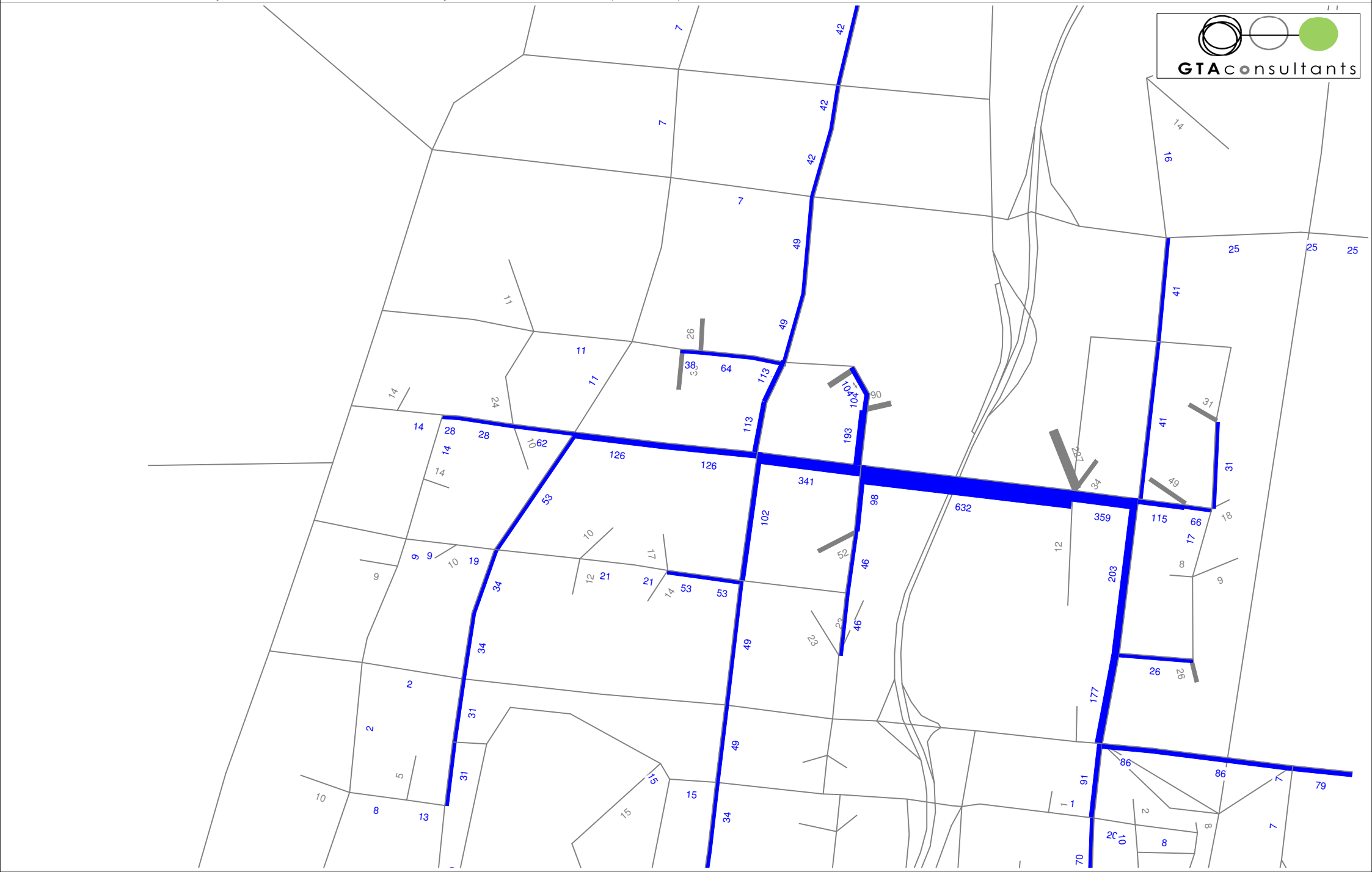
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis East-West Connector at Hume Hwy WB Year 2046 Scenario 1 (Base Case)



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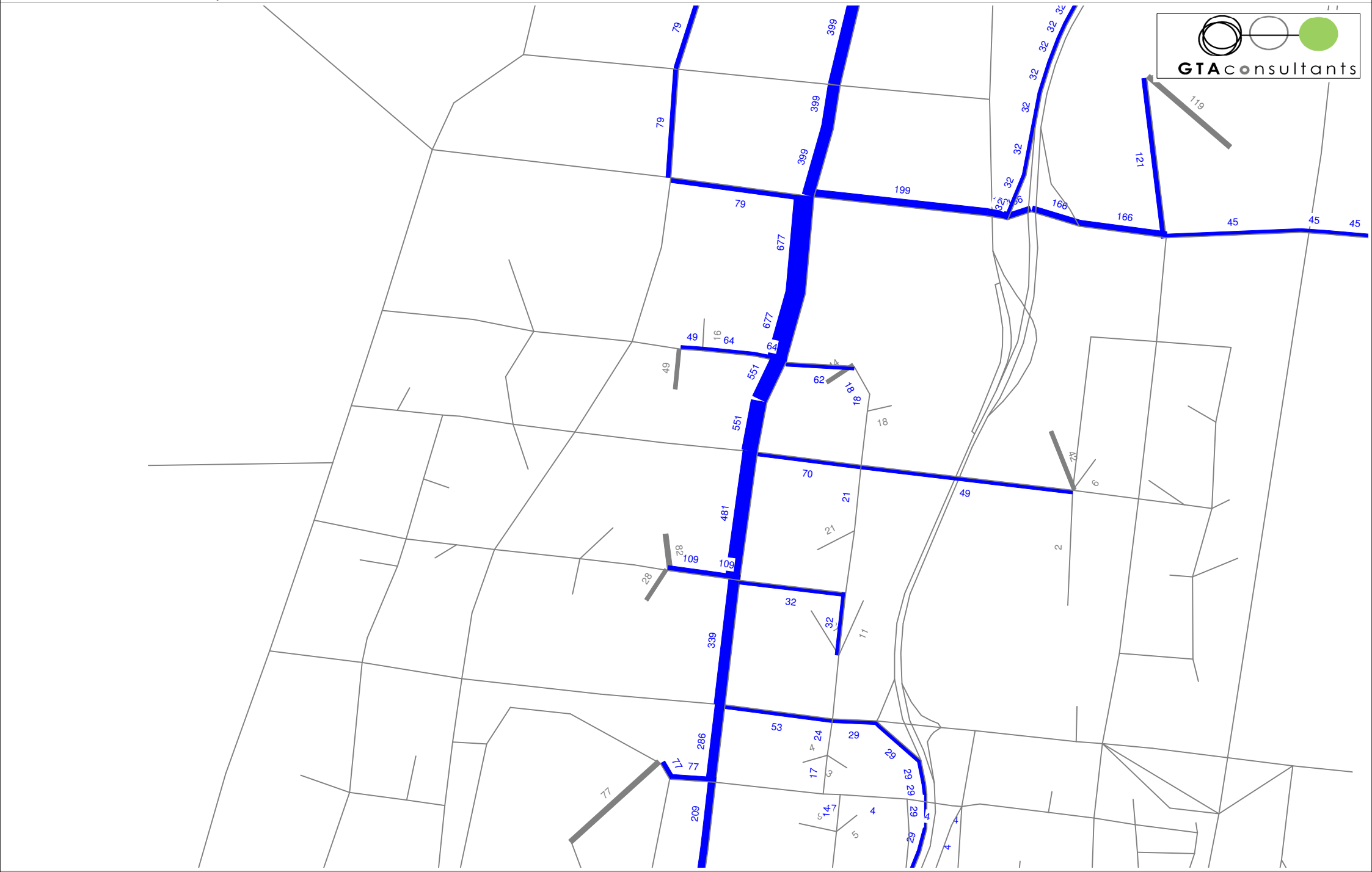
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2046 Scenario 1



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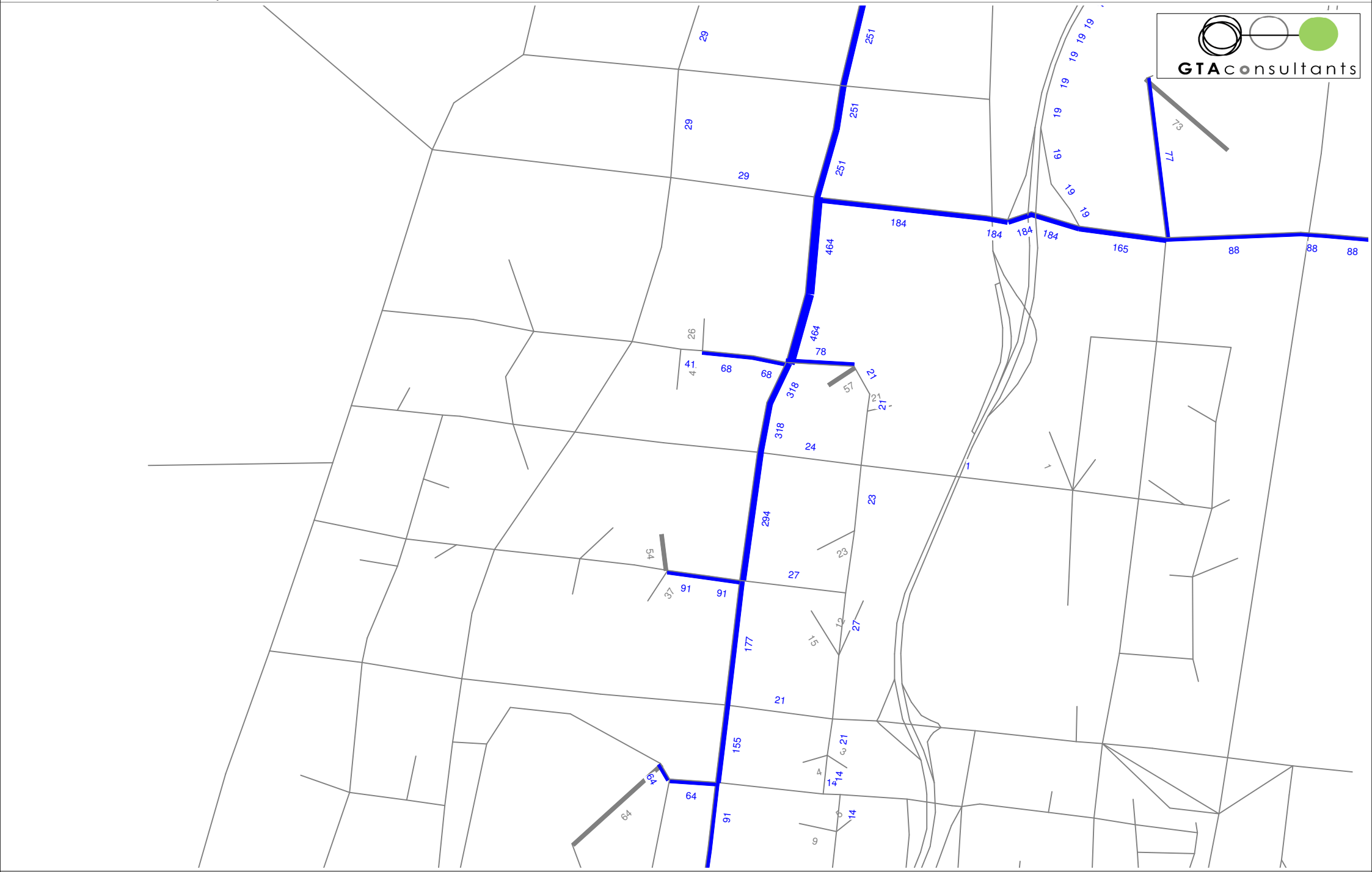
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2046 Scenario 1



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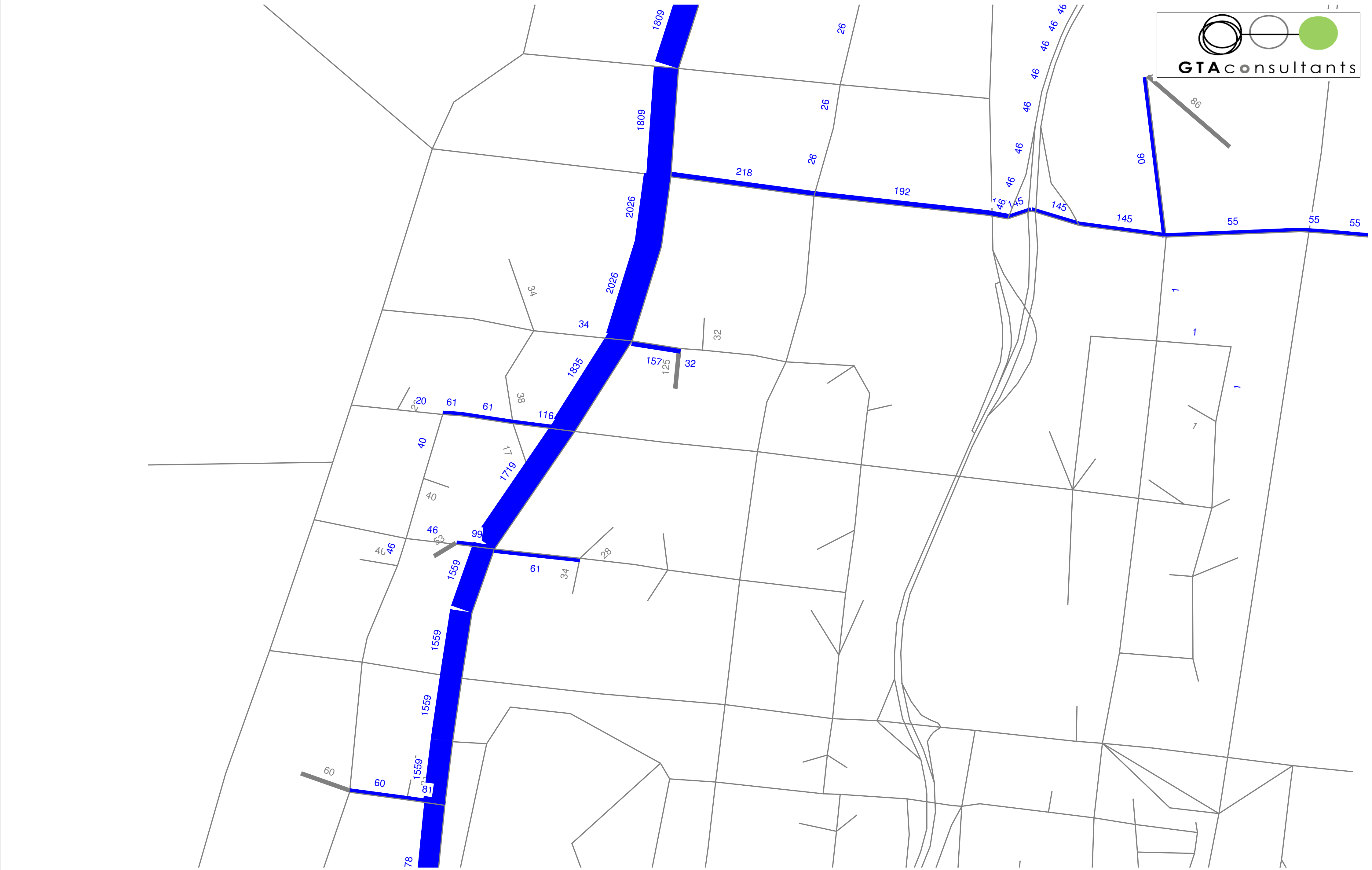

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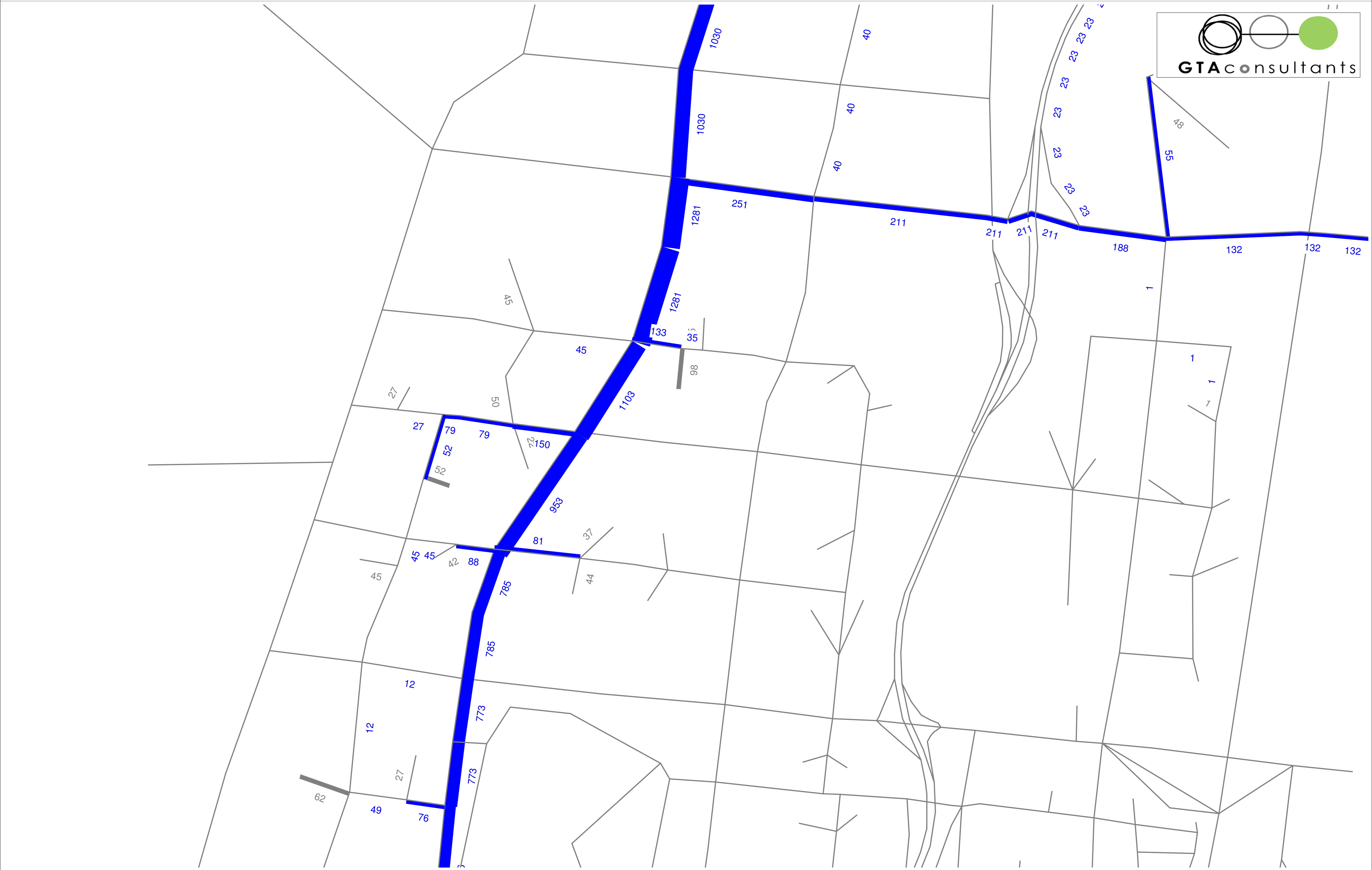
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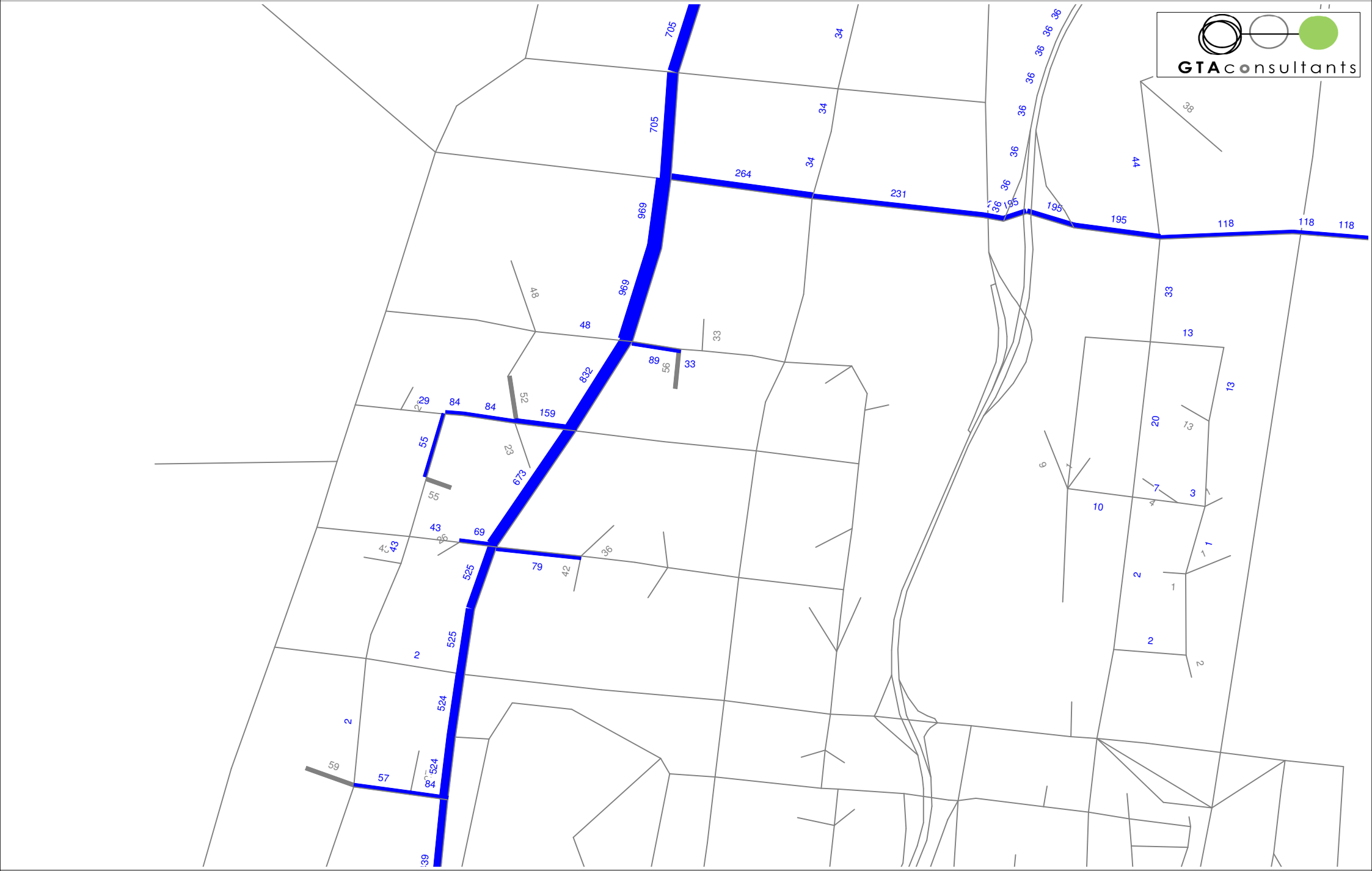
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2046 Scenario 2



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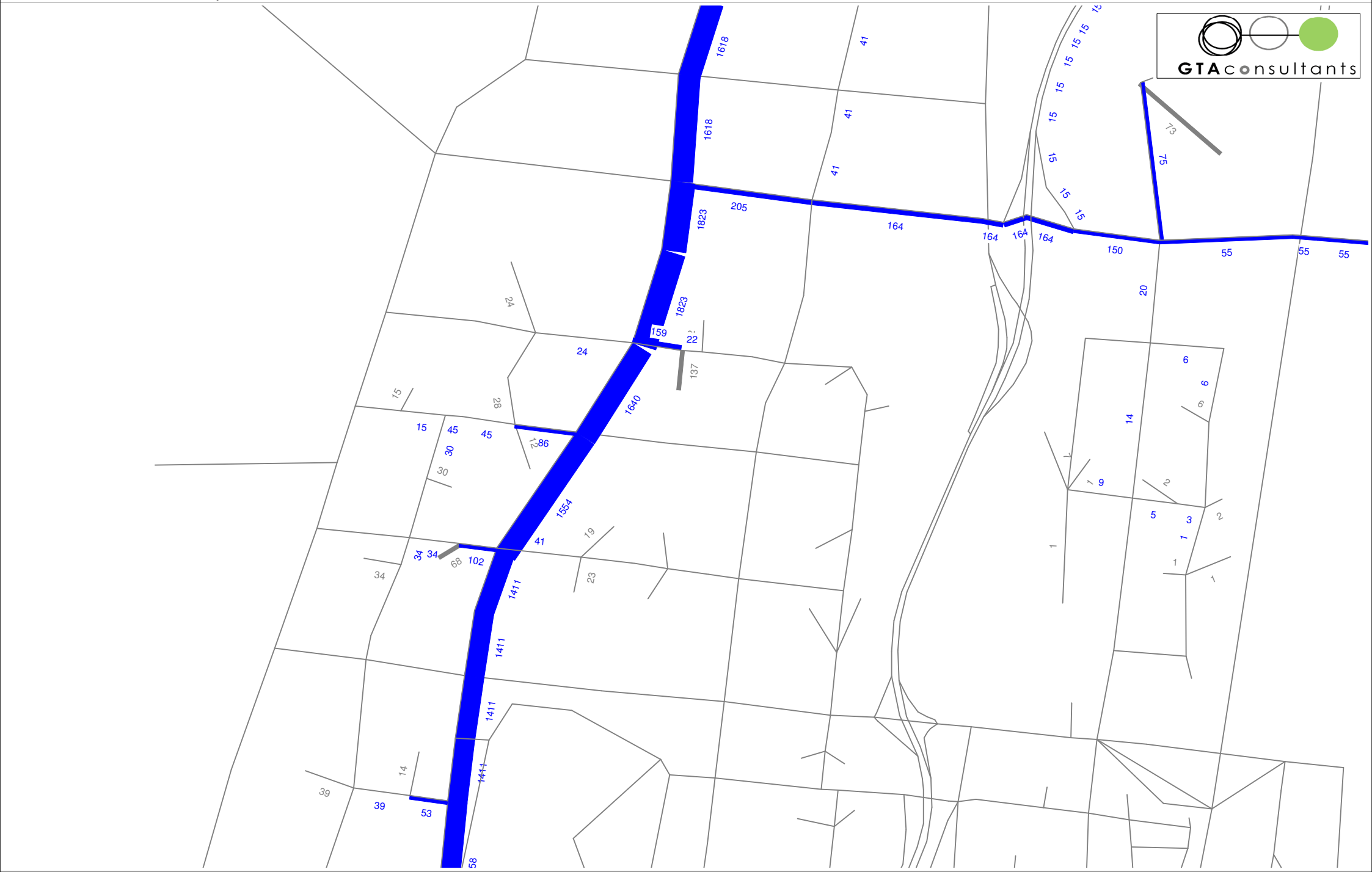
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd SB Year 2046 Scenario 2



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VITM Northern Growth Corridor Model
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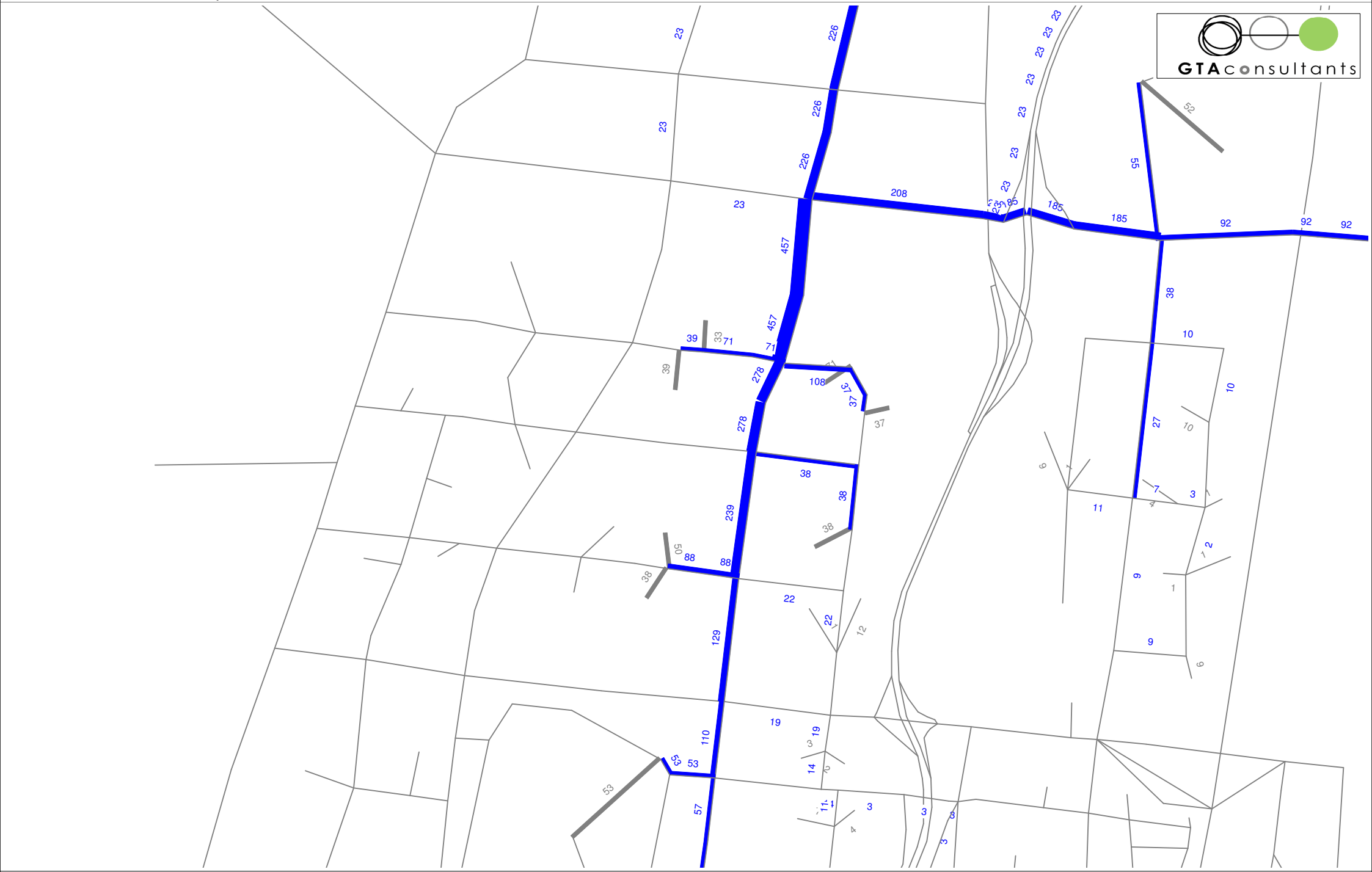

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VITM Northern Growth Corridor Model
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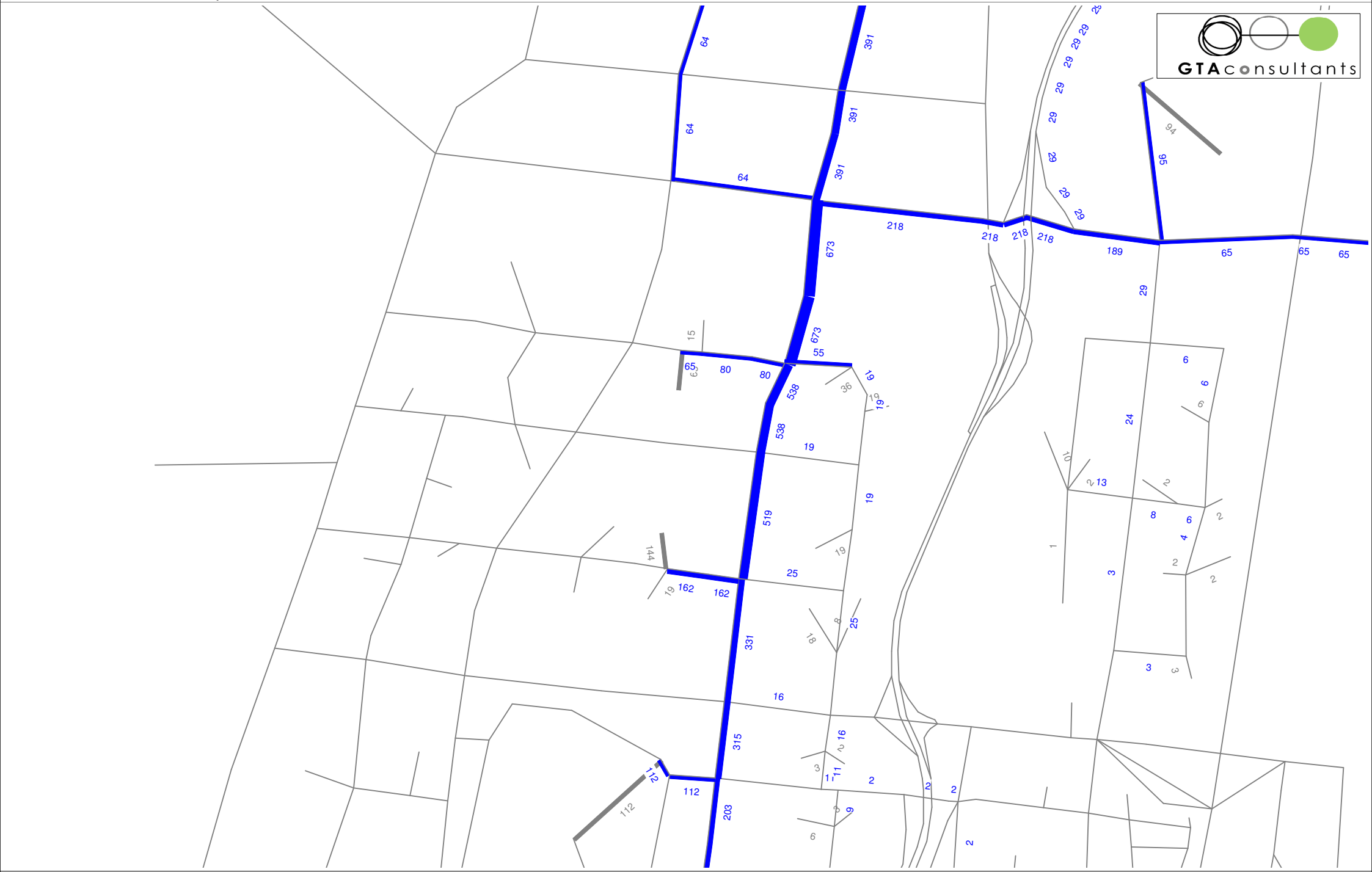

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VITM Northern Growth Corridor Model
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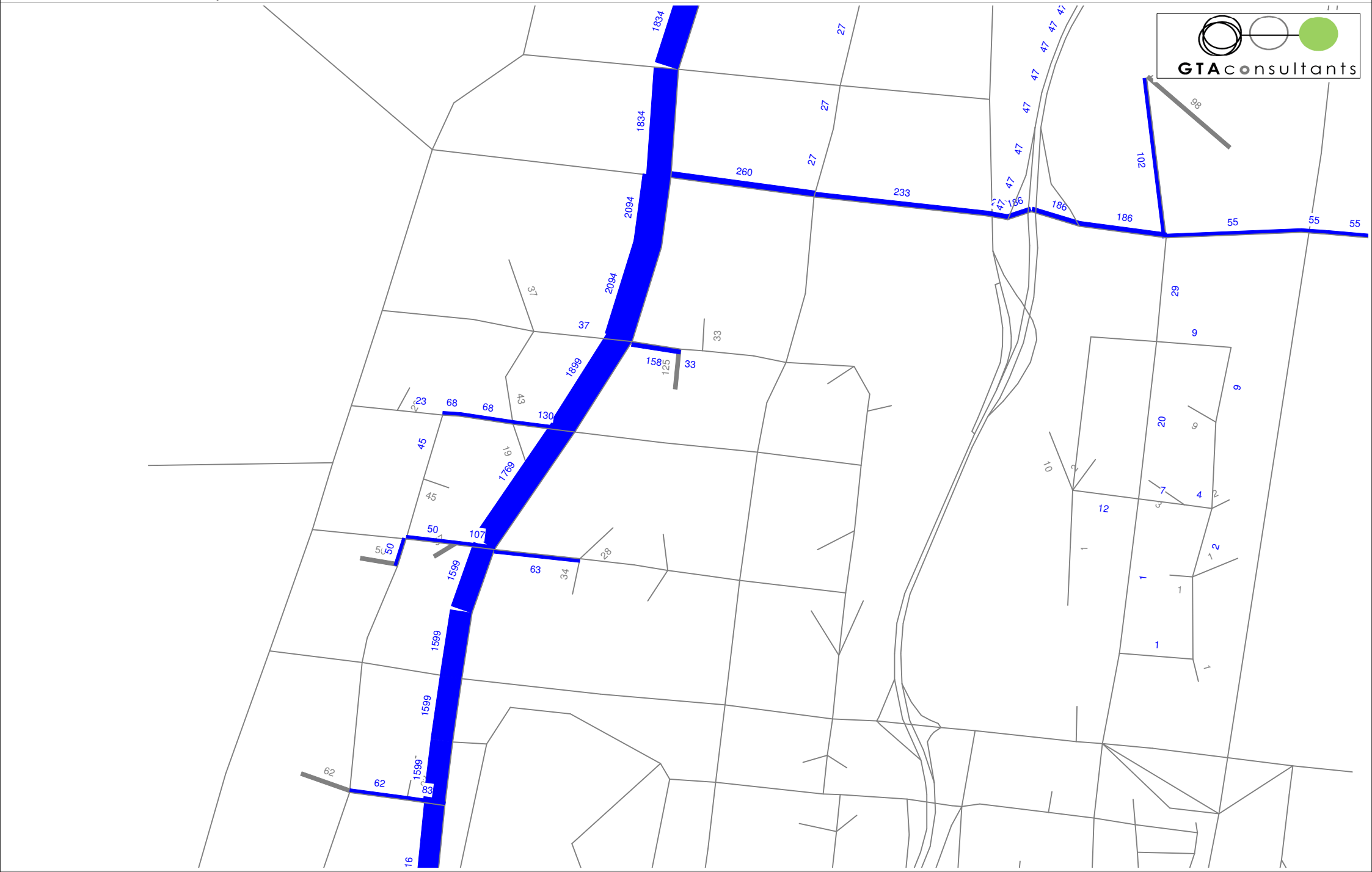

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VITM Northern Growth Corridor Model
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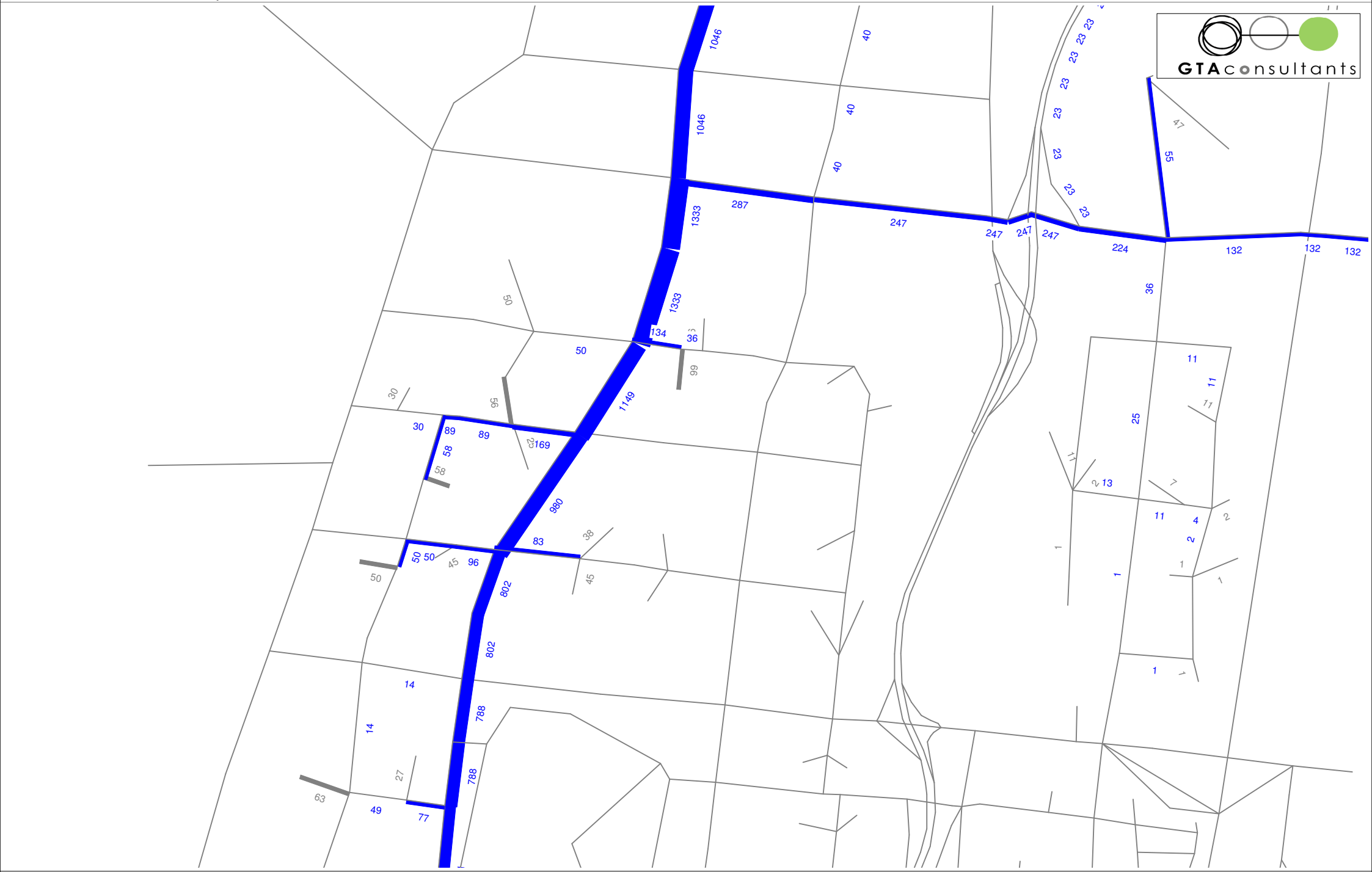

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VITM Northern Growth Corridor Model
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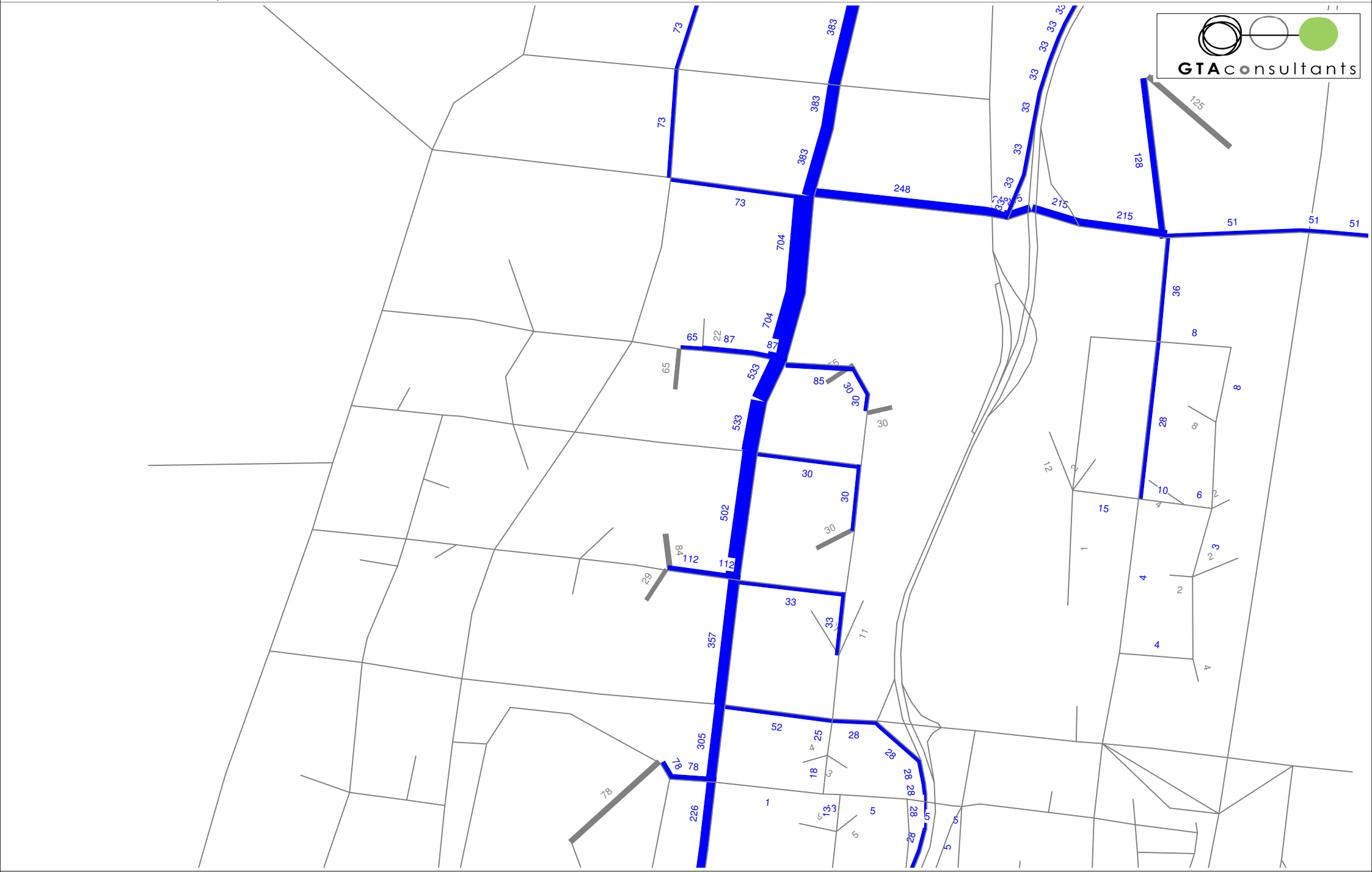

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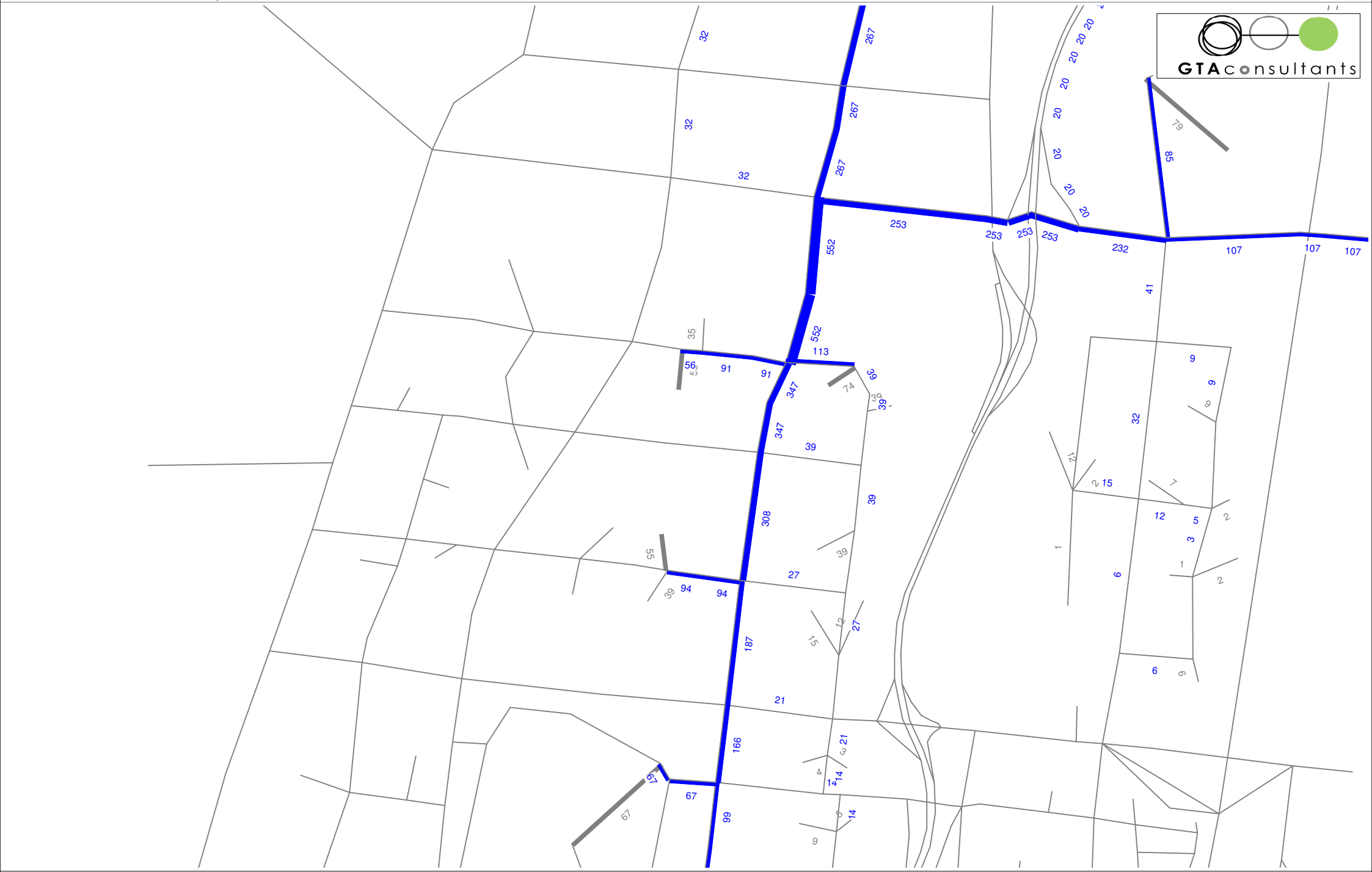
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2046 Scenario 2



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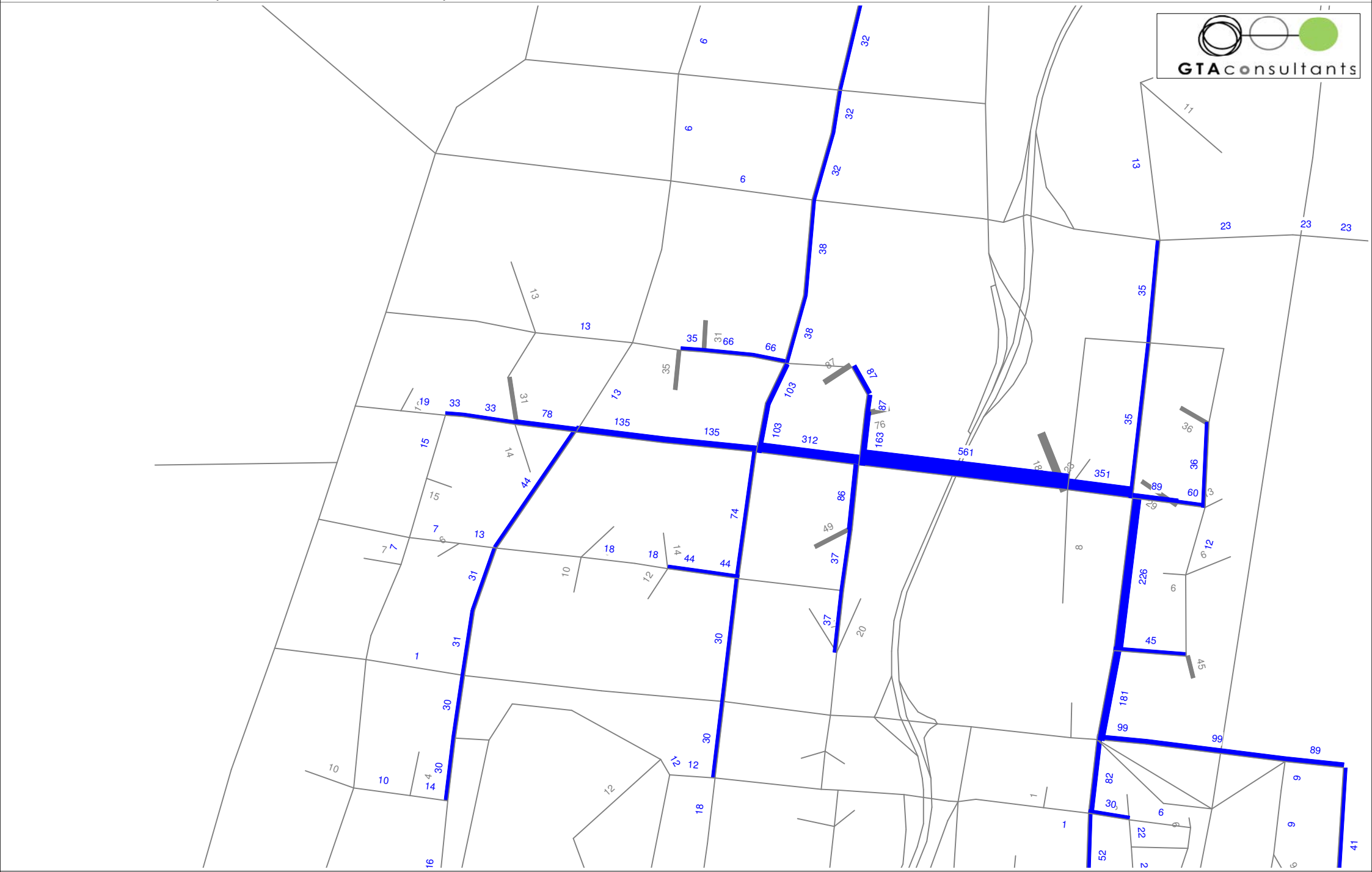
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy EB Year 2046 Scenario 1



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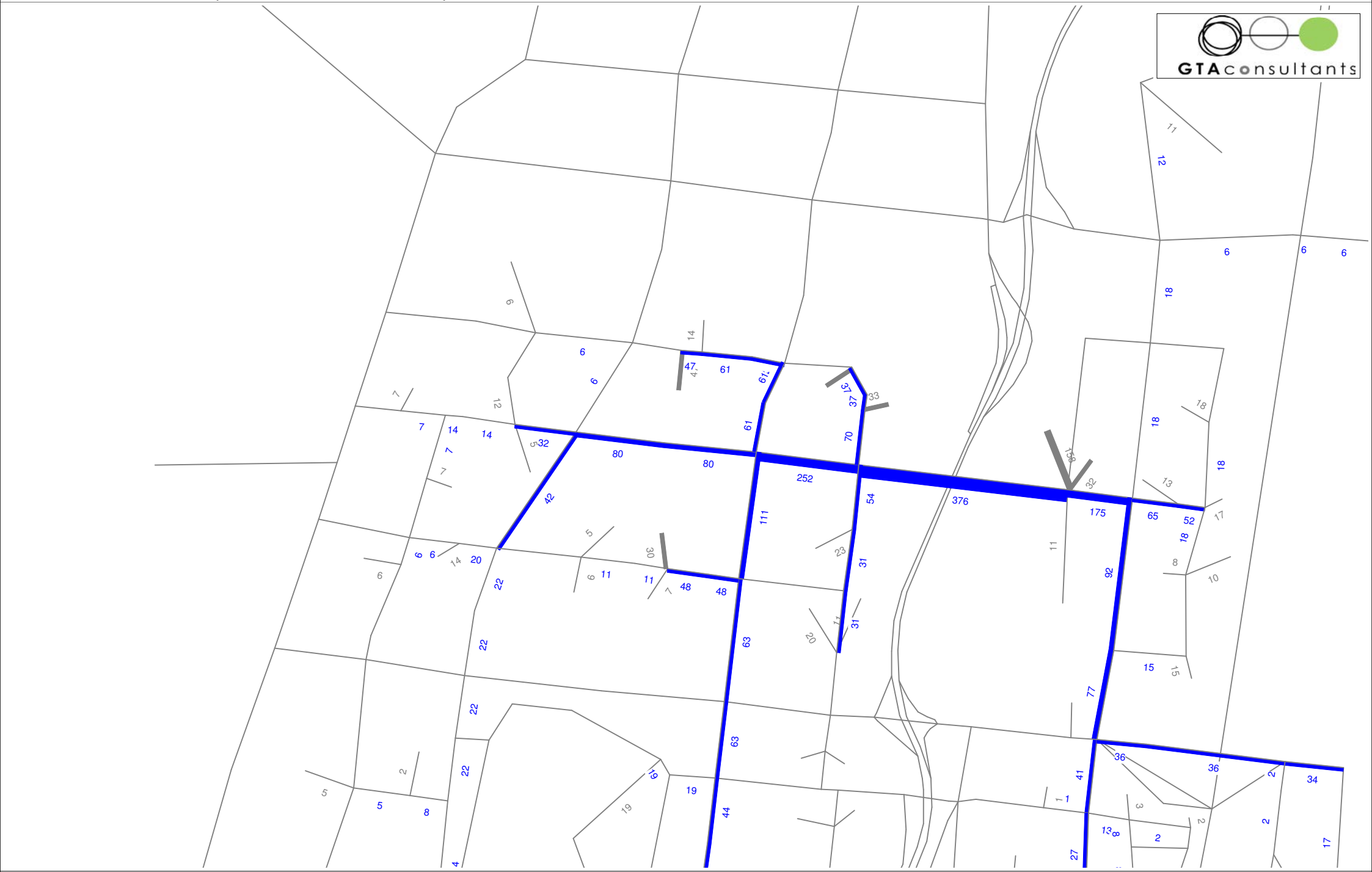
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis East West Connector at Hume Hwy WB Year 2046 Scenario 1



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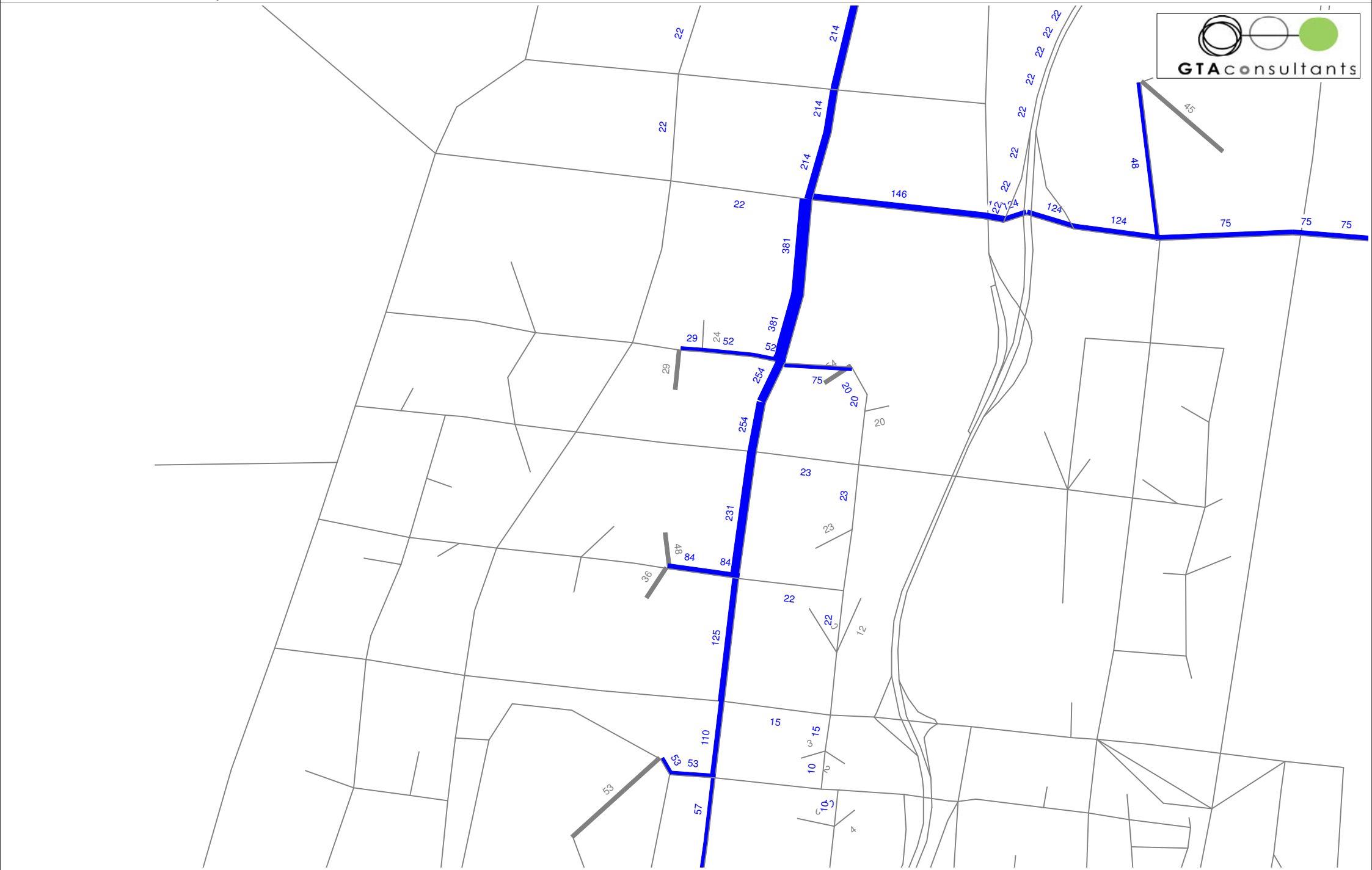
25/07/2014

VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2046 Scenario 1



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25/07/2014

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VITM Northern Growth Corridor Model
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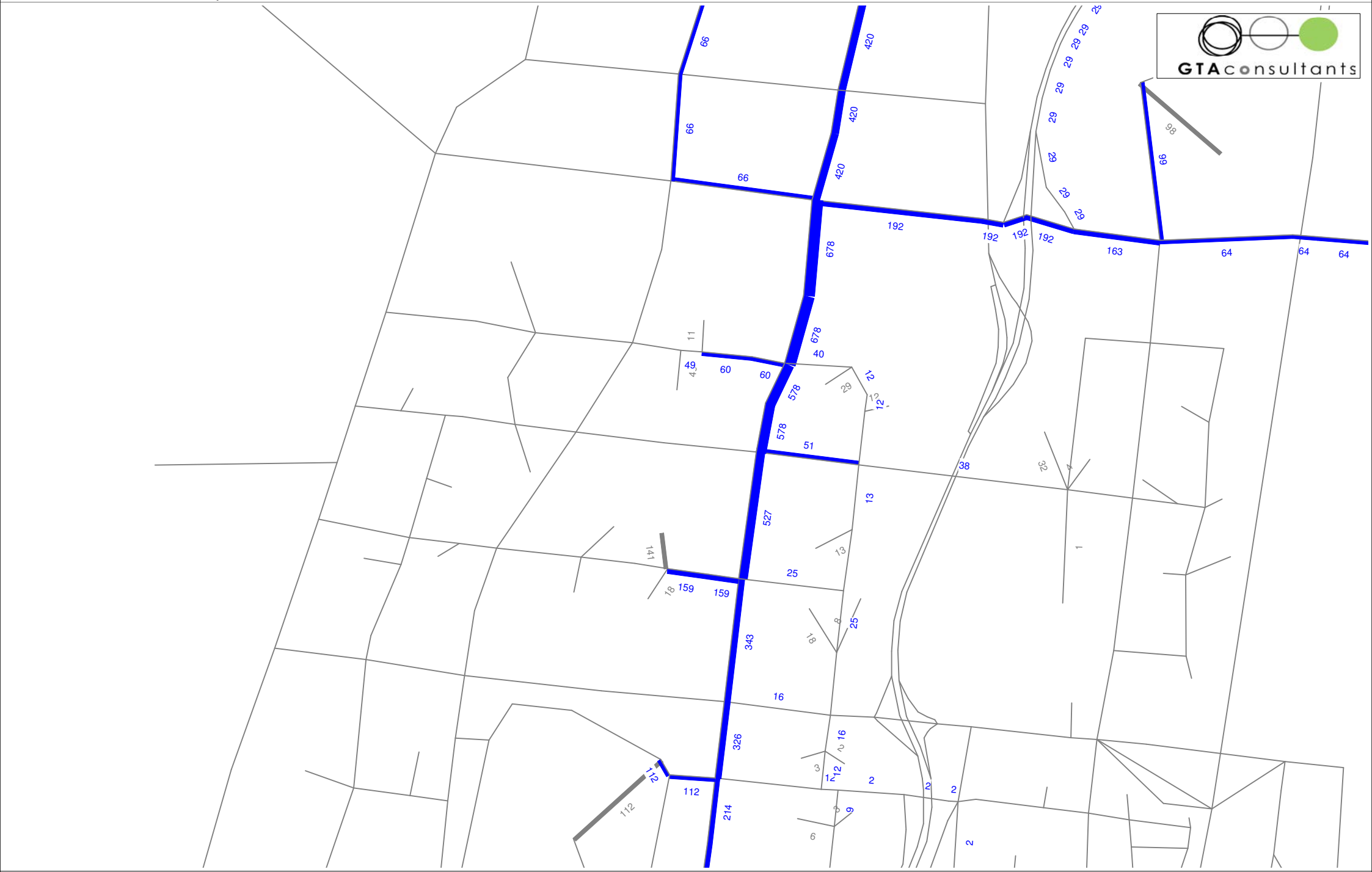

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VITM Northern Growth Corridor Model
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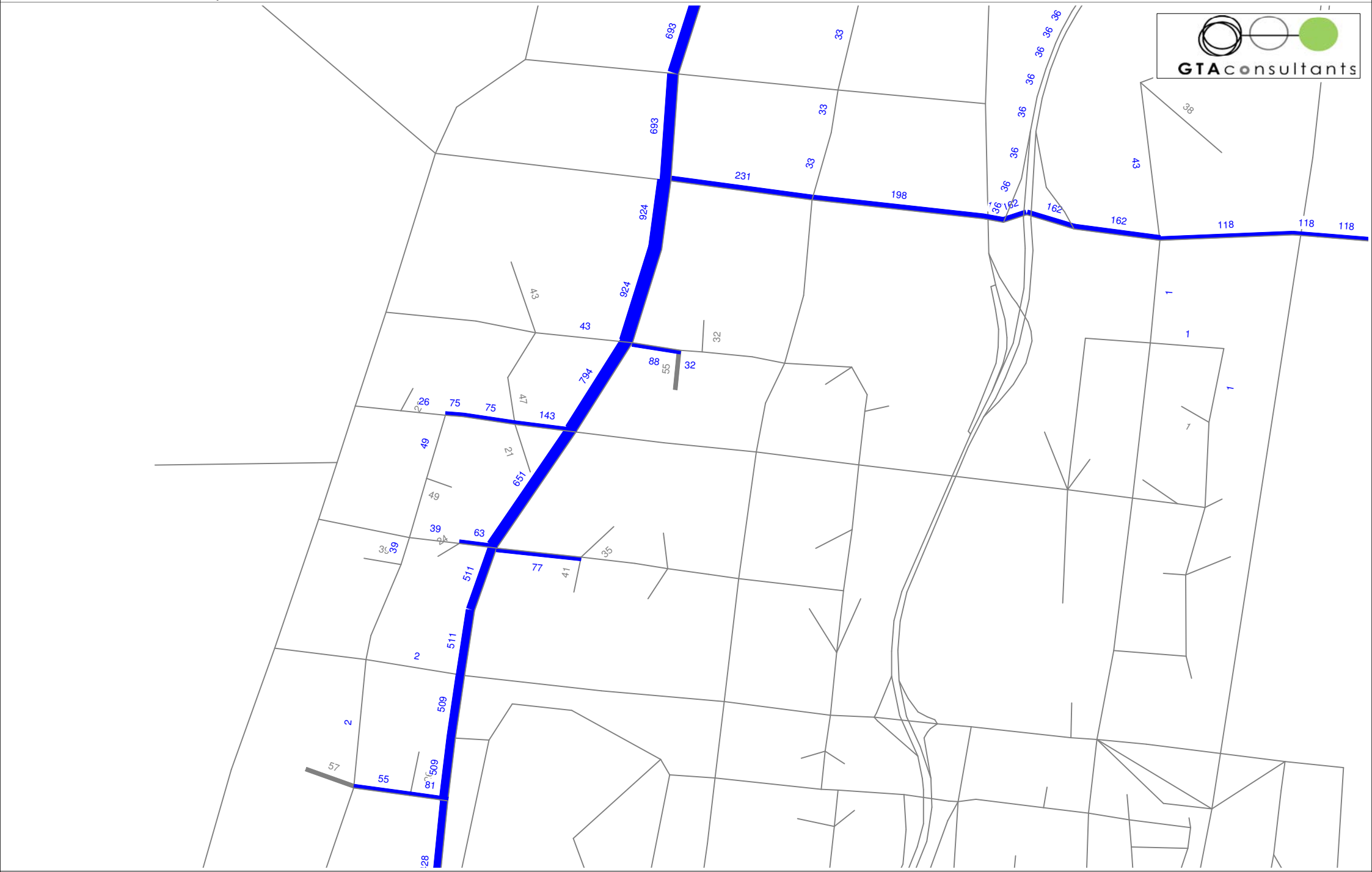

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VITM Northern Growth Corridor Model
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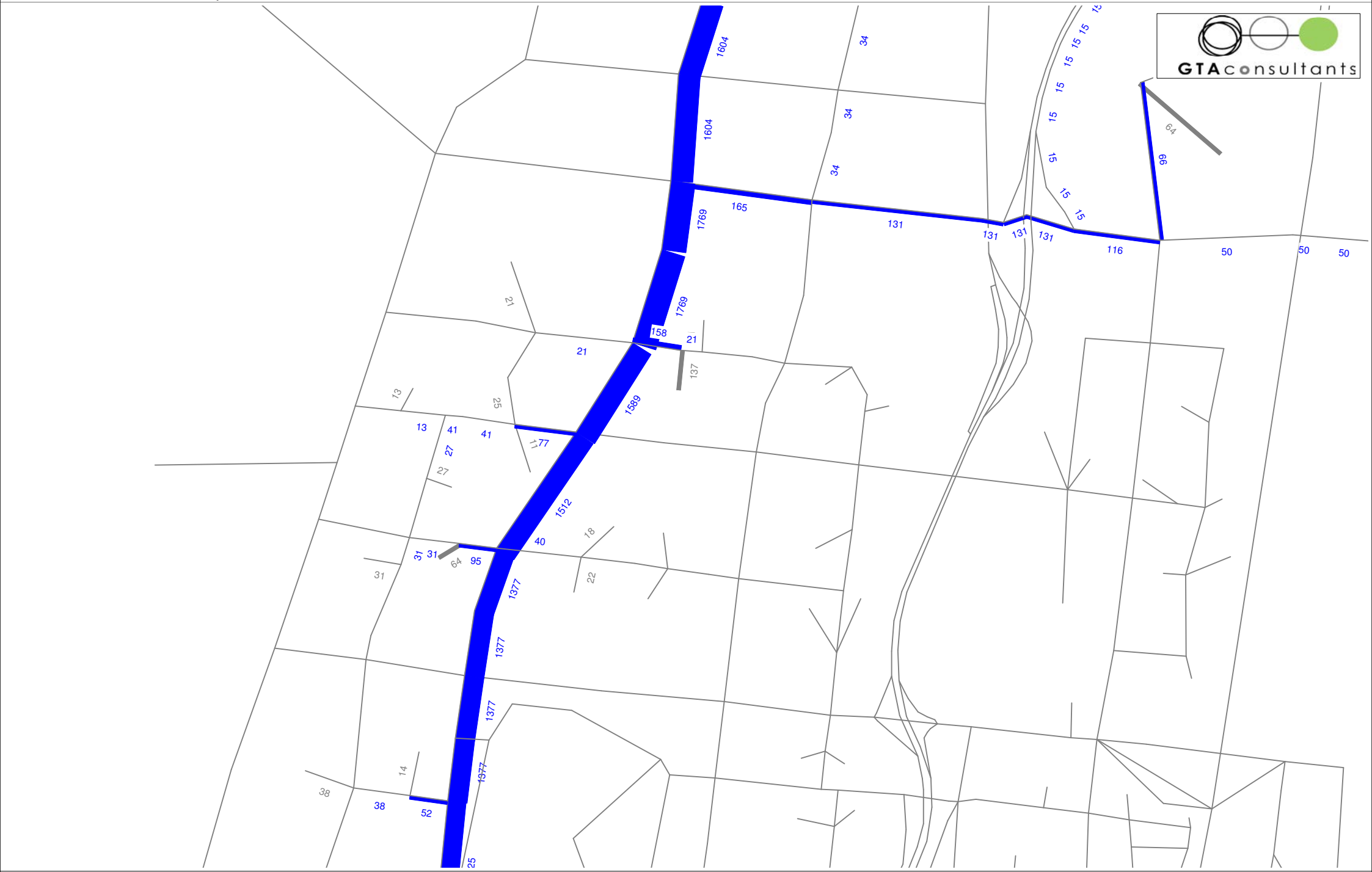

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VITM Northern Growth Corridor Model
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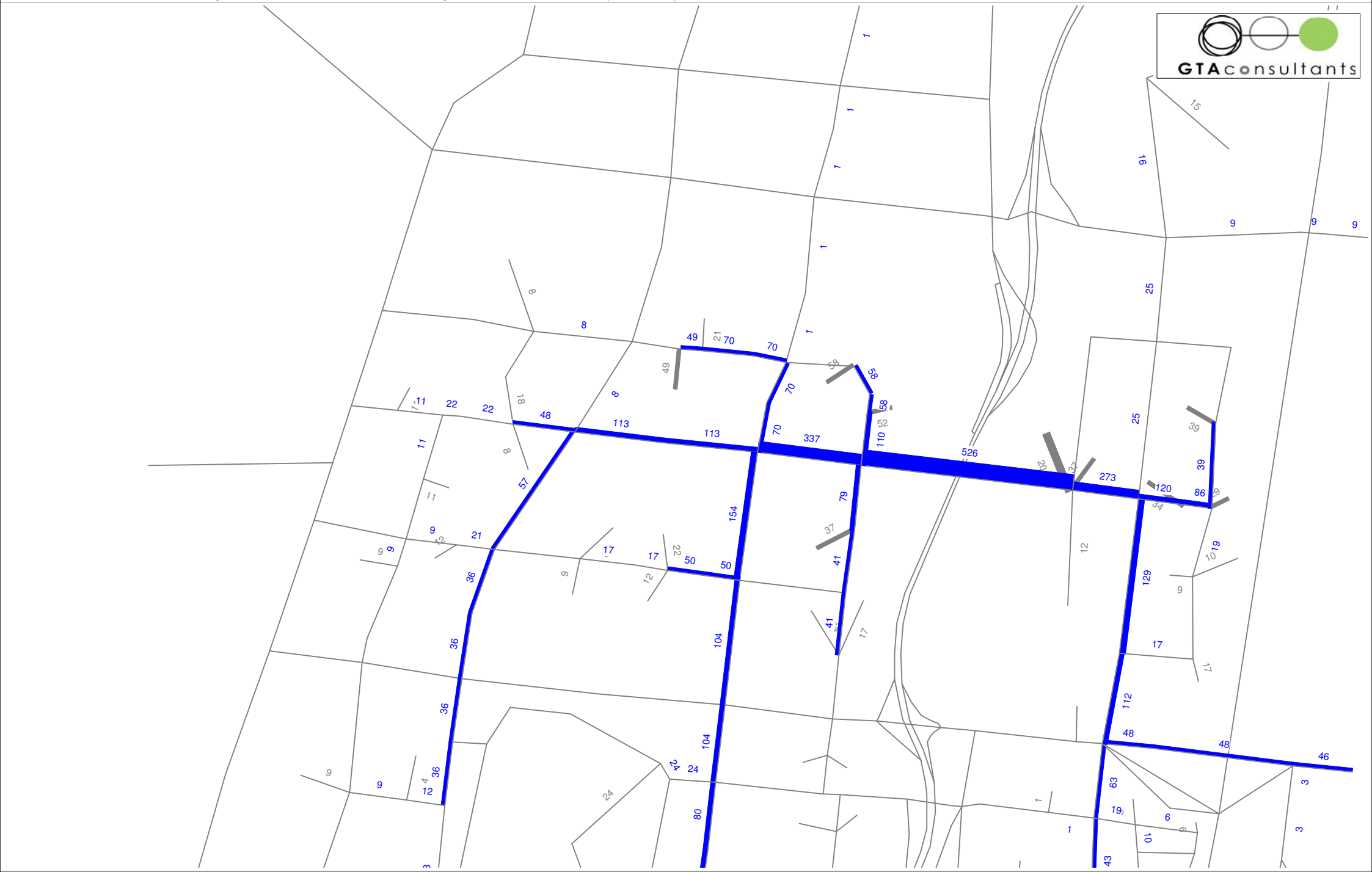

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VITM Northern Growth Corridor Model
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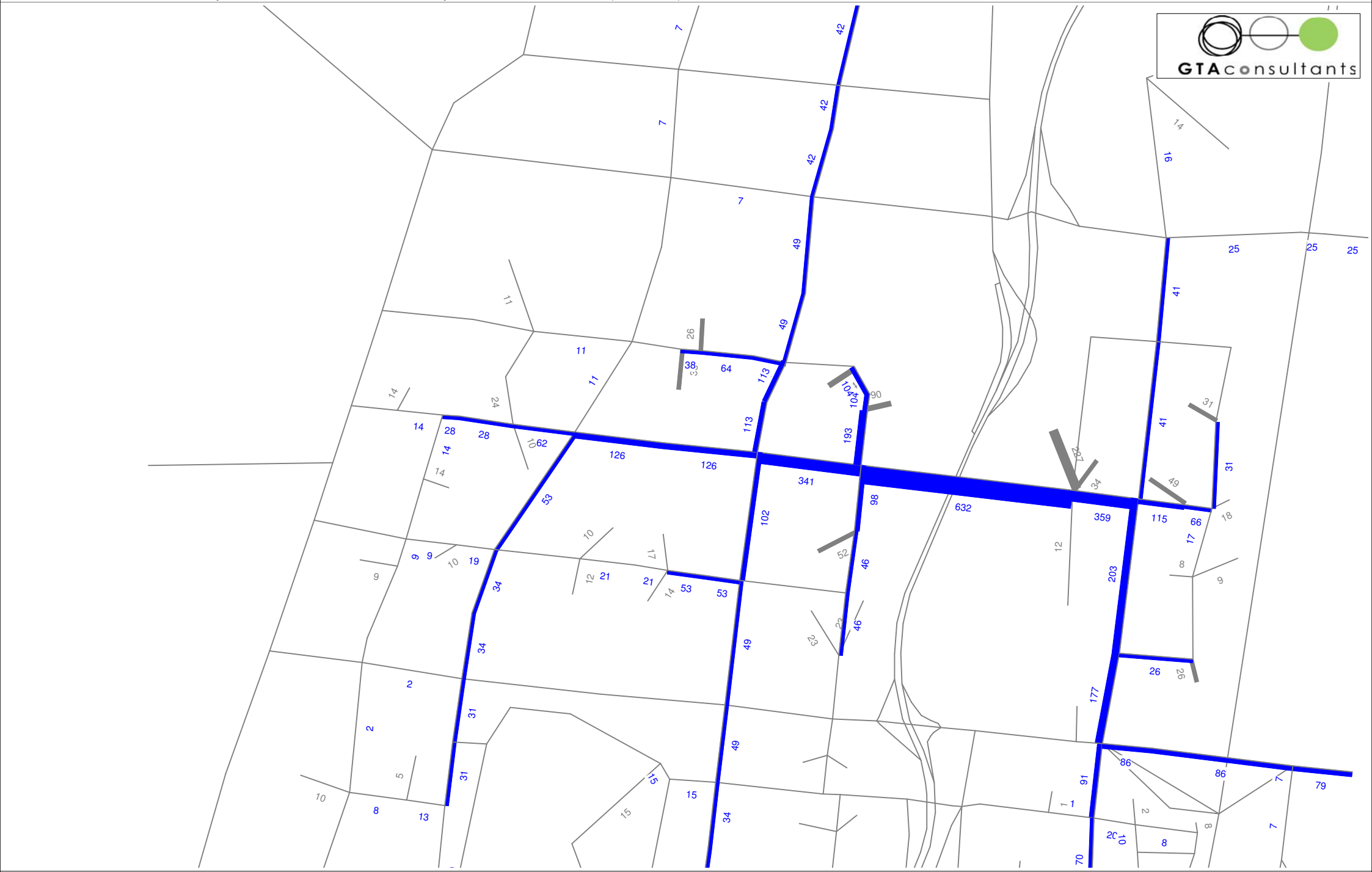

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VITM Northern Growth Corridor Model
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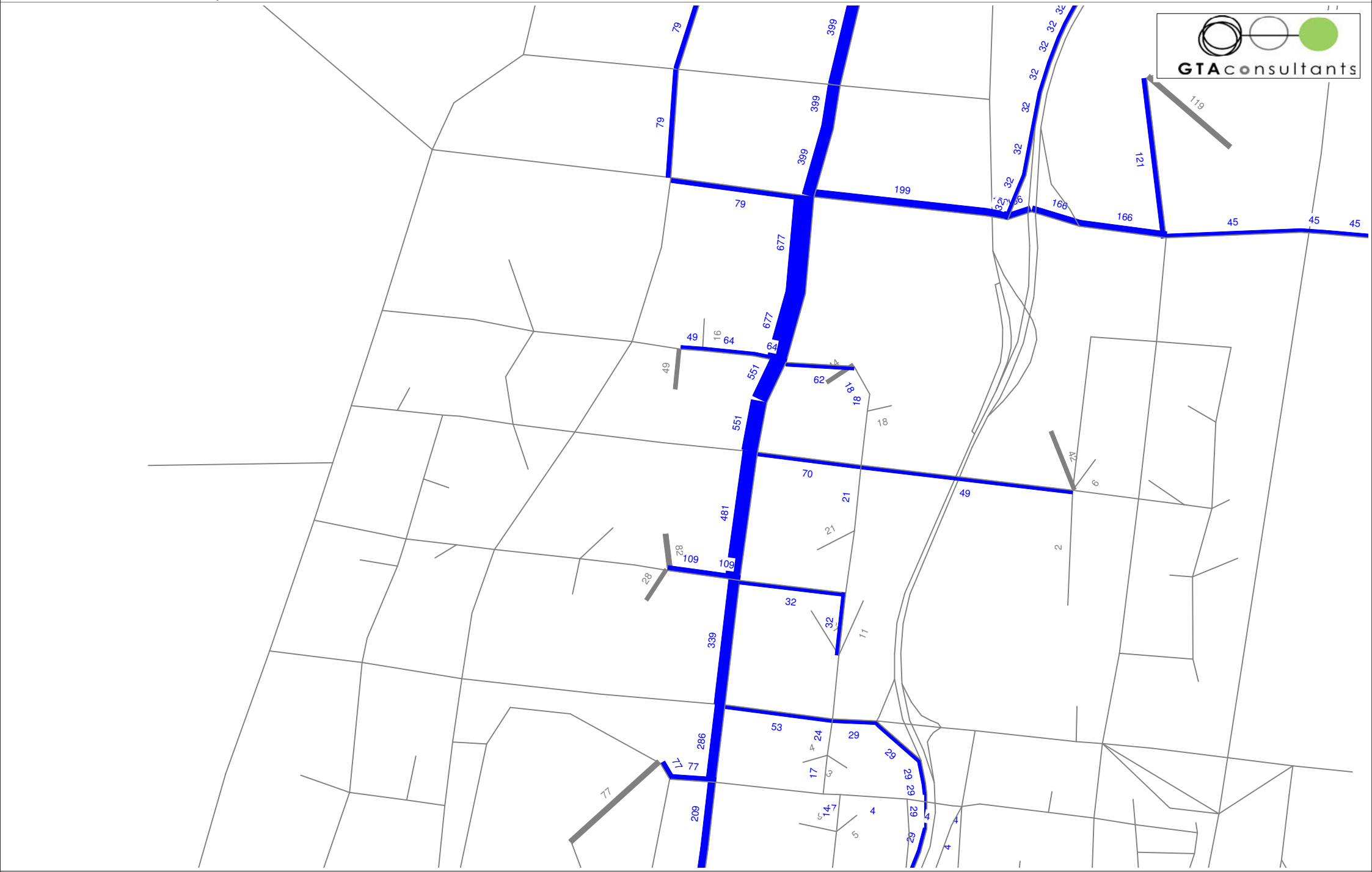

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VITM Northern Growth Corridor Model
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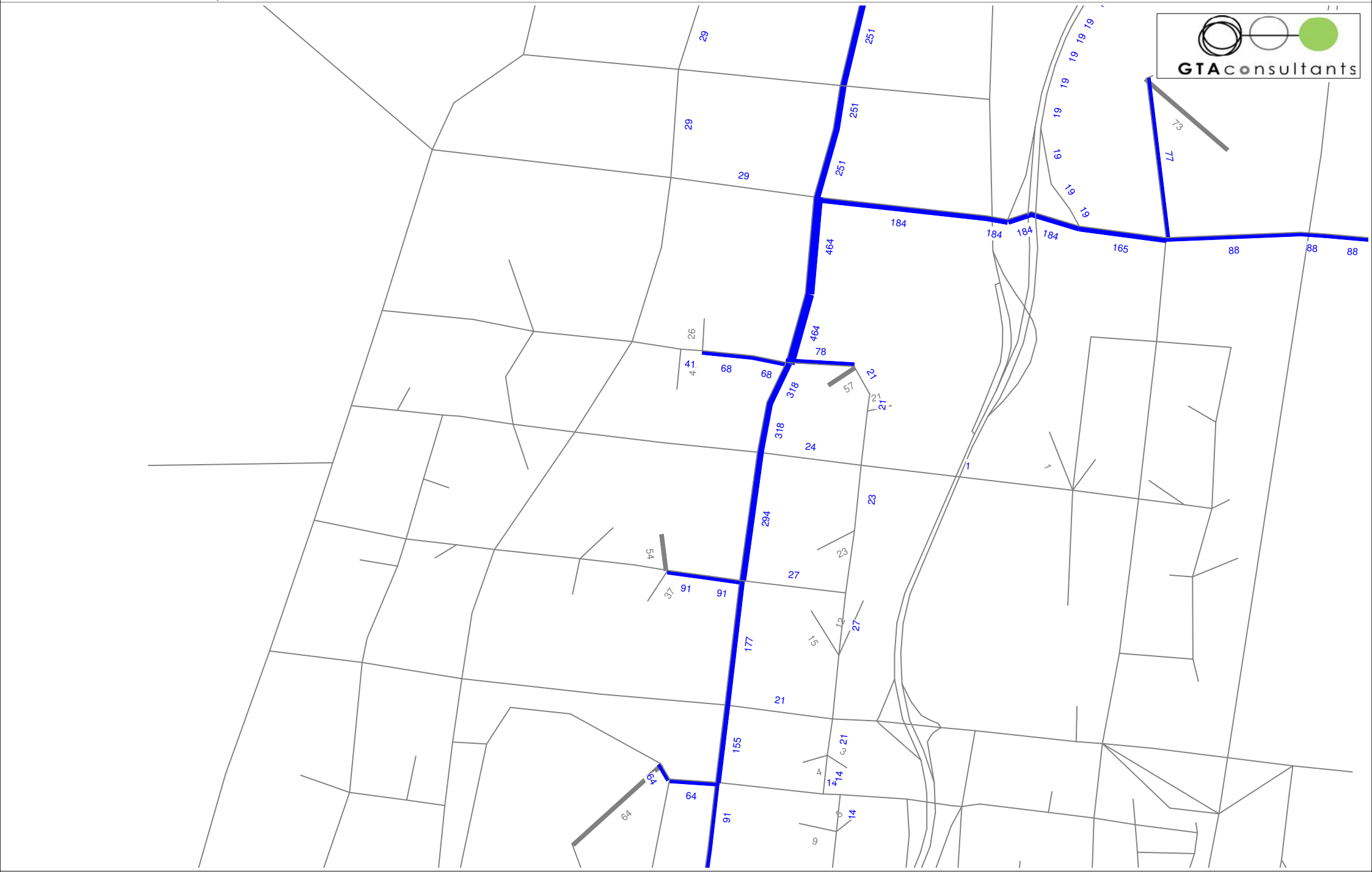

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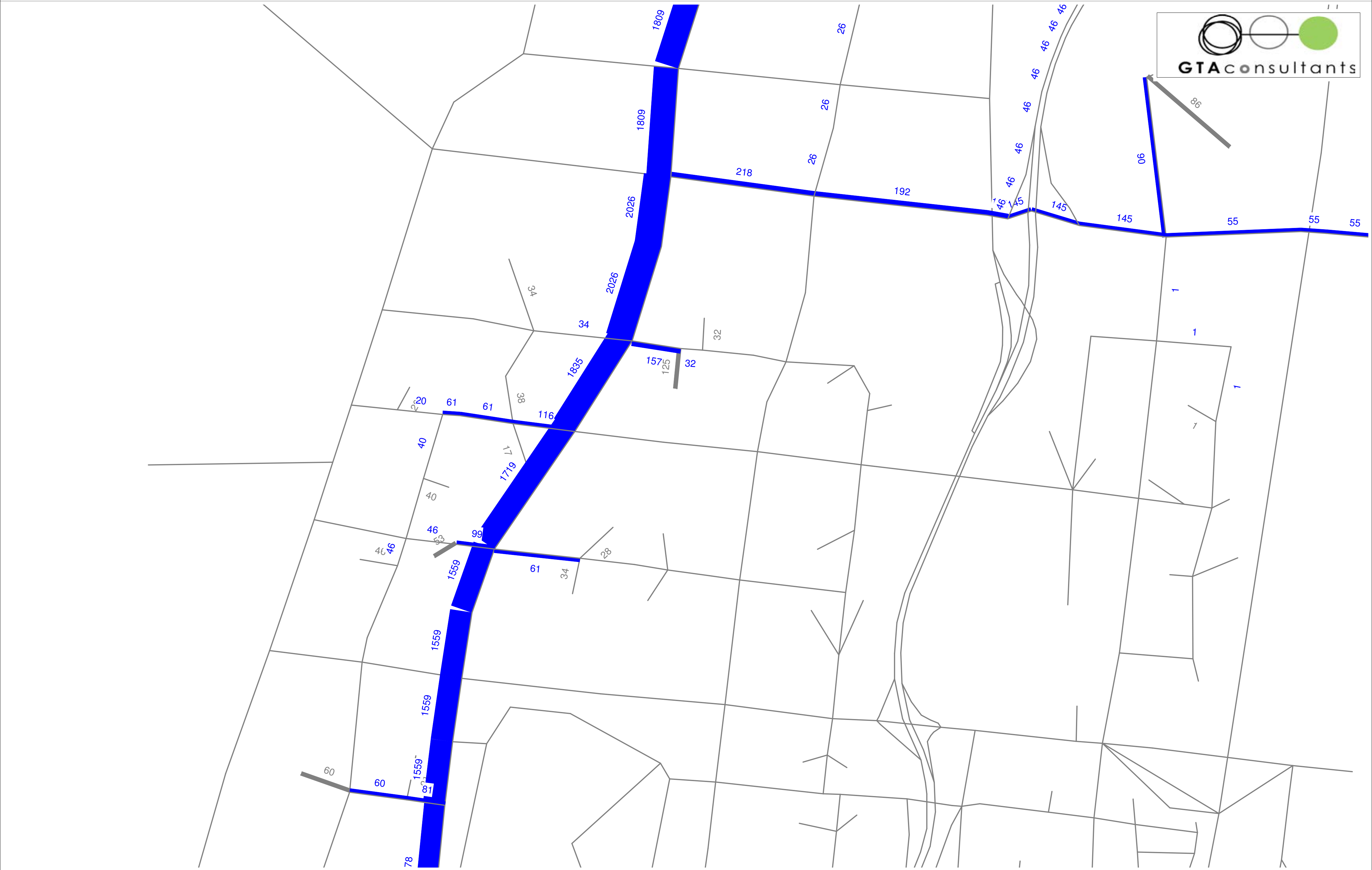

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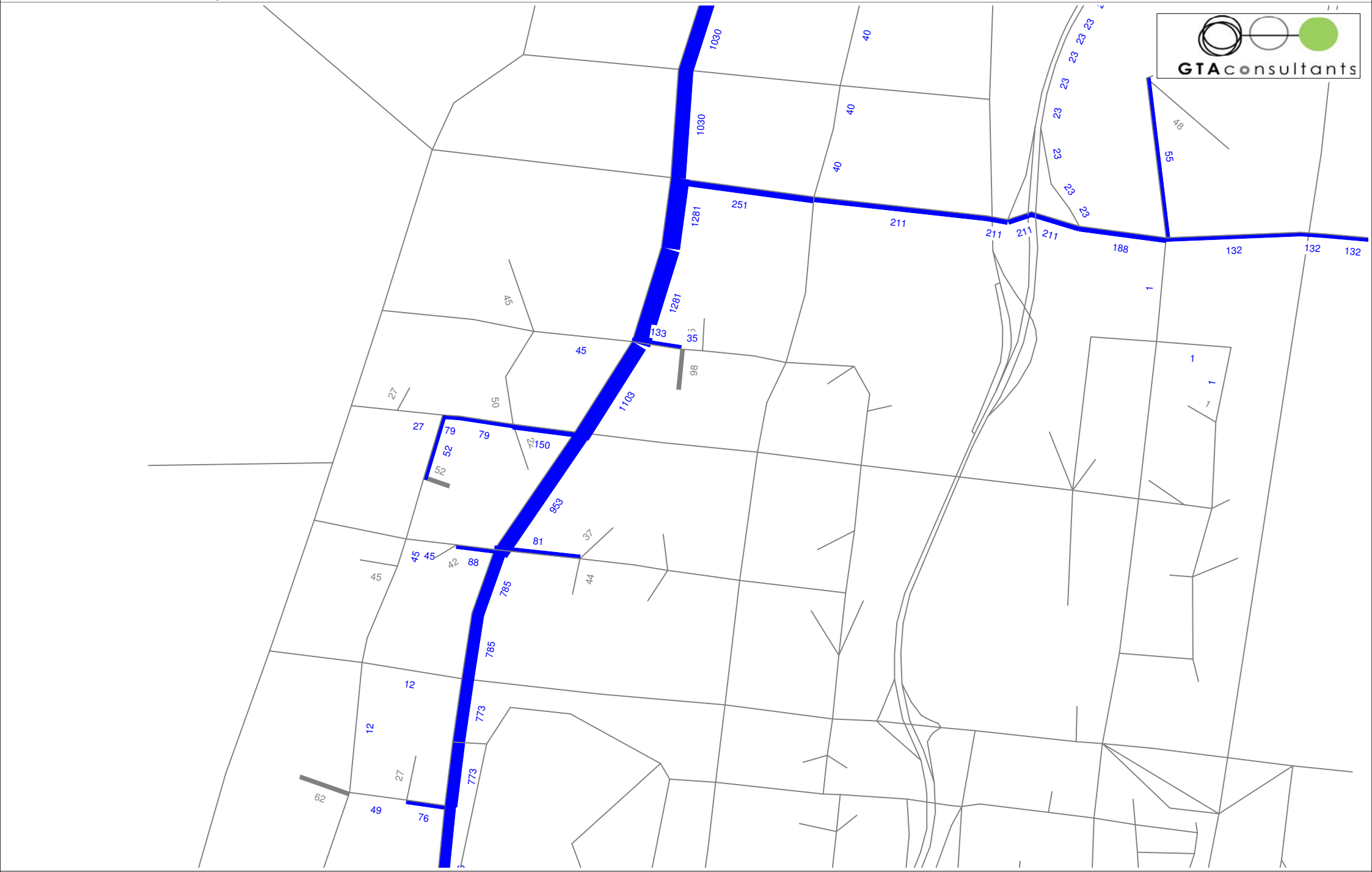
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd SB Year 2046 Scenario 1



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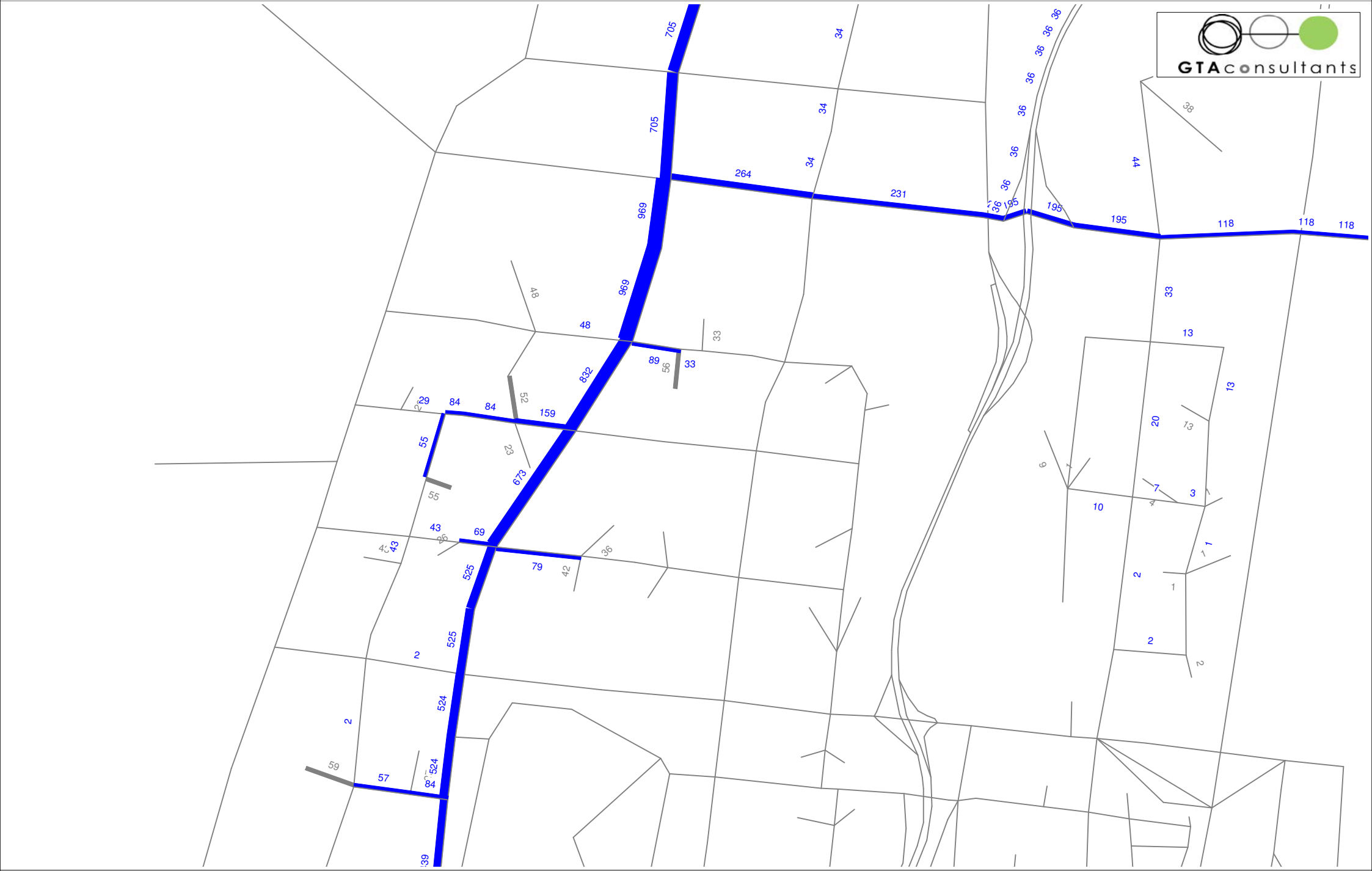
VITM Northern Growth Corridor Model
14M2340000 - AM Select Link Analysis E14 south of Stockdale Rd NB Year 2046 Scenario 2



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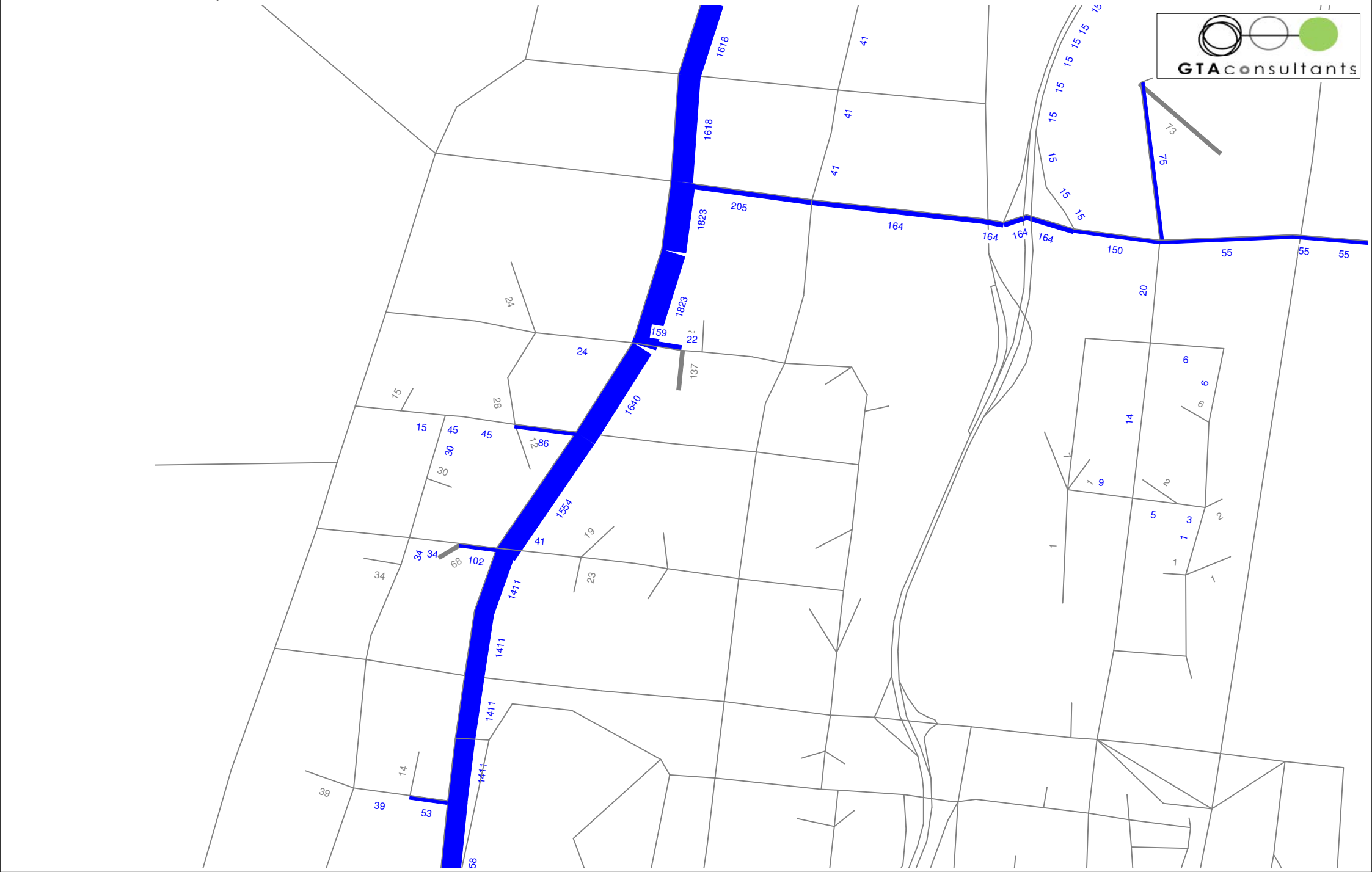

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VITM Northern Growth Corridor Model
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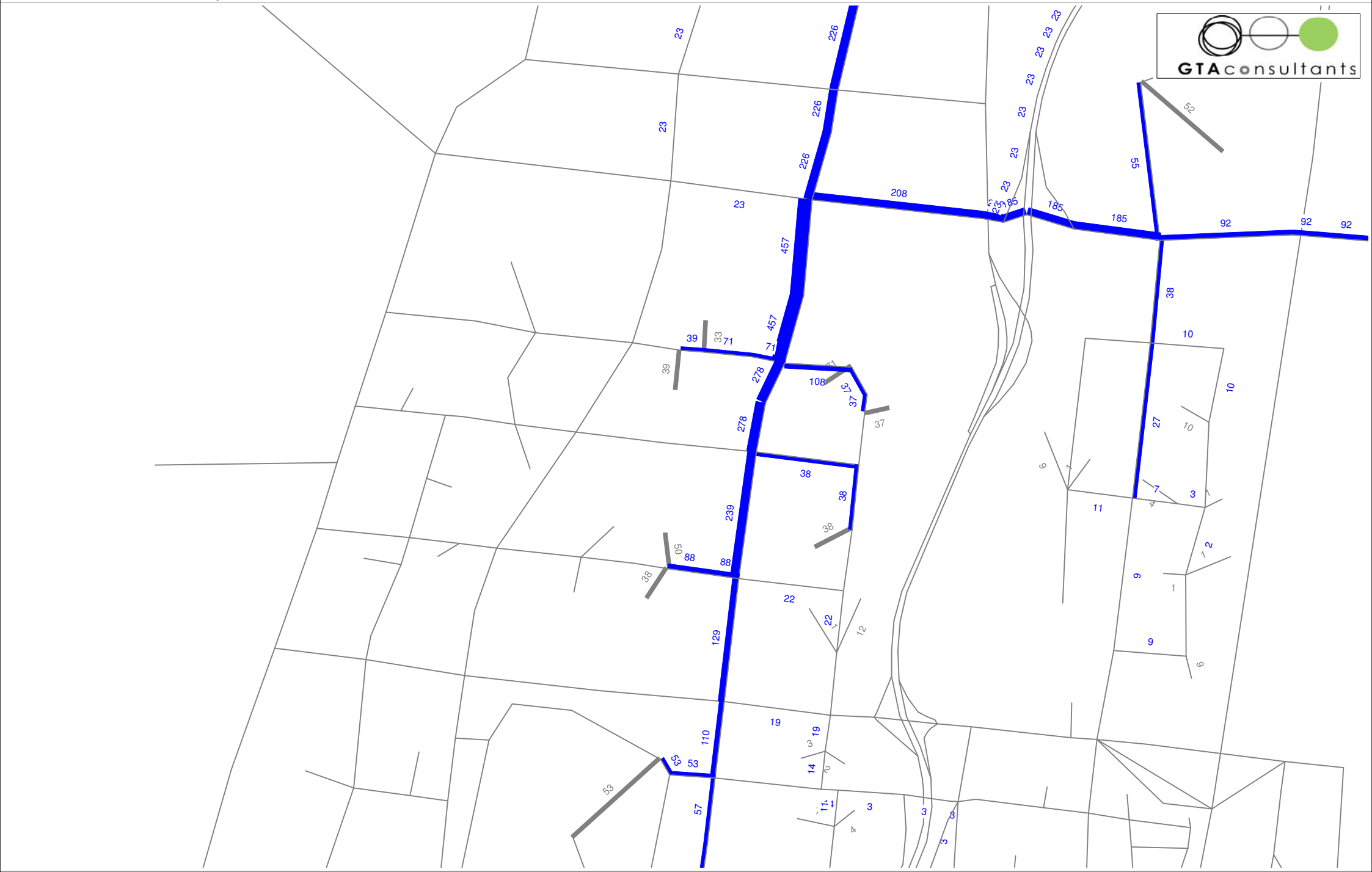

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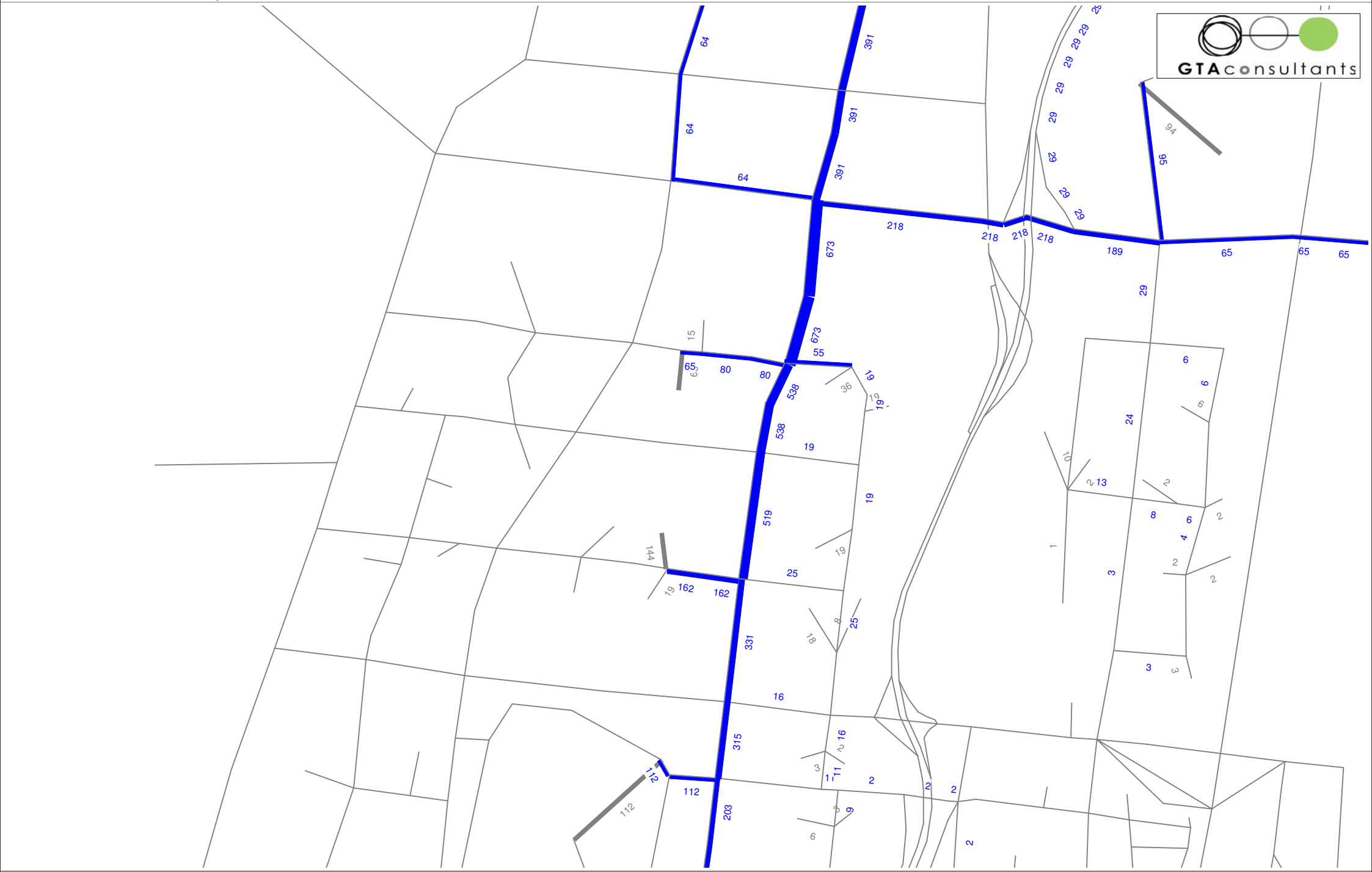

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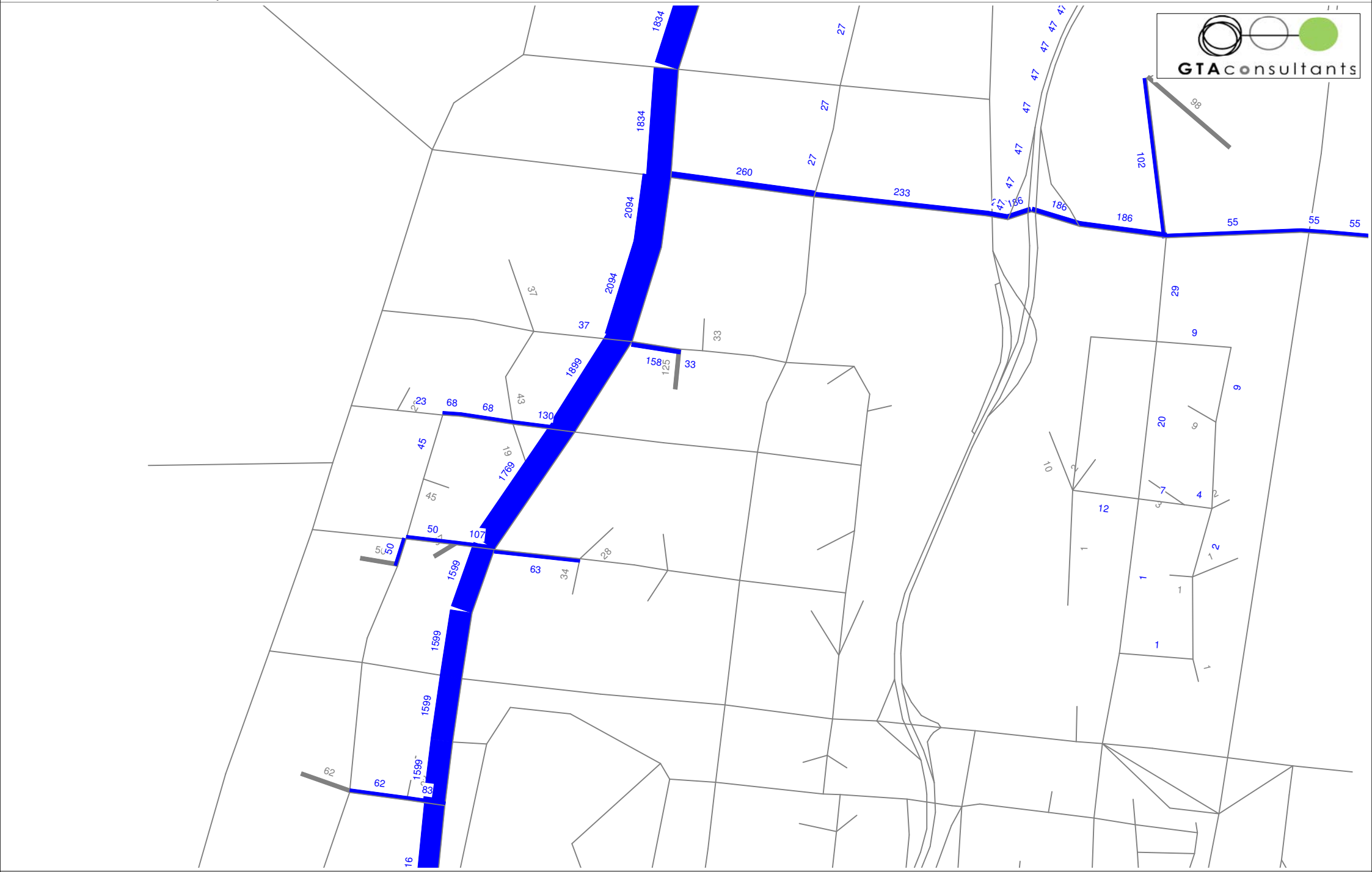
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis E14 south of Stockdale Rd NB Year 2046 Scenario 2



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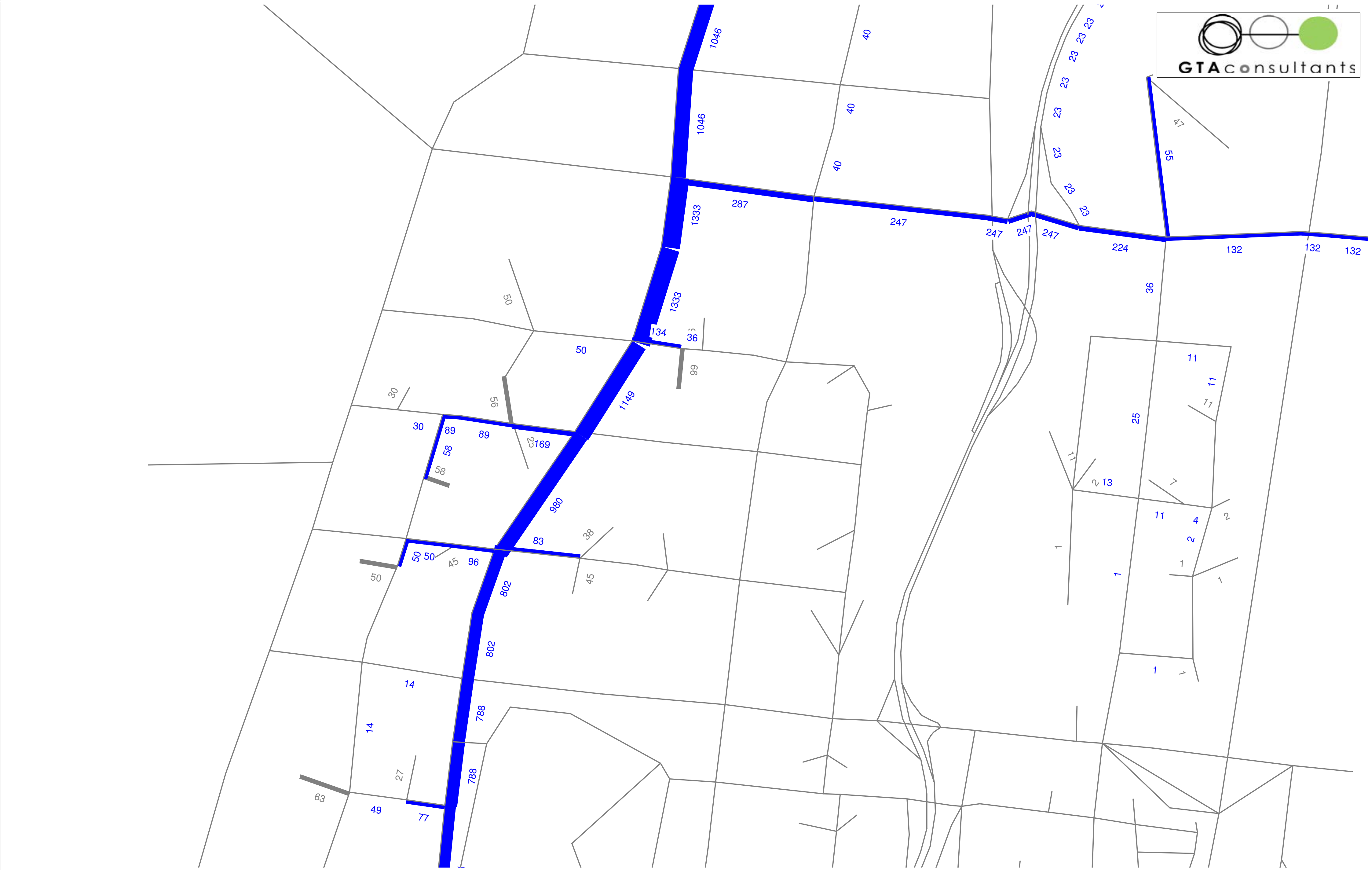
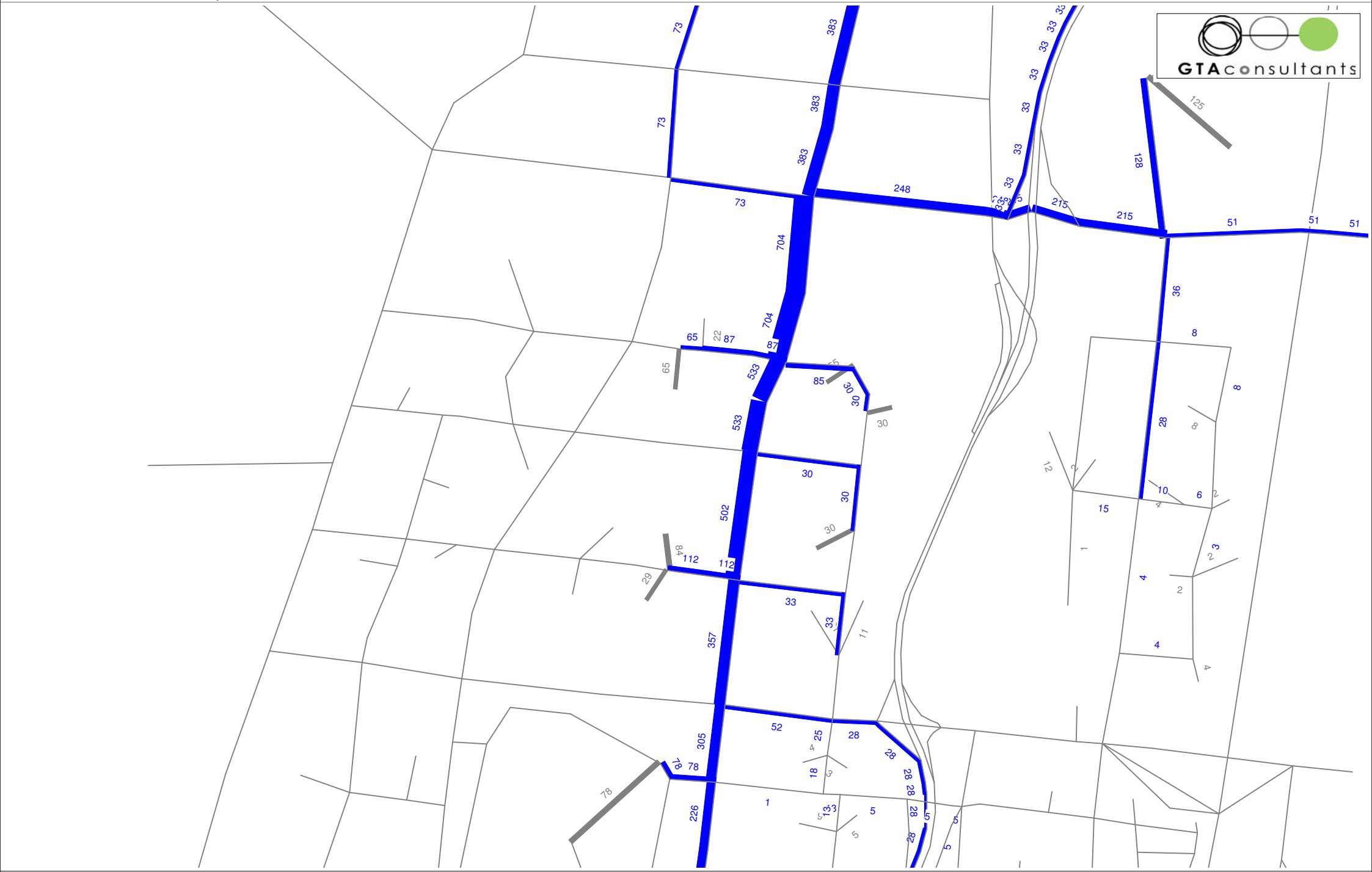


VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson Rd south of Stockdale Rd NB Year 2046 Scenario 2



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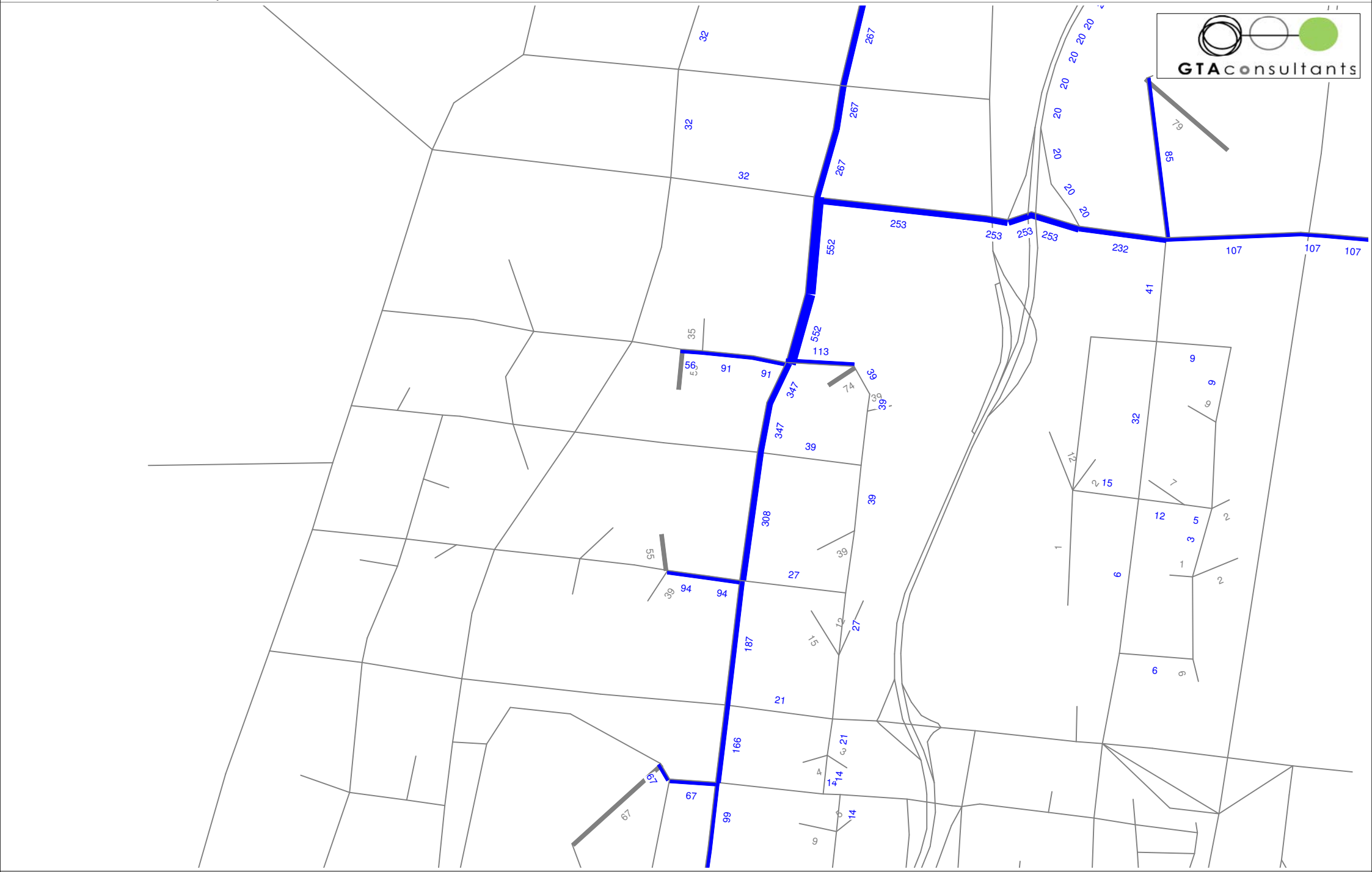
VITM Northern Growth Corridor Model
14M2340000 - PM Select Link Analysis Patterson Rd south of Stockdale Rd SB Year 2046 Scenario 2



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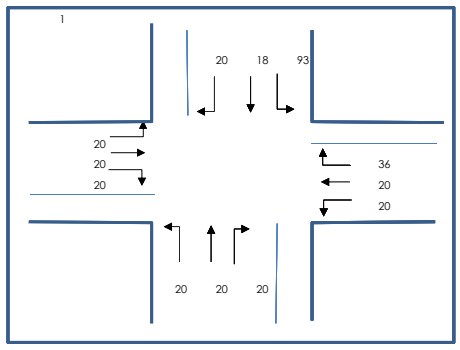
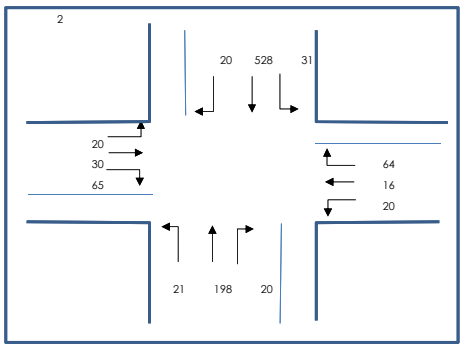
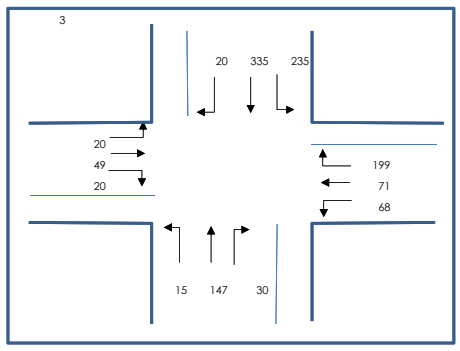
Appendix E

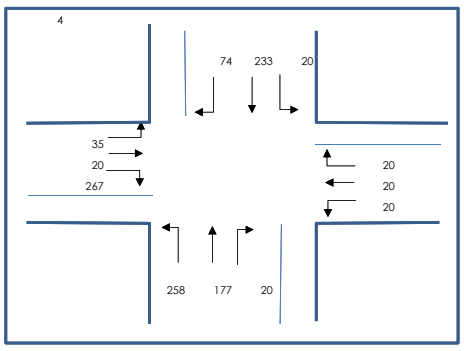
Peak Hour Intersection Turning Movements

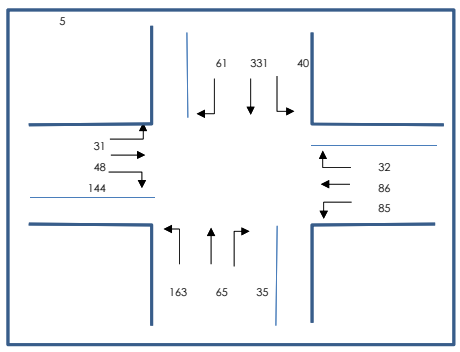
1 Hr AM 2026 Base Case Turning Movement

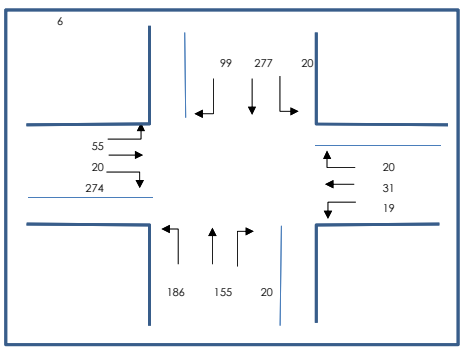


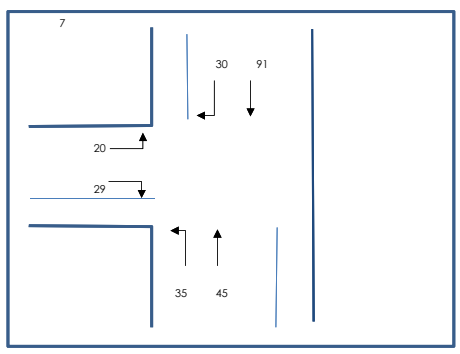


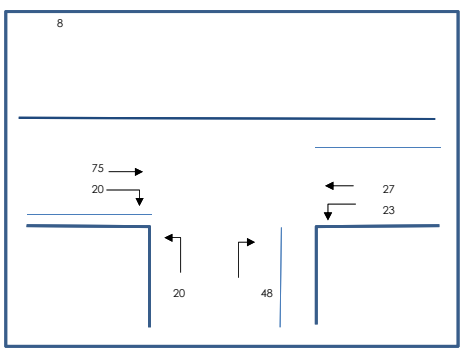


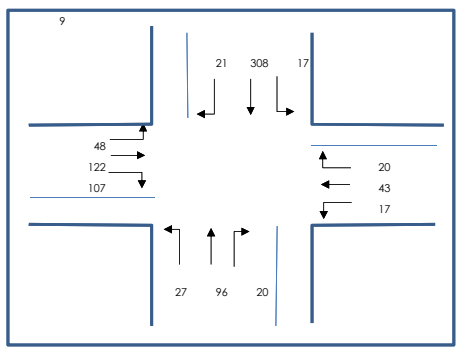


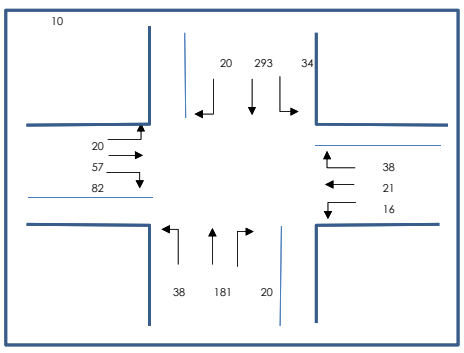


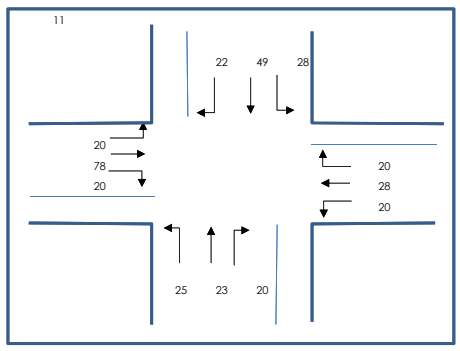


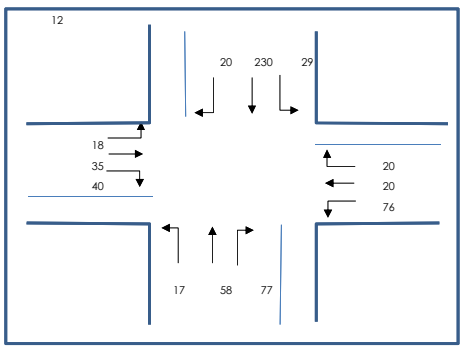


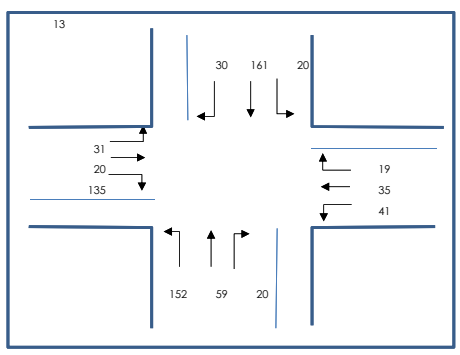




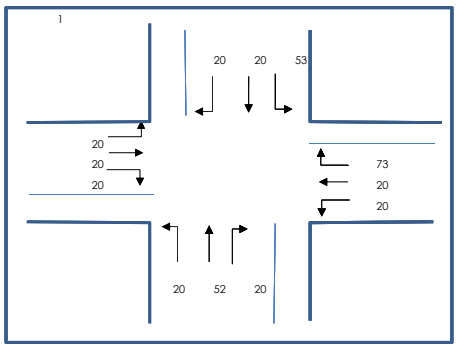


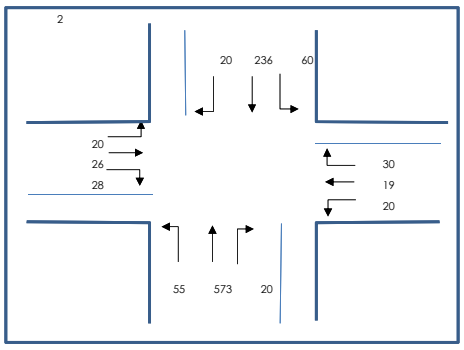


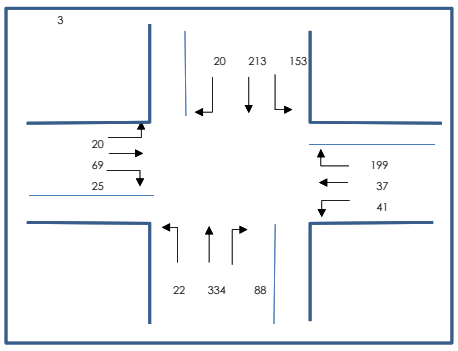


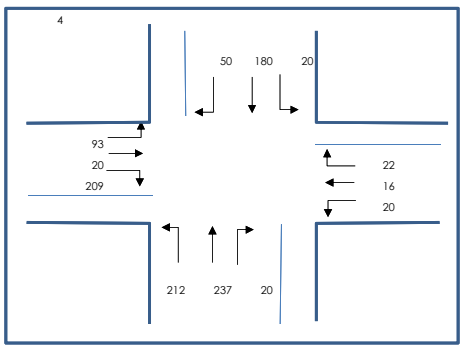


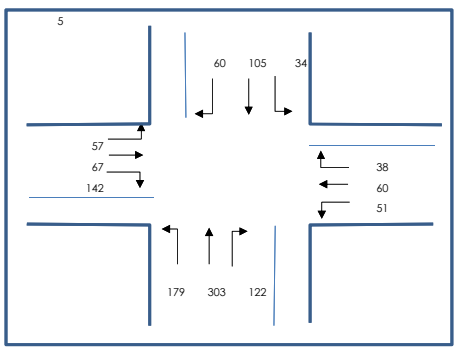
1 Hr PM 2026 Base Case Turning Movement

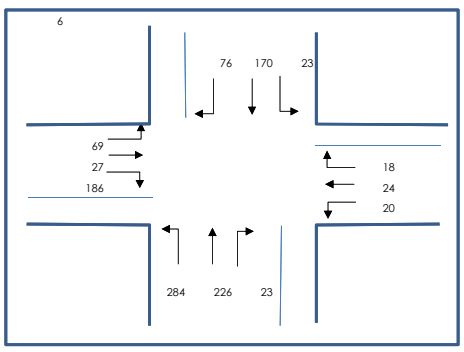


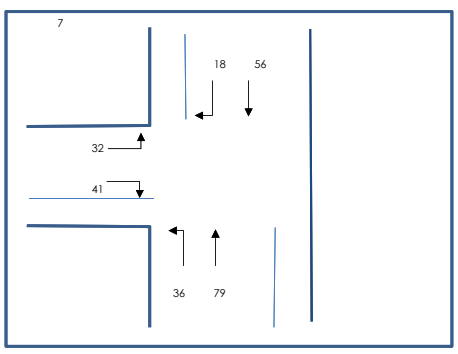


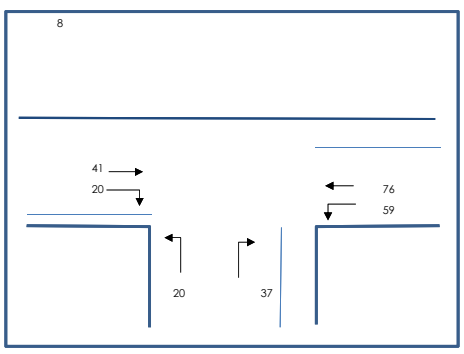


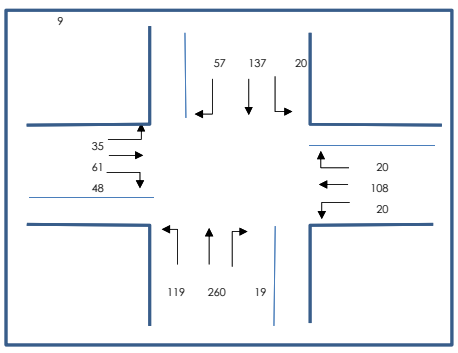


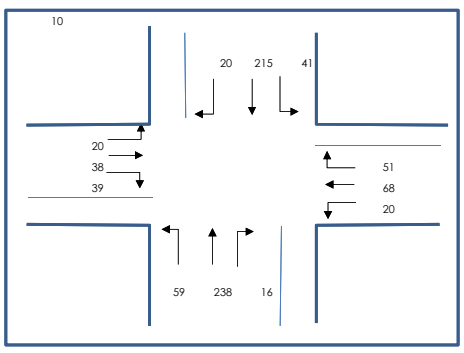


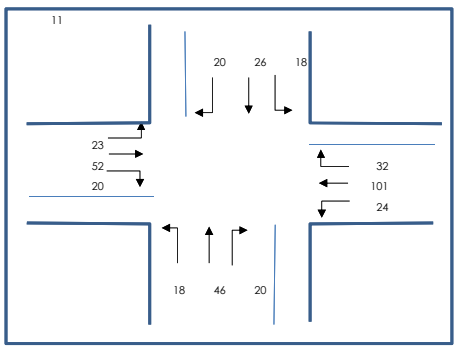


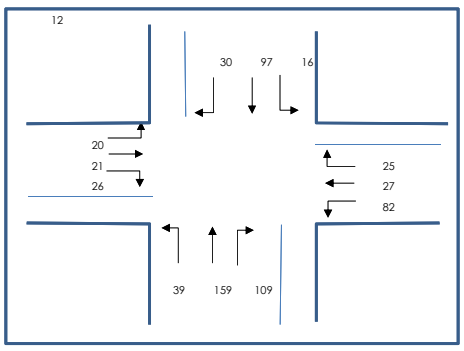


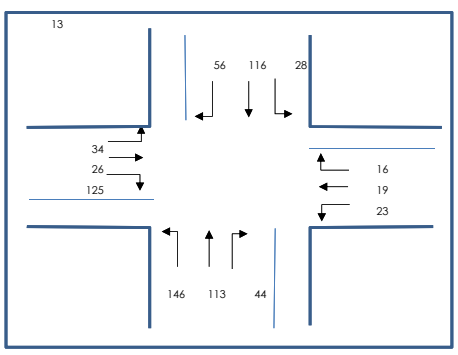




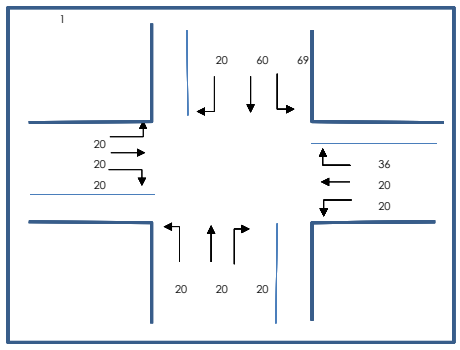


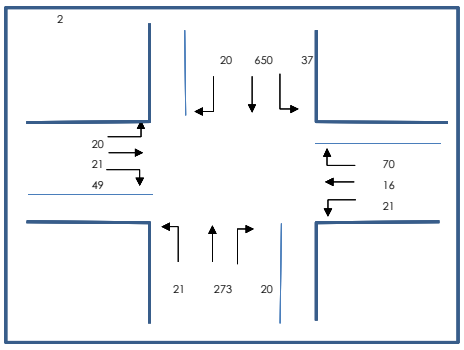


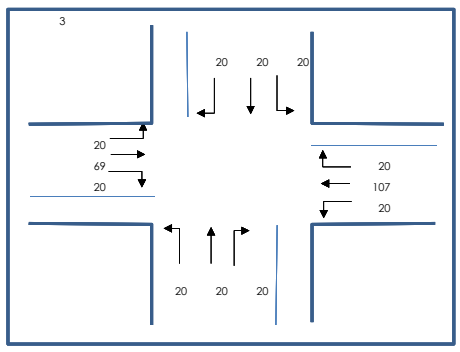


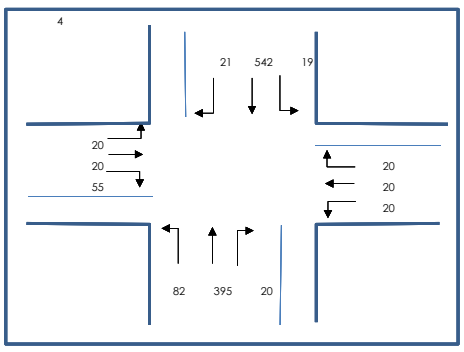


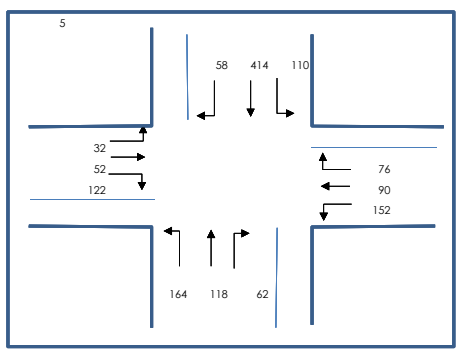
1 Hr AM 2026 Scenario 2 Turning Movement

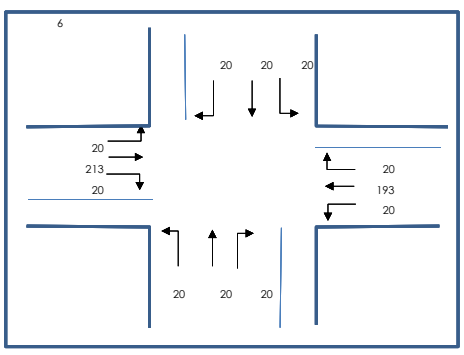


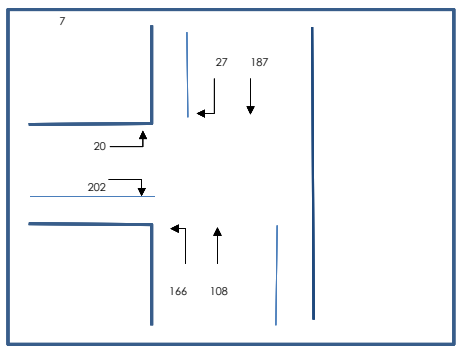


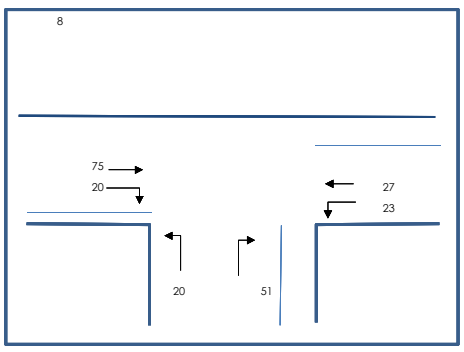


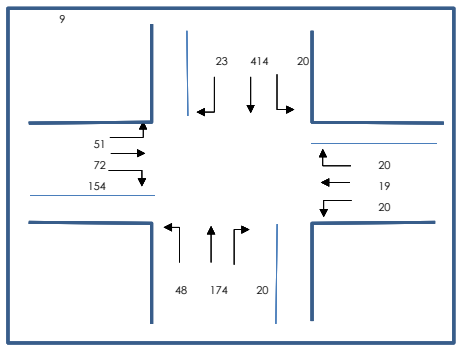


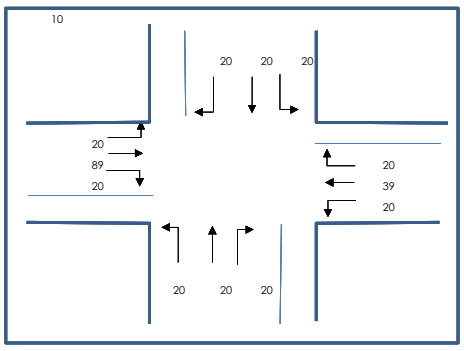


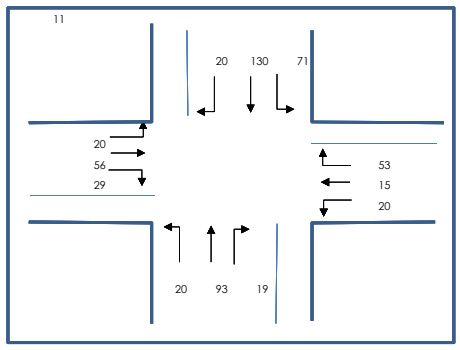


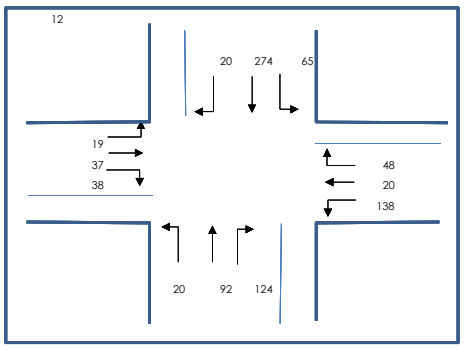


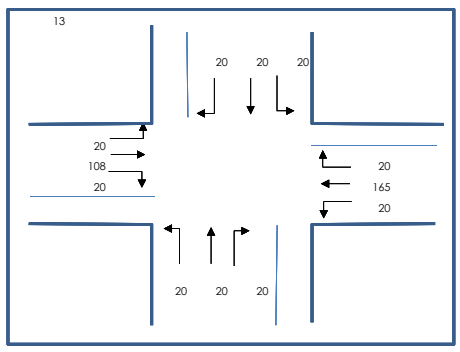




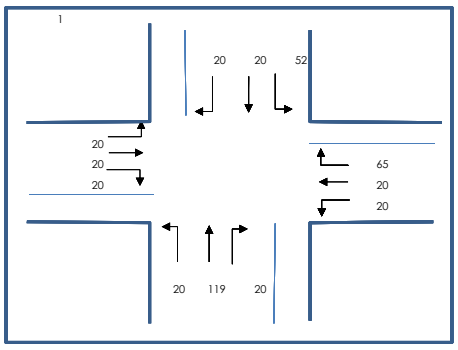


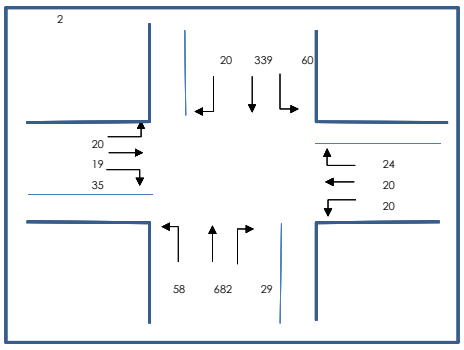


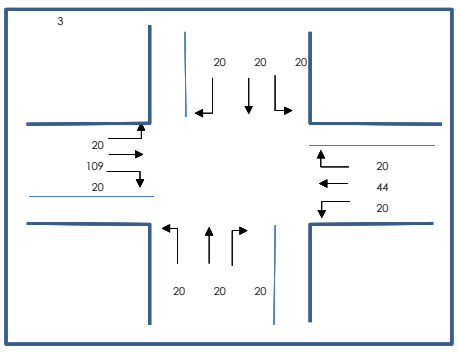


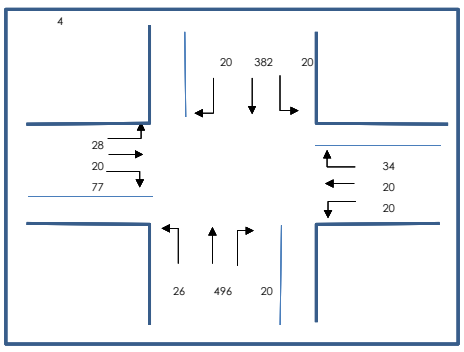


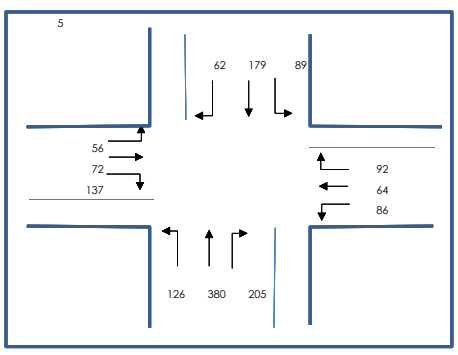
1 Hr PM 2026 Scenario 2 Turning Movement

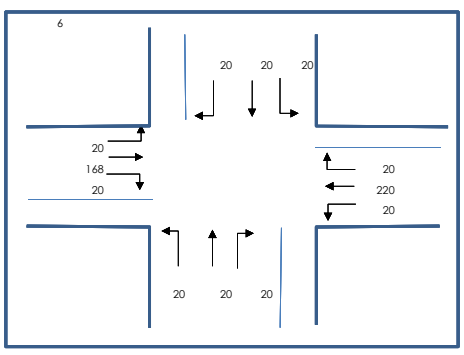


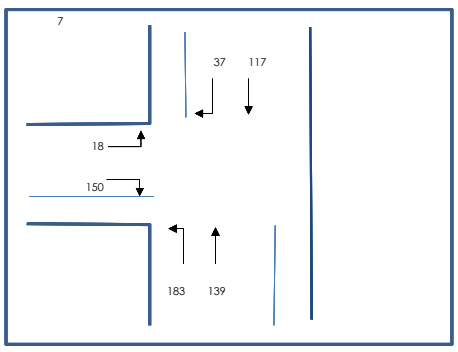


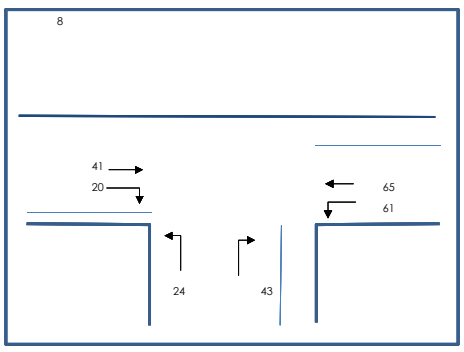


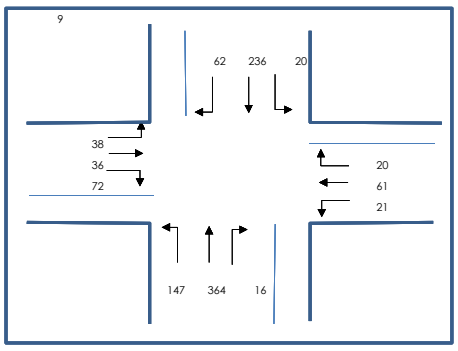


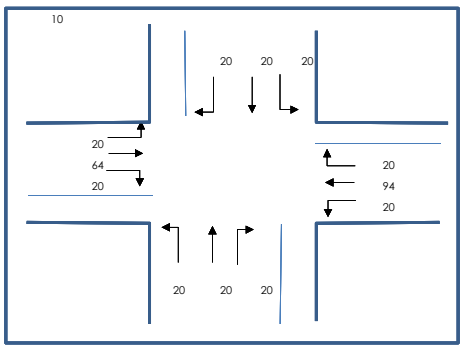


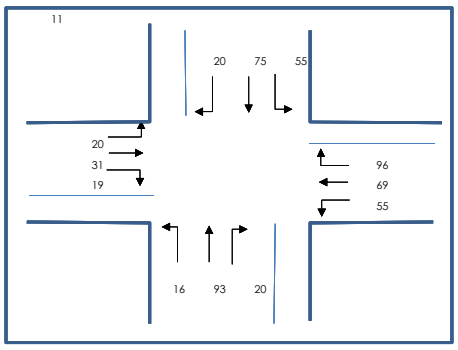


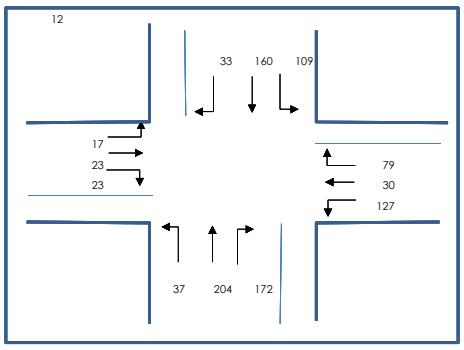


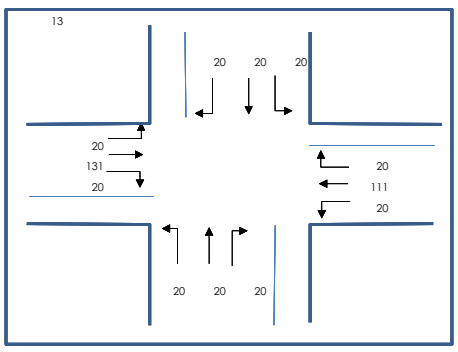




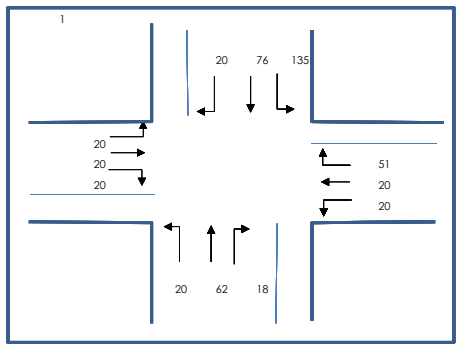


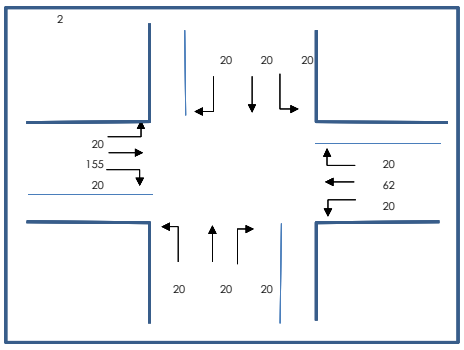


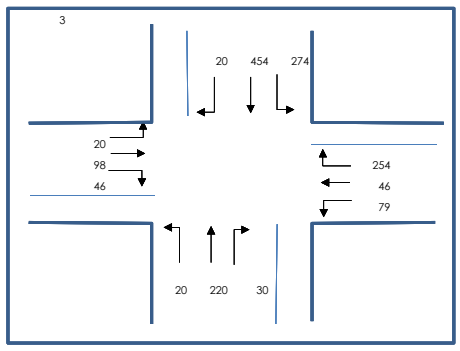


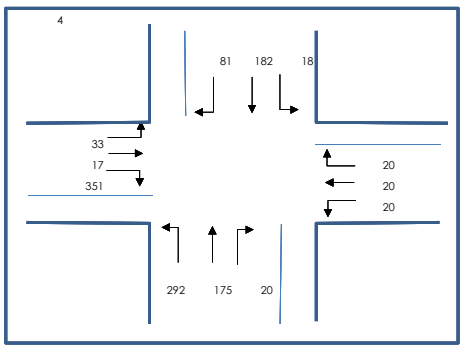


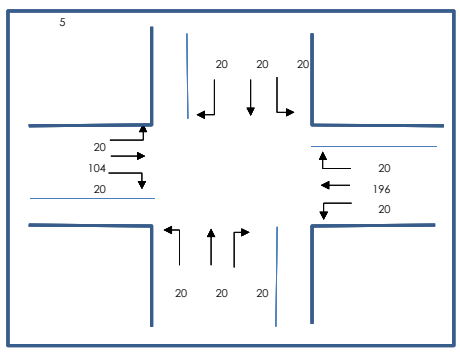
1 Hr AM 2026 Scenario 3 Turning Movement

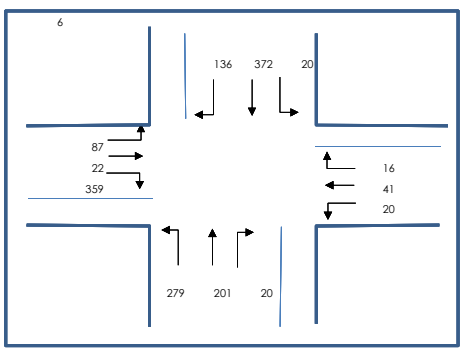


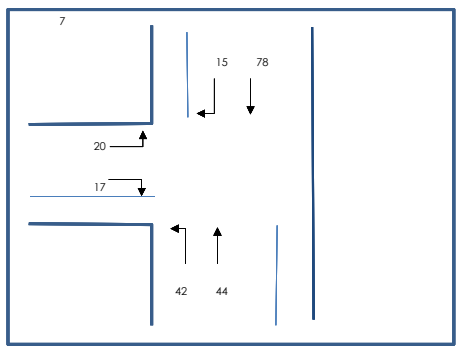


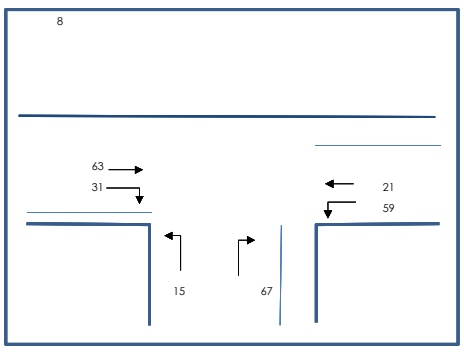


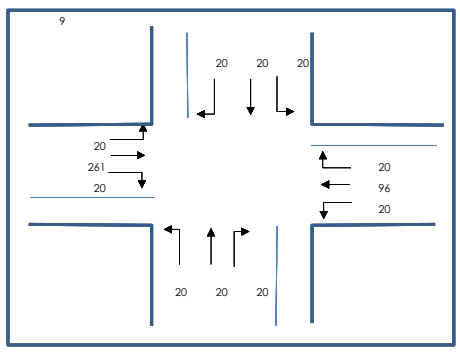


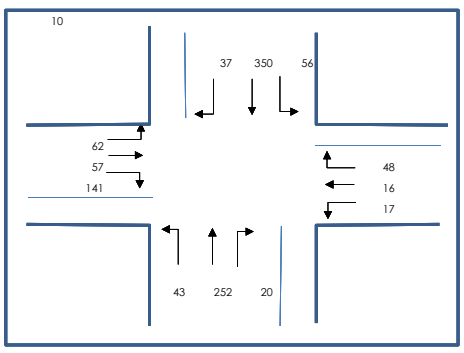


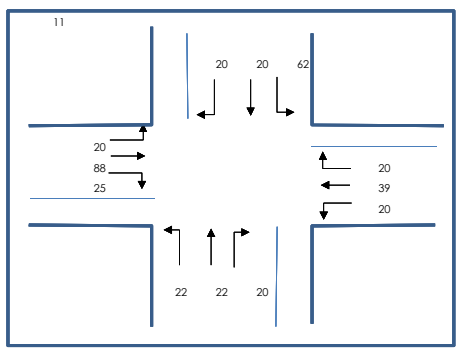


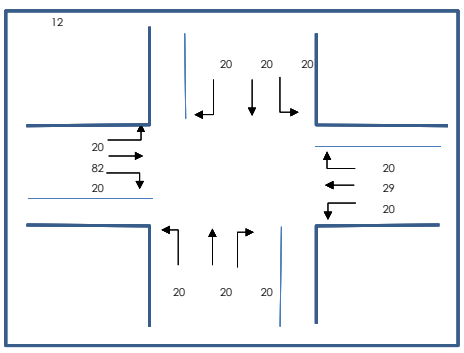


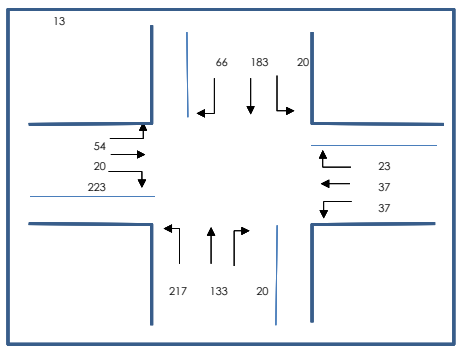




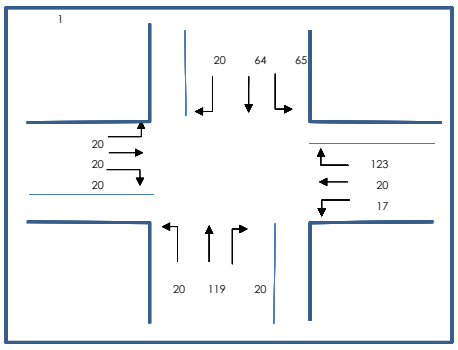


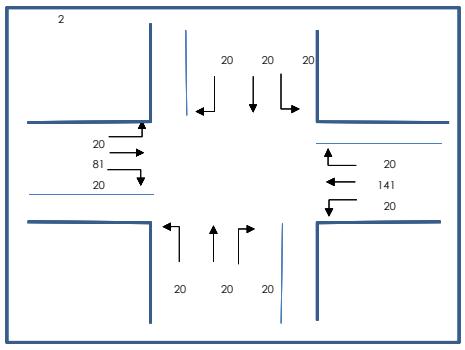


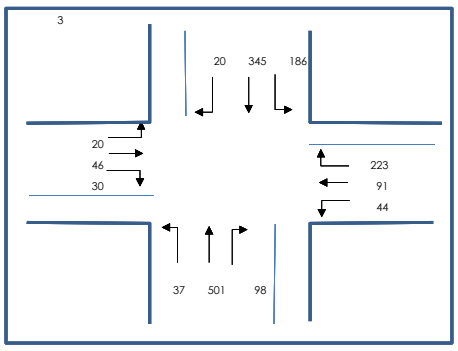


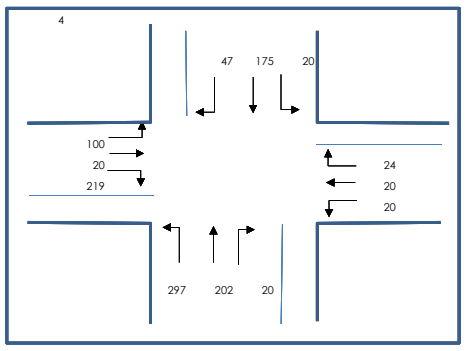


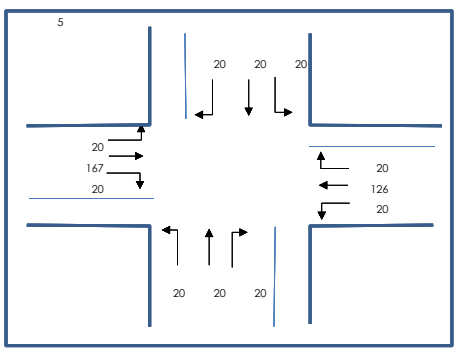
1 Hr PM 2026 Scenario 3 Turning Movement

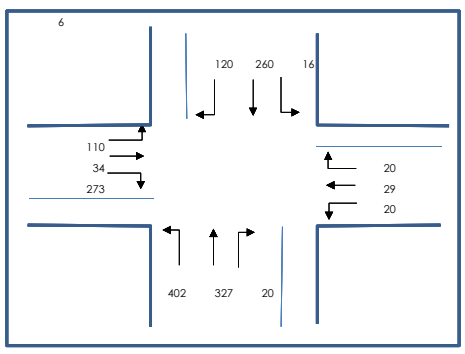


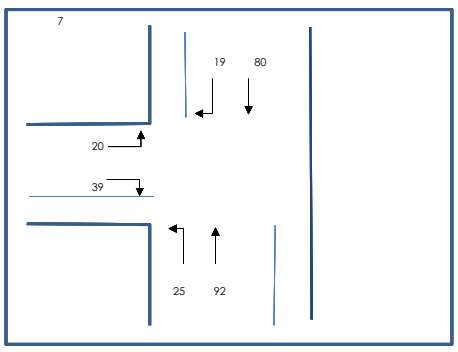


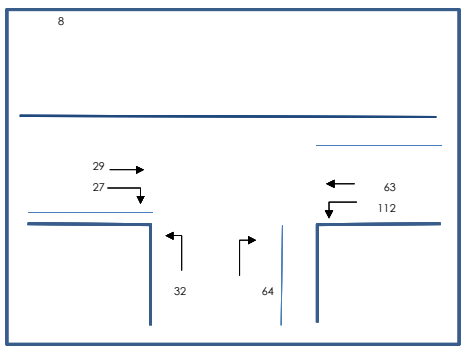


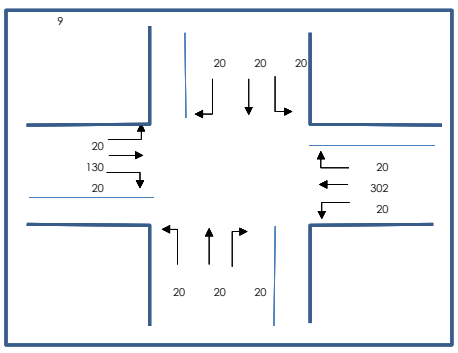


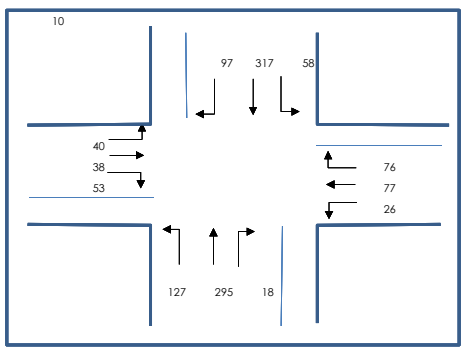


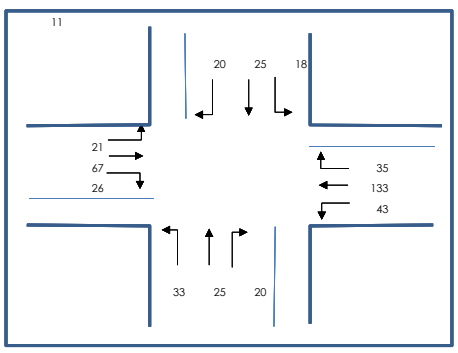


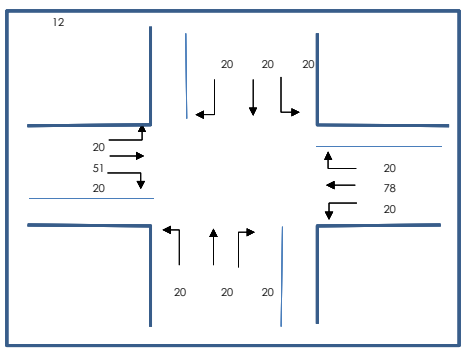


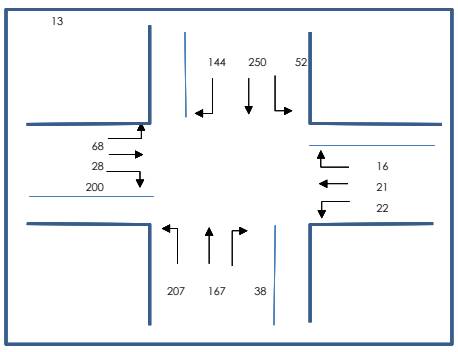




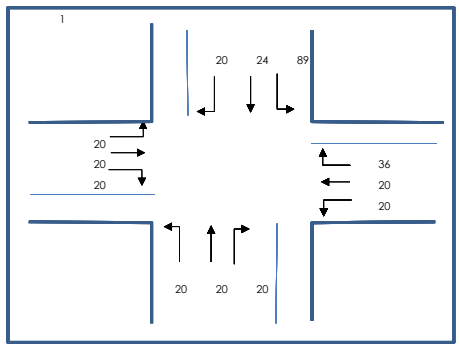


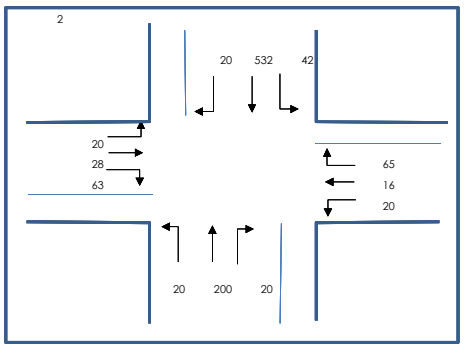


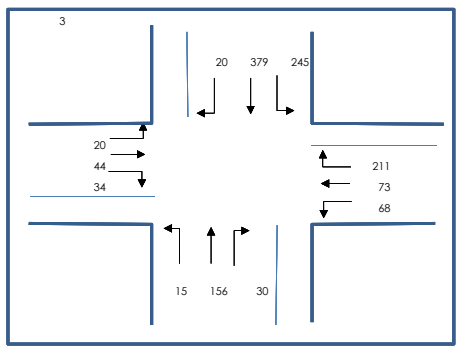


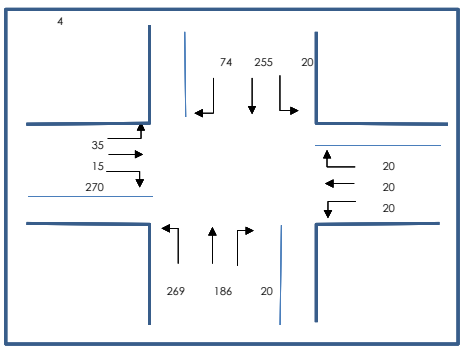


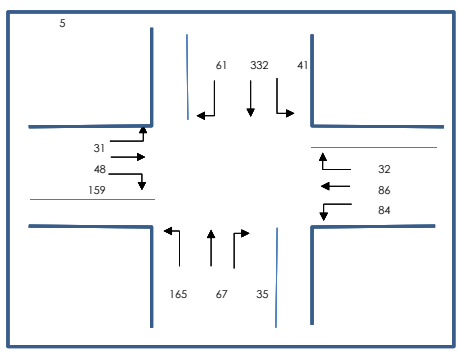
1 Hr AM 2026 Scenario 4 Turning Movement

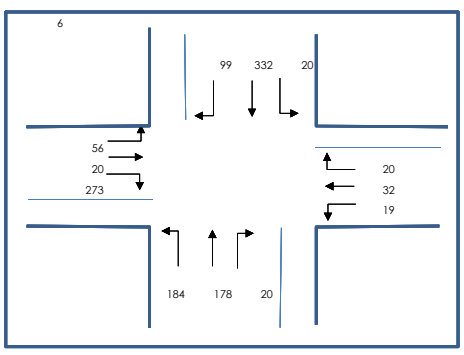


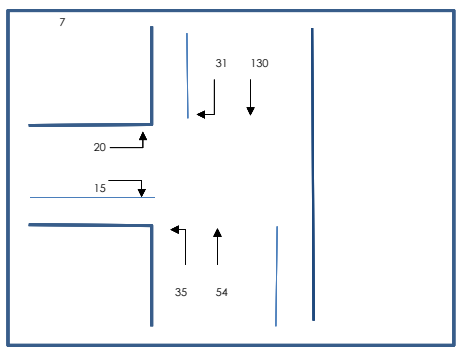


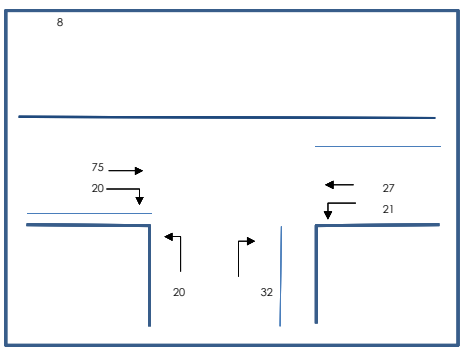


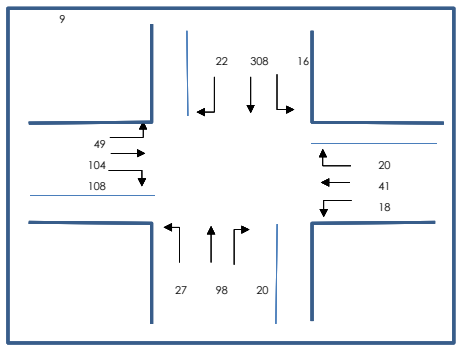


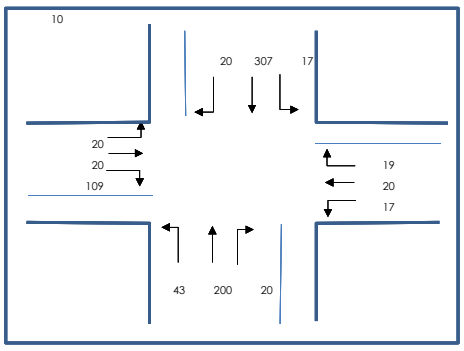


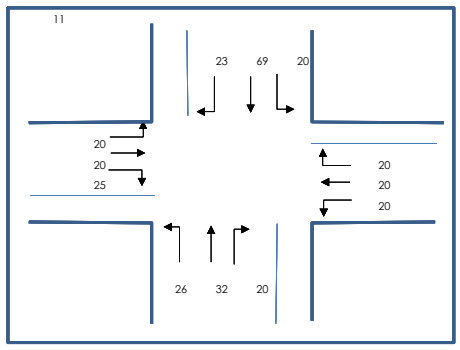


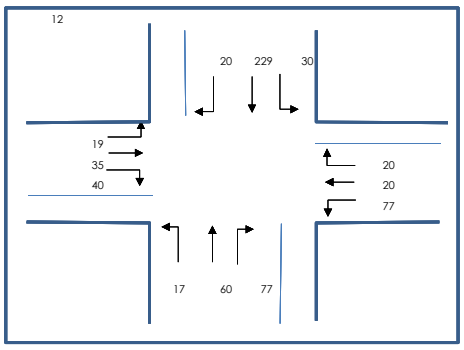


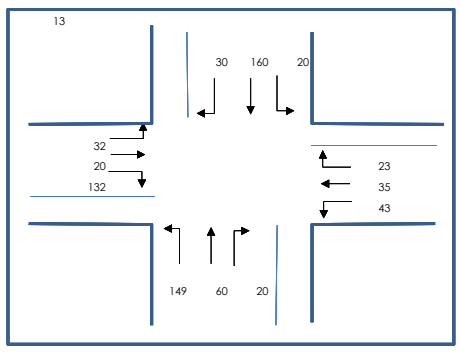




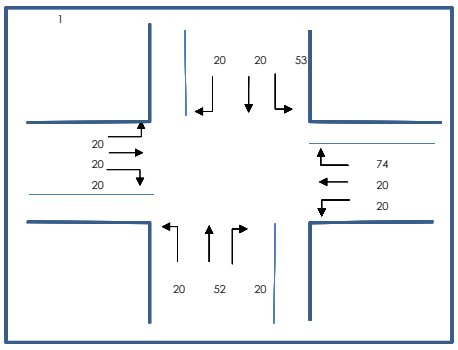


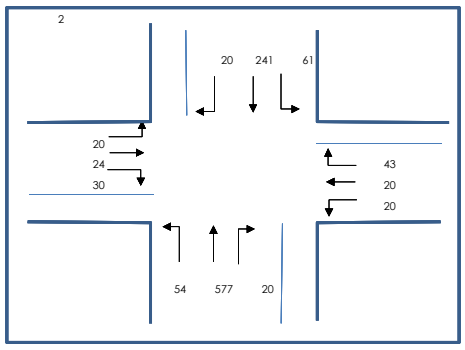


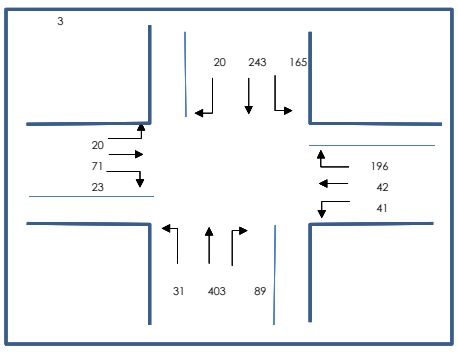


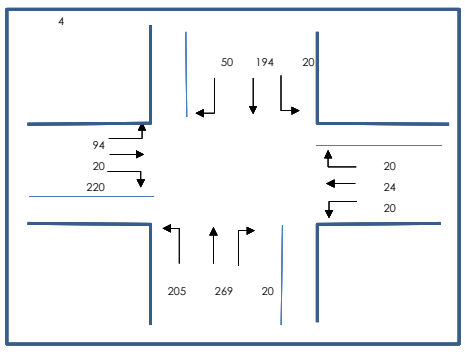


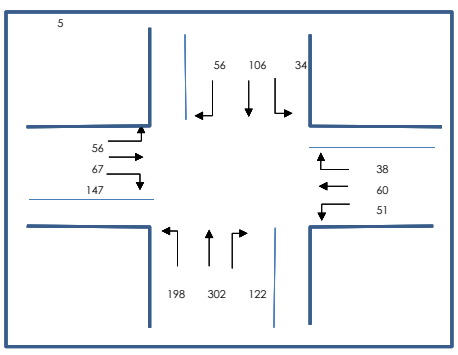
1 Hr PM 2026 Scenario 4 Turning Movement

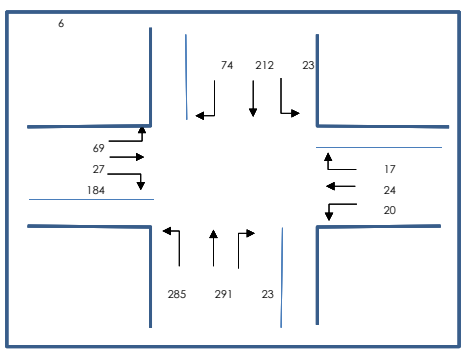


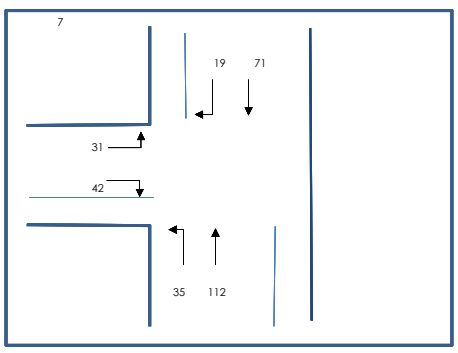


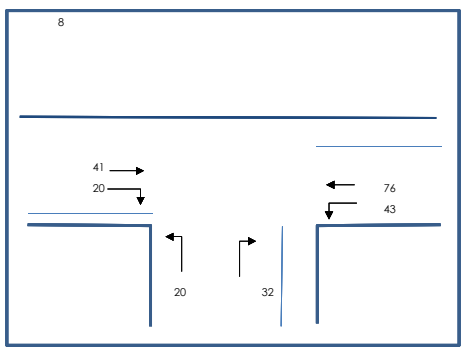


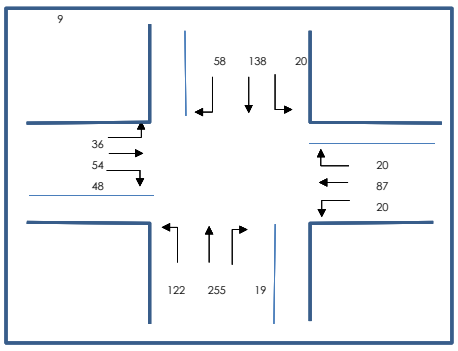


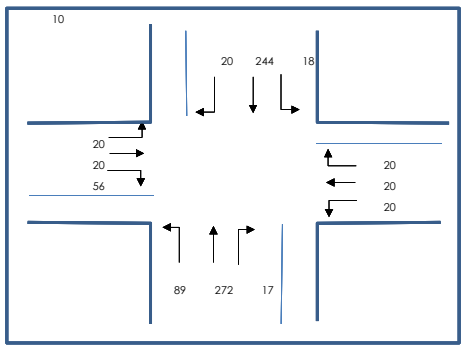


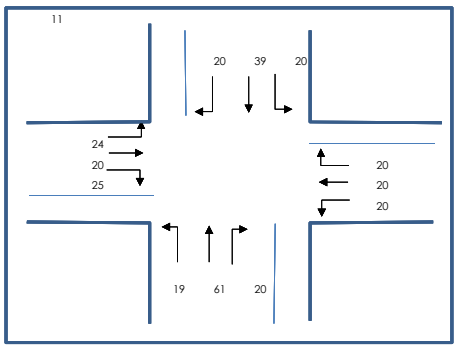


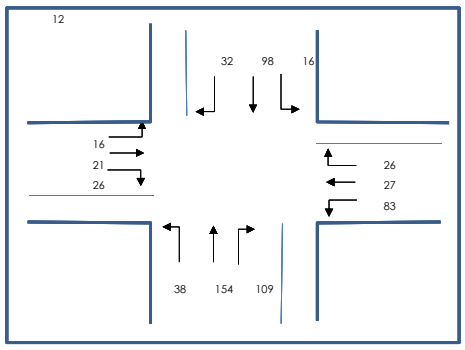


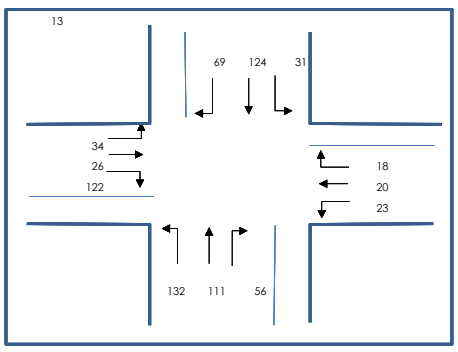




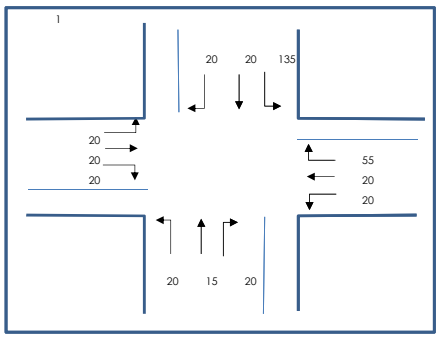


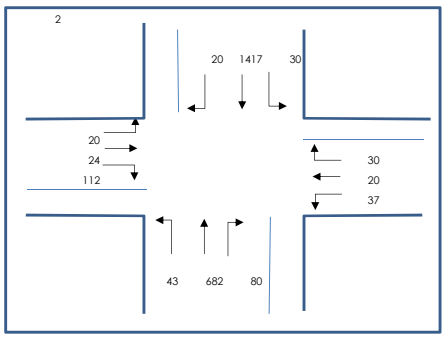


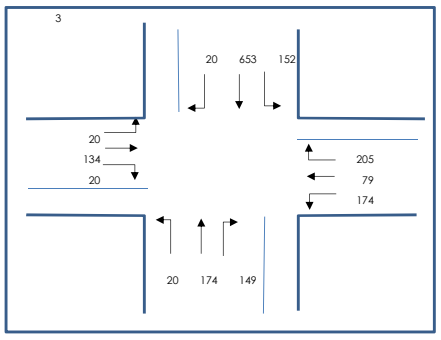


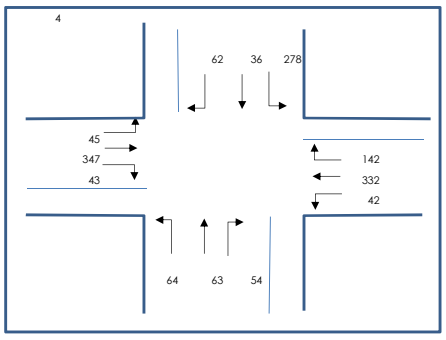


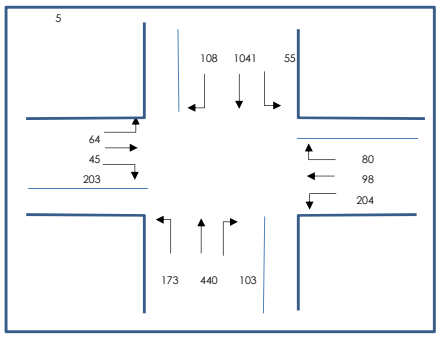
1 Hr AM 2046 Base Case Turning Movement

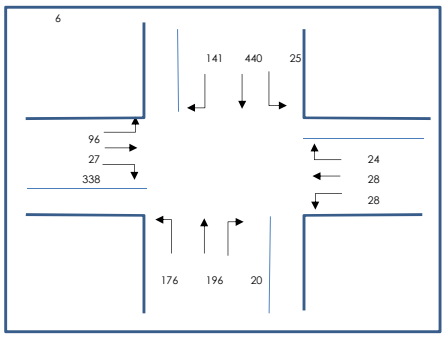


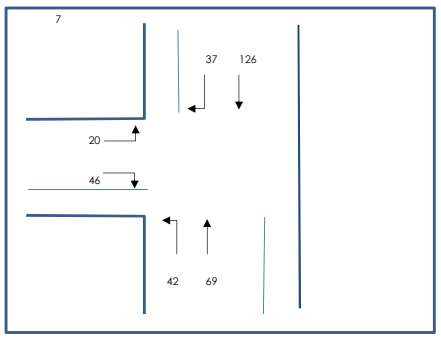


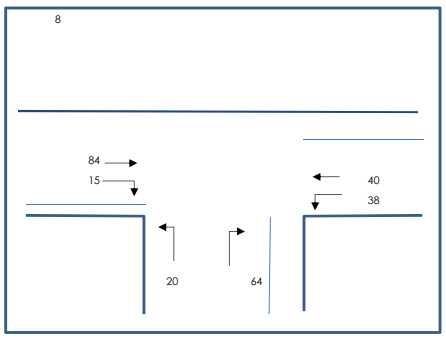


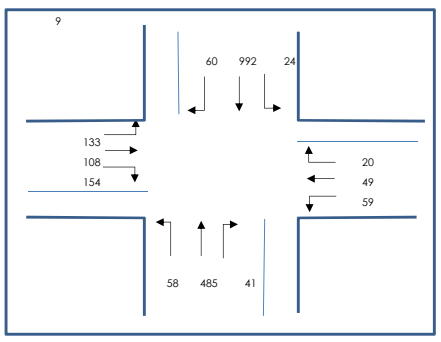


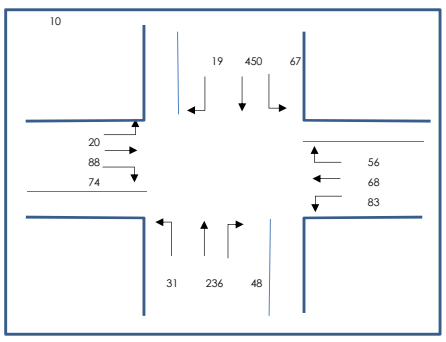


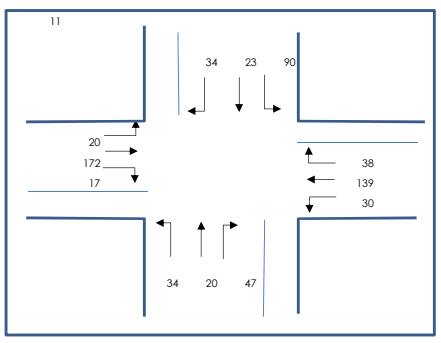


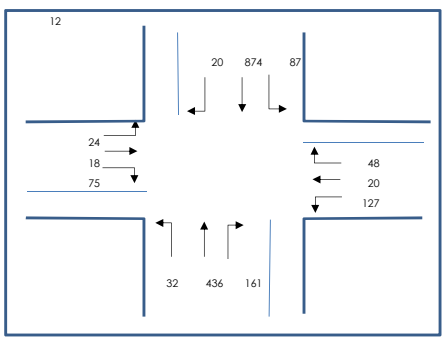


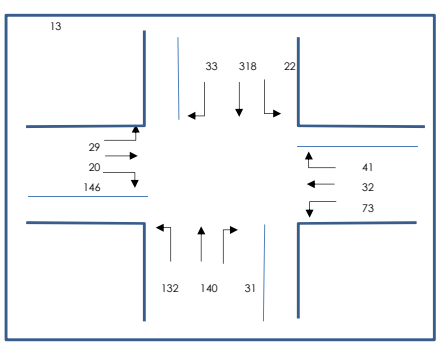




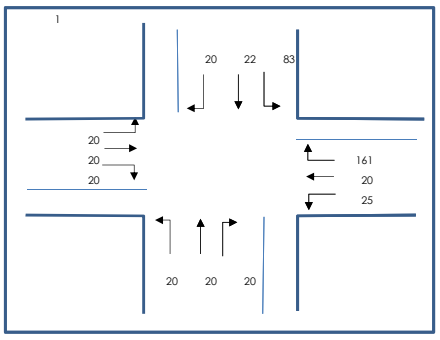


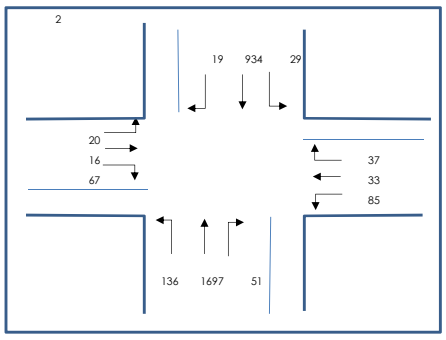


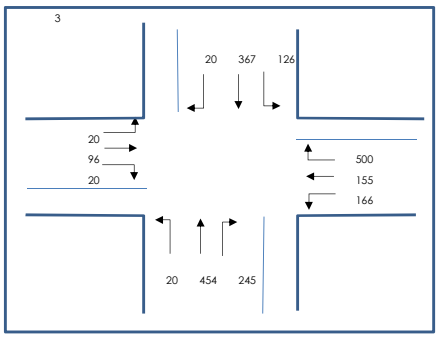


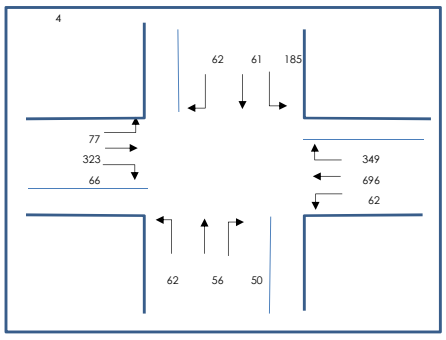


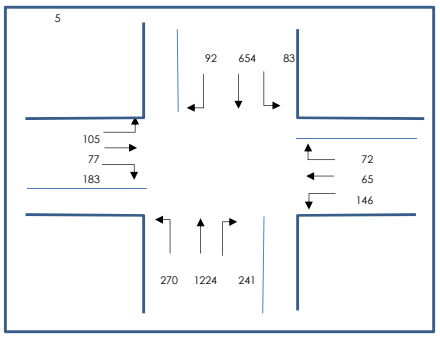
1 Hr PM 2046 Base Case Turning Movement

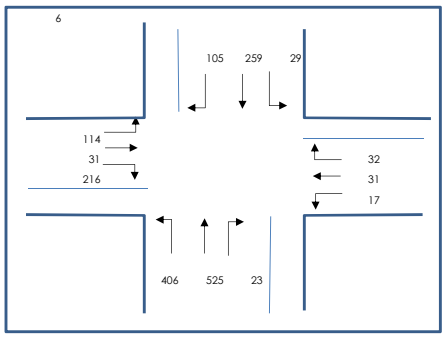


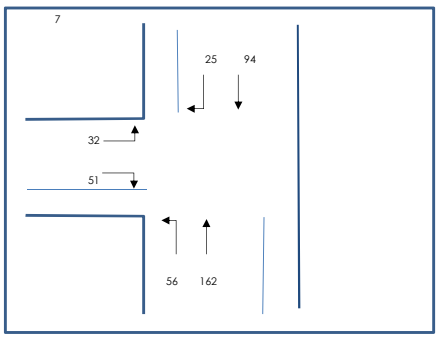


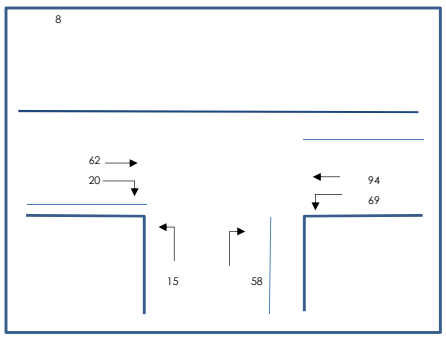


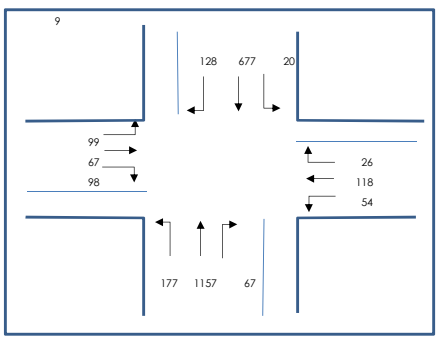


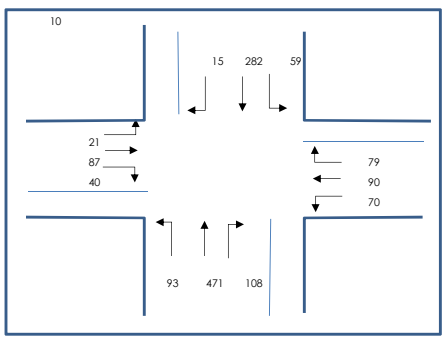


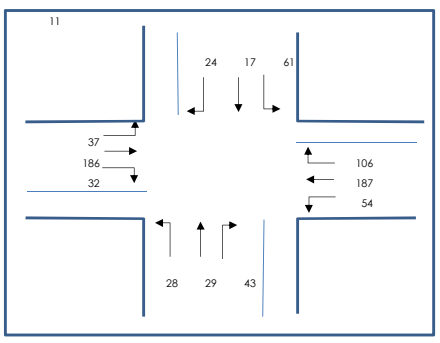


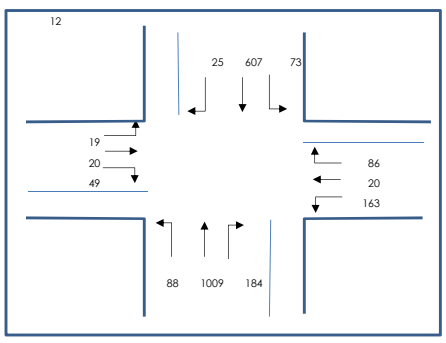


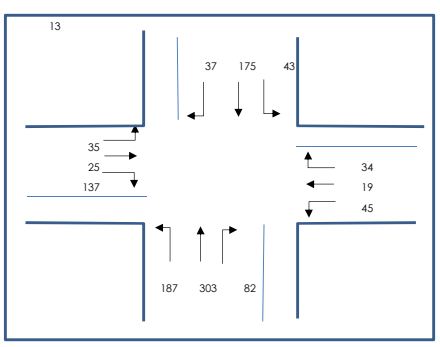




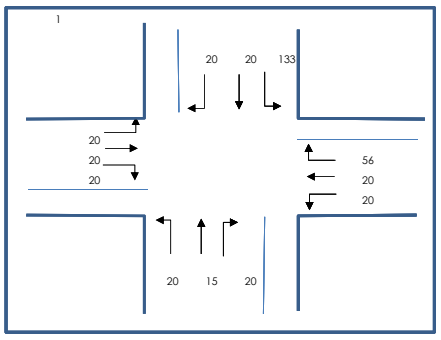


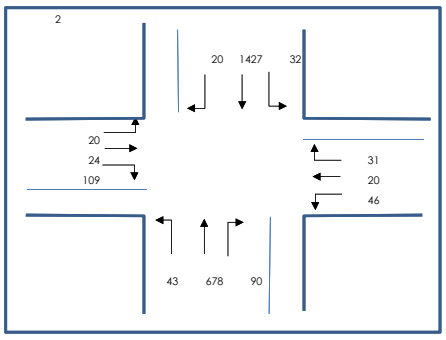


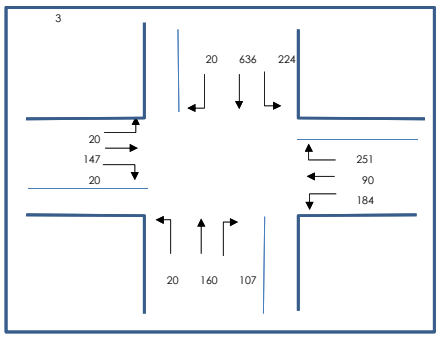


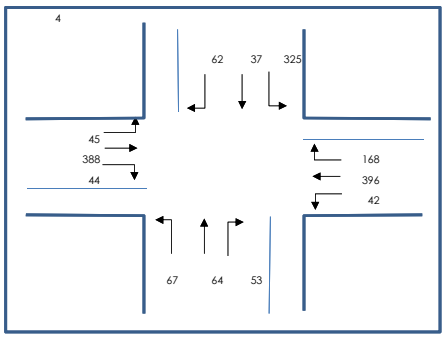


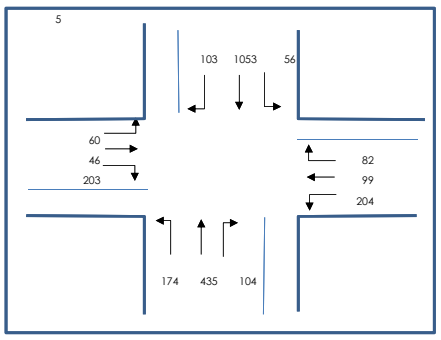
1 Hr AM 2046 Scenario 2 Turning Movement

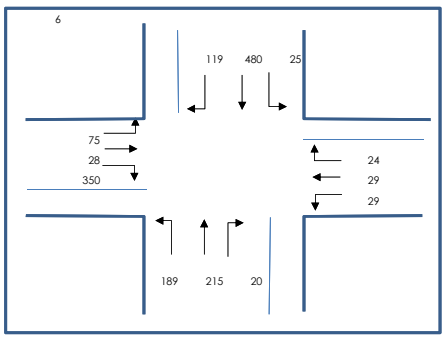


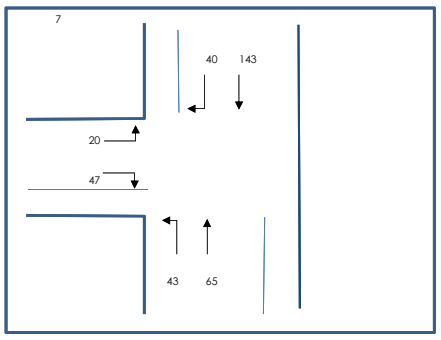


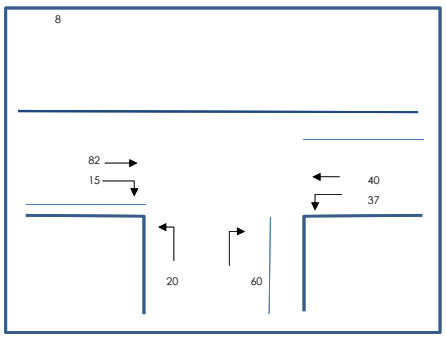


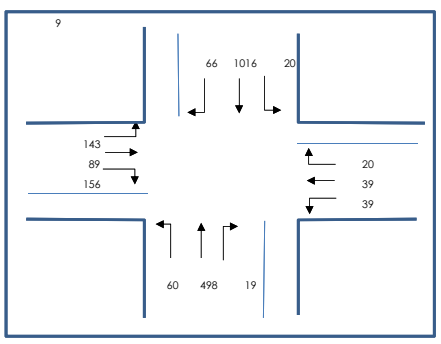


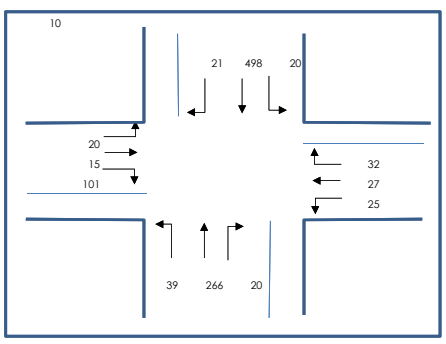


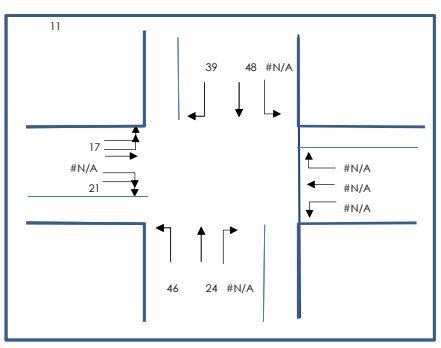


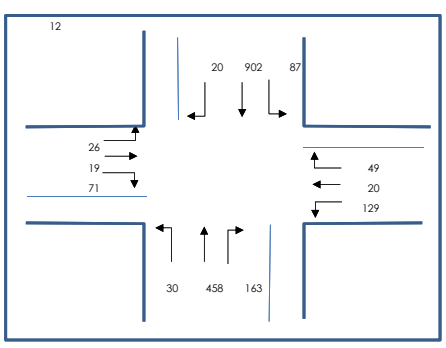


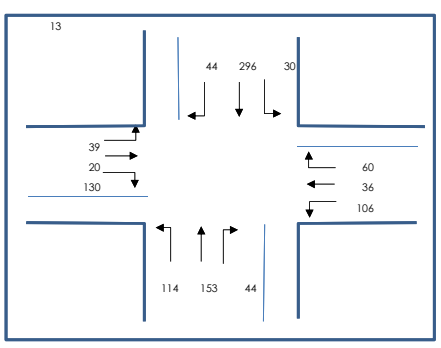




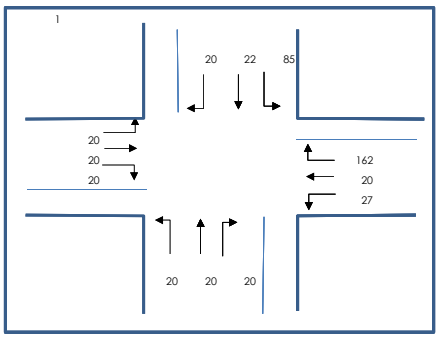


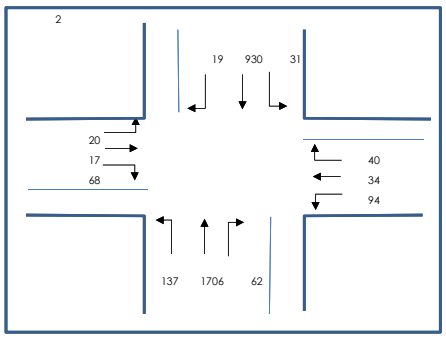


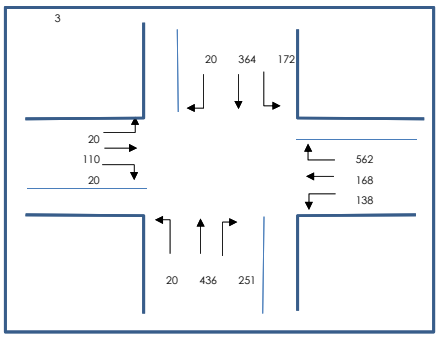


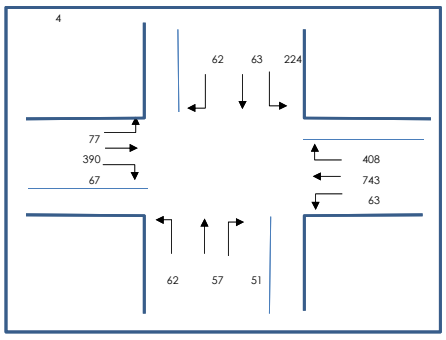


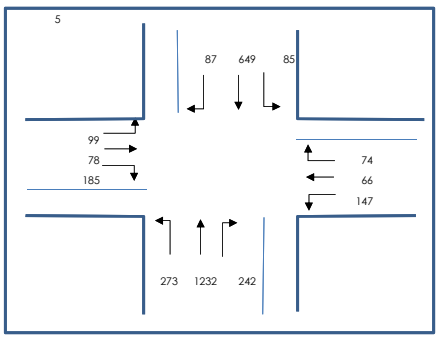
1 Hr PM 2046 Scenario 2 Turning Movement

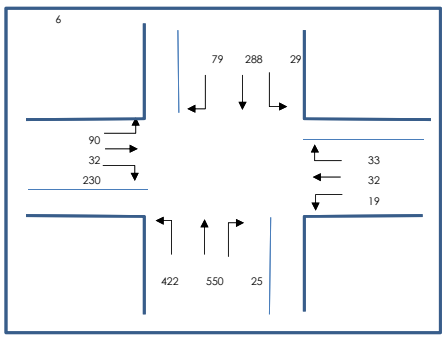


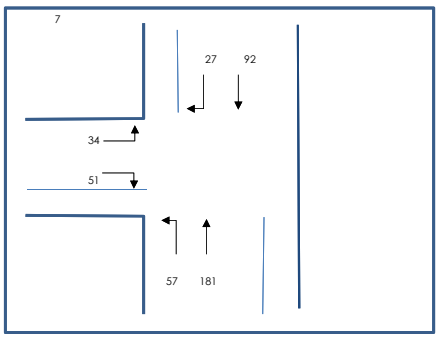


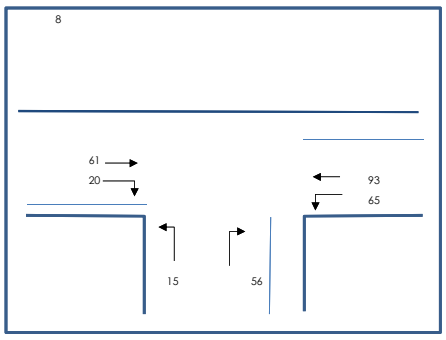


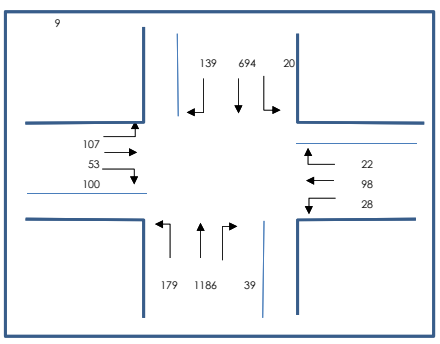


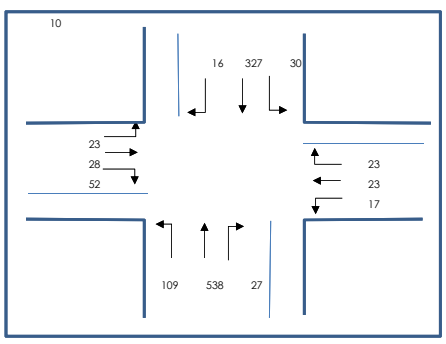


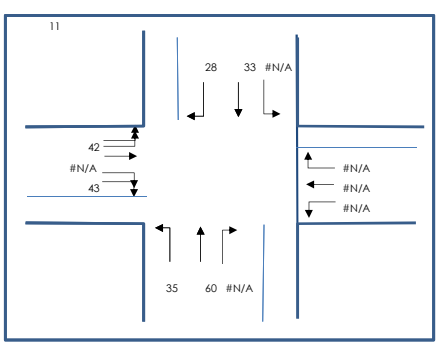


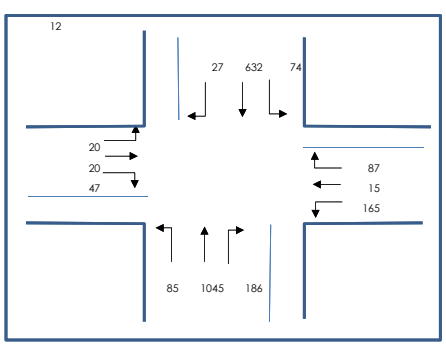


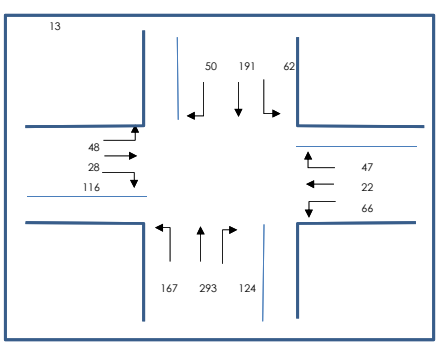












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