Growth Areas Authority
31 May 2013

Wyndham North Traffic Modelling and SIDRA Analysis

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Prepared for

Growth Areas Authority

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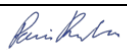
D	31-May-2013	Final Report	Paris Brunton Project Manager	

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Executive Summary

The purpose of this project is to provide detailed traffic analysis for the Wyndham North PSPs. The intention is that this information be used for subsequent Functional Layout Plans (FLPs) and the development of Wyndham North Developer Contributions Plan (DCP).

In order to derive estimates of traffic demand for the Wyndham North PSPs, enhancements were made to the Melbourne Integrated Transport Model (MITM) developed for the modelling of Westbrook Drive / Ison Road in Wyndham growth areas. Two future year scenarios were to be modelled, an Ultimate development scenario and an Interim development scenario.

The strategic modelling of the Ultimate development scenario found that the network with the PSPs is predicted to operate within capacity with the exception of some local road and access points to RRL stations and activity centres.

The strategic modelling of the Interim development scenario indicated traffic demand on sections of Boundary Road, Doherty's Road and Leakes Road would exceed capacity.

The volumes extracted from the Wyndham North ultimate scenario MITM model were used as inputs into the intersection design process. A sensibility check was made against the Western Growth Corridor VITM model prior to undertaking the design. Designs were developed for both an ultimate year (2046) and an interim year (2021).

A methodology to determine the configuration of intersections was developed in which standard template configurations were applied except in cases where a suitable template configuration cannot be readily identified. In this instance, intersection modelling was used to determine intersection layout. This approach was supported by GAA, VicRoads, Wyndham City Council and City of Melton.

Twenty intersections in the ultimate scenario and two in the interim scenario were designed using modelling. The remainder were designed using the standard template approach.

1.0 Introduction

1.1 Background

AECOM was awarded the brief by the Growth Areas Authority (GAA) to undertake strategic modelling and SIDRA intersection modelling for the Wyndham North Precinct Structure Plans (PSPs) in the Western Growth Corridor. The brief stipulated that the model build upon the Melbourne Integrated Transport Model (MITM) developed for the modelling of Westbrook Drive / Ison Road and that two future year scenarios were to be modelled an Ultimate development scenario and an Interim development scenario.

The purpose of this project is to provide detailed traffic analysis for the Wyndham north PSPs. The intention is that this information be used for subsequent Functional Layout Plans (FLPs) and the development of Wyndham North Developer Contributions Plan (DCP).

To achieve the aims of this project, AECOM has

- Received the Westbrook Drive version of the MITM
- Audited the MITM network in the western growth region.
- Added collector roads and other local area roads within the study area not currently in MITM
- Reviewed the placement of transport zone centroid connectors.
- Disaggregated the MITM zone systems with the western growth area.
- Developed Ultimate development and Interim development scenarios for modelling
- Used turning movement outputs from MITM as starting demand for SIDRA analysis.
- Assessed the intersection performance and advised on intersection layouts.

1.2 Melbourne Integrated Transport Model (VITM)

The Melbourne Integrated Transport Model (MITM) is the name given to the Department of Transport's four-step strategic traffic model.

Features of the MITM include:

- AM peak assignment of strategic highway and public transport demand
- Three vehicle types (Car, Rigid Trucks and Articulated Trucks)
- Three public transport modes (Train (Metro and VLine), Trams and Buses.)
- Outputs from the Freight Movement Model to forecast truck volumes

Details of these features are discussed over the following page.

1.2.1 Zones

The MITM covers the Melbourne Statistical Division (MSD) as defined by the Australian Bureau of Statistics (ABS) and consists of 2912 transport zones of which 2893 are internal to the MSD with the remainder being either external connectors or regional rail stations. The zones are generally more detailed in the inner and middle suburbs, and along major transport corridors.

1.2.2 Public Transport

All public transport routes are coded with details of service frequencies and stopping patterns by time of day. The public transport network includes:

- Stopping and express services for all metropolitan passenger train lines (including V/Line)
- Services for all tram routes
- Services for all bus routes
- Zonal public transport fare modelling

- Rail lines
- Park and ride facilities for rail
- Links to reflect walk access, including interchanges.

1.2.3 Road Network

The modelled highway transport network includes all freeways, highways, arterials, and a selection of collector roads. The network includes:

- Geographic and connectivity information;
- Clearways and transit lanes;
- Parking charges and tolls; and
- Links to reflect walk access.

Each link in the road network contains attributes relating to the road characteristics such as:

- The number of lanes;
- The posted speed;
- The geographic location; and
- An index relating to the link classification.

1.3 SIDRA modelling

An intersection modelling package, SIDRA Intersection, was used to analyse the operation and guide the design of the proposed intersections. SIDRA Intersection is an advanced micro-analytical tool used to evaluate signalised and unsignalised intersection designs in terms of capacity, level of service and a wide range of other performance measures. The outputs from SIDRA Intersection used to develop the intersection designs were the:

- Intersection Layout Plan, showing the geometry of the intersection.
- Movement Summaries outlining a range of operational parameters including degree of saturation, level or service, delay and queue lengths.
- Signal Phasing Summaries, including phasing sequence, cycle times and green time allocation.

2.0 Review

2.1 Westbrook Drive model

2.1.1 Overview of model

The starting point for the development of a model for the Wyndham North PSPs was the Westbrook Drive model developed by SKM for VicRoads in 2011. The Westbrooks Drive model was used to assess different alignment options for Westbrook Drive between the Princes Highway and Dohertys Road.

The Westbrook Drive model was based on a 2009 version of MITM. This version of MITM produced results for the AM 2 hour peak from 7am to 9am. The 2009 validation year was updated to a 2011 validation year using 2011 traffic counts and 2011 land use forecasts. The validation of the 2011 Westbrook drive model is reported in the SKM report to VicRoads dated 26 September 2011.

The Westbrook Drive model consisted of 2893 internal zones and 19 external zones for a total of 2912 zones. The external trips are defined by fixed trip matrices. The highway assignment consists of three user classes:

- cars
- rigid trucks
- articulated trucks

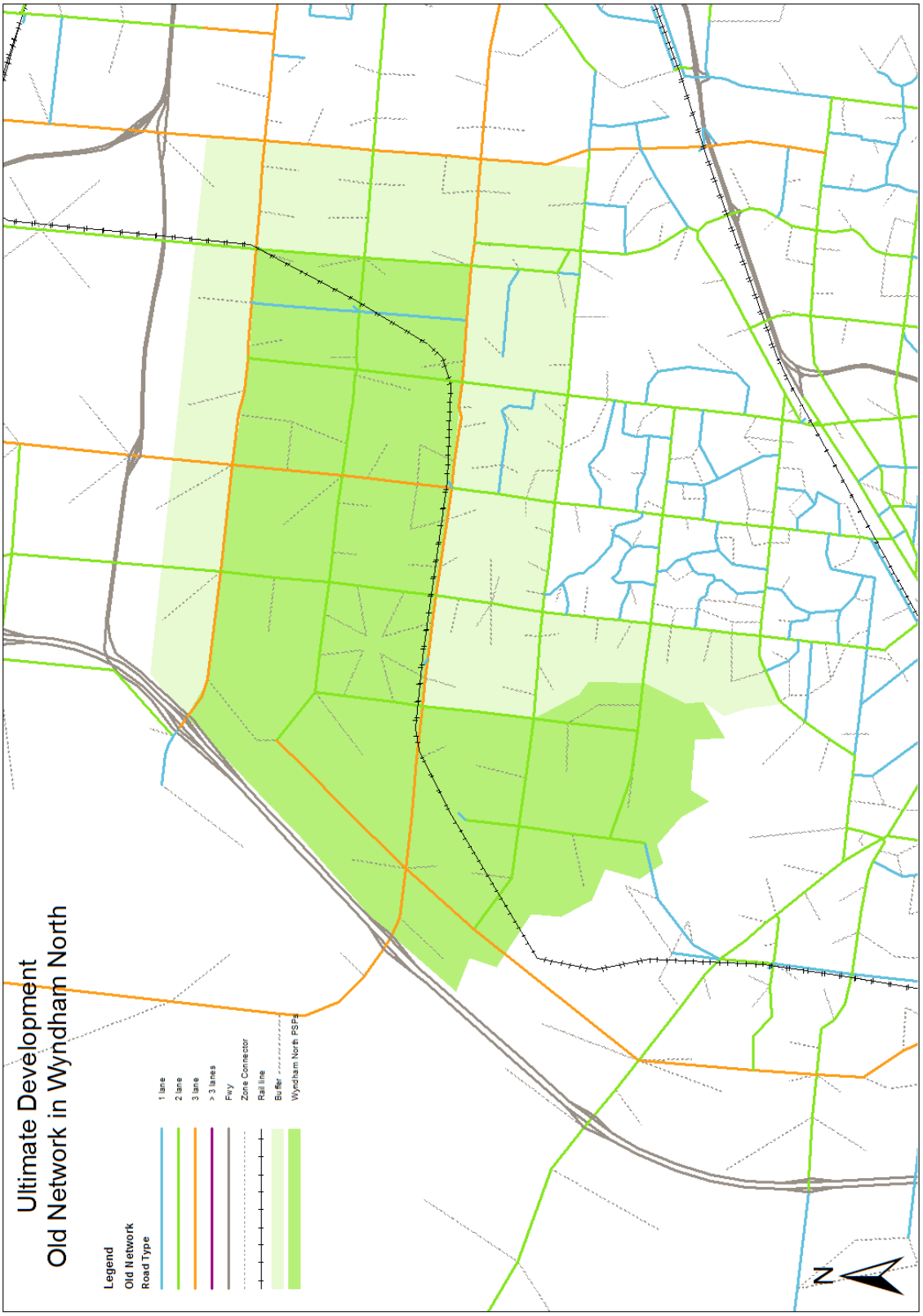
Car demand is generated within MITM, whereas rigid trucks and articulated tucks are derived from the Melbourne Freight Movement Model (FMM).

The Westbrook Drive model produced traffic forecasts for the years 2021, 2031 and 2046. Figure 1 shows the road network from the Westbrook Drive model for the 2046 forecast year. Figure 1 shows the key area of interest for the Wyndham North modelling, which defines the four PSPs. Figure 1 also shows a buffer area adjacent to Wyndham North PSPs. The buffer area was identified to ensure the road network and zones immediately adjacent to the Wyndham North PSPs were updated in detail to produce more refined model outputs.

Figure 1 indicates that the area defined by the four Wyndham North PSPs and the adjacent buffer has very little representation of local/collector road network. Most of the zones in Wyndham North load directly onto the arterial road network, with some zones connecting into intersections of arterial roads.

The public transport services represented in the Westbrook Drive model for 2046 include bus services on most of the arterial roads in the Wyndham North region, plus train services on the RRL alignment. The RRL has four new stations, all in the Wyndham North area, but none of these were represented as park and ride stations.

Figure 1 Westbrook Drive model – road network



2.2 Recommended enhancements for the Wyndham North model

A review of the Westbrook Drive model with respect to the requirements of the Wyndham North model confirmed that the following enhancements were required:

- Coding of the future local / collector road network in the Wyndham North PSPs and adjacent buffer region
- Disaggregation of the zones in the Wyndham North and buffer region
- Updating the truck demand using the latest version of the FMM
- Updating the external trips with the latest information from VicRoads
- Coding the RLL stations as park and ride stations
- Deriving a PM assignment model based on the AM model

The next section documents the development of the Wyndham North model and shows the traffic assignment results for an interim network and an ultimate network.

2.2.1 Network Development

The Growth Areas Authority (GAA) provided AECOM with an 'ultimate' network plan for the four Wyndham North PSPs and adjacent land (buffer region). Most of the arterial network in the GAA ultimate network was already coded within the Westbrook Drive model. However, the GAA plan required the addition of local / collector roads into the model. The addition of the local / collector roads is intended to more realistically represent local traffic access and the way traffic distributes between the arterial network and local origins and destinations.

Figure 2 shows the ultimate road network proposed for the Wyndham North PSPs and surrounding buffer region. This ultimate network was coded into the Wyndham North model, using the Westbrook Drive 2046 network as a starting point. Compared to the Westbrook drive model, the Wyndham North model has:

- 714 more links
- 374 more nodes
- 188 more lane kms

The vast majority of additional lane kms is due to the addition of local / collector roads.

2.2.2 Zone Disaggregation

GAA provided AECOM with a proposed structure plan for the Wyndham North PSPs. The structure plan divided the four Wyndham North PSPs into 82 zones and the surrounding buffer region into 71 zones. The Westbrook Drive model had the PSPs represented by 33 zones and the buffer region 49 zones. Therefore the Wyndham North model required an addition of 71 zones, 49 in the PSPs and 22 in the buffer region.

Figure 3 shows the zone outlines for both the Westbrook Drive model and the Wyndham North model. Most of the zone disaggregation occurs within the four Wyndham North PSPs, with some disaggregation occurring in the buffer region adjacent to the PSPs.

Figure 2 Wyndham North model – ultimate road network

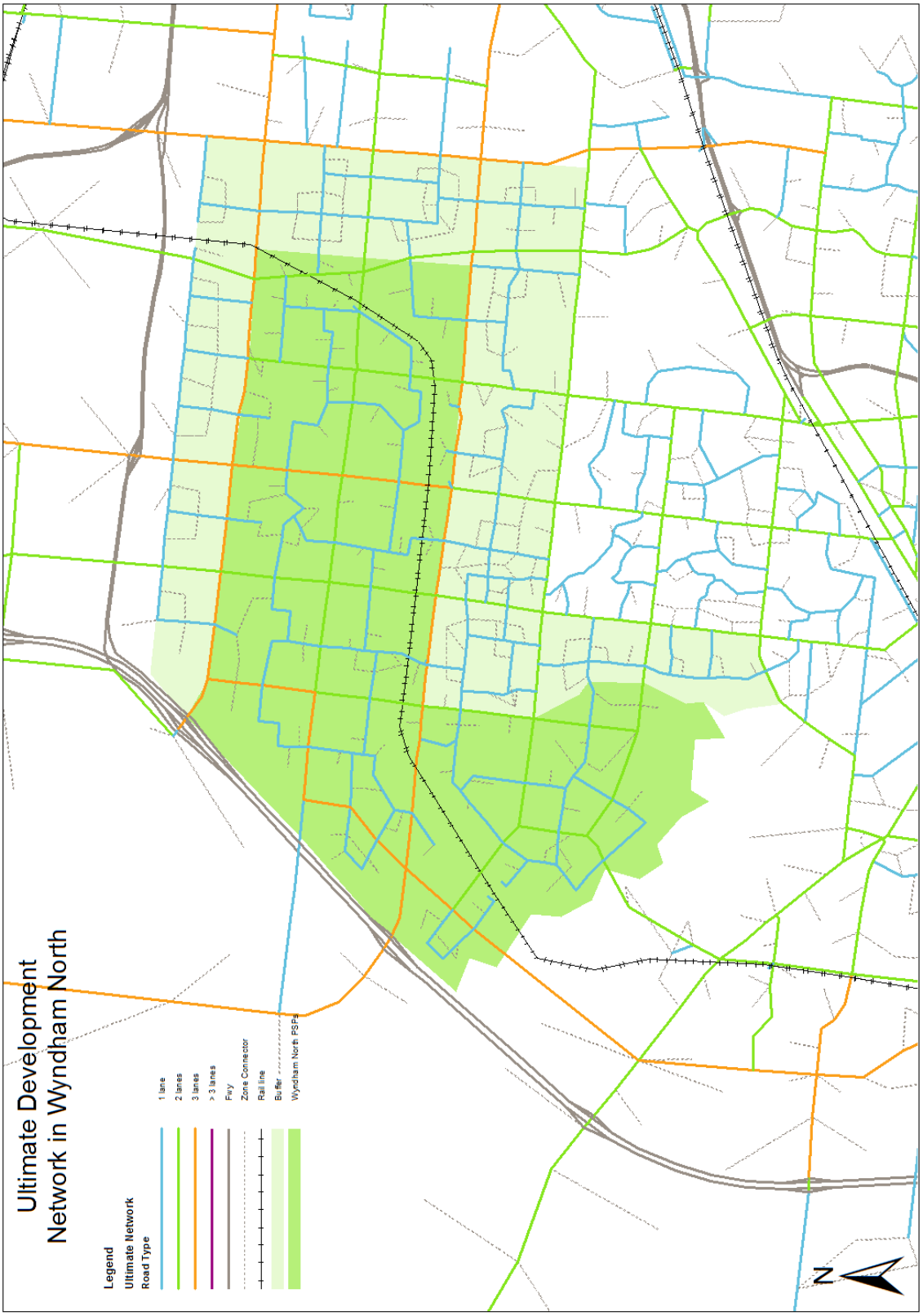
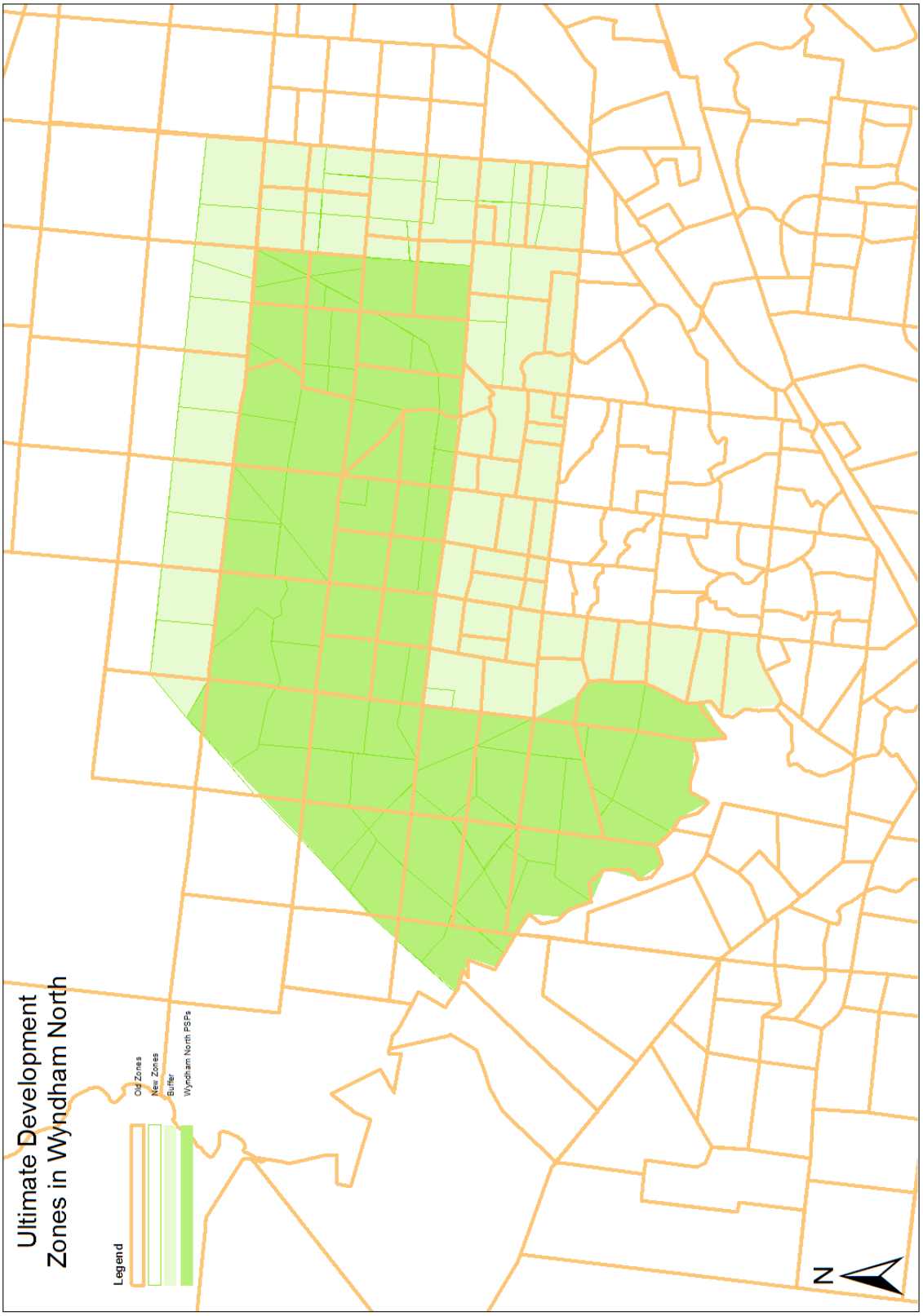


Figure 3 Westbrook Drive Model and Wyndham North model zones



3.0 MITM Wyndham North model development

3.1 Overview

Following the review of the Westbrook Drive model, the development of the Wyndham North model involved incorporating additional network details, particularly with respect to local and collector roads and the disaggregation of zones.

GAA provided AECOM with updated demographic and landuse information for the zones in the PSP and buffer regions. This information included:

- the number of houses
- population
- education enrolments
- employment

3.2 Population and employment

Figure 4 shows the density of households per hectare. This indicates that apart from a commercial / light industrial buffer south of Boundary Road, residential development is distributed relatively evenly thorough the four PSPs (outlined in blue). This contrasts with the distribution of employment shown in Figure 5, which indicates that employment is concentrated to the north around Boundary Road, to the east of Forsyth Road, and around town centres located at rail stations. Further to the south away from the study area there is significant clustering of employment at the Werribee Employment Precinct.

The updating of demographic data represented a significant increase in total population within the Wyndham North PSPs and a slight decrease in employment within the Wyndham North PSPs. School enrolment data was added to the PSPs, which was absent from the Westbrook Drive model. Table 1 shows the difference in demographic data between the Westbrook Drive model and the Wyndham North model.

Table 1 Updating demographic data for Wyndham North

2046	Population	Employment	Enrolments
Westbrook Drive model	81,109	21,040	0
Wyndham North model	108,844	18,964	13,900
Change	34%	-10%	13,900

Figure 4 Wyndham North Model – Household Density

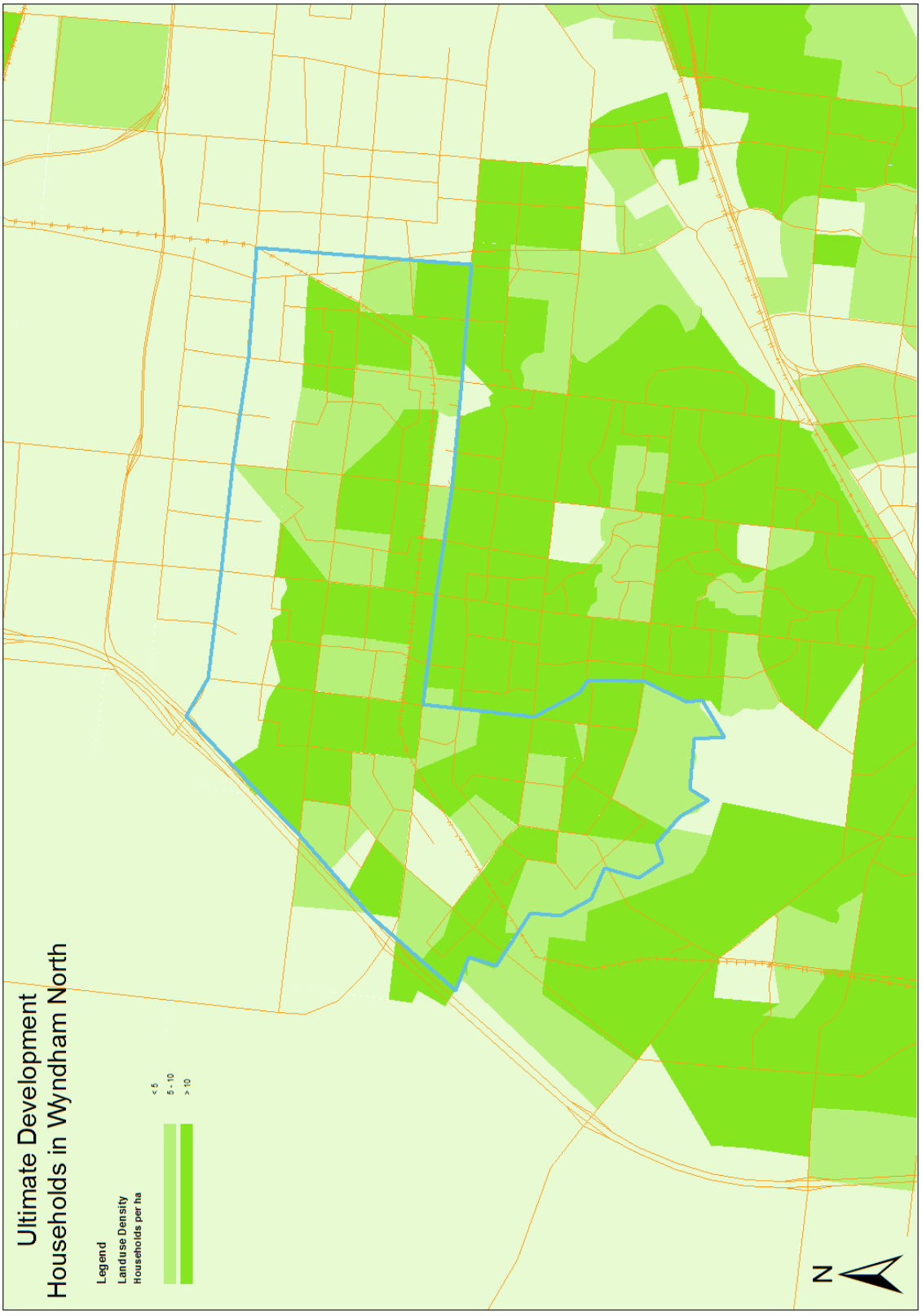
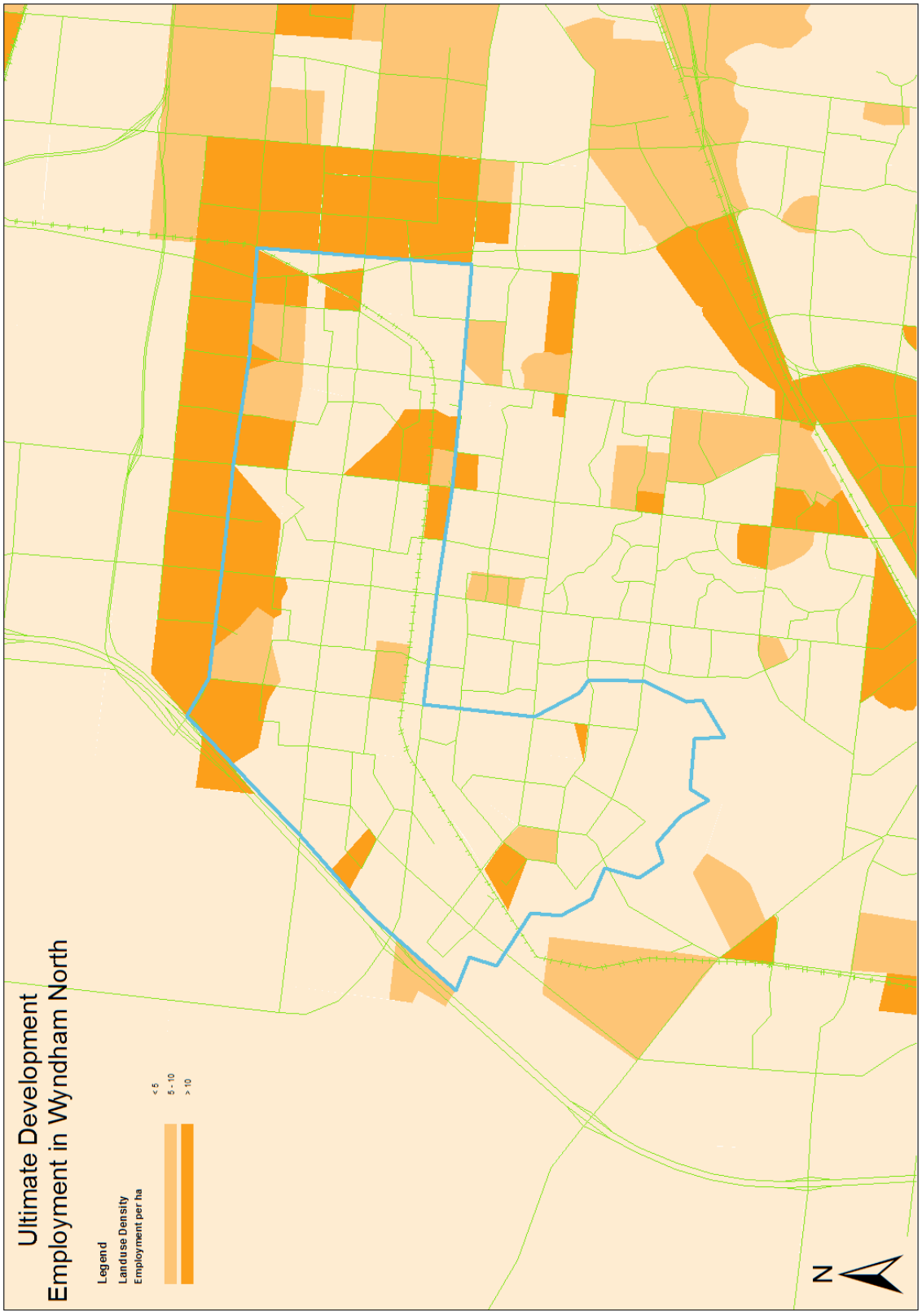


Figure 5 Wyndham North Model – Employment Density



3.3 Truck demand

The truck demand for the Wyndham North model was initially derived from the Melbourne Freight Movement Model (FMM). Key assumptions for predicting truck demand for the Wyndham North area relate to the operation of the Western Intermodal Freight Terminal (WIFT), and the Metropolitan Intermodal System (MIS).

3.3.1 WIFT and MIS

WIFT is planned to be an intermodal terminal where rail freight arriving from interstate is transferred from rail to truck. The current interstate intermodal terminal is located at the Dynon port precinct. The operations of the current terminal will be moved to WIFT, which is expected to be located north of Boundary Road. The FMM assumes that WIFT is operating in 2046.

MIS is planned to be a system of container freight terminals for port related container freight. The MIS operations will involve line haul movements from the port to the terminals, then transfer of containers from the terminals to the importer/exporter final destination of the container (Impex). It is assumed that the line haul is undertaken 25% by road on high productivity vehicles and 75% by rail. It is also assumed that the line haul movement does not occur during peak hours. The transfer of containers from the terminal to the Impex sites occurs throughout the day and night.

For the purpose of the Wyndham North modelling, after consultation with GAA, VicRoads, Wyndham City and City of Melton it was agreed truck volumes generated by the FMM in the Wyndham North area were too coarse to accurately reflect network planning at a PSP level. It was agreed that instead that trucks should comprise 15% of the traffic on Boundary Road and the OMR and 6% of other arterial roads. These truck percentages were chosen in consideration of truck volumes on existing surrounding arterial roads, and were agreed between GAA, VicRoads, Wyndham City and City of Melton. The car traffic from the Wyndham North model is therefore uplifted to represent these truck volumes.

3.4 Public transport services

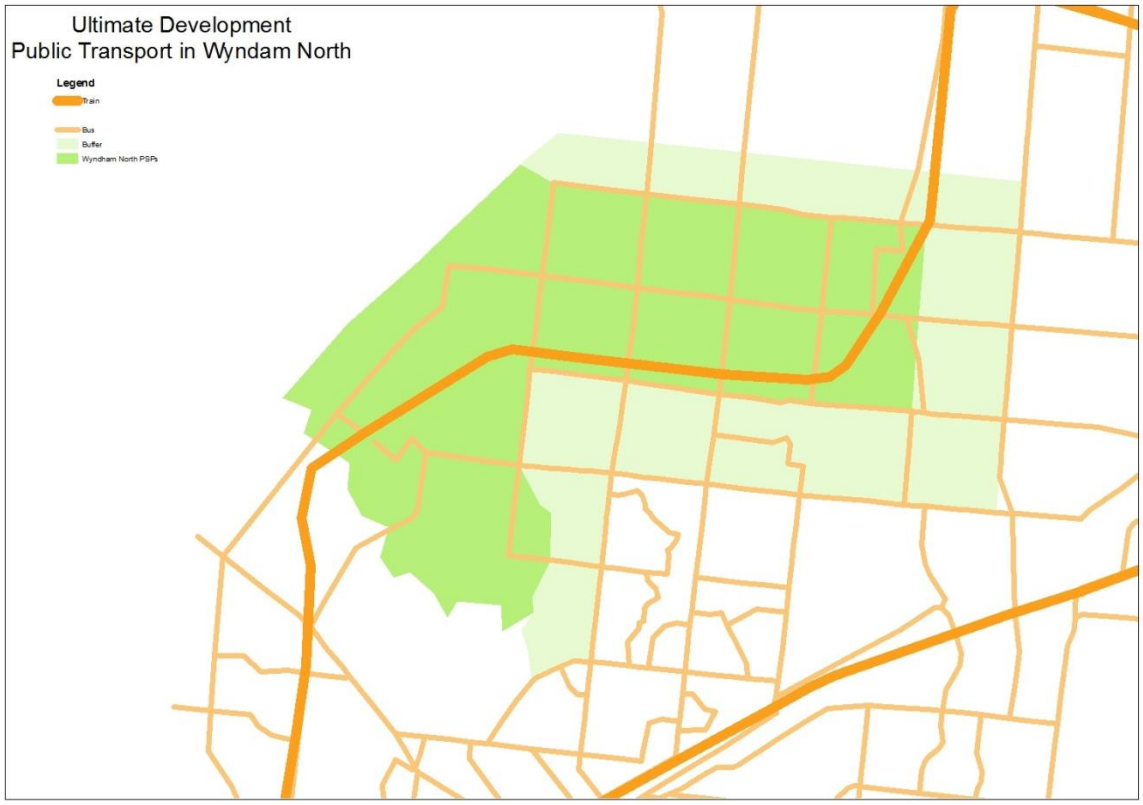
The public transport service coverage used in the Wyndham North model is the same as the service coverage used in the Westbrook Drive model with some alterations. These alterations include:

- Move the Sayers Road RRL station south to location indicated on the structure plan
- Routing bus services to the adjusted station location
- Removing bus services off Forsyth Road and putting them onto adjacent local roads.

Buses were removed from Forsyth Road to allow for the testing of removing the Forsyth Road RRL overpass. Consistent with the Westbrook drive model, the Wyndham north model assumed ten minute AM Peak headways for the Regional Rail Link services, and a mix of 30 minute and 15 minute headways for bus services.

In addition to the above changes the Wyndham North model added the capability of the RRL station to cater for park and ride access. This results in some addition car traffic around the RRL stations.

Figure 6 Public Transport coverage for 2046



3.5 PM model

The Wyndham North model generates private vehicle (car) demand matrices for a typical weekday AM period from 7am to 9am. Estimates of the PM Peak demand were derived by transposing the AM matrices and factoring the matrices by trip purpose to allow for differences in the mix of trip purposes between the AM and PM peaks. For example, analysis of the VISTA07 travel survey data indicated that the total number of work to home trips in the 2 hour PM peak is 70.9% of the total home to work trips in the 2 hour AM peak. Therefore, the PM work to home demand was estimated by transposing the AM home to work matrix and multiplying by 0.709.

PM traffic volumes were obtained by assigning the estimate of PM demand onto the highway network. This method of estimating PM demand does not explicitly model public transport. Therefore, estimates of the traffic generated by RRL park and ride trips were derived by reversing the park and ride traffic calculated in the AM model.

Table 2 shows the AM to PM peak factors by trip purpose used to derive an estimate of the PM peak demand. It should be noted that the 2 hour PM peak is a 2 hour average of a 3 hour period.

Table 2 AM to PM factors by trip purpose

Trip Purpose	AM 2hr VISTA07	PM 2hr VISTA07	AM to PM factor
Home Based Work	498,172	353,069	0.709
Home Based Education Primary	360,903	213,505	0.592
Home Based Education Secondary	187,518	65,291	0.348
Home Based Education Tertiary	31,445	19,369	0.616
Home Based Shopping/Recreation	96,060	291,713	3.037
Home Based Other	278,739	316,226	1.134
Employers Business	75,693	84,829	1.121
Non Home Based Other	323,703	404,347	1.249
Total	1,852,233	1,748,346	0.944

3.6 Estimate of daily trips

Daily (typical weekday) traffic estimates were derived by combining the AM and PM estimates and multiplying by combined peak to daily factors for cars and for trucks. These factors were derived from the 2006 screenline count data collected by VicRoads and analysing the proportion of traffic occurring in the AM and PM peak periods compared to the daily traffic. Table 3 shows the factors used to estimate daily traffic from the AM and PM estimates.

Table 3 Am & PM to daily factors

	AM & PM to Daily
Cars	3.24
Trucks	3.87

3.7 External trips

Analysis of the external trips used in the Westbrook Drive model indicated that the total number of trips coming in and out of the external location on the Princes Freeway near Little River did not meet VicRoads expectations for growth based on recent observed growth. Therefore, the VicRoads provided new estimates for the growth in external trips on Princes Freeway, these are shown in Table 4.

Table 4 External trips on Princes Freeway

Model Year	AM		PM	
	In	Out	In	Out
2011	3,975	2,984	3,274	4,774
2021	4,946	3,713	4,074	5,941
2046	8,543	6,412	7,036	10,260

4.0 Forecast Results

4.1 Ultimate development results

The ultimate development scenario had the following features:

- 2046 population, school enrolment and employment forecasts for all areas outside of the Wyndham North PSPs and buffer region, (as per the 2046 Westbrook Drive model)
- The assumed 2046 road network and public transport service pattern for areas outside of the Wyndham North PSPs and buffer region, (as per the 2046 Westbrook Drive model)
- The ultimate network, zone and landuse inputs for the Wyndham North PSPs and the buffer region to the north, east and to the south of the PSPs.

The results of the ultimate scenario model run are summarised below.

4.1.1 Ultimate weekday daily volumes

Figure 7 shows the forecast weekday traffic volumes for the ultimate scenario. This indicates that the roads carrying the highest volumes within the Wyndham North PSPs are Boundary Road, Derrimut Road, Leakes Road and sections of Westbrook Drive and Davis Road. Other nearby roads carrying high volumes are the Outer Metropolitan Ring Road (OMR), the East West road north of Boundary Road, and Palmers Road.

It is noted that zones south of Werribee River have not been disaggregated, that is, they have not been refined as they have in the traffic model for the Wyndham West area located south of the river. As such, volumes on Armstrong Road south of the river are influenced by zones that load the network across barriers such as RRL and the proposed rail stabling and will be higher in the model than would be expected, while volumes on Westbrook Drive are also affected but will be lower in the model than expected.

The Wyndham West PSP model has disaggregated the zones south of the Werribee River to load the network appropriately. As such, any volumes/infrastructure recommendations for Armstrong Road and Westbrook Drive south of Werribee River must be based on information sourced from the Wyndham West PSP modelling.

Figure 8 shows the volume thresholds for the indicative number of lanes required. This indicates that Boundary Road, Leakes Road, Derrimut Road and Davis Road north of Dohertys Road will all require three lanes each way. Dohertys Road carries volumes suggesting a requirement of between one and two lanes. AM peak and PM peak plots are provided in Appendix A.

Figure 7 Ultimate Daily Traffic Volumes

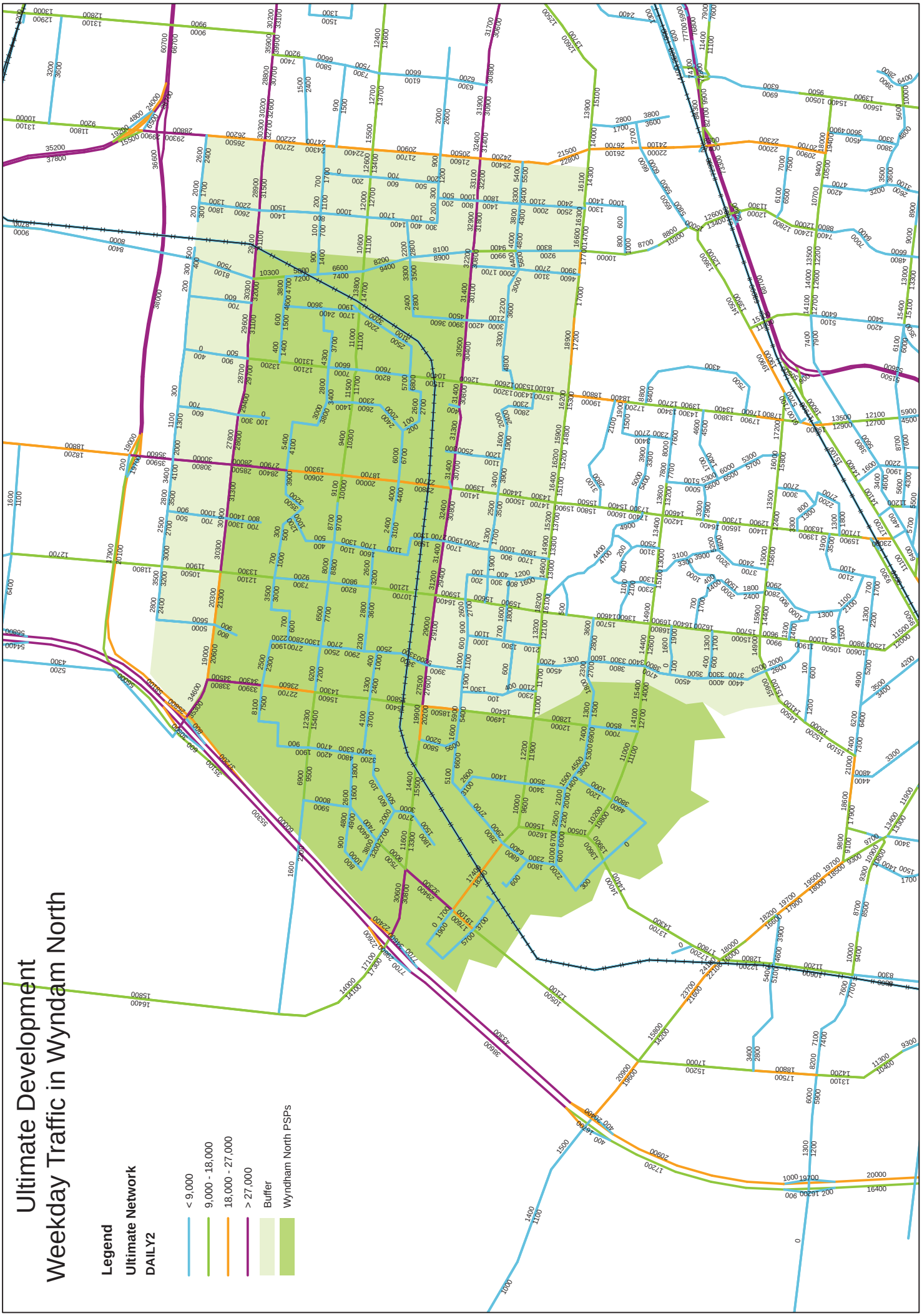
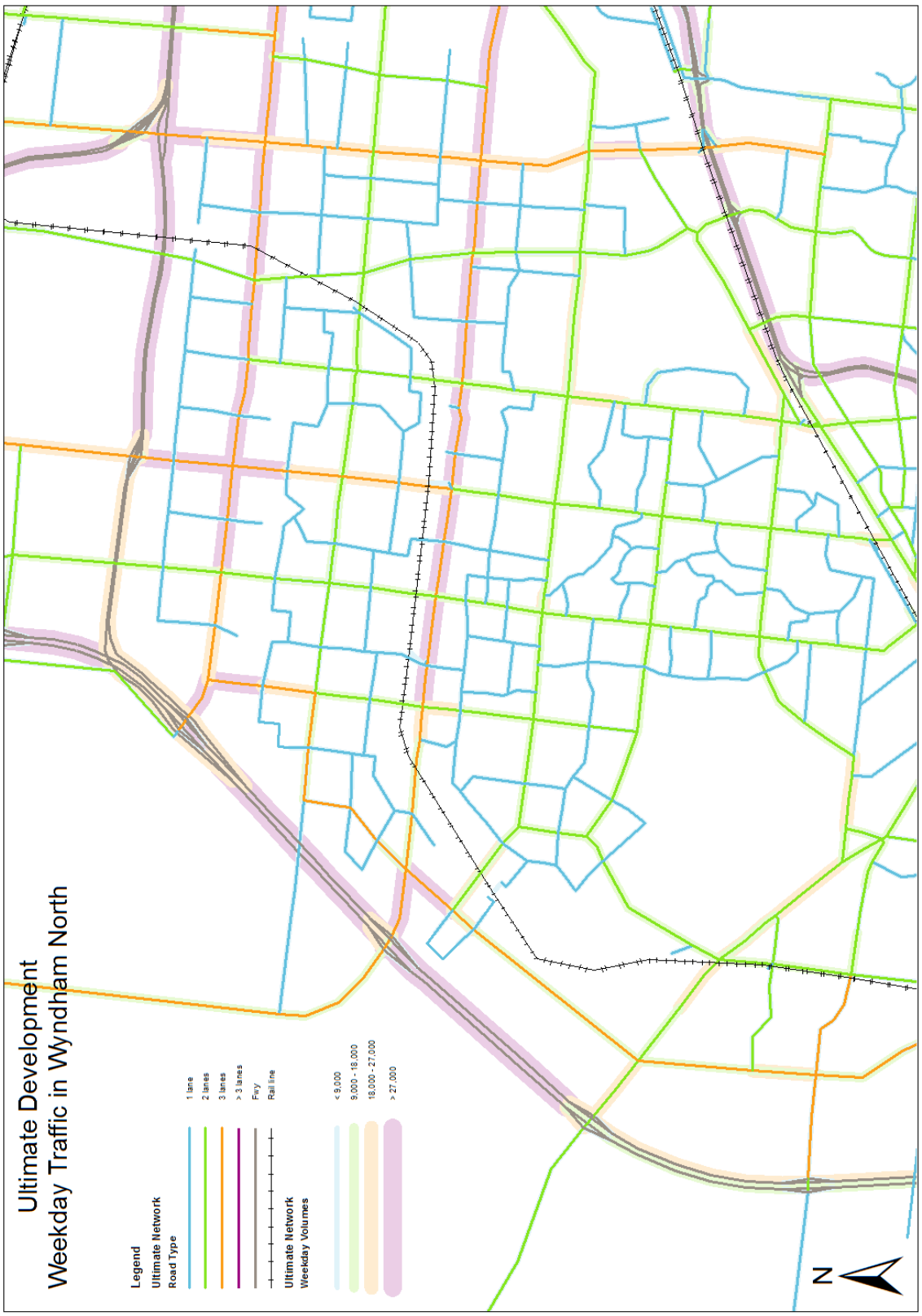


Figure 8 Daily volume lane thresholds for the ultimate scenario



4.1.2 Ultimate scenario truck volumes

As previously discussed the introduction of WIFT will create a focal point for moving of container freight to and from interstate and greater Melbourne and Victoria. The introduction of MIS will be a focal point for container freight to and from the Port of Melbourne and greater Melbourne and Victoria. The location of the WIFT and MIS sites is assumed to be north of Boundary Road and east of Derrimut Road. Key routes for the freight movements in the study area are Boundary Road and the Outer Metropolitan Ring Road (OMR).

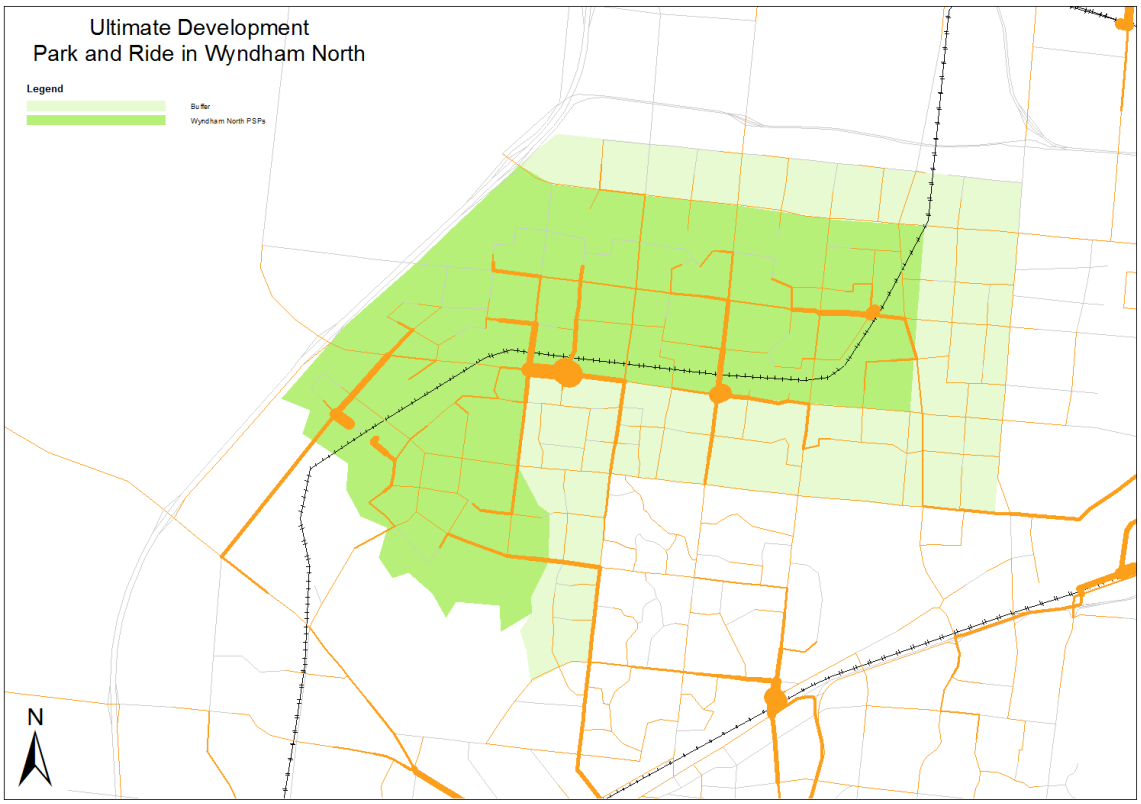
For the purpose of the Wyndham north modelling, after consultation with GAA and stakeholders it is assumed that trucks comprise 15% of the traffic on Boundary Road and the OMR and 6% of other arterial roads. The car traffic from the Wyndham North model is therefore uplifted to represent these truck volumes.

4.1.3 Park and Ride volumes

One change to the Westbrook Drive model was the introduction of the ability to model park and ride trips to the RRL stations. Four stations are assumed in the ultimate scenario, one near Sayers Road, one between Davis Road and Tarneit Road, one near Derrimut Road and one near Dohertys Road.

Figure 9 shows the forecast park and ride traffic volumes for the AM peak. As would be predicted, the park and ride traffic is greatest near the stations. The precise nature of this traffic will depend on the size and location of the park and ride car parks and availability of on street parking on nearby street, details the strategic model does not consider. However, Figure 9 does indicate that there might be some local traffic generated by the park and ride stations.

Figure 9 Park and Ride traffic volumes for the AM peak ultimate scenario



4.1.4 Ultimate volume capacity ratios

The strategic model allows for a comparison of the forecast traffic volumes to the road capacity for each section of the road network by the calculation of volume to capacity ratios (VCR). The VCR analysis is not intended to replace a more thorough capacity analysis that is undertaken using SIDRA, however, the VCR analysis can help interpret the operation of the network, the road layout and the location of key traffic generators.

Figure 10 and Figure 11 show the forecast volume capacity ratios for the AM and PM peaks respectively. As seen in Figure 10, most of the network within Wyndham North is predicted to operate within capacity, with the exception of some local roads located either near an RRL station or near schools. Sections of Boundary Road, Leakes Road and Derrimut Road are forecast to approach capacity in the AM peak.

Figure 11 shows the forecast volume capacity ratios for the PM peak. This indicates that there is some local traffic congestion around town centres such as the town centre near the RRL station at Sayers Road. Sections of Leakes Road and Boundary Road will be approaching capacity. Traffic congestion on local roads is expected to be relieved by left in / left out intersections, which are not included in the model.

More detailed plots of volume capacity ratios volumes are provided in Appendix A.

Figure 10 AM peak volume capacity ratios for the ultimate scenario

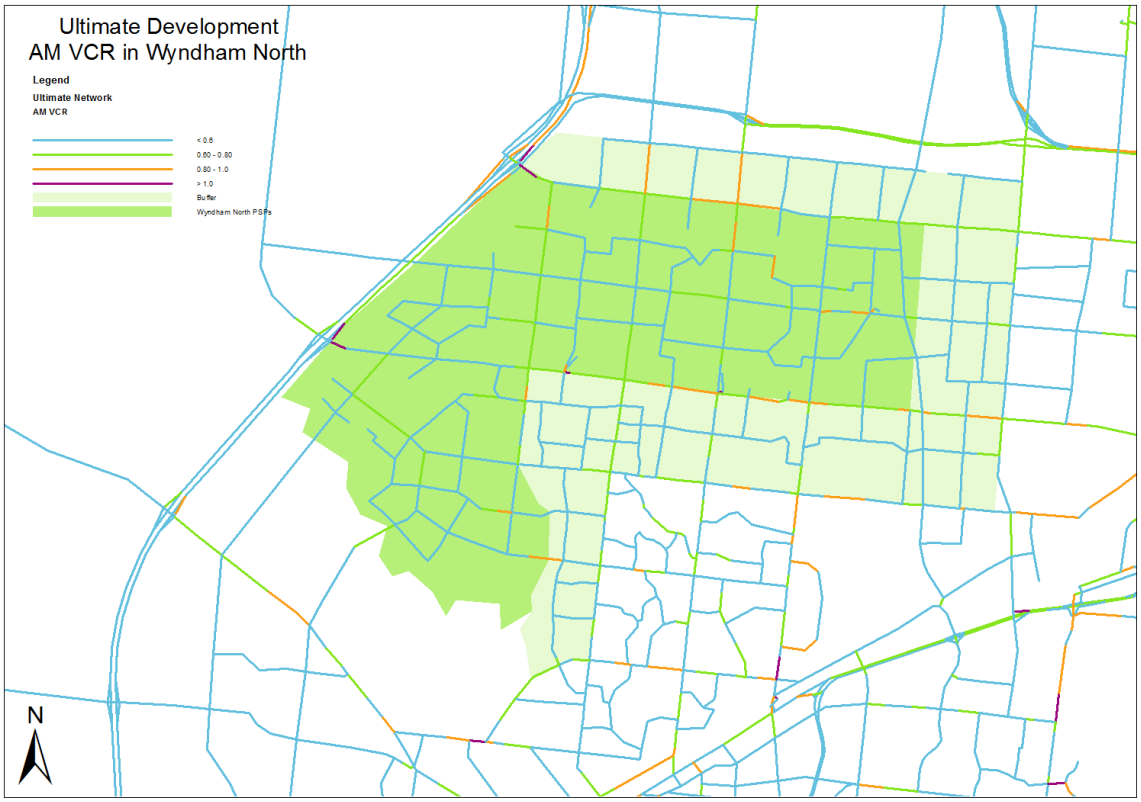
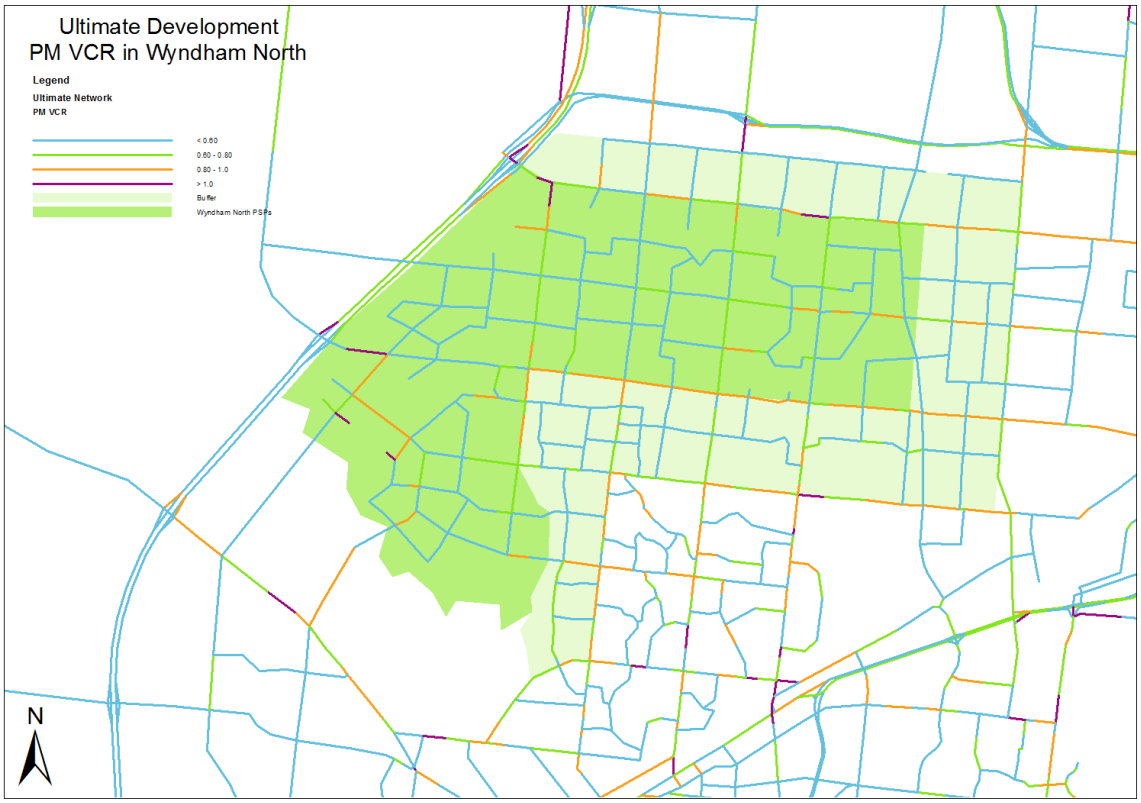


Figure 11 PM peak volume capacity ratios for the ultimate scenario



4.2 Interim Forecasts

An interim development scenario was developed to test the network performance for a possible interim stage of development. The interim scenario had the following features:

- 2021 population, school enrolment and employment forecasts for all areas outside of the Wyndham North PSPs and buffer region, (as per the 2021 Westbrook Drive model)
- The assumed 2021 road network and public transport service pattern for areas outside of the Wyndham North PSPs and buffer region, (as per the 2021 Westbrook Drive model)
- Freight demand as per the 2021 Westbrook Drive model, i.e. no WIFT or MIS
- The ultimate zone and landuse inputs for the Wyndham North PSPs
- An interim road network within the PSPs.

The interim road network reflects the arterial road delivery strategy discussed between GAA, VicRoads, Wyndham City and City of Melton. The strategy is based on the draft arterial road protocol, which entails delivery of a constructed carriageway by new development, whether this is delivery of a constructed carriageway where none currently exists, or provision of an additional carriageway where one currently does exist. The interim model also reflects ultimate land use in the Wyndham North area to test the proposed road delivery strategy against the traffic generated by this development, and as such some level of congestion in the model outputs is considered appropriate.

In the interim model Boundary Road is coded as two lanes (one lane in each direction), and Dohertys Road and Leakes Roads are coded as four lanes (two lanes in each direction). The interim network does not include the bridges across the Werribee River or the Forsyth Road crossing of the Regional Rail Link (RRL), as these are not expected to be delivered in the next 10 years. The interim road network reflects the number of lanes on overpasses of the RRL which will be delivered by the RRL project. Derrimut Road is coded as six lanes to reflect its status as the major north-south arterial road connecting to freeways and major arterials. The interim network is shown in Figure 12.

Figure 12 Interim Road Network

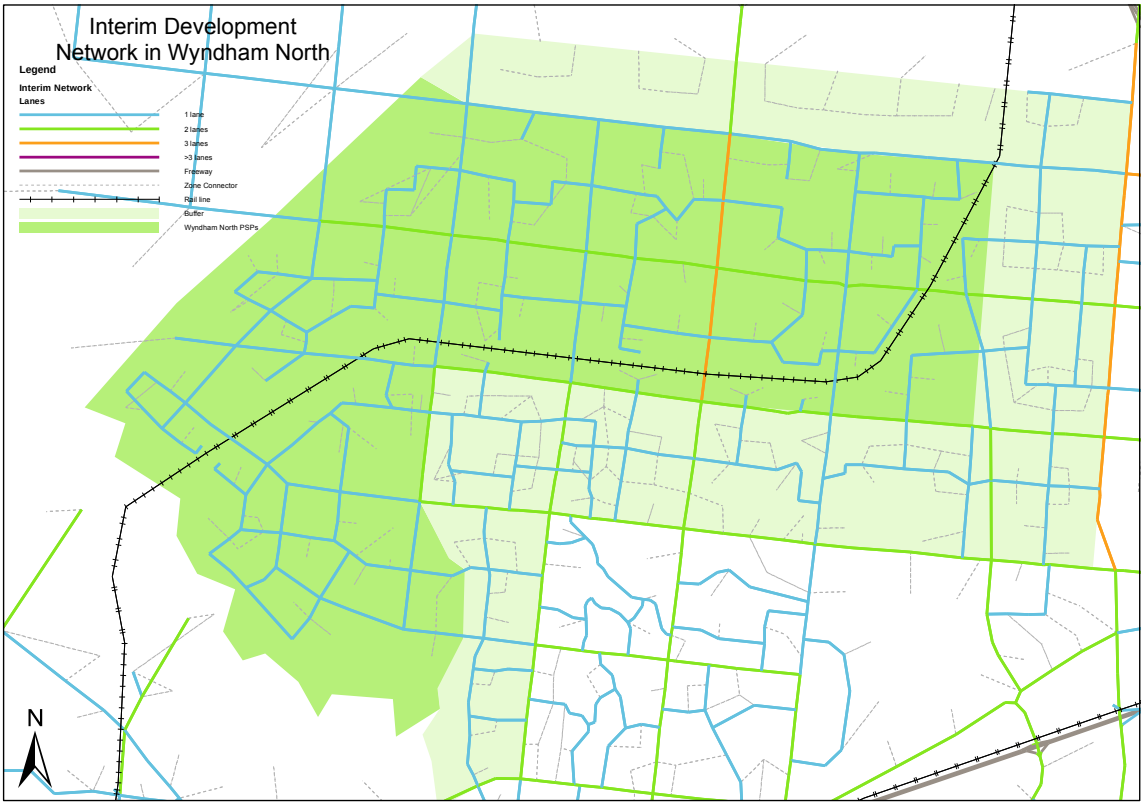


Figure 13 and Figure 14 shows the ranges of average weekday volumes for the interim scenario. This indicates that Doherty's Road, Leakes Road and Derrimut Road are forecast to have the highest traffic volumes. Figure 15 shows the forecast AM peak Volume Capacity Ratios (VCRs) for the interim scenario. AM peak and PM peak plots are provided in Appendix A. This indicates that volumes on Boundary Road, Leakes Road and Dohertys Road are forecast to exceed capacity, in a number of locations.

Figure 13 Interim Scenario Daily Volumes

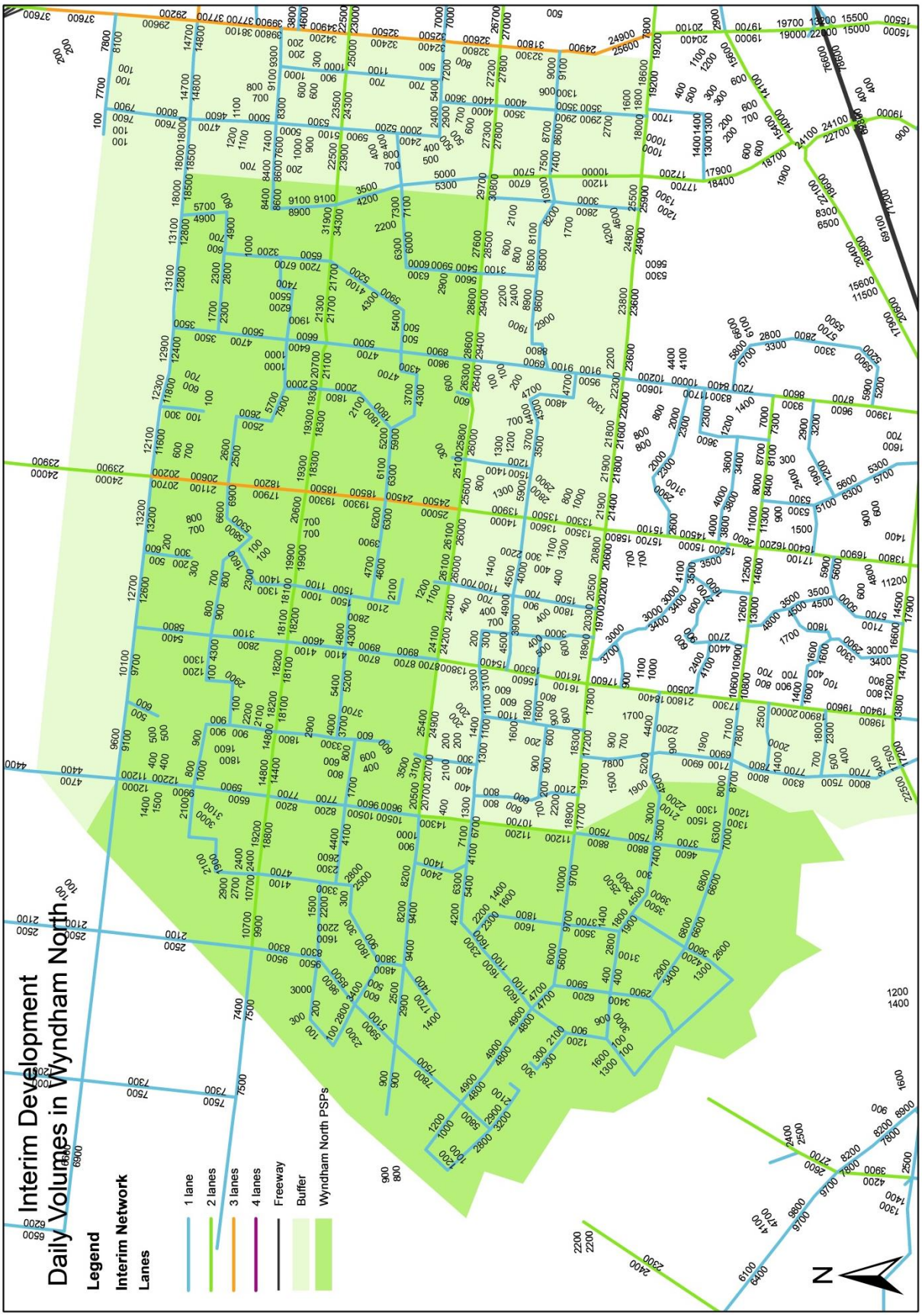


Figure 14 Interim Scenario Daily Volume Ranges

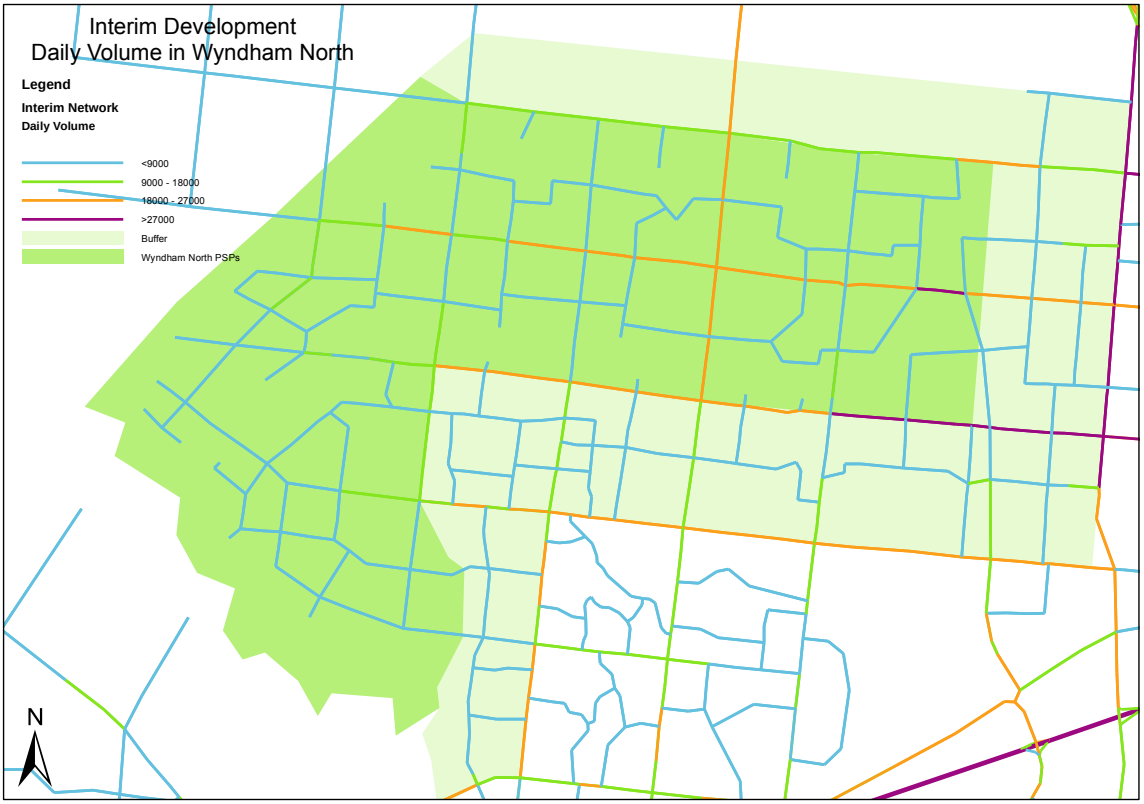
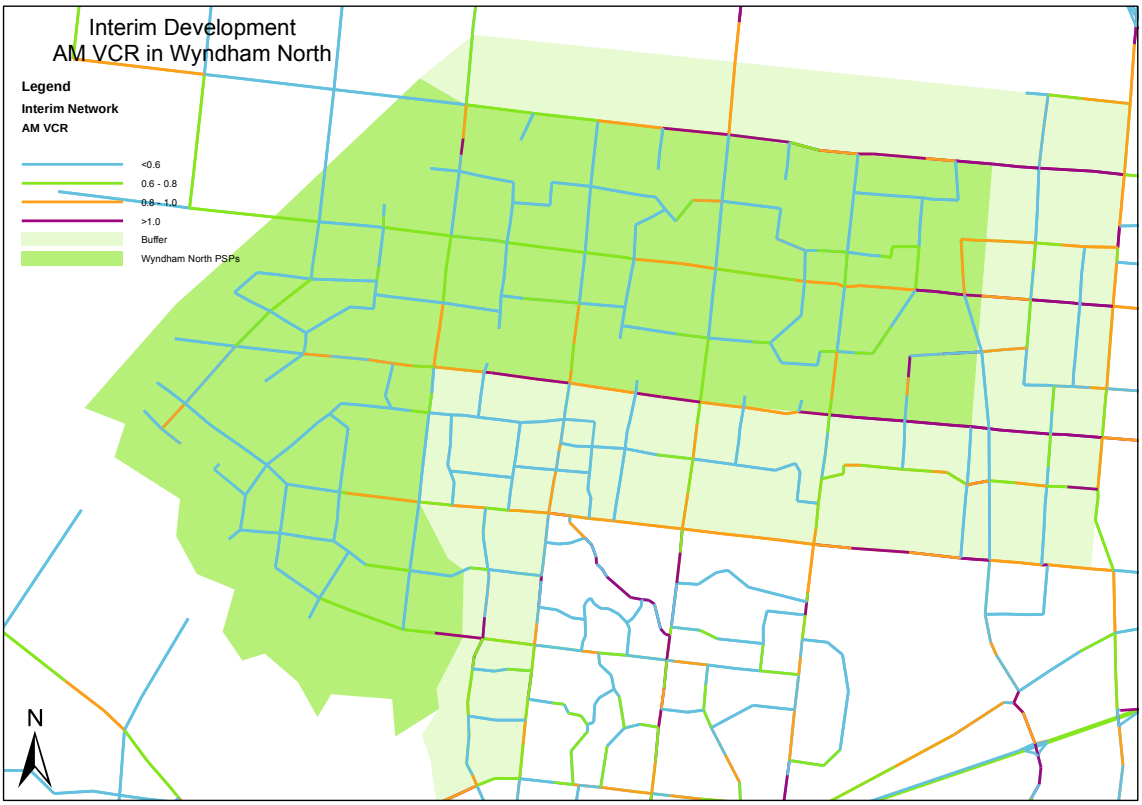


Figure 15 Interim Scenario AM VCR



5.0 Intersection Design

The volumes extracted from the Wyndham North ultimate MITM model were used as inputs into the intersection design process. A sensibility check was made against the Western Growth Corridor VITM model prior to undertaking the design for the ultimate scenario. Intersections were designed for both an ultimate year (2046) and an interim year (2021).

GAA, VicRoads, Wyndham City and City of Melton all agreed a template approach should be developed for intersection configurations for the Wyndham North area, which could then be applied to future growth area precincts. The templates developed drew on experience in previous PSP planning and standard practice in intersection design.

A methodology to determine the configuration of intersections was developed in which standard template configurations were applied except in cases where a suitable template configuration could not be readily identified or agreed upon. In this instance, intersection modelling was used to determine intersection layout. This approach was supported by GAA, VicRoads, Wyndham City Council and City of Melton.

Intersection modelling was undertaken using SIDRA Intersection. SIDRA Intersection is a micro-analytical tool used to evaluate signalised intersection designs in terms of capacity, level of service (LOS) and a wide range of other performance measures.

Intersection numbers as outlined in Wyndham North Development Contributions Plan, locations and method of design are listed Table 5 and shown schematically in Figure 16.

In response to high volumes generated on connectors associated with the two major town centres and adjacent train stations (near Derrimut Road and Sayers Road), additional local roads and intersections IN-90-08, IN-90-13 and IN-91-08 were added to provide alternative routes to better distribute this traffic. An additional connector road and intersection IN-91-13 were also added in the southern section of PSP 1091 to better distribute high connector road volumes in this area.

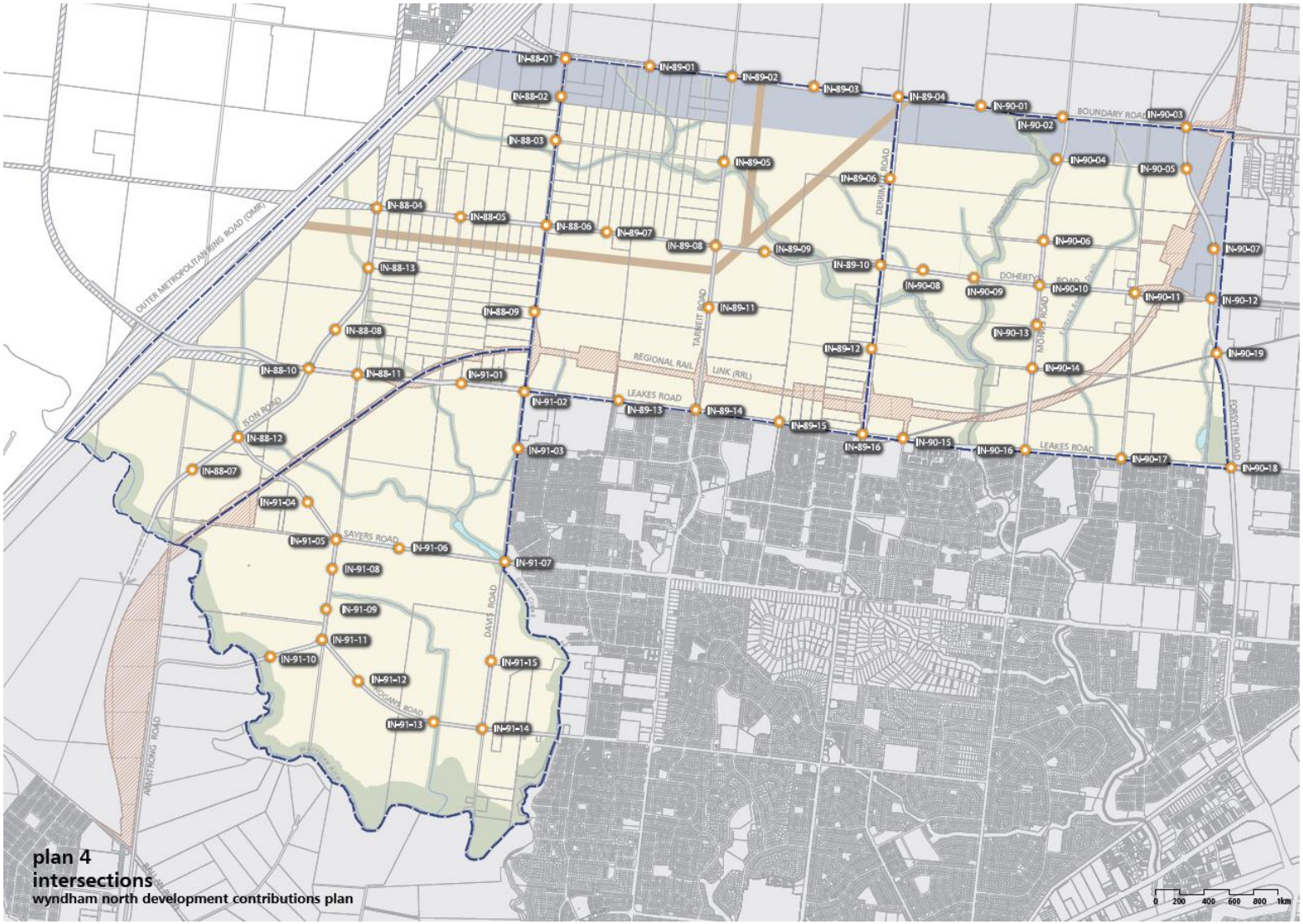
Table 5 Intersections Summary

Number	Location	Design Method Ultimate Year	Design Method Interim Year
IN-88-01	Boundary and Davis	Modelling	Template
IN-88-02	Davis and East-West connector (north)	Template	Template
IN-88-03	Davis and East-West connector (central)	Template	Template
IN-88-04	Dohertys and Ison	Modelling	Template
IN-88-05	Dohertys and Gard (connector)	Template	Template
IN-88-06	Dohertys and Davis	Modelling	Template
IN-88-07	Ison and East-West connector Blvd (south)	Template	Template
IN-88-08	Ison and East-West connector (central)	Modelling	Template
IN-88-09	Davis and East-West connector (south)	Modelling	Template
IN-88-10	Leakes and Ison	Template	Template
IN-88-11	Leakes and North-South connector	Template	Template
IN-88-12	Sayers and Ison	Modelling	Template
IN-88-13	Ison and East-West connector (north)	Template	Template
IN-89-01	Boundary and North-South connector (west)	Template	Template
IN-89-02	Boundary and Tarneit	Template	Template
IN-89-03	Boundary and North-South connector (east)	Template	Template
IN-89-04	Boundary and Derrimut	Modelling	Template
IN-89-05	Tarneit and Kenning	Template	Template

Number	Location	Design Method Ultimate Year	Design Method Interim Year
IN-89-06	Derrimut and East-West connector (central)	Modelling	Template
IN-89-07	Dohertys and North-South connector Blvd	Template	Template
IN-89-08	Dohertys and Tarneit	Template	Template
IN-89-09	Dohertys and North-South connector	Template	Template
IN-89-10	Dohertys and Derrimut	Modelling	Modelling
IN-89-11	Tarneit and East-West connector (south)	Template	Template
IN-89-12	Derrimut and East-West connector (south)	Modelling	Template
IN-89-13	Leakes and connector to west of Cottesloe Blvd	Template	Template
IN-89-14	Leakes and Tarneit	Modelling	Modelling
IN-89-15	Leakes and Crossway Ave	Template	Template
IN-89-16	Leakes and Derrimut	Modelling	Template
IN-90-01	Boundary and North-South connector	Template	Template
IN-90-02	Boundary and Morris	Modelling	Template
IN-90-03	Boundary and Forsyth / Christies	Modelling	Template
IN-90-04	Morris and East-West connector (north)	Template	Template
IN-90-05	Forsyth / Christies and East-West connector (north)	Template	Template
IN-90-06	Morris and East-West connector (central)	Template	Template
IN-90-07	Forsyth / Christies and East-West connector (central)	Template	Template
IN-90-08	Dohertys and Additional North-South connector	Template	Template
IN-90-09	Dohertys and North-South connector	Template	Template
IN-90-10	Dohertys and Morris	Template	Template
IN-90-11	Dohertys and Woods	Template	Template
IN-90-12	Dohertys and Forsyth / Christies	Template	Template
IN-90-13	Morris and Additional East-West connector	Template	Template
IN-90-14	Morris and East-West connector (south)	Template	Template
IN-90-15	Leakes and Sunset Views Blvd	Modelling	Template
IN-90-16	Leakes and Morris	Modelling	Template
IN-90-17	Leakes and Woods	Modelling	Template
IN-90-18	Leakes and Forsyth / Christies	Template	Template
IN-90-19	Forsyth / Christies and East-West connector Blvd (south)	Template	Template
IN-91-01	Leakes and North-South connector	Modelling	Template
IN-91-02	Leakes and Davis	Modelling	Template
IN-91-03	Davis and East-West connector (north)	Template	Template
IN-91-04	Sayers and North-South connector (west)	Modelling	Template
IN-91-05	Sayers and Armstrong	Custom	Template
IN-91-06	Sayers and North-South connector (east)	Template	Template
IN-91-07	Davis and Sayers	Template	Template

Number	Location	Design Method Ultimate Year	Design Method Interim Year
IN-91-08	Armstrong and Additional East-West connector	Template	Template
IN-91-09	Armstrong and East-West connector (north)	Template	Template
IN-91-10	Armstrong and East-West connector (south)	Template	Template
IN-91-11	Armstrong and Hogans	Custom	Template
IN-91-12	Hogans and North-South connector Blvd	Template	Template
IN-91-13	Hogans and Additional North-South connector	Template	Template
IN-91-14	Davis and Hogans	Custom	Template
IN-91-15	Davis and East-West connector (south)	Template	Template

Figure 16 Intersection Locations



5.1 Intersection Modelling Assumptions

For each of the intersections designed using SIDRA Intersection modelling, a number of assumptions were made. These are detailed in the following sections.

5.1.1 Volumes

In both the ultimate and interim year assessments the following assumptions were applied to traffic volumes:

- 55% of the two-hour strategic model traffic volumes were used as a peak hour volume
- Loading was applied consistently across the peak hour period (Peak Flow Factor = 1)
- 50 pedestrians per hour in all directions have been assumed, except along Boundary Road at which 25 pedestrians per hour were applied.
- Vehicular flows were rounded up to the nearest integer for analysis.

5.1.2 Heavy Vehicle Volumes

In the ultimate year analysis, heavy vehicle volumes were applied as a proportion of total vehicles. The proportions varied by road type and are summarised in in Table 6. For example 6% of total vehicles travelling from an arterial to another arterial or Boundary Road were assumed to be heavy vehicles. However it was assumed no vehicles turned from an Arterial into a collector or local road.

Table 6 Ultimate Year Truck Proportions

Turning from / turning to	Collector / Local	Arterial	Boundary Road
Collector / Local	0%	0%	0%
Arterial	0%	6%	6%
Boundary Road	0%	6%	15%

In the interim year heavy vehicle volumes were applied as extracted from the Wyndham North strategic model.

5.1.3 Cycle Times and Phasing

In both the ultimate and interim year assessments the following assumptions were applied to signals:

- Cycle time of 120 seconds at all intersections
- Fully controlled right turns
- Diamond phasing tested prior to testing alternate phasing arrangements

5.1.4 Speed Limits

In the ultimate year assessment the following speed limit assumptions were applied:

- 80km/h allocated to the 6 lane roadways
- 70km/h allocated to the 4 lane roadways
- 60km/h allocated to the 2 lane roadways
- 50km/h allocated to roadways within activity centres

In the interim year assessment the following speed limit assumptions were applied:

- Leakes Road 80km/h
- Leakes Road (either side of Derrimut Road intersection) 60km/h
- Derrimut Road 80 km/h
- Dohertys Road 60km/h
- Boundary 80km/h
- Tarneit Road 60km/h

- Davis Road 60km/h
- Davis Road (between Dohertys and Boundary Roads) 80km/h
- Sayers Road 60km/h
- Westbrook Drive / Ison Road 80km/h
- Forsyth Road 80km/h
- Morris Road 60km/h

5.1.5 Acceptable Operating Conditions

Acceptable operating conditions, at which a layout design is considered sufficient, were based on the degree of saturation (DOS) of the intersection. The following assumptions were followed in reaching acceptable operating conditions:

- When the DOS was less than 0.7 on a movement, the intersection geometry was reduced until the minimum allowable geometry was reached, or the DOS was above 0.7.
- When the DOS was between 0.7 and 0.95 on a movement, it was considered that acceptable operating conditions had been met.
- When the DOS was greater than 0.95, the intersection geometry was increased until the maximum allowable geometry was reached, or the DOS was below 0.95.

5.1.6 Intersection Layouts

Some over-riding assumptions used for the intersection layouts are specified below:

- 3-leg intersections provide pedestrian crossings on two arms only, except in activity centres where high pedestrian activity is expected.
- Auxiliary turn and approach lane maximum length is 150 metres
- Slip lanes avoided where possible for interim year designs
- Existing roads will be utilised in their current form, where practical, to minimise upgrades

5.1.7 Intersection Modelling Outputs

For each of the modelled intersections, the following SIDRA outputs have been provided:

- Intersection layout plan;
- Peak hour movement summaries; and
- Peak hour signal phasing summaries.

5.2 Ultimate Year Intersection Design

5.2.1 Template Designed Intersections

The template designs agreed between GAA, VicRoads, Wyndham City Council and City of Melton used in the ultimate year intersection designs are listed in Table 7. A complete list of template designed intersection layouts is provided in Appendix B.

Table 7 Ultimate Year Template Designs

Intersection Type	Description
6 to 6 Lane Arterial	- Use same number of through lanes in the intersection as the agreed number of lanes for each arterial (as shown in Figure 2) - Double right turns lanes in all directions - Minimum length of turning lanes as agreed by GAA, VicRoads and Council - Flaring as needed to accommodate turning lanes - Include allowance for future modification of intersection for bus queue jump lanes where appropriate
6 to 4 Lane Arterial Intersection	- Use same number of through lanes in the intersection as the agreed number of lanes for each arterial (as shown in Figure 2) - Double right turns lanes on 6 lane sections of intersection - Single right turn lanes on 4 lane sections of intersection - Minimum length of turning lanes as agreed by GAA, VicRoads and Council - Flaring as needed to accommodate turning lanes - Include allowance for future modification of intersection for bus queue jump lanes where appropriate
4 to 4 Lane Arterial	- Use same number of through lanes in the intersection as the agreed number of lanes for each arterial (as shown in Figure 2) - Minimum length of turning lanes as agreed by GAA, VicRoads and Council - Flaring as needed to accommodate turning lanes - Include allowance for future modification of intersection for bus queue jump lanes where appropriate
Arterial to Connector	- Use same number of through lanes in the intersection as the agreed number of lanes for each arterial (as shown in Figure 2) - Single right turn lanes - Minimum length of turning lanes as agreed by GAA, VicRoads and Council - Flaring as needed to accommodate turning lanes - No left turn slip lanes at town centres or near multiple school locations in response to higher anticipated pedestrian volumes
Arterial to Town Centre Connector	- Arterial to connector intersection template with no left turn slip lanes to improve pedestrian priority at intersection
Arterial to Industrial Connector	- Arterial to connector intersection template with two right turn lanes in and out of connectors in industrial areas

5.2.2 Modelling Designed Intersections

A total of 20 intersections were designed using SIDRA Intersection for the ultimate year. Complete intersection modelling outputs, including layouts and results discussion is provided in Appendix C.

5.3 Interim Year Intersection Design

5.3.1 Template Designed Intersections

The template designs agreed between GAA, VicRoads, Wyndham City Council and City of Melton used in the interim year intersection designs are listed in Table 8. A complete list of template designed intersection layouts is provided in Appendix D.

Table 8 Interim Year Template Designs

Approach Type	Description
Standard Capacity 2 Lane Arterial	- 4 lanes at intersection (1 through lane in each direction plus additional short 100m through lane including absolute minimum taper) - Separate single right turn lane (70m long plus 30m taper) - Separate single left turn slip lane
High Capacity 2 Lane Arterial	- 4 lanes at intersection (1 through lane in each direction plus additional 100m short stand-up lane on arrival side and 100m short lane on departure side, both including minimum taper) - Separate single right turn lane (70m long plus 30m taper) - Separate single left turn slip lane
Standard Capacity 4 Lane Arterial	- 4 lanes at intersection (2 through lanes in each direction) - Separate single right turn lane (70m long plus 30m taper) - Separate single left turn slip lane
High Capacity 4 Lane Arterial	- 6 lanes at intersection (2 through lanes in each direction plus additional 100m short stand-up lane on arrival side and 100m short lane on departure side, both including minimum taper) - Separate single right turn lane (70m long plus 30m taper) - Separate single left turn slip lane
2 Lane Arterial At Connector	- 2 lanes at intersection (1 through lane in each direction) - Separate single right turn lane (50m long with minimum taper) - Separate single left turn stand-up lane(30m long with absolute minimum taper)
4 Lane Arterial At Connector	- 4 lanes at intersection (2 through lanes in each direction) - Separate single right turn lane (50m long with minimum taper) - Separate single left turn stand-up lane(30m long with absolute minimum taper)
Standard Connector	- 2 lanes at intersection (1 through lane in each direction) - Separate single right turn lane - Left turn lane combined with through lane
Industrial Connector	- 2 lanes at intersection (1 through lane in each direction) - Separate single right turn lane - Separate left turn slip lane

The Standard Capacity 2 Lane Arterial and Standard Capacity 4 Lane Arterial templates are the same, as VicRoads standard practice is to require a short through lane at arterial intersections. The absolute minimum length of the short through lane has been applied to the templates. The short through lane in some Standard Capacity 2 Lane Arterial intersections has however been removed where these intersections are on the edge of the precinct and are not expected to experience high volumes.

In preparing the functional layout plans for the interim intersections, it is expected that in most cases where the ultimate scenario contains left turn slip lanes, the interim layout will be designed to provide these left turn slip lanes if this does not result in additional redundant works when the intersection is upgraded to its ultimate configuration.

5.3.2 Modelling Designed Intersections

Two intersections were designed using SIDRA Intersection for the interim year. Complete intersection modelling outputs, including layouts and results discussion is provided in Appendix E.

6.0 Summary and Conclusions

Strategic modelling was undertaken for the Wyndham North PSPs for an Ultimate development and an Interim development scenario. The strategic modelling of the Ultimate development scenario found that the network with the PSPs is predicted to operate within capacity with the exception of some local road and access points to RRL stations and activity centres.

The strategic modelling of the Interim development scenario indicated traffic demand on sections of Boundary Road, Doherty's Road and Leakes Road would exceed capacity.

The volumes extracted from the Wyndham North ultimate MITM model were used as inputs into the intersection design process. Using either a standard template or modelling based approach, a series of intersection design layouts were determined for both an ultimate and interim year. These designs will now form the basis of a functional design. In this next stage road design standards and site specific constraints will be applied to the capacity requirements detailed in this report to reach a final intersection design.

Appendix A

Traffic volumes

Appendix A Traffic volumes

Figure 17 Ultimate Development - AM peak traffic by direction and Volume Capacity Ratio

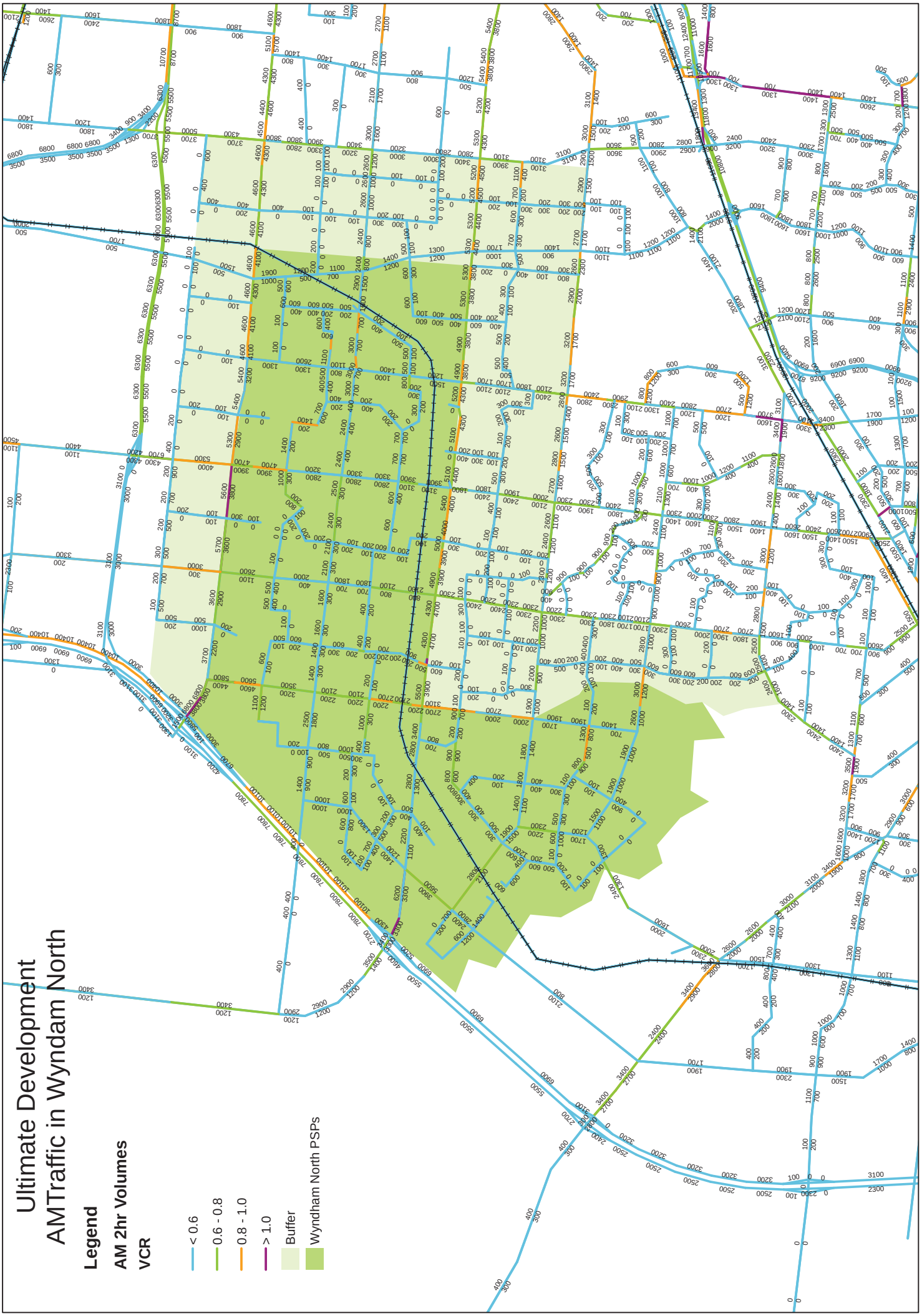


Figure 18 Ultimate Development - PM peak traffic by direction and Volume Capacity Ratio

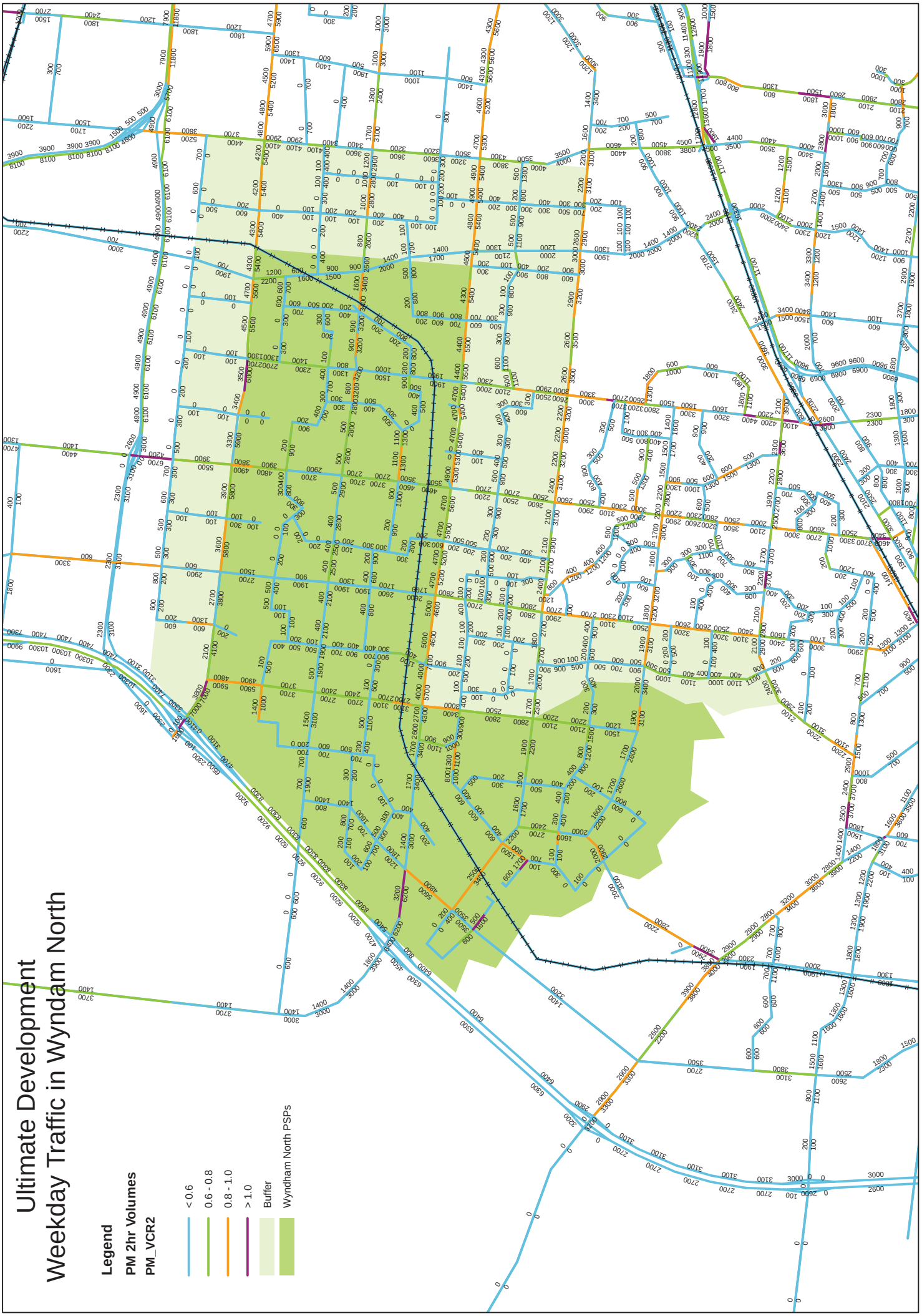


Figure 19 Interim development – AM peak traffic by direction and Volume Capacity Ratio

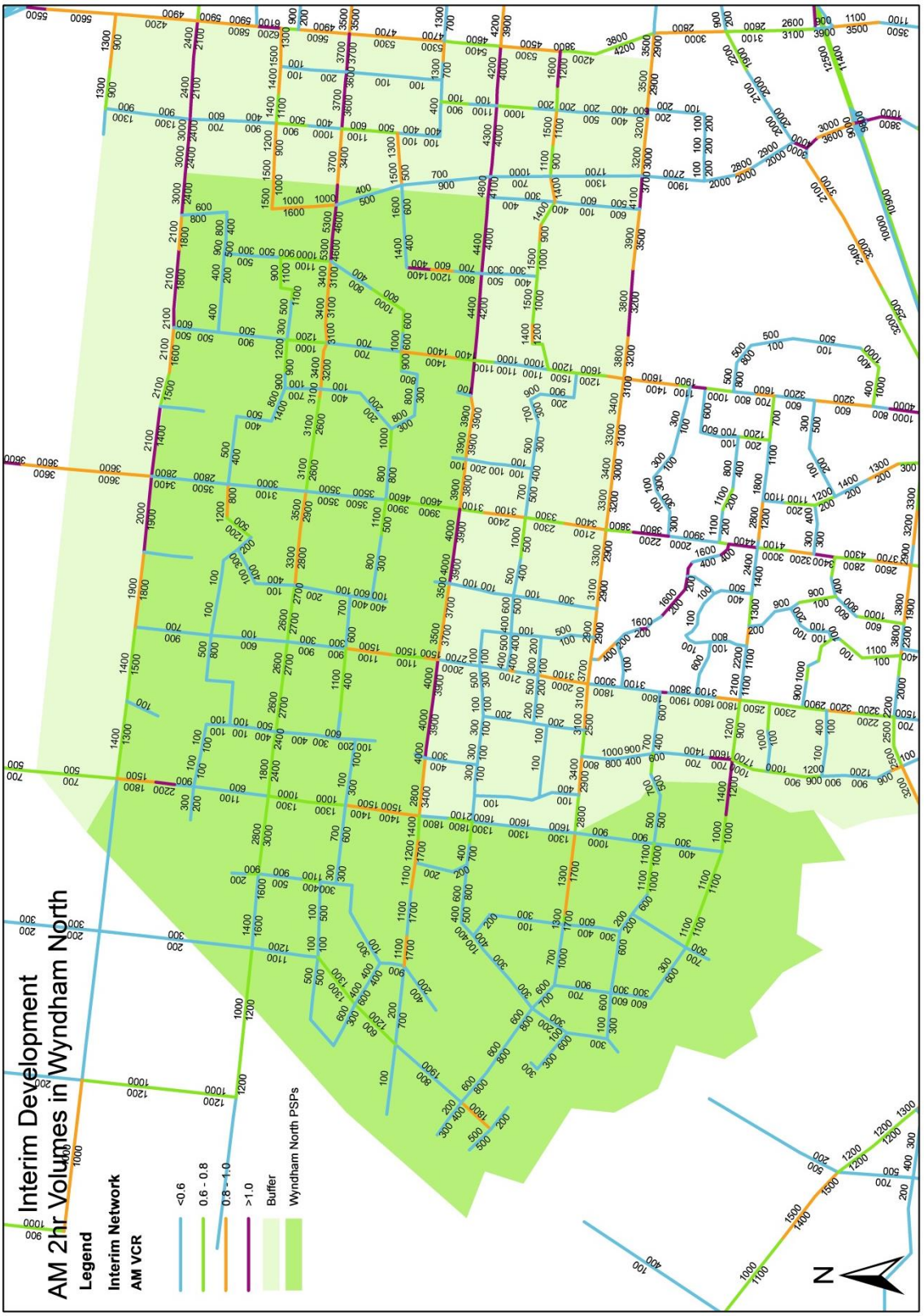
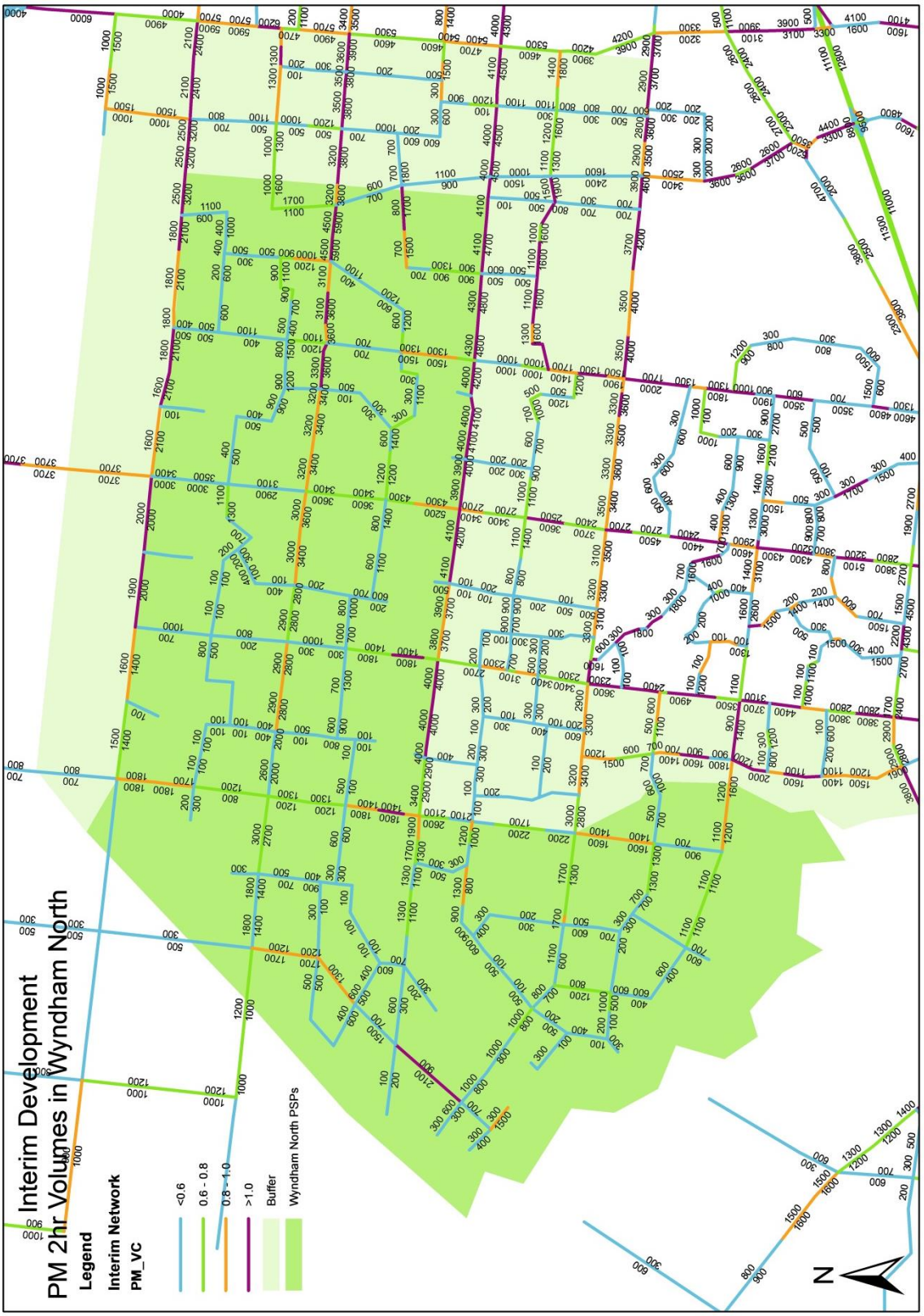


Figure 20 Interim development – PM peak traffic by direction and Volume Capacity Ratio



Appendix B

Ultimate Year (2046) Template Design Intersection Layouts

Appendix B Ultimate Year (2046) Template Design Intersection Layouts

Number	Road #1	Road #2	Template Design
IN-88-02	Davis	East-West connector (north)	Arterial to industrial connector
IN-88-03	Davis	East-West connector (central)	Arterial to connector
IN-88-05	Dohertys	Gard (connector)	Arterial to connector
IN-88-07	Ison	East-West connector Blvd (south)	Arterial to connector
IN-88-10	Leakes	Ison	6 to 6 lane arterial
IN-88-11	Leakes	North-South connector	Arterial to connector
IN-88-13	Ison	East-West connector (north)	Arterial to connector
IN-89-01	Boundary	North-South connector (west)	Arterial to industrial connector
IN-89-02	Boundary	Tarneit	6 to 4 lane arterial
IN-89-03	Boundary	North-South connector (east)	Arterial to industrial connector
IN-89-05	Tarneit	Kenning	Arterial to connector
IN-89-06*	Derrimut	East-West connector (central)	Arterial to connector
IN-89-07	Dohertys	North-South connector Blvd	Arterial to connector
IN-89-08	Dohertys	Tarneit	4 to 4 lane arterial
IN-89-09	Dohertys	North-South connector	Arterial to connector
IN-89-11	Tarneit	East-West connector (south)	Arterial to connector
IN-89-13	Leakes	Connector west of Cottesloe Blvd	Arterial to connector
IN-89-15	Leakes	Crossway Ave	Arterial to connector
IN-90-01	Boundary	North-South connector	Arterial to industrial connector
IN-90-04	Morris	East-West connector (north)	Arterial to industrial connector
IN-90-05	Forsyth / Christies	East-West connector (north)	Arterial to industrial connector
IN-90-06	Morris	East-West connector (central)	Arterial to connector
IN-90-07	Forsyth / Christies	East-West connector (central)	Arterial to industrial connector
IN-90-08	Dohertys	Additional North-South connector	Arterial to connector
IN-90-09	Dohertys	North-South connector	Arterial to connector
IN-90-10	Dohertys	Morris	4 to 4 lane arterial
IN-90-11	Dohertys	Woods	Arterial to town centre connector
IN-90-12	Dohertys	Forsyth / Christies	4 to 4 lane arterial intersection
IN-90-13	Morris	Additional East-West connector	Arterial to connector
IN-90-14	Morris	East-West connector (south)	Arterial to connector
IN-90-18	Leakes	Forsyth / Christies	Intersection included in Truganina Sth DCP
IN-90-19	Forsyth / Christies	East-West connector Blvd (south)	Arterial to connector
IN-91-03	Davis	East-West connector (north)	Arterial to town centre connector

Number	Road #1	Road #2	Template Design
IN-91-05	Sayers	Armstrong	Custom intersection design
IN-91-06	Sayers	North-South connector (east)	Arterial to connector
IN-91-07	Davis	Sayers	4 to 4 lane arterial
IN-91-08	Armstrong	Additional East-West connector	Arterial to town centre connector
IN-91-09	Armstrong	East-West connector (north)	Arterial to connector
IN-91-10	Armstrong	East-West connector (south)	Arterial to connector
IN-91-11	Armstrong	Hogans	Custom intersection design
IN-91-12	Hogans	North-South connector Blvd	Arterial to connector
IN-91-13	Hogans	Additional North-South connector	Arterial to connector
IN-91-14	Davis	Hogans	Custom intersection design
IN-91-15	Davis	East-West connector (south)	Arterial to town centre connector

*Intersection IN-89-06 was originally designed using SIDRA Intersection modelling, however template approach was applied following an evaluation of the results.

Appendix C

Ultimate Year (2046) Modelling Design Intersection Layouts

Appendix C Ultimate Year (2046) Modelling Design Intersection Layouts

The table below provides a results summary of the intersections design using SIDRA Intersection. Complete SIDRA Intersection modelling outputs, including layouts, movement summaries and signal phasing summaries are provided on the subsequent pages.

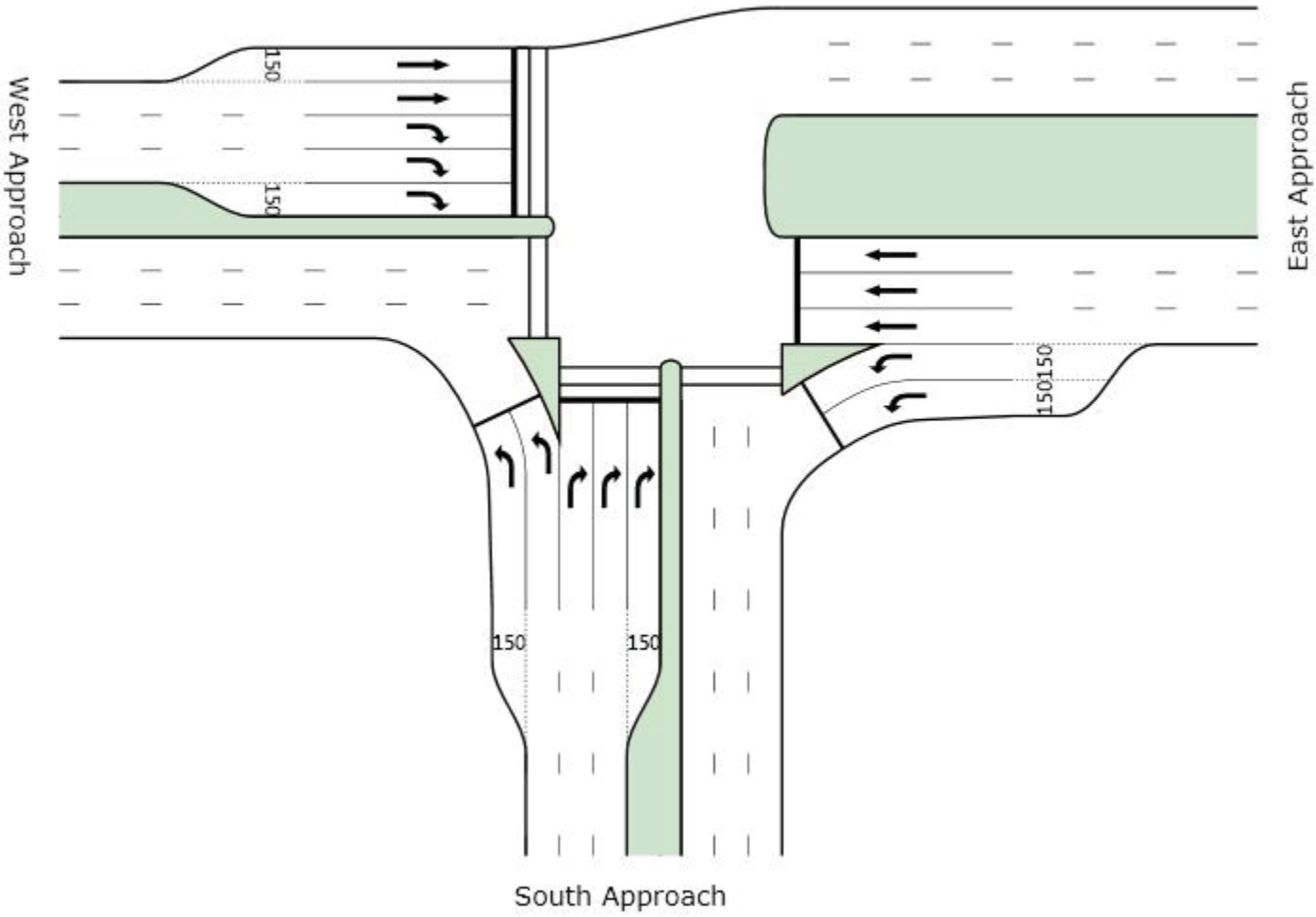
Ultimate Year Intersection Modelling Summary

Intersection Number	Key Issues and Comments
IN-88-01	- Proposed layout may be unsatisfactory as DOS is 0.953 in the AM peak and 1.073 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high volumes travelling to and from the west and south. - Pedestrian crossing removed from east approach, remaining crossings staged and 20 pedestrians per hour applied.
IN-88-04	- The proposed layout is acceptable given the DOS of 0.693 in the AM peak and 0.530 in the PM peak. - No issues
IN-88-06	- The proposed layout is acceptable given the DOS of 0.869 in the AM peak and 0.876 in the PM peak. - Pedestrian crossings staged on all approaches.
IN-88-08	- The proposed layout is acceptable given the DOS of 0.674 in the AM peak and 0.832 in the PM peak. - No issues
IN-88-09	- The proposed layout is acceptable given the DOS of 0.670 in the AM peak and 0.896 in the PM peak. - No issues
IN-88-12	- Proposed layout may be unsatisfactory as DOS is 0.924 in the AM peak and 1.024 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high volumes of right turning traffic on he south-east approach. - Pedestrian crossings staged on north-east and south-west approaches, not on all approaches however due to sensitive pedestrian location.
IN-89-04	- Proposed layout may be unsatisfactory as DOS is 0.889 in the AM peak and 1.024 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high volumes of through traffic on all approaches. - Pedestrian crossings staged and 20 pedestrians per hour applied.
IN-89-06*	- The proposed layout is acceptable given the DOS of 0.767 in the AM peak and 0.942 in the PM peak. - No issues - Modelling produced double right turn lanes on the eastern approach, which GAA felt was unwarranted. An “Arterial to Connector” intersection template was therefore adopted.
IN-89-10	- The proposed layout is acceptable given the DOS of 0.817 in the AM peak and 0.889 in the PM peak. - No issues
IN-89-12	- Proposed layout may be unsatisfactory as DOS is 0.771 in the AM peak and 1.004 in the PM peak. - Results can be attributed to high through volumes on the north and south approaches. - Pedestrian crossings not staged due to nearby activity centre. - Diamond phasing introduced on all approaches due to single tight turn lanes. Use of filtered right turns on east and west approaches approved by GAA.

Intersection Number	Key Issues and Comments
IN-89-14	- The proposed layout is acceptable given the DOS of 0.886 in the AM peak and 0.876 in the PM peak. - Pedestrian crossings staged on all approaches.
IN-89-16	- Proposed layout may be unsatisfactory as DOS is 0.863 in the AM peak and 0.969 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high through volumes of the east and west approaches. - Pedestrian crossings staged on all approaches.
IN-90-02	- Proposed layout may be unsatisfactory as DOS is 1.021 in the AM peak and 0.884 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high volumes of right turning vehicles on the west approach and high volumes of through traffic on both the west and east approaches. - Pedestrian crossings staged and 20 pedestrians per hour applied.
IN-90-03	- The proposed layout is acceptable given the DOS of 0.869 in the AM peak and 0.904 in the PM peak. - Pedestrian crossings staged and 20 pedestrians per hour applied. - Leading and lagging right turn phasing was employed in the AM peak as it resulted in better intersection performance results than diamond phasing. In the PM peak diamond phasing was introduced for the north-south approaches.
IN-90-15	- Proposed layout may be unsatisfactory as DOS is 0.842 in the AM peak and 0.991 in the PM peak. The intersection was deemed to be at maximum geometry and therefore not expanded further. - Results can be attributed to high through volumes of the eat approach - Pedestrian crossings staged on all approaches. - Diamond phasing introduced on all approaches due to single right turn lanes.
IN-90-16	- The proposed layout is acceptable given the DOS of 0.874 in the AM peak and 0.913 in the PM peak. - Pedestrian crossings staged on all approaches. - Diamond phasing introduced on north and south approaches due to single right turn lanes.
IN-90-17	- The proposed layout is acceptable given the DOS of 0.898 in the AM peak and 0.985 in the PM peak. - Results can be attributed to high volumes of through vehicles on the east approach. - Pedestrian crossings staged on all approaches. - Diamond phasing introduced on north and south approaches due to single right turn lanes. Not on east and west approaches as it reduces intersection performance.
IN-91-01	- The proposed layout is acceptable given the DOS of 0.654 in the AM peak and 0.808 in the PM peak. - No issues
IN-91-02	- The proposed layout is acceptable given the DOS of 0.828 in the AM peak and 0.909 in the PM peak. - Pedestrian crossings staged on all approaches. - Diamond phasing introduced on north and south approaches due to single right turn lanes.
IN-91-04	- The proposed layout is acceptable given the DOS of 0.892 in the AM peak and 0.819 in the PM peak. - Pedestrian crossings not staged due to nearby activity centre. - Diamond phasing introduced on all approaches due to single tight turn lanes. Use of filtered right turns approved by GAA.

*Intersection IN-89-06 was originally designed using SIDRA Intersection modelling; however template approach was applied following an evaluation of the results.

N IN-88-01 ULTIMATE LAYOUT



MOVEMENT SUMMARY

Site: IN-88-01 Ultimate AM

IN-88-01 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	1150	6.0	0.478	16.4	LOS B	13.8	101.5	0.38	0.77	52.4
3	R	1066	6.0	0.921	81.2	LOS F	25.5	187.8	1.00	1.03	22.0
Approach		2216	6.0	0.921	47.6	LOS D	25.5	187.8	0.68	0.89	31.5
East: East Approach											
4	L	519	6.0	0.416	38.2	LOS D	10.6	77.7	0.75	0.81	35.8
5	T	660	15.0	0.919	74.0	LOS E	15.6	123.0	1.00	1.07	22.7
Approach		1179	11.0	0.919	58.2	LOS E	15.6	123.0	0.89	0.95	27.0
West: West Approach											
11	T	616	14.9	0.295	7.7	LOS A	8.1	64.4	0.41	0.36	61.1
12	R	2362	6.0	0.953	66.9	LOS E	67.1	493.8	0.98	1.02	25.2
Approach		2977	7.9	0.953	54.7	LOS D	67.1	493.8	0.86	0.88	28.8
All Vehicles		6372	7.8	0.953	52.9	LOS D	67.1	493.8	0.80	0.90	29.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P2	Across S approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P7	Across W approach	20	46.8	LOS E	0.1	0.1	0.88	0.88
P8	Across W approach	20	42.5	LOS E	0.1	0.1	0.84	0.84
All Pedestrians		80	48.0	LOS E			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-01 Ultimate PM

IN-88-01 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	2502	6.0	1.073	129.7	LOS F	209.8	1544.2	1.00	1.26	15.4
3	R	389	7.0	0.176	32.7	LOS C	4.8	35.6	0.64	0.77	38.9
Approach		2891	6.1	1.073	116.7	LOS F	209.8	1544.2	0.95	1.19	16.7
East: East Approach											
4	L	1365	6.0	0.823	31.1	LOS C	26.1	192.0	0.73	0.87	39.9
5	T	754	15.0	1.050	183.0	LOS F	29.8	235.8	1.00	1.51	11.4
Approach		2119	9.2	1.050	85.2	LOS F	29.8	235.8	0.83	1.09	21.0
West: West Approach											
11	T	525	15.1	0.363	22.0	LOS C	11.1	87.7	0.68	0.58	44.2
12	R	1176	6.0	0.800	58.8	LOS E	22.7	167.2	0.99	0.90	27.5
Approach		1701	8.8	0.800	47.4	LOS D	22.7	167.2	0.90	0.80	31.2
All Vehicles		6711	7.8	1.073	89.2	LOS F	209.8	1544.2	0.90	1.06	20.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P2	Across S approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P7	Across W approach	20	26.0	LOS C	0.0	0.0	0.66	0.66
P8	Across W approach	20	22.8	LOS C	0.0	0.0	0.62	0.62
All Pedestrians		80	37.9	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

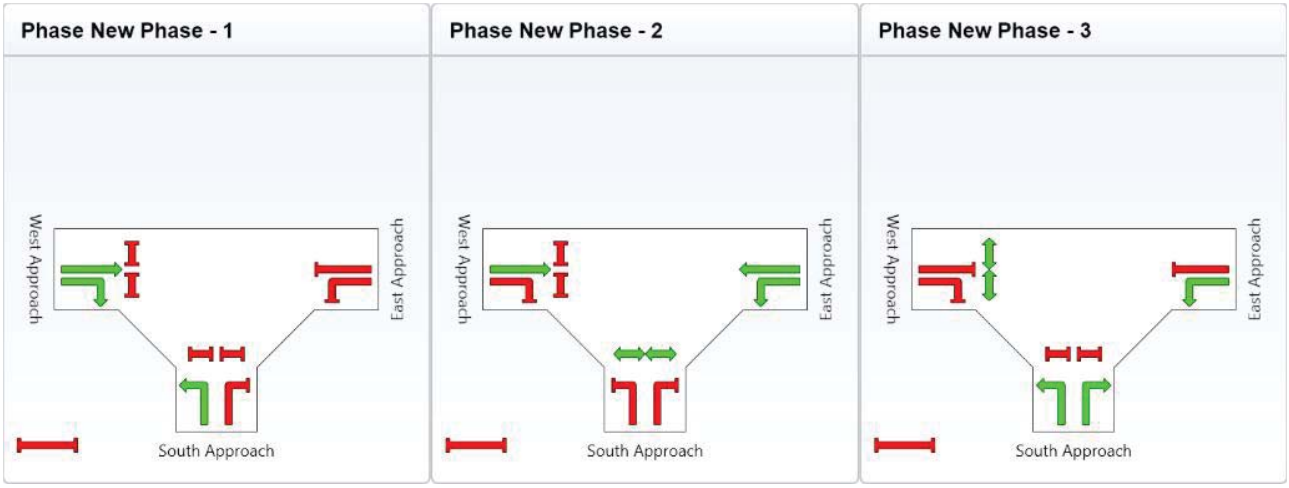
Site: IN-88-01 Ultimate AM

IN-88-01 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3
Green Time (sec)	60	16	26
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	66	22	32
Phase Split	55 %	18 %	27 %



PHASING SUMMARY

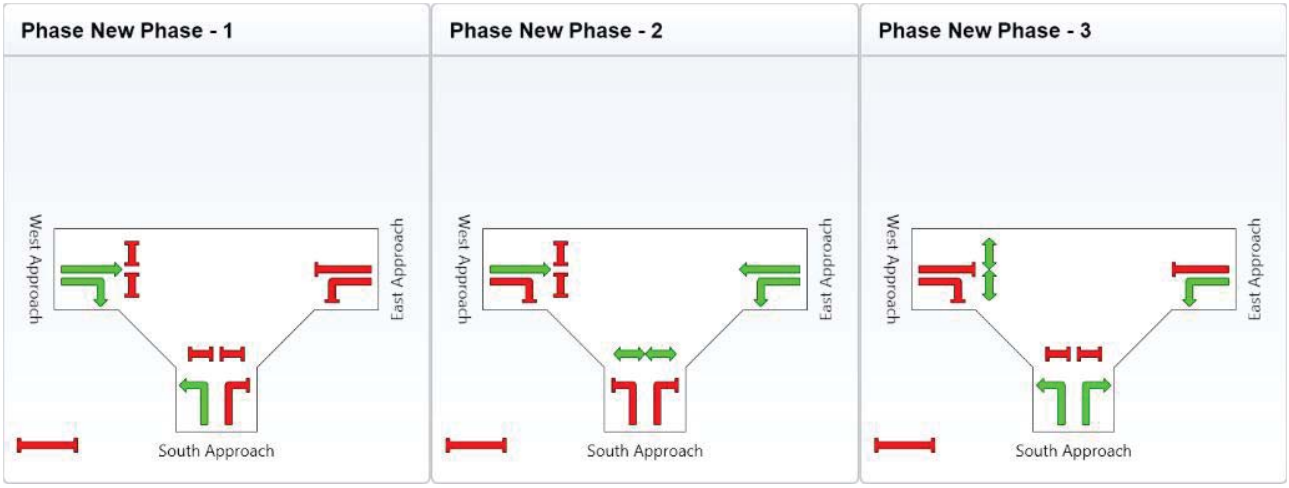
Site: IN-88-01 Ultimate PM

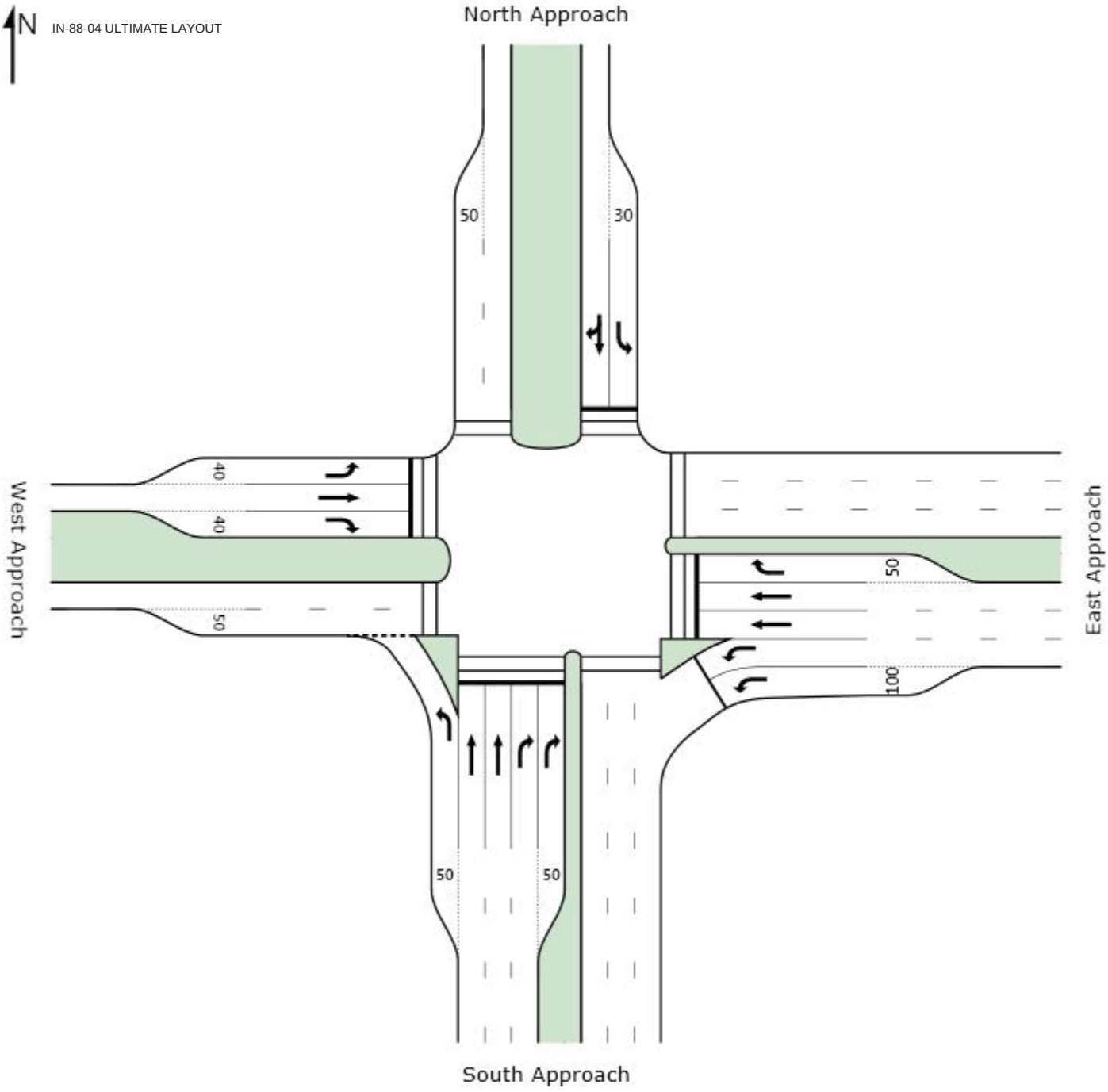
IN-88-01 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3
Green Time (sec)	33	16	53
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	39	22	59
Phase Split	33 %	18 %	49 %




N
IN-88-04 ULTIMATE LAYOUT
North Approach
50
30
West Approach
40
40
50
East Approach
50
100
50
50
South Approach

MOVEMENT SUMMARY

Site: IN-88-04 Ultimate AM

IN-88-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	1	0.0	0.001	10.3	LOS B	0.0	0.0	0.13	0.66	56.6
2	T	144	0.0	0.163	34.9	LOS C	4.3	29.8	0.74	0.68	33.9
3	R	570	6.0	0.693	48.4	LOS D	20.5	150.9	0.89	0.85	31.2
Approach		715	4.8	0.693	45.6	LOS D	20.5	150.9	0.86	0.81	31.6
East: East Approach											
4	L	538	5.9	0.319	23.8	LOS C	9.8	72.3	0.52	0.78	45.3
5	T	10	11.1	0.018	41.8	LOS D	0.3	2.5	0.81	0.58	31.2
6	R	24	0.0	0.258	72.8	LOS E	1.5	10.2	0.99	0.71	21.0
Approach		572	5.8	0.319	26.2	LOS C	9.8	72.3	0.55	0.77	43.2
North: North Approach											
7	L	20	0.0	0.081	26.8	LOS C	0.5	3.5	0.78	0.69	33.9
8	T	122	0.0	0.471	46.1	LOS D	9.5	66.8	0.93	0.77	25.0
9	R	61	0.0	0.471	53.0	LOS D	9.5	66.8	0.93	0.82	23.3
Approach		202	0.0	0.471	46.3	LOS D	9.5	66.8	0.92	0.77	25.1
West: West Approach											
10	L	72	0.0	0.269	25.6	LOS C	2.2	15.7	0.57	0.72	34.1
11	T	223	5.9	0.529	44.4	LOS D	11.6	85.4	0.93	0.78	27.7
12	R	70	6.3	0.679	74.3	LOS E	4.4	32.4	1.00	0.82	21.7
Approach		365	4.8	0.679	46.5	LOS D	11.6	85.4	0.88	0.77	27.1
All Vehicles		1855	4.6	0.693	39.9	LOS D	20.5	150.9	0.77	0.79	32.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	50	45.9	LOS E	0.1	0.1	0.88	0.88
P7	Across W approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		200	48.2	LOS E			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-04 Ultimate PM

IN-88-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	70	6.3	0.114	12.3	LOS B	0.8	5.8	0.26	0.69	54.0
2	T	118	0.0	0.152	38.6	LOS D	3.7	25.6	0.78	0.69	31.9
3	R	389	5.9	0.530	49.3	LOS D	13.3	97.5	0.87	0.82	30.8
Approach		577	4.8	0.530	42.6	LOS D	13.3	97.5	0.78	0.77	32.6
East: East Approach											
4	L	788	6.0	0.481	26.3	LOS C	16.9	124.0	0.60	0.80	43.3
5	T	328	6.0	0.514	44.3	LOS D	12.0	88.5	0.90	0.76	30.2
6	R	20	0.0	0.097	58.4	LOS E	1.0	7.1	0.90	0.71	24.6
Approach		1135	5.9	0.514	32.1	LOS C	16.9	124.0	0.69	0.79	38.4
North: North Approach											
7	L	25	0.0	0.094	21.4	LOS C	0.6	4.0	0.67	0.70	36.6
8	T	153	0.0	0.527	44.4	LOS D	11.9	83.5	0.93	0.78	25.5
9	R	77	0.0	0.527	51.3	LOS D	11.9	83.5	0.93	0.83	23.7
Approach		255	0.0	0.527	44.2	LOS D	11.9	83.5	0.91	0.79	25.7
West: West Approach											
10	L	59	0.0	0.242	29.1	LOS C	2.0	14.2	0.62	0.72	32.3
11	T	14	7.7	0.051	47.2	LOS D	0.7	5.4	0.88	0.62	26.9
12	R	1	0.0	0.012	69.1	LOS E	0.1	0.4	0.97	0.59	22.7
Approach		75	1.5	0.242	33.1	LOS C	2.0	14.2	0.68	0.70	30.7
All Vehicles		2043	4.7	0.530	36.6	LOS D	16.9	124.0	0.74	0.78	34.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P3	Across E approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	42.5	LOS E	0.1	0.1	0.84	0.84
All Pedestrians		200	49.8	LOS E			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

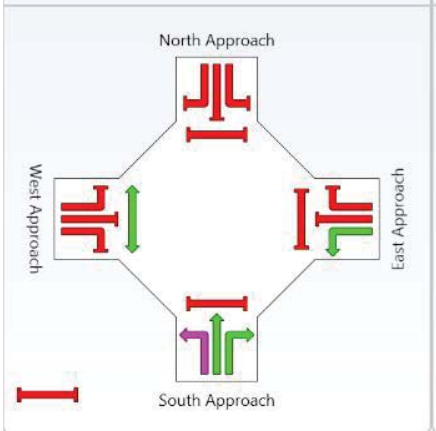
IN-88-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

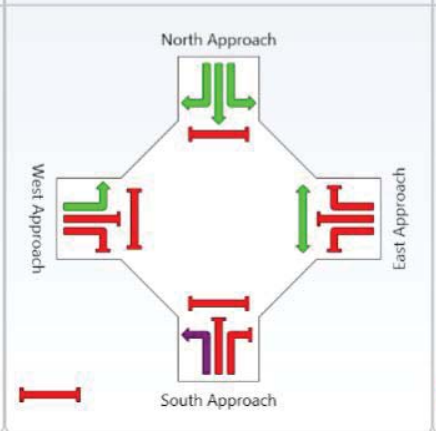
Phase Timing Results

Phase	New Phase - 1	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	39	24	7	14	6
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	45	30	13	20	12
Phase Split	38 %	25 %	11 %	17 %	10 %

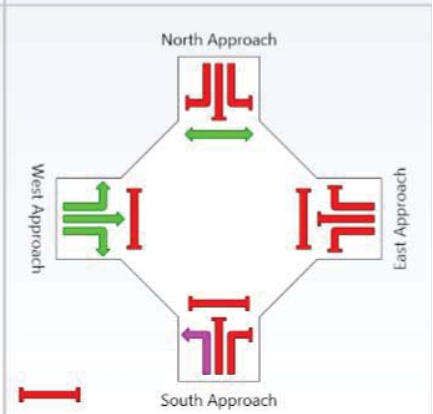
Phase New Phase - 1



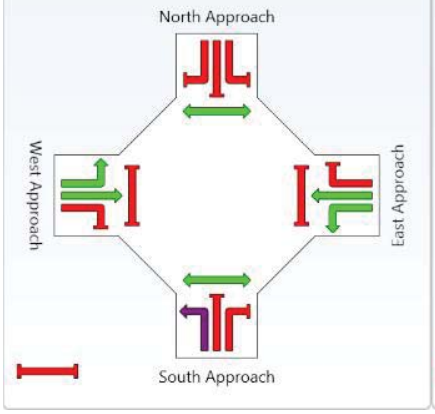
Phase New Phase - 3



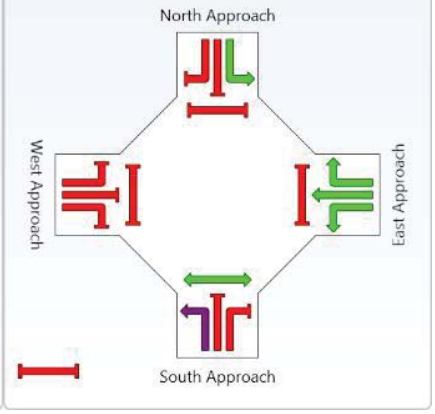
Phase New Phase - 4



Phase New Phase - 5



Phase New Phase - 6



PHASING SUMMARY

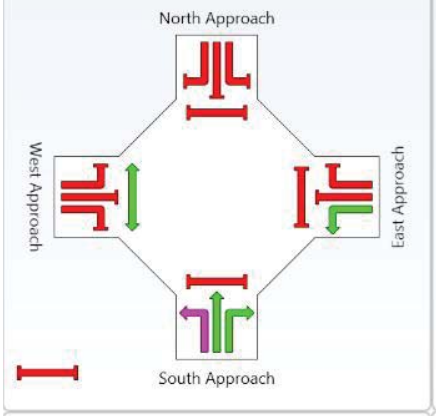
IN-88-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

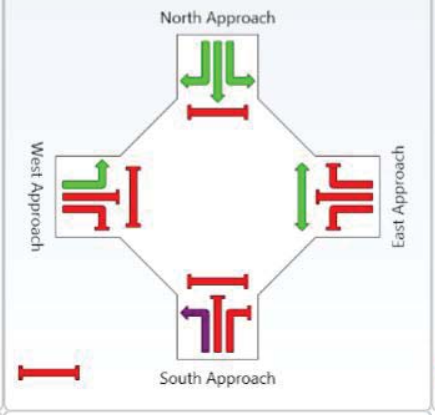
Phase Timing Results

Phase	New Phase - 1	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	34	27	6	6	17
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	40	33	12	12	23
Phase Split	33 %	28 %	10 %	10 %	19 %

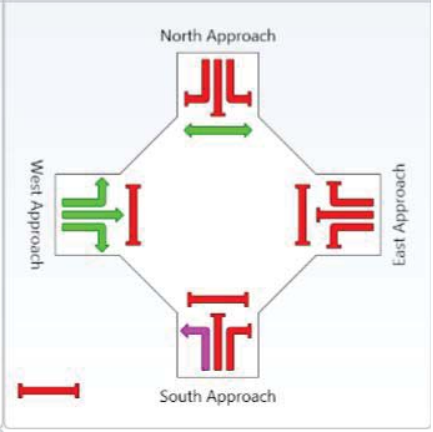
Phase New Phase - 1



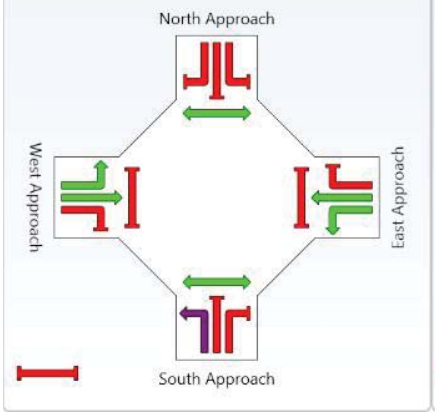
Phase New Phase - 3



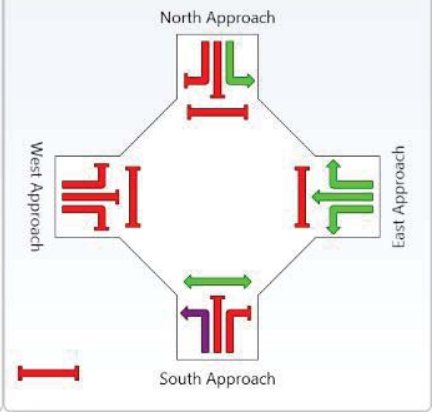
Phase New Phase - 4

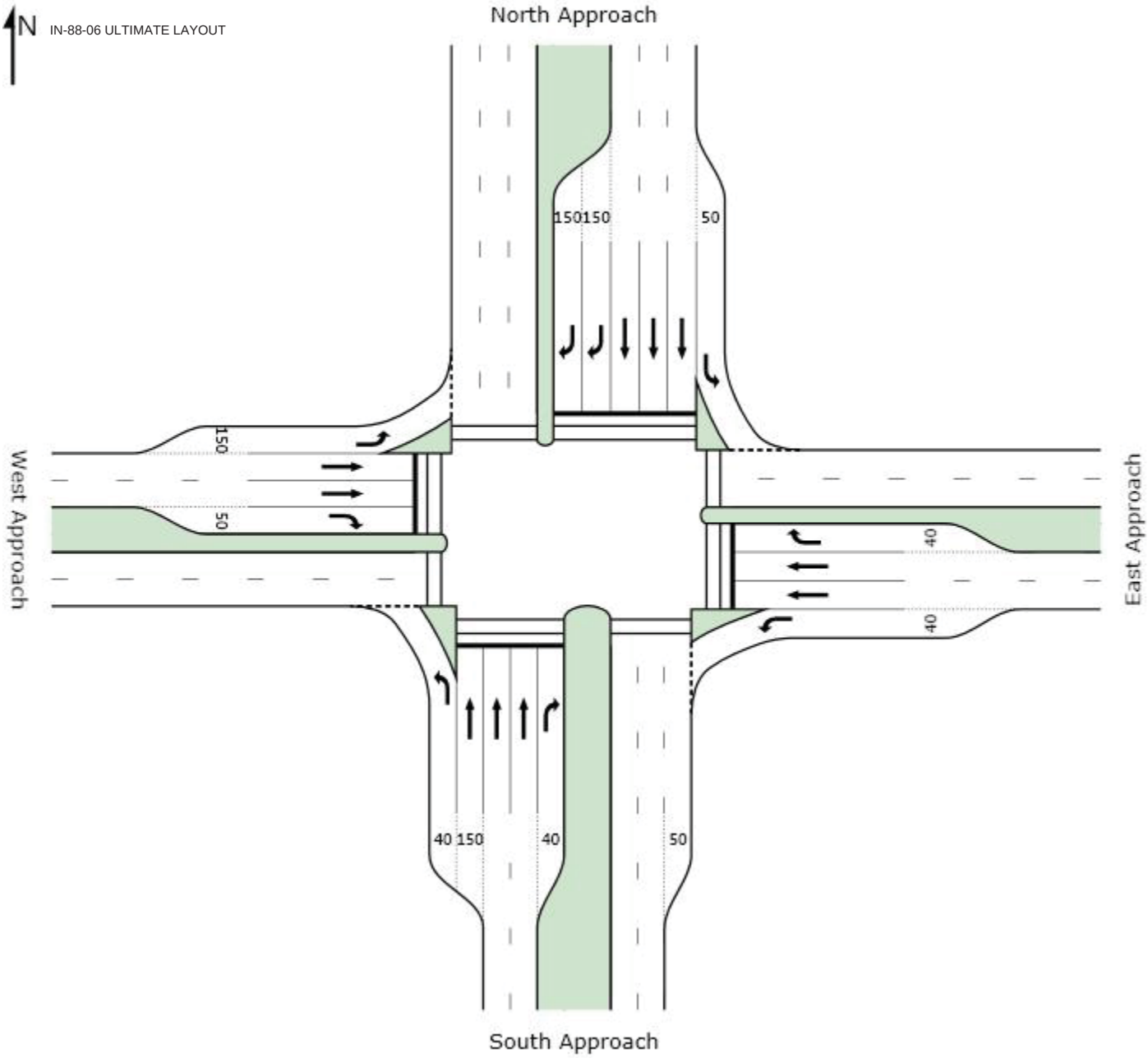


Phase New Phase - 5



Phase New Phase - 6




N
IN-88-06 ULTIMATE LAYOUT
North Approach
150150
50
150
50
West Approach
40
East Approach
40
40 150
40
50
South Approach

MOVEMENT SUMMARY

Site: IN-88-06 Ultimate AM

IN-88-06 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	20	5.6	0.053	15.4	LOS B	0.4	2.6	0.38	0.67	45.4
2	T	1217	6.0	0.864	55.5	LOS E	25.7	189.0	1.00	1.01	24.5
3	R	41	5.4	0.455	72.0	LOS E	2.5	18.3	1.00	0.73	20.3
Approach		1277	5.9	0.864	55.4	LOS E	25.7	189.0	0.99	1.00	24.6
East: East Approach											
4	L	4	0.0	0.010	10.3	LOS B	0.1	0.4	0.26	0.62	46.8
5	T	128	6.0	0.168	42.9	LOS D	3.1	22.8	0.87	0.67	28.3
6	R	85	6.5	0.810	77.3	LOS E	5.5	40.4	1.00	0.91	21.3
Approach		217	6.1	0.810	55.7	LOS E	5.5	40.4	0.91	0.76	25.2
North: North Approach											
7	L	86	6.4	0.148	13.7	LOS B	1.2	9.2	0.30	0.70	52.3
8	T	1023	6.0	0.463	23.4	LOS C	16.4	120.9	0.69	0.67	42.4
9	R	912	6.0	0.869	64.6	LOS E	28.9	213.0	1.00	0.95	25.8
Approach		2021	6.0	0.869	41.6	LOS D	28.9	213.0	0.81	0.80	32.6
West: West Approach											
10	L	550	6.0	0.595	19.1	LOS B	13.4	98.5	0.53	0.80	49.4
11	T	638	6.0	0.850	60.5	LOS E	20.1	147.9	1.00	0.96	24.6
12	R	21	5.3	0.200	71.2	LOS E	1.2	9.0	0.98	0.71	22.1
Approach		1209	6.0	0.850	41.9	LOS D	20.1	147.9	0.79	0.88	32.5
All Vehicles		4723	6.0	0.869	46.0	LOS D	28.9	213.0	0.86	0.87	29.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	45.9	LOS E	0.1	0.1	0.88	0.88
P2	Across S approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P3	Across E approach	50	19.3	LOS B	0.1	0.1	0.57	0.57
P4	Across E approach	50	17.6	LOS B	0.1	0.1	0.54	0.54
P5	Across N approach	50	49.5	LOS E	0.2	0.2	0.91	0.91
P6	Across N approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P7	Across W approach	50	39.2	LOS D	0.1	0.1	0.81	0.81
P8	Across W approach	50	36.8	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		400	37.1	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-06 Ultimate PM

IN-88-06 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	22	5.0	0.076	21.5	LOS C	0.6	4.1	0.51	0.68	40.8
2	T	1356	6.0	0.876	55.2	LOS E	29.0	213.7	1.00	1.03	24.6
3	R	2	0.0	0.024	68.2	LOS E	0.1	0.9	0.97	0.61	21.0
Approach		1381	6.0	0.876	54.7	LOS D	29.0	213.7	0.99	1.03	24.8
East: East Approach											
4	L	92	6.0	0.278	13.5	LOS B	1.7	12.6	0.38	0.68	44.0
5	T	849	6.0	0.867	55.0	LOS E	26.9	197.9	1.00	1.02	24.6
6	R	68	6.5	0.760	76.9	LOS E	4.4	32.3	1.00	0.86	21.3
Approach		1010	6.0	0.867	52.7	LOS D	26.9	197.9	0.94	0.98	25.3
North: North Approach											
7	L	121	6.4	0.135	10.6	LOS B	0.6	4.7	0.15	0.68	56.4
8	T	1279	6.0	0.645	29.6	LOS C	24.5	180.2	0.81	0.76	37.8
9	R	680	6.0	0.872	70.9	LOS E	22.1	162.5	1.00	0.95	24.2
Approach		2080	6.0	0.872	42.0	LOS D	24.5	180.2	0.84	0.82	32.0
West: West Approach											
10	L	671	6.1	0.748	21.1	LOS C	19.4	143.2	0.62	0.82	47.5
11	T	172	5.8	0.177	39.7	LOS D	3.9	28.6	0.82	0.69	32.2
12	R	17	6.7	0.186	72.7	LOS E	1.0	7.3	0.99	0.69	21.8
Approach		859	6.0	0.748	25.8	LOS C	19.4	143.2	0.67	0.79	42.9
All Vehicles		5330	6.0	0.876	44.7	LOS D	29.0	213.7	0.87	0.90	29.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P2	Across S approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
P3	Across E approach	50	22.8	LOS C	0.1	0.1	0.62	0.62
P4	Across E approach	50	21.0	LOS C	0.1	0.1	0.59	0.59
P5	Across N approach	50	43.4	LOS E	0.1	0.1	0.85	0.85
P6	Across N approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
P7	Across W approach	50	36.8	LOS D	0.1	0.1	0.78	0.78
P8	Across W approach	50	34.5	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		400	34.4	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

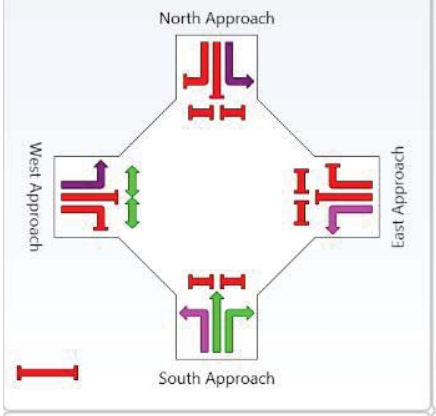
IN-88-06 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

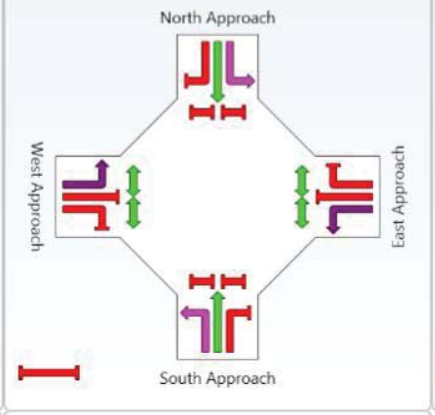
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	6	18	35	7	24
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	12	24	41	13	30
Phase Split	10 %	20 %	34 %	11 %	25 %

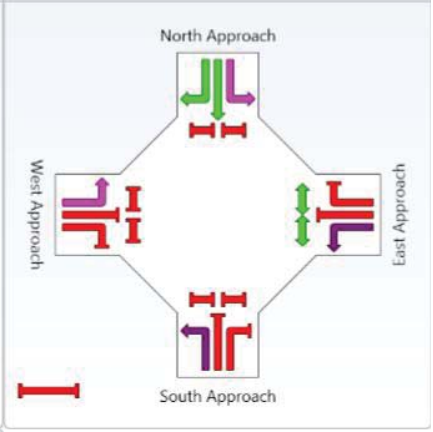
Phase New Phase - 1



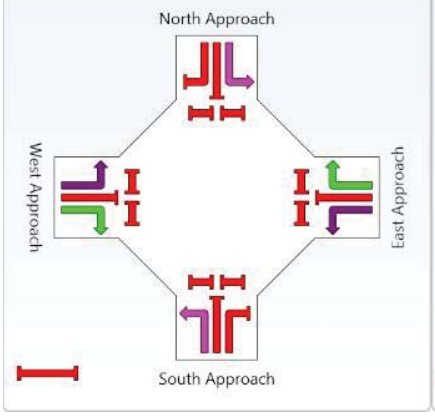
Phase New Phase - 2



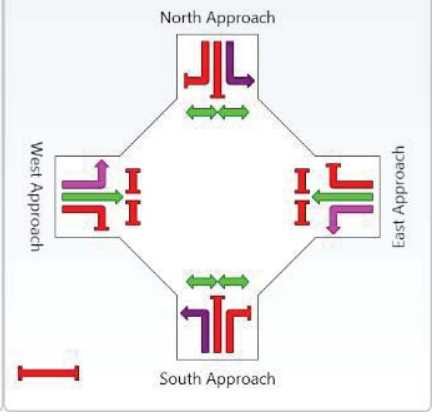
Phase New Phase - 3



Phase New Phase - 4



Phase New Phase - 5



PHASING SUMMARY

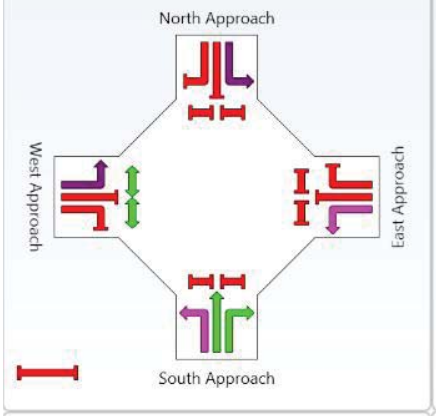
IN-88-06 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

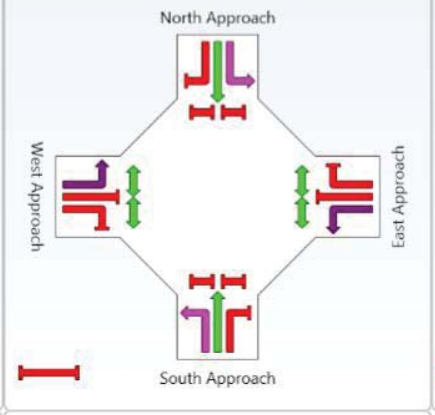
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	6	21	26	6	31
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	12	27	32	12	37
Phase Split	10 %	23 %	27 %	10 %	31 %

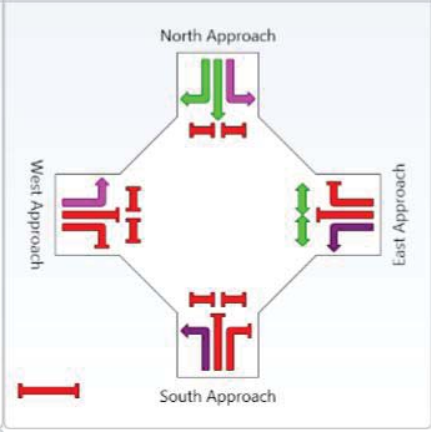
Phase New Phase - 1



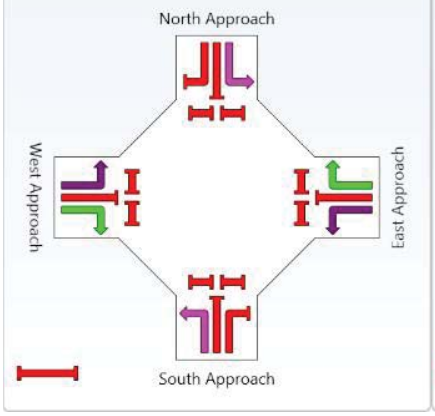
Phase New Phase - 2



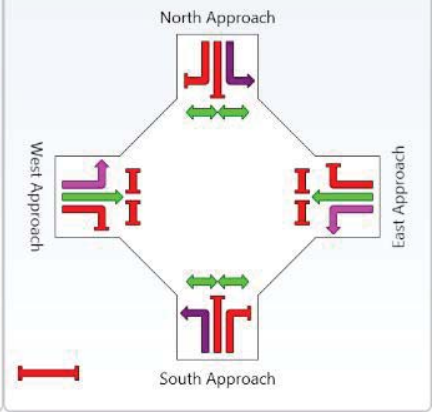
Phase New Phase - 3



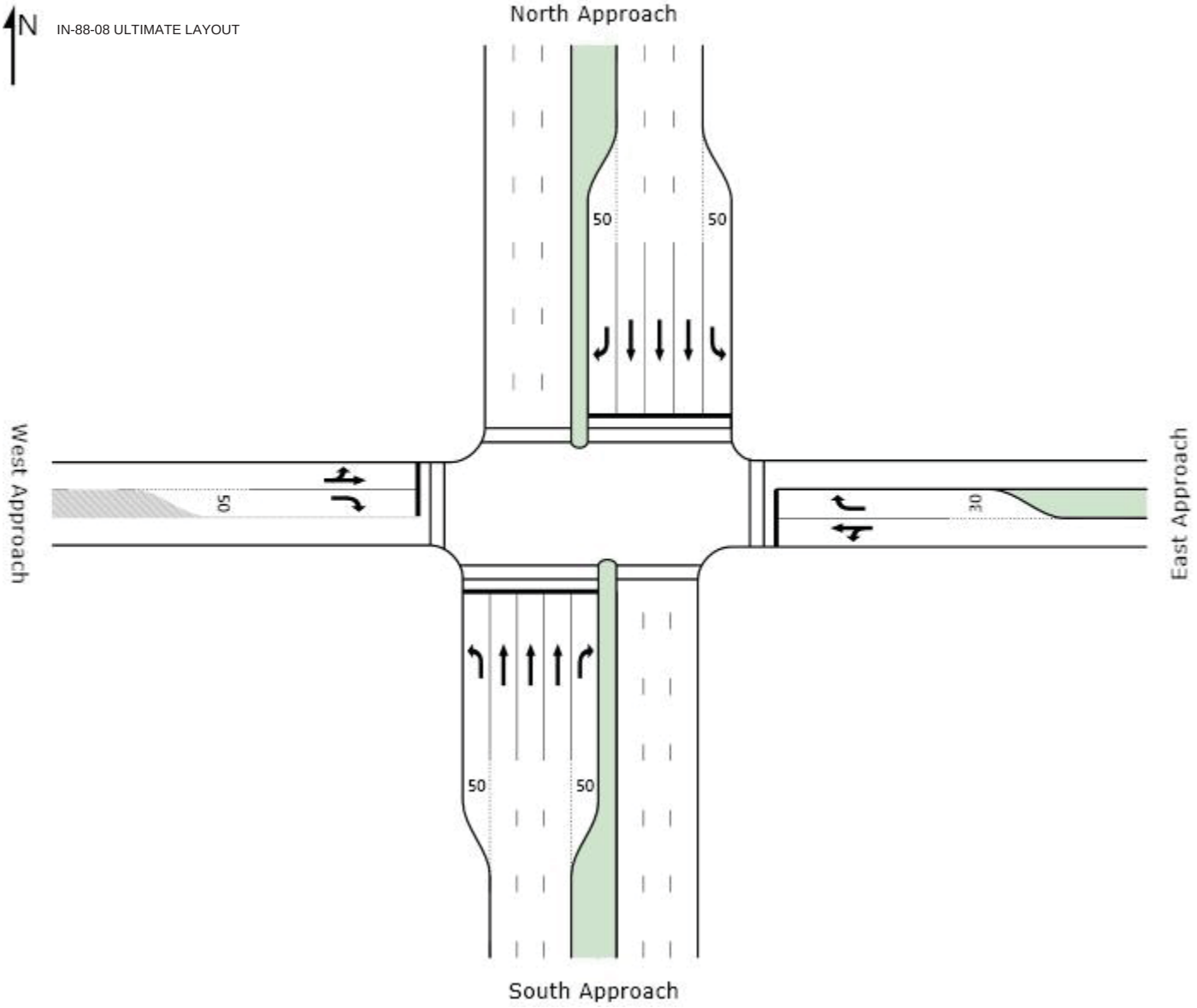
Phase New Phase - 4



Phase New Phase - 5



IN-88-08 ULTIMATE LAYOUT



MOVEMENT SUMMARY

Site: IN-88-08 Ultimate AM

IN-88-08 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	149	0.0	0.634	46.4	LOS D	7.1	49.7	0.85	0.79	24.8
2	T	589	6.0	0.405	39.8	LOS D	9.5	70.2	0.88	0.73	27.5
3	R	43	0.0	0.198	50.5	LOS D	2.1	14.6	0.86	0.73	24.2
Approach		780	4.5	0.634	41.6	LOS D	9.5	70.2	0.87	0.74	26.8
East: East Approach											
4	L	54	0.0	0.320	47.5	LOS D	7.2	50.5	0.87	0.81	24.6
5	T	96	0.0	0.320	41.6	LOS D	7.2	50.5	0.87	0.72	23.6
6	R	90	0.0	0.620	47.0	LOS D	4.3	30.2	0.84	0.78	24.5
Approach		240	0.0	0.620	44.9	LOS D	7.2	50.5	0.86	0.76	24.2
North: North Approach											
7	L	102	0.0	0.523	62.4	LOS E	5.8	40.4	0.98	0.78	21.2
8	T	241	5.9	0.363	54.1	LOS D	4.5	32.8	0.96	0.75	23.2
9	R	10	0.0	0.106	68.6	LOS E	0.6	4.1	0.98	0.67	19.5
Approach		353	4.0	0.523	56.9	LOS E	5.8	40.4	0.97	0.76	22.5
West: West Approach											
10	L	48	0.0	0.246	44.5	LOS D	5.5	38.5	0.84	0.78	22.7
11	T	69	0.0	0.246	38.7	LOS D	5.5	38.5	0.84	0.68	22.1
12	R	156	0.0	0.674	46.5	LOS D	7.7	54.0	0.86	0.81	22.2
Approach		274	0.0	0.674	44.2	LOS D	7.7	54.0	0.85	0.77	22.3
All Vehicles		1647	3.0	0.674	45.8	LOS D	9.5	70.2	0.89	0.75	24.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		200	50.2	LOS E			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-08 Ultimate PM

IN-88-08 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	129	0.0	0.638	60.1	LOS E	7.2	50.3	0.97	0.81	21.2
2	T	260	5.9	0.325	50.9	LOS D	4.7	34.2	0.94	0.74	24.1
3	R	45	0.0	0.486	71.4	LOS E	2.8	19.3	1.00	0.74	19.5
Approach		433	3.6	0.638	55.8	LOS E	7.2	50.3	0.96	0.76	22.7
East: East Approach											
4	L	66	0.0	0.247	46.7	LOS D	5.4	37.8	0.85	0.79	24.7
5	T	48	0.0	0.247	40.8	LOS D	5.4	37.8	0.85	0.70	23.7
6	R	102	0.0	0.704	50.0	LOS D	5.1	36.0	0.84	0.83	23.7
Approach		217	0.0	0.704	46.9	LOS D	5.4	37.8	0.85	0.79	24.0
North: North Approach											
7	L	91	0.0	0.441	56.3	LOS E	4.8	33.6	0.93	0.77	22.7
8	T	734	6.0	0.815	58.4	LOS E	15.1	110.8	1.00	0.95	22.2
9	R	79	0.0	0.633	69.8	LOS E	4.8	33.8	1.00	0.80	19.3
Approach		904	4.9	0.815	59.2	LOS E	15.1	110.8	0.99	0.91	22.0
West: West Approach											
10	L	10	0.0	0.186	34.6	LOS C	5.1	35.6	0.73	0.78	25.4
11	T	117	0.0	0.186	28.8	LOS C	5.1	35.6	0.73	0.60	25.0
12	R	220	0.0	0.832	50.4	LOS D	11.7	81.6	0.80	0.95	21.4
Approach		347	0.0	0.832	42.7	LOS D	11.7	81.6	0.78	0.83	22.5
All Vehicles		1901	3.1	0.832	54.0	LOS D	15.1	110.8	0.93	0.85	22.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	49.5	LOS E	0.2	0.2	0.91	0.91
P5	Across N approach	50	43.4	LOS E	0.1	0.1	0.85	0.85
P7	Across W approach	50	50.4	LOS E	0.2	0.2	0.92	0.92
All Pedestrians		200	49.4	LOS E			0.91	0.91

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

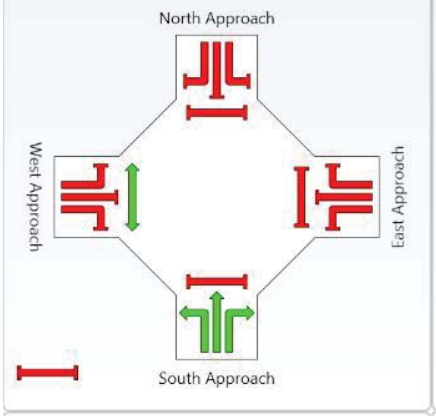
IN-88-08 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B (phase reduction applied)
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

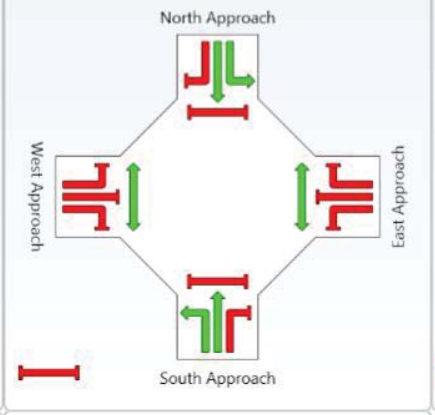
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	23	2	6	30	29
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	29	8	12	36	35
Phase Split	24 %	7 %	10 %	30 %	29 %

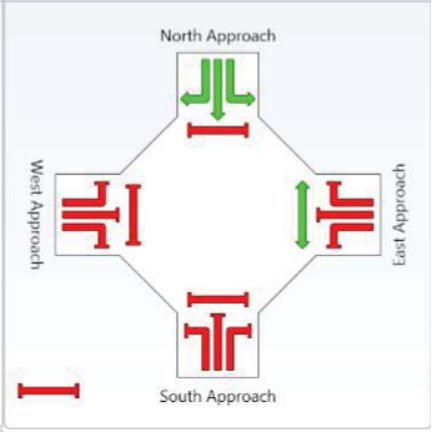
Phase New Phase - 1



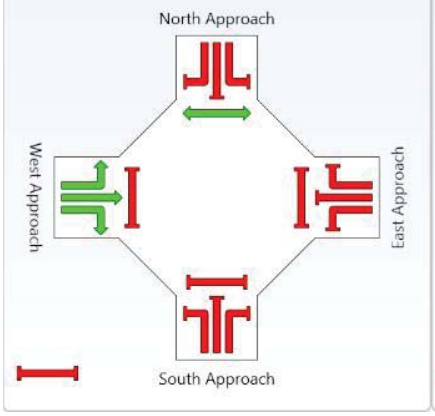
Phase New Phase - 2



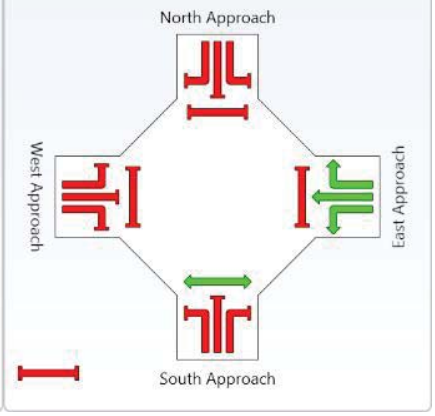
Phase New Phase - 3



Phase New Phase - 4



Phase New Phase - 6



PHASING SUMMARY

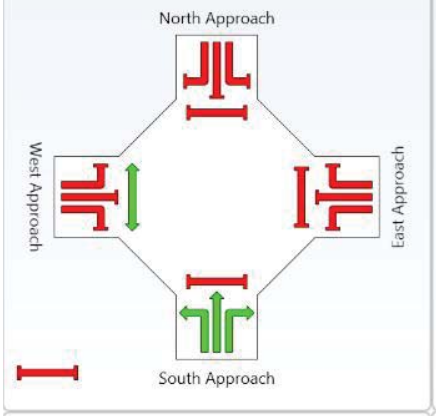
IN-88-08 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B (phase reduction applied)
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

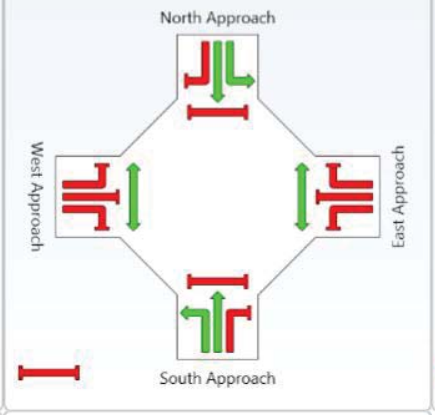
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	6	5	8	42	29
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	12	11	14	48	35
Phase Split	10 %	9 %	12 %	40 %	29 %

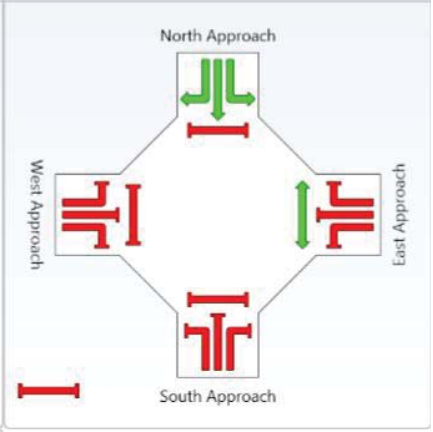
Phase New Phase - 1



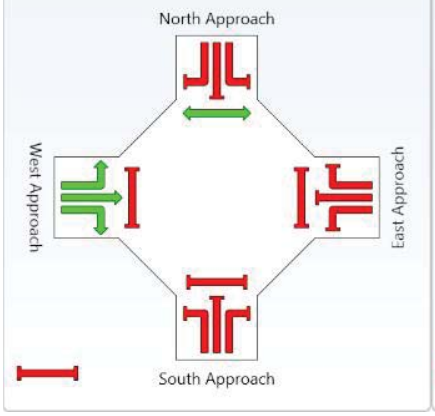
Phase New Phase - 2



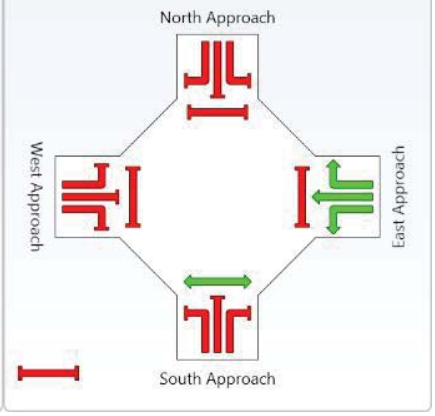
Phase New Phase - 3

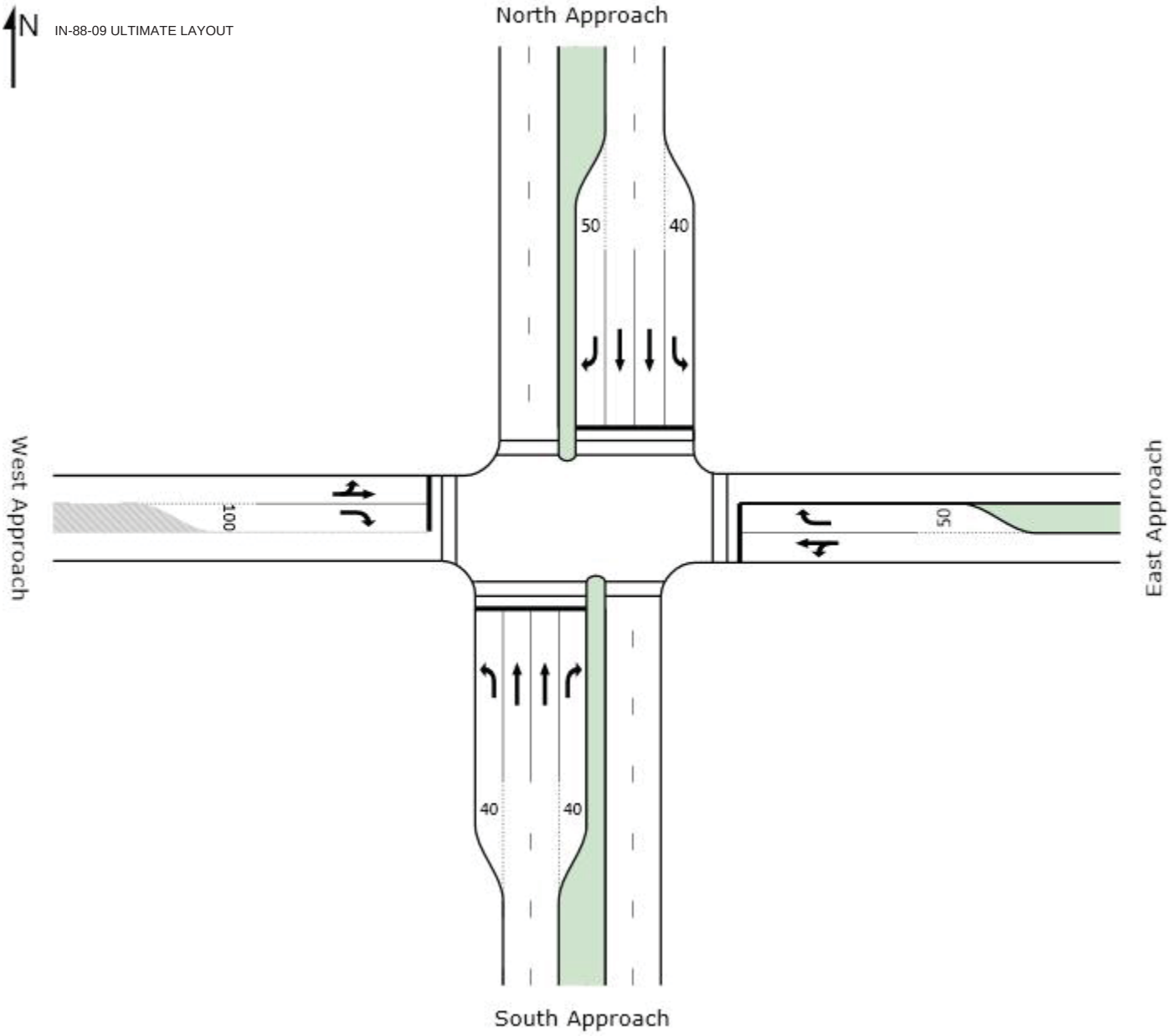


Phase New Phase - 4



Phase New Phase - 6




N
IN-88-09 ULTIMATE LAYOUT
North Approach
50
40
West Approach
100
50
East Approach
40
40
South Approach

MOVEMENT SUMMARY

Site: IN-88-09 Ultimate AM

IN-88-09 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	119	0.0	0.492	30.6	LOS C	4.3	29.9	0.66	0.74	31.5
2	T	1047	6.0	0.670	30.3	LOS C	24.6	181.3	0.87	0.77	31.3
3	R	62	0.0	0.498	68.7	LOS E	3.7	25.8	1.00	0.75	19.4
Approach		1228	5.1	0.670	32.2	LOS C	24.6	181.3	0.86	0.77	30.5
East: East Approach											
4	L	33	0.0	0.124	49.1	LOS D	2.2	15.3	0.86	0.74	21.6
5	T	12	0.0	0.124	43.3	LOS D	2.2	15.3	0.86	0.65	20.9
6	R	40	0.0	0.422	69.2	LOS E	2.4	16.9	1.00	0.73	18.0
Approach		85	0.0	0.422	57.7	LOS E	2.4	16.9	0.93	0.72	19.7
North: North Approach											
7	L	53	0.0	0.215	28.7	LOS C	1.8	12.5	0.62	0.71	31.9
8	T	899	6.0	0.558	27.7	LOS C	19.7	144.6	0.81	0.71	32.6
9	R	88	0.0	0.625	69.0	LOS E	5.3	37.2	1.00	0.80	19.9
Approach		1040	5.2	0.625	31.3	LOS C	19.7	144.6	0.82	0.72	31.0
West: West Approach											
10	L	178	0.0	0.398	46.9	LOS D	9.3	65.0	0.88	0.81	24.4
11	T	13	0.0	0.398	41.0	LOS D	9.3	65.0	0.88	0.74	23.3
12	R	140	0.0	0.645	63.8	LOS E	8.2	57.1	1.00	0.82	20.6
Approach		331	0.0	0.645	53.8	LOS D	9.3	65.0	0.93	0.81	22.6
All Vehicles		2683	4.3	0.670	35.3	LOS D	24.6	181.3	0.85	0.75	28.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
P5	Across N approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
P7	Across W approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
All Pedestrians		200	37.8	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-09 Ultimate PM

IN-88-09 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	133	0.0	0.632	39.8	LOS D	5.7	40.2	0.77	0.78	27.6
2	T	1093	6.0	0.896	55.1	LOS E	36.2	266.7	1.00	1.06	23.0
3	R	57	0.0	0.616	72.4	LOS E	3.6	24.9	1.00	0.78	18.8
Approach		1284	5.1	0.896	54.3	LOS D	36.2	266.7	0.98	1.02	23.1
East: East Approach											
4	L	182	0.0	0.557	53.7	LOS D	10.8	75.8	0.96	0.82	20.6
5	T	20	0.0	0.557	47.9	LOS D	10.8	75.8	0.96	0.79	19.8
6	R	143	0.0	0.831	70.9	LOS E	9.1	64.0	1.00	0.99	17.8
Approach		344	0.0	0.831	60.5	LOS E	10.8	75.8	0.97	0.89	19.3
North: North Approach											
7	L	26	0.0	0.102	25.9	LOS C	0.8	5.8	0.57	0.69	33.4
8	T	1157	6.0	0.666	27.0	LOS C	26.2	192.5	0.84	0.75	32.9
9	R	190	0.0	0.895	66.9	LOS E	11.7	81.6	0.96	0.94	20.3
Approach		1374	5.0	0.895	32.5	LOS C	26.2	192.5	0.85	0.78	30.4
West: West Approach											
10	L	128	0.0	0.383	52.4	LOS D	7.3	51.3	0.91	0.80	23.0
11	T	15	0.0	0.383	46.5	LOS D	7.3	51.3	0.91	0.75	21.9
12	R	160	0.0	0.859	73.8	LOS E	10.4	72.7	1.00	0.99	18.8
Approach		303	0.0	0.859	63.4	LOS E	10.4	72.7	0.96	0.90	20.5
All Vehicles		3304	4.1	0.896	46.7	LOS D	36.2	266.7	0.92	0.90	24.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	22.2	LOS C	0.1	0.1	0.61	0.61
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	32.3	LOS D	0.1	0.1	0.73	0.73
All Pedestrians		200	40.7	LOS E			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

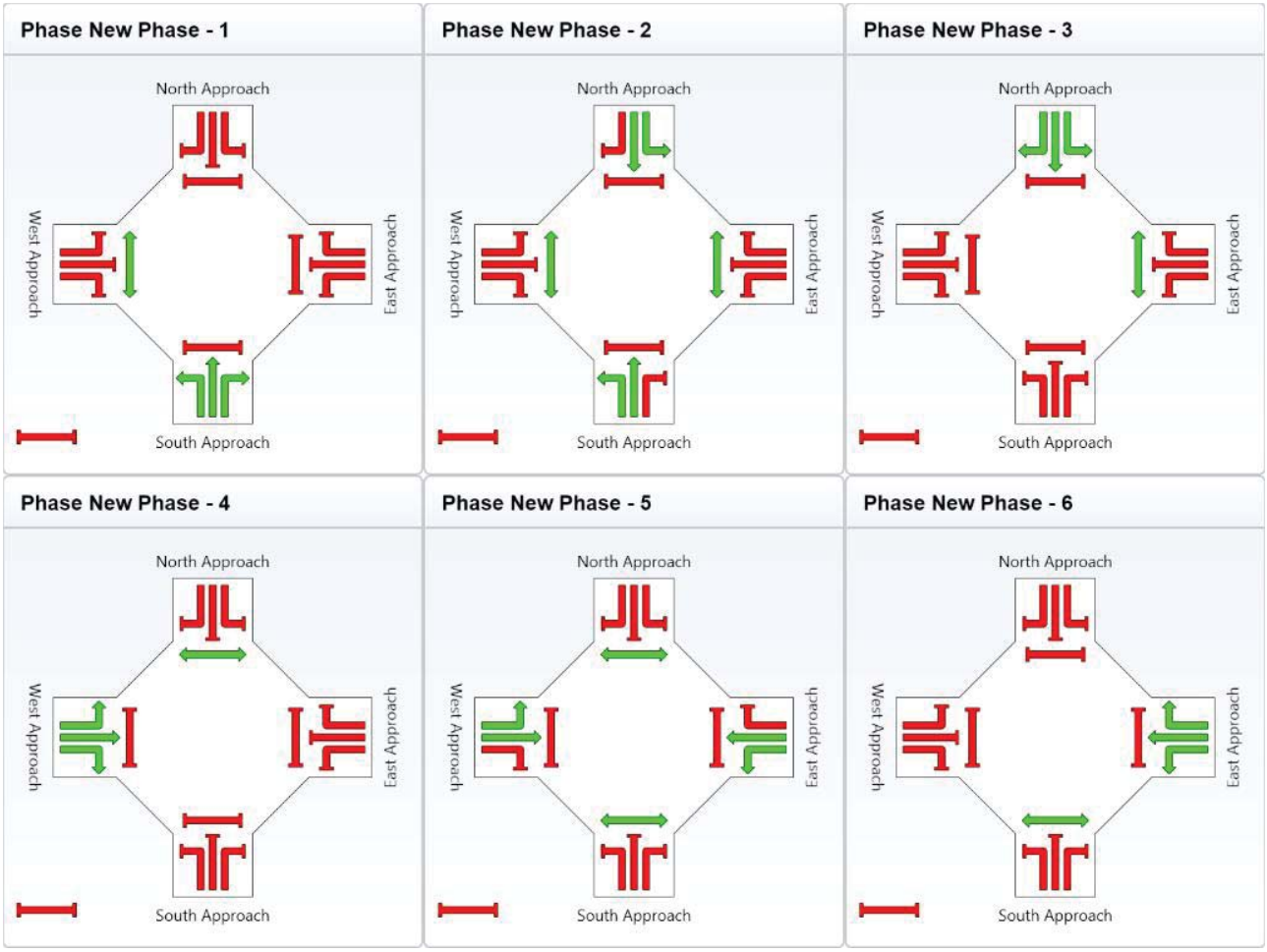
PHASING SUMMARY

IN-88-09 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	8	36	9	14	11	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	14	42	15	20	17	12
Phase Split	12 %	35 %	13 %	17 %	14 %	10 %



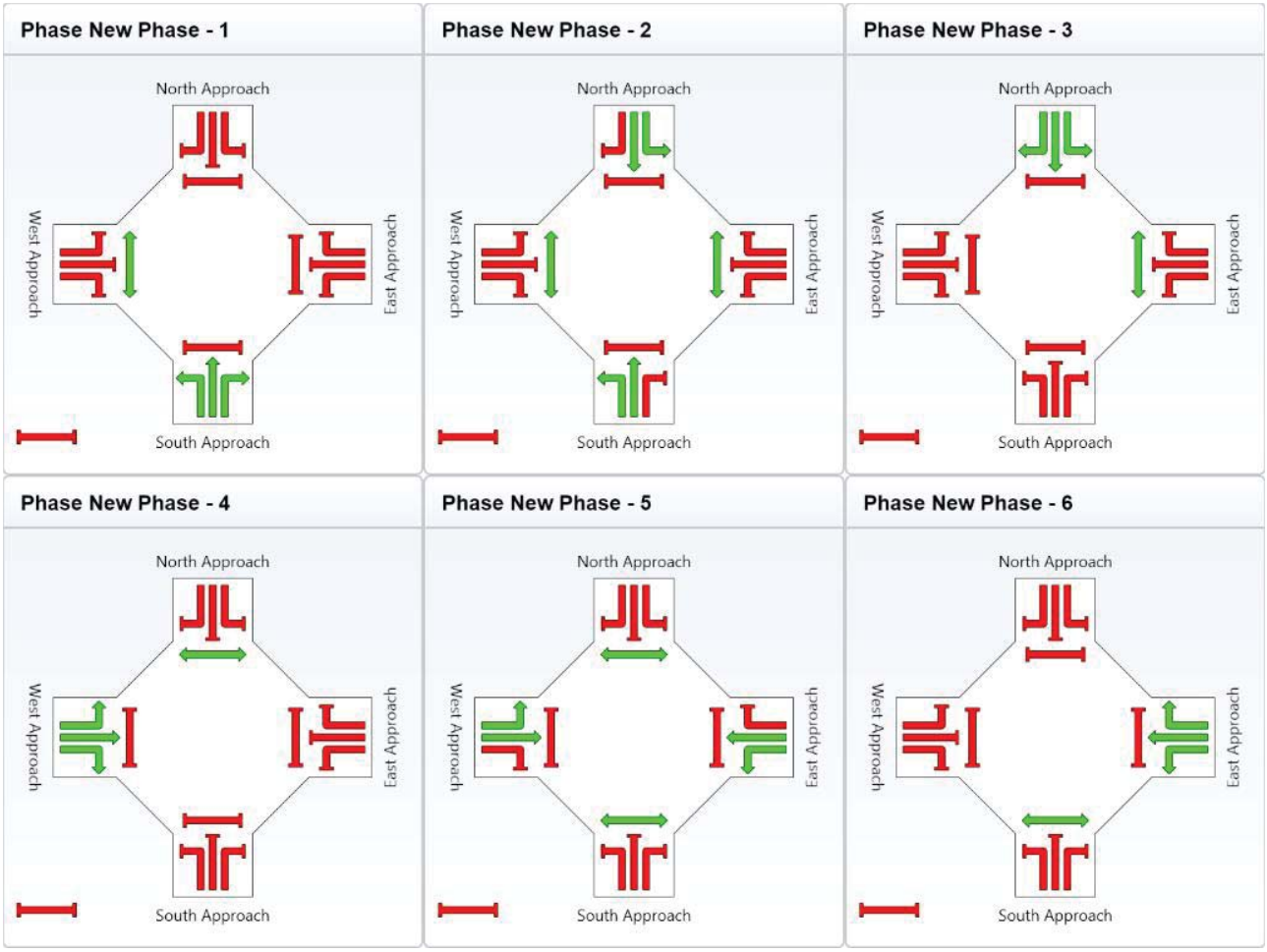
PHASING SUMMARY

IN-88-09 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

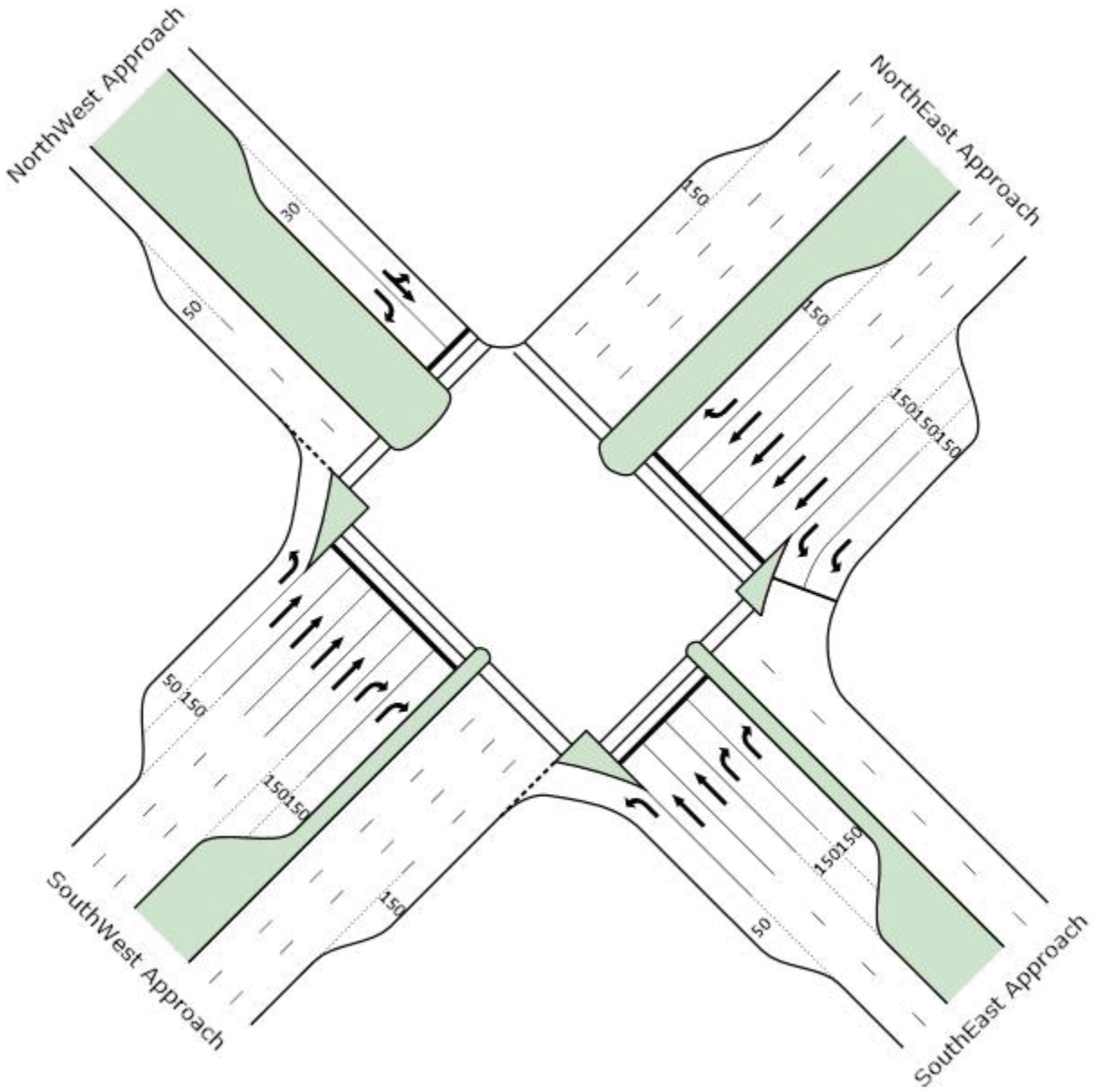
Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	6	27	22	12	6	11
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	33	28	18	12	17
Phase Split	10 %	28 %	23 %	15 %	10 %	14 %



IN-88-12 ULTIMATE LAYOUT



MOVEMENT SUMMARY

Site: IN-88-12 Ultimate AM

IN-88-12 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: SouthEast Approach											
4	L	162	6.2	0.252	10.8	LOS B	1.6	11.5	0.23	0.68	49.6
5	T	32	0.0	0.036	31.8	LOS C	0.9	6.2	0.72	0.55	30.5
6	R	1004	6.0	0.905	65.3	LOS E	33.3	244.8	1.00	1.00	23.8
Approach		1198	5.8	0.905	57.0	LOS E	33.3	244.8	0.89	0.95	25.7
North East: NorthEast Approach											
7	L	1070	6.0	0.549	19.8	LOS B	11.6	85.2	0.70	0.82	45.8
8	T	778	6.0	0.453	42.6	LOS D	10.1	74.4	0.90	0.75	32.0
9	R	275	0.0	0.924	83.3	LOS F	19.6	137.4	1.00	1.02	19.1
Approach		2123	5.2	0.924	36.4	LOS D	19.6	137.4	0.81	0.82	34.2
North West: NorthWest Approach											
10	L	73	0.0	0.354	54.4	LOS D	6.3	44.2	0.92	0.80	24.7
11	T	49	0.0	0.354	46.6	LOS D	6.3	44.2	0.92	0.74	22.9
12	R	34	0.0	0.260	54.4	LOS D	1.7	12.1	0.89	0.71	24.7
Approach		156	0.0	0.354	51.9	LOS D	6.3	44.2	0.91	0.76	24.2
South West: SouthWest Approach											
1	L	17	0.0	0.026	12.2	LOS B	0.2	1.3	0.25	0.67	53.8
2	T	1146	6.0	0.898	64.0	LOS E	20.0	147.2	1.00	1.00	25.0
3	R	185	5.9	0.519	67.4	LOS E	5.4	39.4	0.99	0.78	23.1
Approach		1348	5.9	0.898	63.8	LOS E	20.0	147.2	0.99	0.97	24.8
All Vehicles		4825	5.4	0.924	49.7	LOS D	33.3	244.8	0.88	0.89	28.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across SE approach	50	50.4	LOS E	0.2	0.2	0.92	0.92
P5	Across NE approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across NE approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P7	Across NW approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P1	Across SW approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P2	Across SW approach	50	35.3	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		300	47.1	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-88-12 Ultimate PM

IN-88-12 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: East Approach											
4	L	388	5.9	0.734	15.3	LOS B	7.6	56.3	0.39	0.74	45.6
5	T	385	6.3	0.417	26.5	LOS C	2.8	20.7	0.74	0.11	34.3
6	R	1186	6.0	1.000[3]	48.7	LOS D	33.3	244.8	1.00	0.89	28.3
Approach		1959	6.0	1.000	37.7	LOS D	33.3	244.8	0.83	0.71	31.3
North East: North Approach											
7	L	833	6.0	0.430	18.4	LOS B	8.2	60.2	0.61	0.79	47.2
8	T	1214	6.0	0.824	54.3	LOS D	19.1	140.4	1.00	0.92	27.7
9	R	86	6.4	0.717	74.5	LOS E	5.4	39.5	1.00	0.83	20.7
Approach		2133	6.0	0.824	41.1	LOS D	19.1	140.4	0.85	0.87	32.1
North West: West Approach											
10	L	57	5.3	0.302	54.1	LOS D	5.1	37.4	0.91	0.79	24.8
11	T	42	7.1	0.302	46.2	LOS D	5.1	37.4	0.91	0.72	23.0
12	R	45	6.7	0.391	61.8	LOS E	2.5	18.4	0.95	0.73	23.0
Approach		144	6.3	0.391	54.2	LOS D	5.1	37.4	0.92	0.75	23.7
South West: South Approach											
1	L	60	0.0	0.072	10.7	LOS B	0.4	2.9	0.18	0.68	55.8
2	T	1204	6.0	0.762	49.5	LOS D	17.8	131.0	0.99	0.87	29.2
3	R	304	5.9	1.024	154.5	LOS F	15.4	113.3	1.00	1.29	12.1
Approach		1568	5.7	1.024	68.3	LOS E	17.8	131.0	0.96	0.95	23.7
All Vehicles		5804	5.9	1.024	47.6	LOS D	33.3	244.8	0.87	0.83	28.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across SE approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P5	Across NE approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across NE approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P7	Across NW approach	50	46.8	LOS E	0.2	0.2	0.88	0.88
P1	Across SW approach	50	30.8	LOS D	0.1	0.1	0.72	0.72
P2	Across SW approach	50	26.7	LOS C	0.1	0.1	0.67	0.67
All Pedestrians		300	44.0	LOS E			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

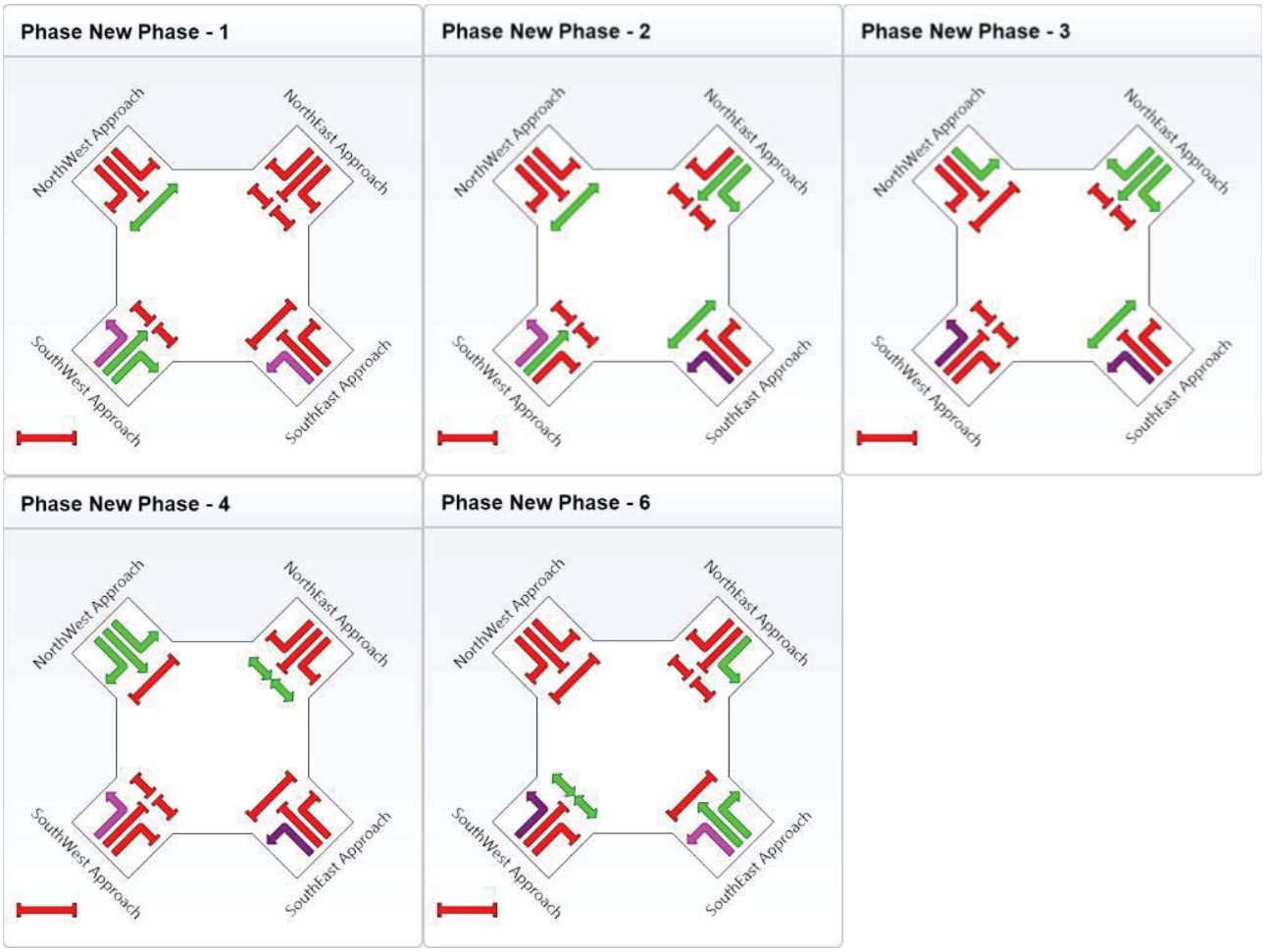
PHASING SUMMARY

IN-88-12 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B (phase reduction applied)
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	12	3	19	19	37
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	18	9	25	25	43
Phase Split	15 %	8 %	21 %	21 %	36 %



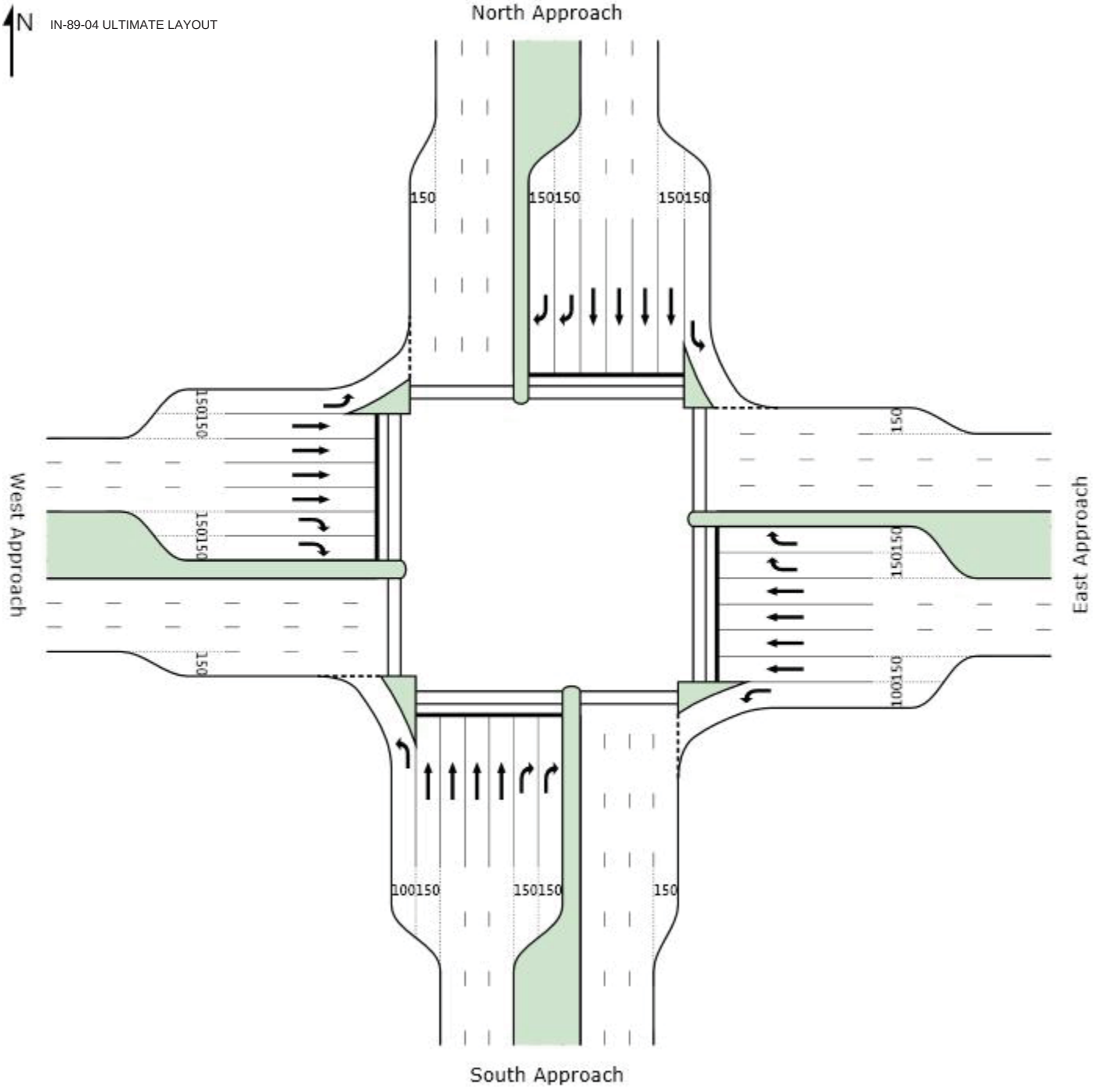
PHASING SUMMARY

IN-88-12 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	10	10	8	13	0	43
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	16	16	14	19	6	49
Phase Split	13 %	13 %	12 %	16 %	5 %	41 %


N
IN-89-04 ULTIMATE LAYOUT
North Approach
150
150150
150150
150
West Approach
East Approach
150150
150150
150
100150
South Approach
100150
150150
150

MOVEMENT SUMMARY

Site: IN-89-04 Ultimate AM

IN-89-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	328	6.0	0.475	20.3	LOS C	7.9	58.0	0.50	0.77	48.3
2	T	1405	6.0	0.629	39.0	LOS D	17.9	132.0	0.92	0.79	33.5
3	R	464	5.9	0.868	75.5	LOS E	15.2	111.8	1.00	0.97	23.4
Approach		2197	6.0	0.868	43.9	LOS D	17.9	132.0	0.87	0.83	32.0
East: East Approach											
4	L	264	5.8	0.383	26.6	LOS C	8.5	62.8	0.62	0.78	43.0
5	T	1252	15.0	0.879	61.1	LOS E	20.8	164.6	1.00	1.00	25.7
6	R	80	5.5	0.445	75.2	LOS E	2.5	18.0	1.00	0.73	23.4
Approach		1596	13.0	0.879	56.1	LOS E	20.8	164.6	0.94	0.95	27.4
North: North Approach											
7	L	630	5.9	0.681	29.2	LOS C	24.8	182.7	0.80	0.87	41.1
8	T	1915	6.0	0.873	52.3	LOS D	30.7	225.5	1.00	0.99	28.3
9	R	441	6.0	0.865	75.6	LOS E	14.4	105.9	1.00	0.97	23.3
Approach		2987	6.0	0.873	50.9	LOS D	30.7	225.5	0.96	0.96	29.3
West: West Approach											
10	L	767	6.0	0.665	18.9	LOS B	21.9	161.0	0.62	0.83	49.6
11	T	1694	15.0	0.780	42.7	LOS D	23.7	187.6	0.97	0.88	31.8
12	R	502	5.9	0.889	77.8	LOS E	16.9	124.1	1.00	1.00	22.8
Approach		2962	11.1	0.889	42.5	LOS D	23.7	187.6	0.89	0.89	32.6
All Vehicles		9742	8.7	0.889	47.6	LOS D	30.7	225.5	0.91	0.91	30.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P2	Across S approach	20	45.9	LOS E	0.1	0.1	0.88	0.88
P3	Across E approach	20	42.5	LOS E	0.1	0.1	0.84	0.84
P4	Across E approach	20	37.6	LOS D	0.1	0.1	0.79	0.79
P5	Across N approach	20	40.8	LOS E	0.1	0.1	0.83	0.83
P6	Across N approach	20	36.0	LOS D	0.1	0.1	0.78	0.78
P7	Across W approach	20	40.8	LOS E	0.1	0.1	0.83	0.83
P8	Across W approach	20	36.0	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		160	41.4	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-04 Ultimate PM

IN-89-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	425	6.0	0.720	31.1	LOS C	15.7	115.3	0.73	0.82	39.8
2	T	1968	6.0	1.024	125.1	LOS F	53.9	396.6	1.00	1.38	15.5
3	R	352	5.9	0.659	64.8	LOS E	10.1	74.0	0.99	0.83	26.0
Approach		2745	6.0	1.024	102.8	LOS F	53.9	396.6	0.96	1.22	18.1
East: East Approach											
4	L	442	6.0	0.541	20.0	LOS C	12.5	91.8	0.56	0.80	48.5
5	T	2006	15.0	0.995	97.5	LOS F	48.5	383.5	1.00	1.27	18.7
6	R	667	5.9	1.010	140.9	LOS F	33.3	244.7	1.00	1.30	14.5
Approach		3115	11.8	1.010	95.8	LOS F	48.5	383.5	0.94	1.21	19.2
North: North Approach											
7	L	114	5.8	0.128	18.6	LOS B	2.3	16.9	0.42	0.74	49.9
8	T	1457	6.0	0.685	41.2	LOS D	19.2	141.4	0.95	0.82	32.4
9	R	642	5.9	1.019	151.2	LOS F	33.3	244.6	1.00	1.33	13.6
Approach		2213	6.0	1.019	71.9	LOS E	33.3	244.6	0.94	0.96	23.5
West: West Approach											
10	L	469	6.1	0.589	33.3	LOS C	18.8	138.6	0.80	0.84	38.5
11	T	1300	15.0	1.007	118.6	LOS F	32.2	254.6	1.00	1.34	16.1
12	R	298	5.9	1.004	132.2	LOS F	13.6	100.3	1.00	1.23	15.2
Approach		2067	11.7	1.007	101.2	LOS F	32.2	254.6	0.95	1.21	18.4
All Vehicles		10140	8.9	1.024	93.6	LOS F	53.9	396.6	0.95	1.16	19.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	42.5	LOS E	0.1	0.1	0.84	0.84
P2	Across S approach	20	37.6	LOS D	0.1	0.1	0.79	0.79
P3	Across E approach	20	43.4	LOS E	0.1	0.1	0.85	0.85
P4	Across E approach	20	38.4	LOS D	0.1	0.1	0.80	0.80
P5	Across N approach	20	54.2	LOS E	0.1	0.1	0.95	0.95
P6	Across N approach	20	48.6	LOS E	0.1	0.1	0.90	0.90
P7	Across W approach	20	45.1	LOS E	0.1	0.1	0.87	0.87
P8	Across W approach	20	40.0	LOS E	0.1	0.1	0.82	0.82
All Pedestrians		160	43.7	LOS E			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

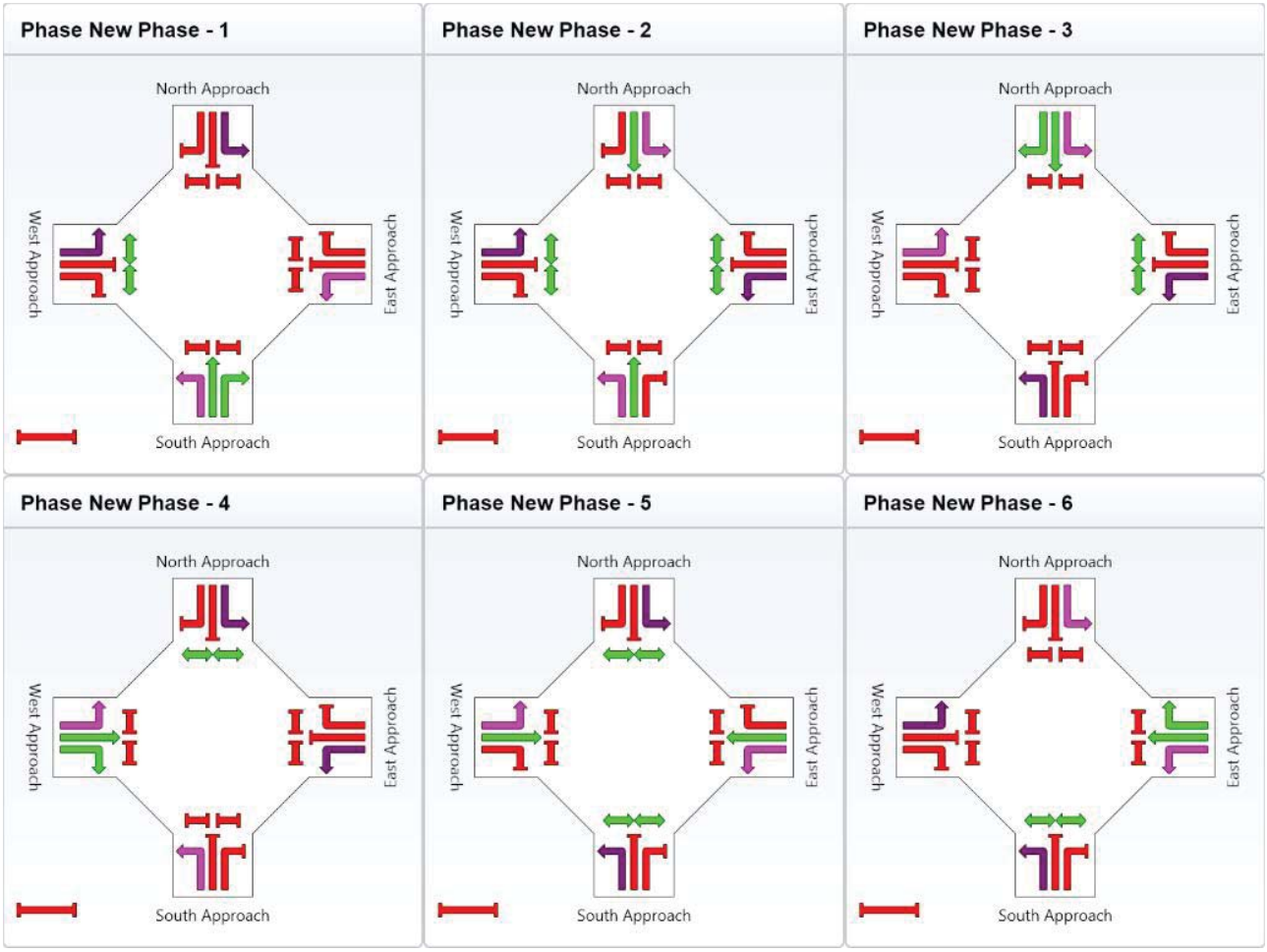
PHASING SUMMARY

IN-89-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	18	12	17	19	12	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	24	18	23	25	18	12
Phase Split	20 %	15 %	19 %	21 %	15 %	10 %



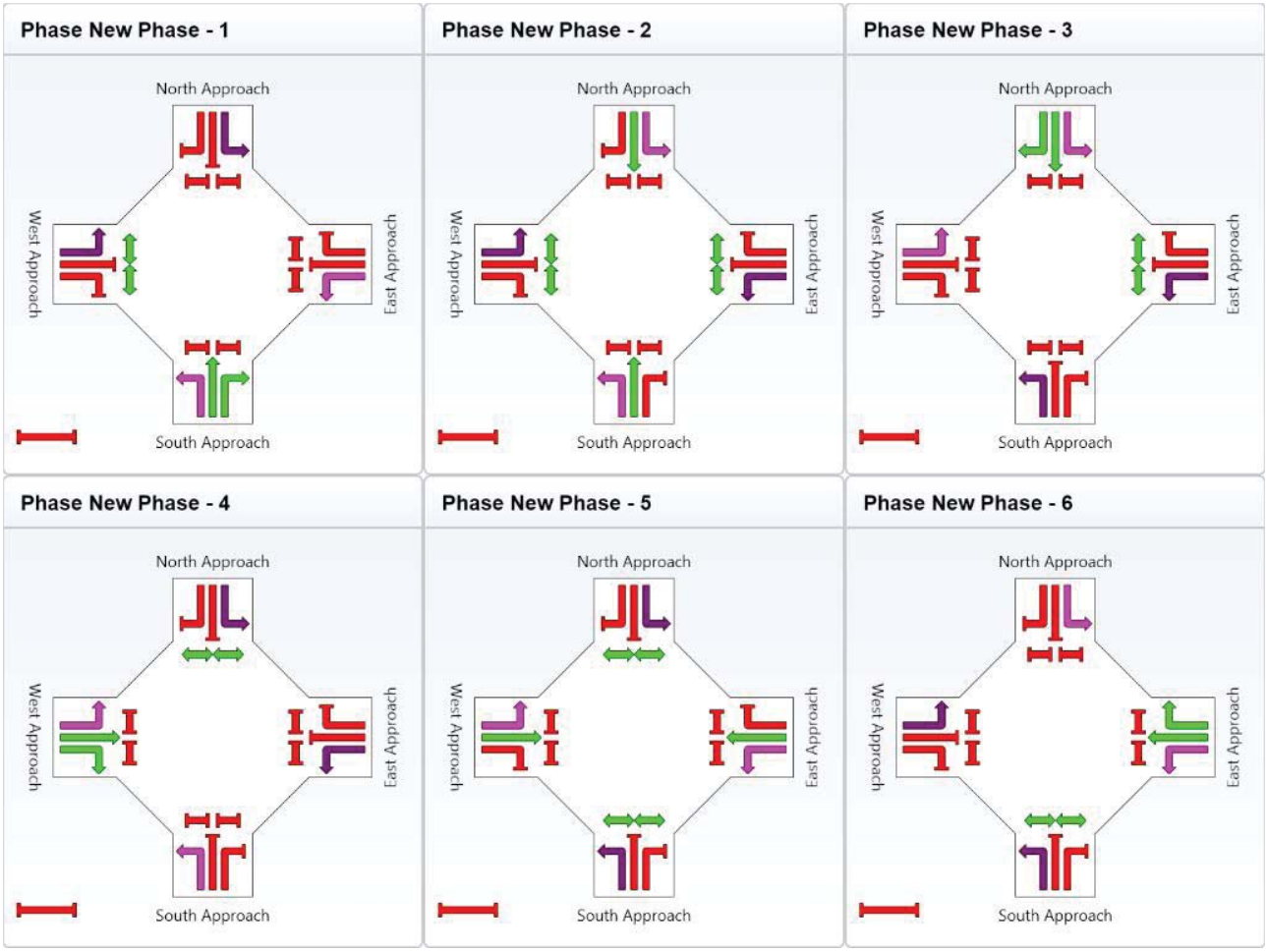
PHASING SUMMARY

IN-89-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

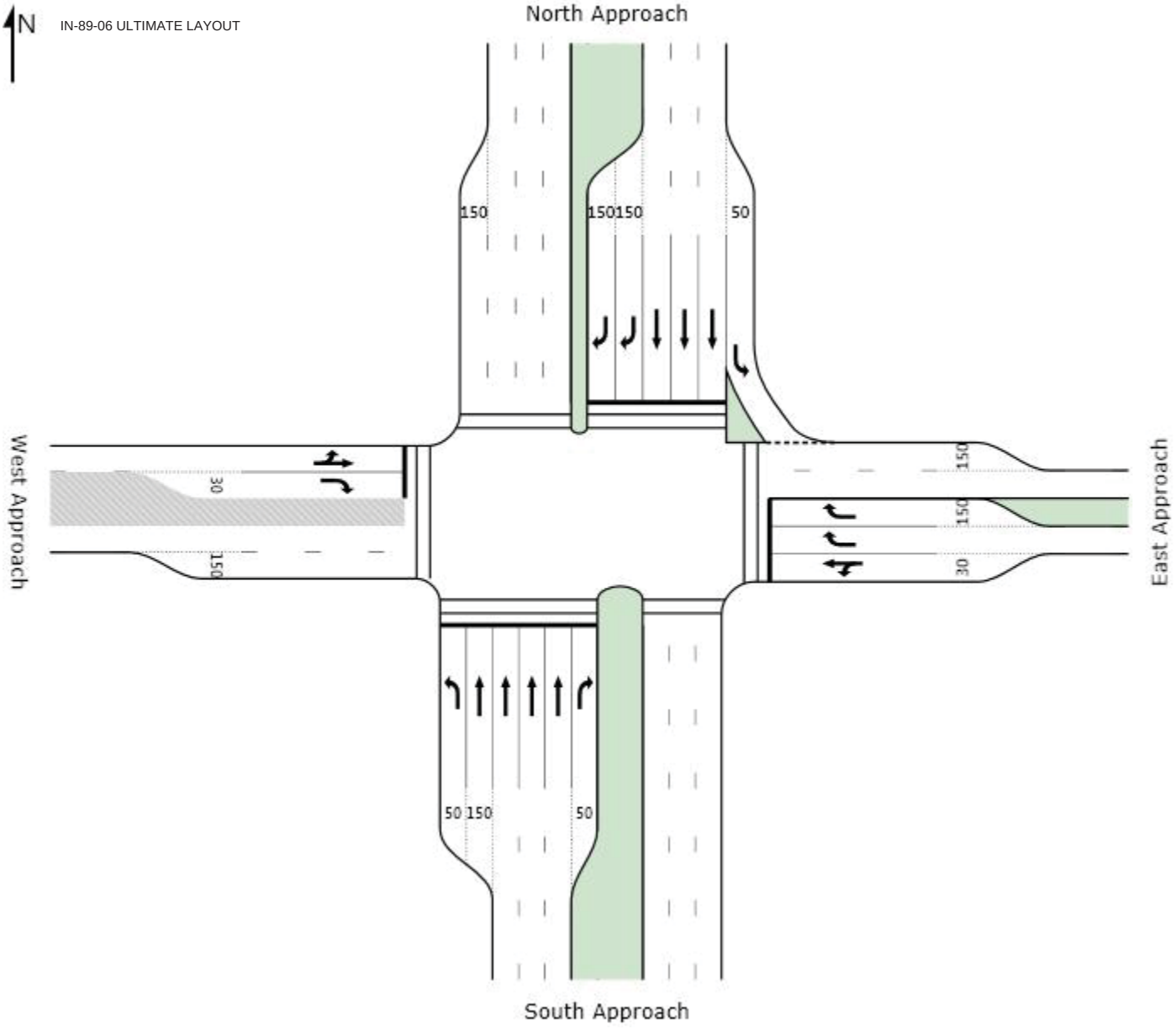
Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	18	7	21	10	6	22
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	24	13	27	16	12	28
Phase Split	20 %	11 %	23 %	13 %	10 %	23 %



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied


N
IN-89-06 ULTIMATE LAYOUT
North Approach
150
150
150
50
West Approach
30
150
150
150
30
East Approach
50
150
50
South Approach

MOVEMENT SUMMARY

Site: IN-89-06 Ultimate AM

IN-89-06 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	10	0.0	0.023	21.1	LOS C	0.2	1.5	0.58	0.70	43.8
2	T	1606	6.0	0.600	31.2	LOS C	20.1	148.1	0.84	0.74	37.6
3	R	119	0.0	0.699	70.8	LOS E	7.2	50.4	1.00	0.83	21.5
Approach		1735	5.6	0.699	33.9	LOS C	20.1	148.1	0.85	0.74	36.0
East: East Approach											
4	L	24	0.0	0.140	32.1	LOS C	0.9	6.3	0.65	0.70	31.6
5	T	1	0.0	0.140	24.4	LOS C	0.9	6.3	0.65	0.47	29.7
6	R	137	0.0	0.730	74.3	LOS E	4.3	30.4	1.00	0.85	20.6
Approach		162	0.0	0.730	67.7	LOS E	4.3	30.4	0.95	0.82	21.7
North: North Approach											
7	L	677	0.0	0.767	12.1	LOS B	7.1	49.9	0.44	0.76	53.7
8	T	1598	6.0	0.733	34.0	LOS C	26.6	196.0	0.92	0.82	35.9
9	R	195	0.0	0.610	68.7	LOS E	6.2	43.4	1.00	0.79	21.9
Approach		2470	3.9	0.767	30.7	LOS C	26.6	196.0	0.80	0.80	37.2
West: West Approach											
10	L	411	0.0	0.535	35.8	LOS D	18.0	125.9	0.80	0.83	30.1
11	T	1	0.0	0.535	28.1	LOS C	18.0	125.9	0.80	0.71	27.8
12	R	40	0.0	0.366	69.7	LOS E	2.4	16.6	1.00	0.73	21.4
Approach		452	0.0	0.535	38.7	LOS D	18.0	125.9	0.82	0.82	29.0
All Vehicles		4819	4.0	0.767	33.9	LOS C	26.6	196.0	0.82	0.78	35.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	32.3	LOS D	0.1	0.1	0.73	0.73
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	29.4	LOS C	0.1	0.1	0.70	0.70
All Pedestrians		200	42.5	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-06 Ultimate PM

IN-89-06 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	47	0.0	0.112	22.1	LOS C	1.0	7.2	0.62	0.74	42.9
2	T	1866	6.0	0.942	67.3	LOS E	37.0	272.2	1.00	1.09	24.2
3	R	22	0.0	0.237	72.7	LOS E	1.3	9.2	0.99	0.71	21.1
Approach		1935	5.8	0.942	66.3	LOS E	37.0	272.2	0.99	1.08	24.3
East: East Approach											
4	L	83	0.0	0.543	36.8	LOS D	3.6	25.4	0.73	0.75	29.8
5	T	8	0.0	0.543	29.1	LOS C	3.6	25.4	0.73	0.57	27.6
6	R	469	0.0	0.937	86.0	LOS F	17.2	120.5	1.00	1.18	18.7
Approach		560	0.0	0.937	77.9	LOS E	17.2	120.5	0.96	1.11	19.9
North: North Approach											
7	L	124	0.0	0.108	10.1	LOS B	0.4	3.1	0.12	0.68	56.6
8	T	1640	6.0	0.844	45.1	LOS D	32.2	237.3	0.99	0.95	30.8
9	R	372	0.0	0.915	77.3	LOS E	13.9	97.6	1.00	0.95	20.1
Approach		2136	4.6	0.915	48.7	LOS D	32.2	237.3	0.94	0.94	29.1
West: West Approach											
10	L	255	0.0	0.315	30.8	LOS C	9.6	67.3	0.69	0.79	32.1
11	T	1	0.0	0.315	23.1	LOS C	9.6	67.3	0.69	0.59	30.1
12	R	12	0.0	0.094	55.6	LOS E	0.6	4.3	0.89	0.68	24.3
Approach		268	0.0	0.315	31.9	LOS C	9.6	67.3	0.70	0.79	31.6
All Vehicles		4899	4.3	0.942	58.0	LOS E	37.0	272.2	0.95	1.00	25.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	36.0	LOS D	0.1	0.1	0.78	0.78
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	39.2	LOS D	0.1	0.1	0.81	0.81
All Pedestrians		200	45.9	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

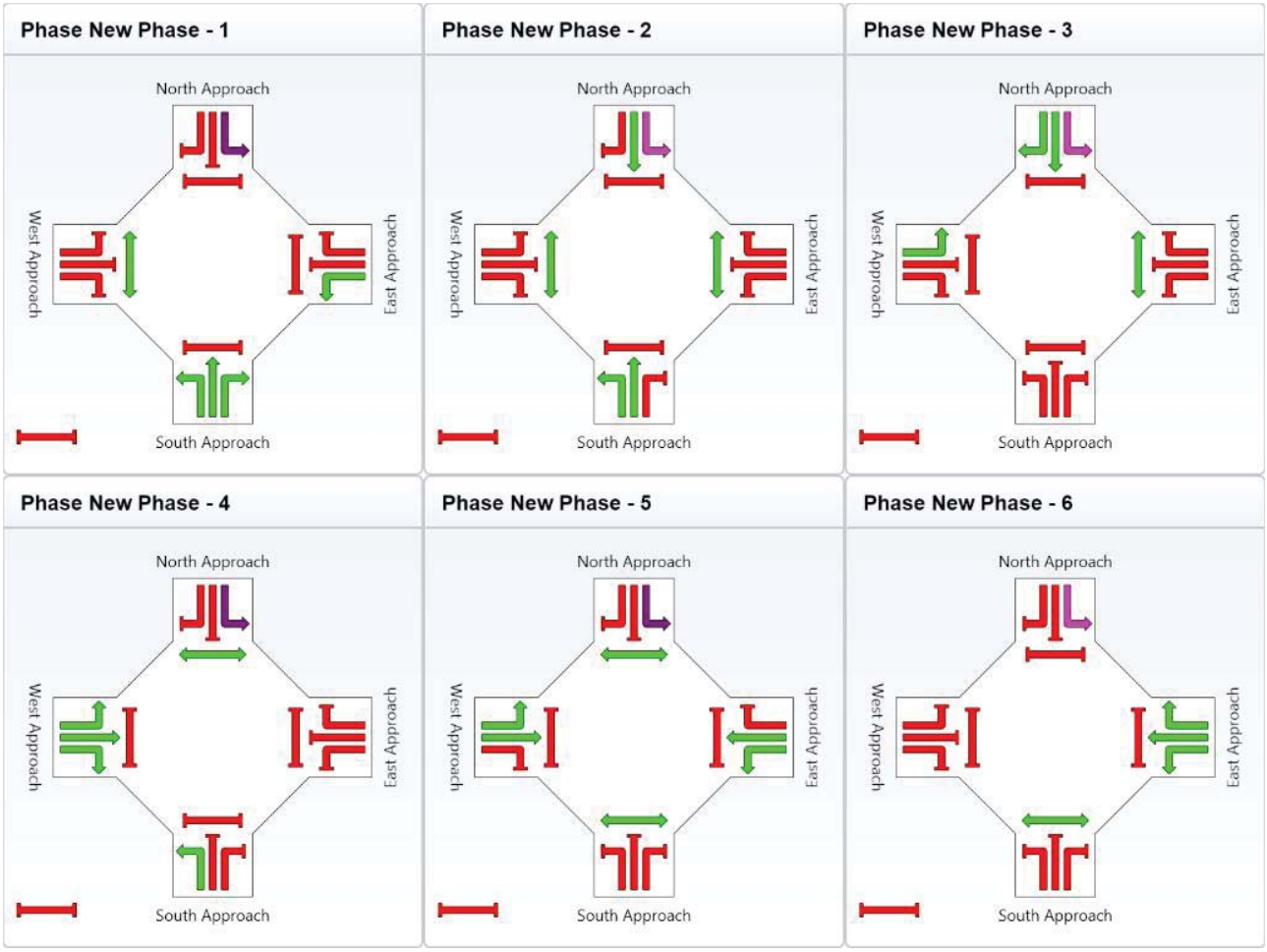
PHASING SUMMARY

IN-89-06 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	11	29	11	7	20	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	17	35	17	13	26	12
Phase Split	14 %	29 %	14 %	11 %	22 %	10 %



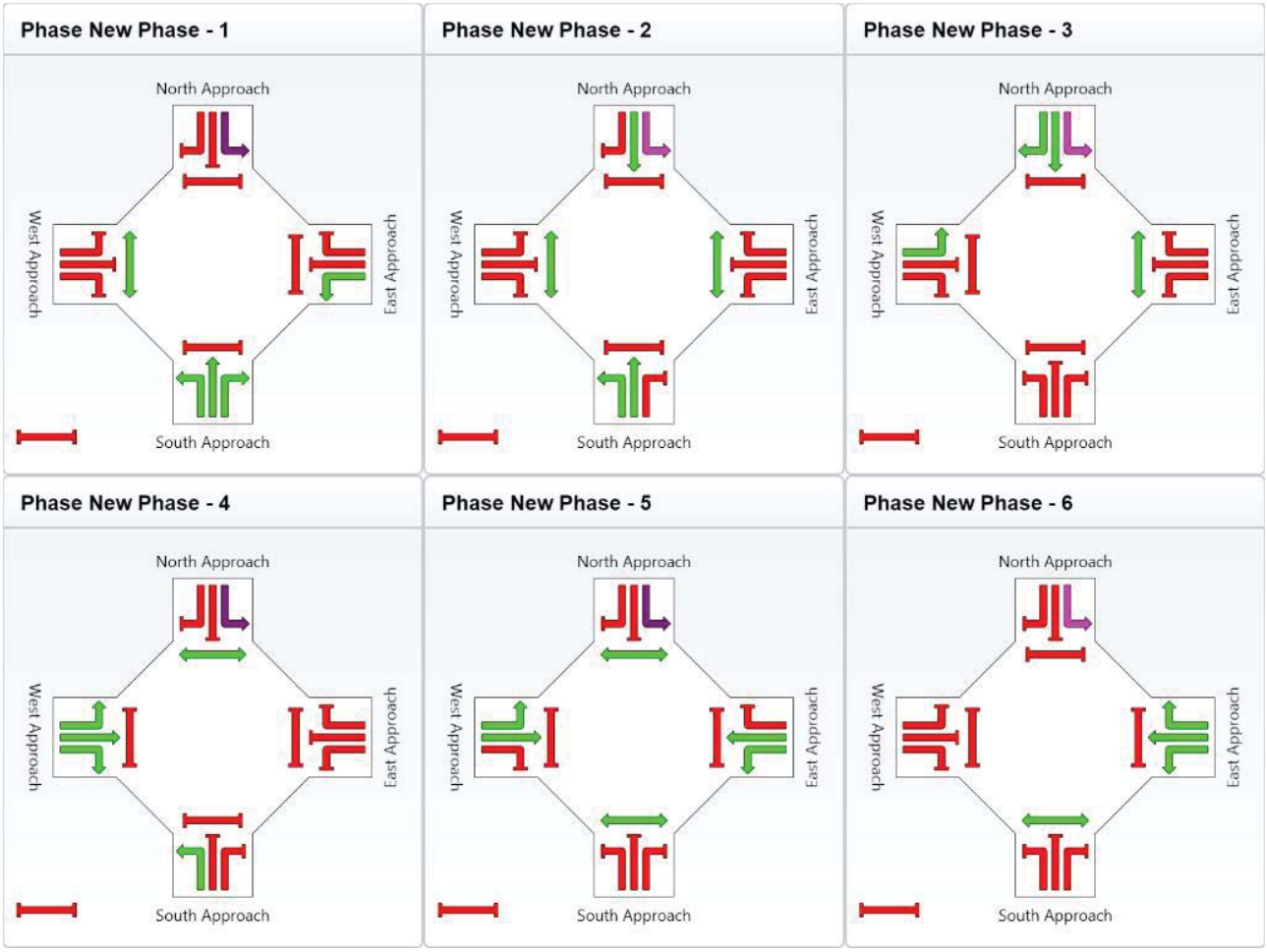
PHASING SUMMARY

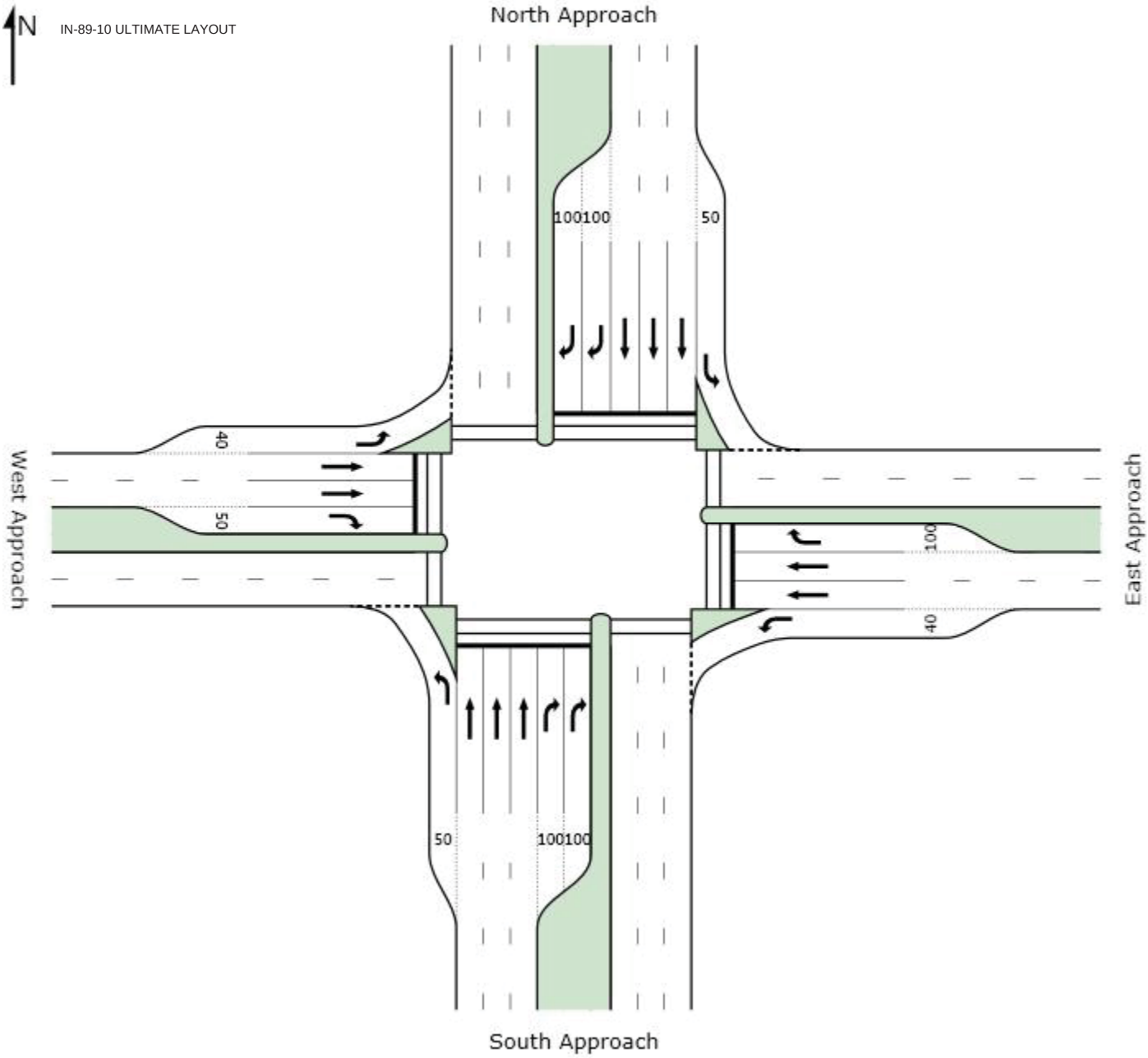
IN-89-06 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	6	21	14	17	10	16
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	27	20	23	16	22
Phase Split	10 %	23 %	17 %	19 %	13 %	18 %




N
IN-89-10 ULTIMATE LAYOUT
North Approach
100100
50
40
50
West Approach
East Approach
100
40
50
100100
South Approach

MOVEMENT SUMMARY

Site: IN-89-10 Ultimate AM

IN-89-10 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	20	5.6	0.021	10.5	LOS B	0.1	0.7	0.14	0.67	56.5
2	T	1373	6.0	0.750	39.5	LOS D	24.2	178.1	0.96	0.85	33.1
3	R	190	5.8	0.800	76.9	LOS E	6.1	44.8	1.00	0.88	20.9
Approach		1583	6.0	0.800	43.7	LOS D	24.2	178.1	0.95	0.85	31.3
East: East Approach											
4	L	50	6.7	0.160	18.1	LOS B	1.1	8.1	0.44	0.70	43.3
5	T	156	6.3	0.171	38.7	LOS D	3.6	26.6	0.83	0.65	28.0
6	R	63	5.3	0.693	75.5	LOS E	4.0	29.0	1.00	0.82	21.6
Approach		268	6.1	0.693	43.5	LOS D	4.0	29.0	0.80	0.70	27.9
North: North Approach											
7	L	209	5.8	0.481	16.4	LOS B	4.2	30.8	0.42	0.74	49.2
8	T	1399	6.0	0.798	43.8	LOS D	26.2	193.1	0.98	0.90	31.3
9	R	32	6.9	0.178	72.6	LOS E	1.0	7.1	0.99	0.69	21.8
Approach		1640	6.0	0.798	40.9	LOS D	26.2	193.1	0.91	0.88	32.4
West: West Approach											
10	L	180	6.1	0.511	16.3	LOS B	3.8	27.9	0.43	0.72	44.7
11	T	899	6.0	0.638	33.0	LOS C	21.5	158.4	0.88	0.78	30.1
12	R	165	6.0	0.817	65.1	LOS E	9.8	71.9	0.95	0.94	23.7
Approach		1244	6.0	0.817	34.8	LOS C	21.5	158.4	0.82	0.79	30.5
All Vehicles		4736	6.0	0.817	40.4	LOS D	26.2	193.1	0.90	0.84	31.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P5	Across N approach	50	40.8	LOS E	0.1	0.1	0.83	0.83
P7	Across W approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		200	43.4	LOS E			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-10 Ultimate PM

IN-89-10 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	123	6.3	0.328	20.1	LOS C	3.0	21.9	0.49	0.73	45.4
2	T	1626	6.0	0.889	53.5	LOS D	35.2	259.4	1.00	1.02	27.9
3	R	68	6.5	0.384	73.9	LOS E	2.1	15.4	1.00	0.73	21.6
Approach		1817	6.1	0.889	52.0	LOS D	35.2	259.4	0.97	0.99	28.3
East: East Approach											
4	L	143	6.2	0.410	14.9	LOS B	2.7	20.1	0.39	0.71	45.8
5	T	1125	6.0	0.848	44.8	LOS D	33.3	244.8	0.99	0.97	25.8
6	R	234	6.1	0.869	73.4	LOS E	15.3	112.9	1.00	1.00	22.0
Approach		1503	6.0	0.869	46.4	LOS D	33.3	244.8	0.94	0.95	26.2
North: North Approach											
7	L	57	5.8	0.065	10.7	LOS B	0.3	2.5	0.16	0.68	56.2
8	T	1372	6.0	0.689	35.9	LOS D	22.9	168.4	0.92	0.81	34.9
9	R	227	5.8	0.839	77.8	LOS E	7.3	54.0	1.00	0.92	20.8
Approach		1656	6.0	0.839	40.7	LOS D	22.9	168.4	0.90	0.82	32.6
West: West Approach											
10	L	56	5.9	0.207	23.0	LOS C	1.6	11.4	0.54	0.71	39.8
11	T	191	5.7	0.204	38.2	LOS D	4.4	32.5	0.83	0.66	28.1
12	R	33	6.7	0.372	73.0	LOS E	2.0	14.9	1.00	0.72	22.1
Approach		281	5.9	0.372	39.3	LOS D	4.4	32.5	0.79	0.68	29.0
All Vehicles		5256	6.0	0.889	46.2	LOS D	35.2	259.4	0.93	0.91	28.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	42.5	LOS E	0.1	0.1	0.84	0.84
P3	Across E approach	50	36.0	LOS D	0.1	0.1	0.78	0.78
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		200	42.8	LOS E			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

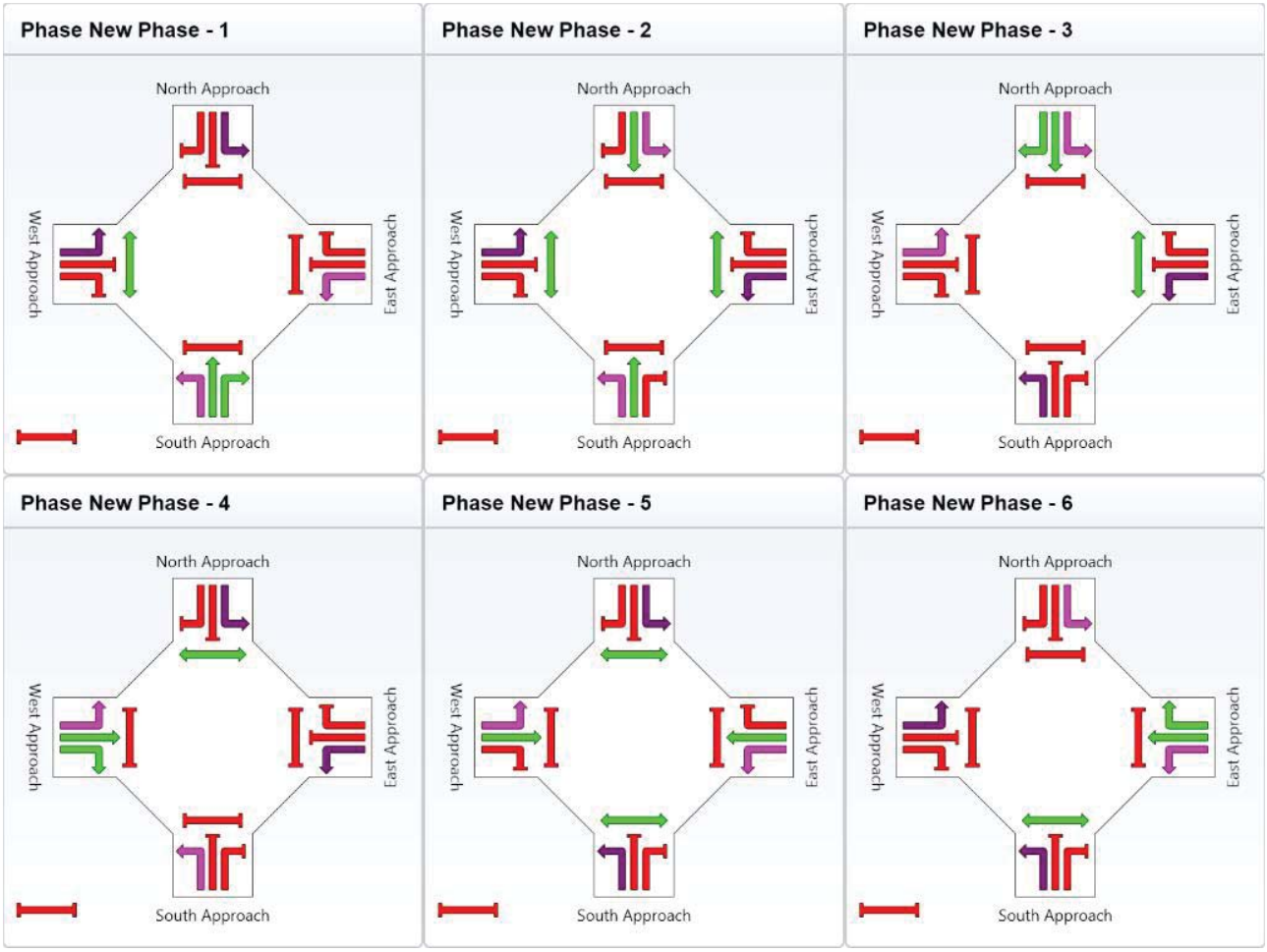
PHASING SUMMARY

IN-89-10 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	8	25	6	22	17	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	14	31	12	28	23	12
Phase Split	12 %	26 %	10 %	23 %	19 %	10 %



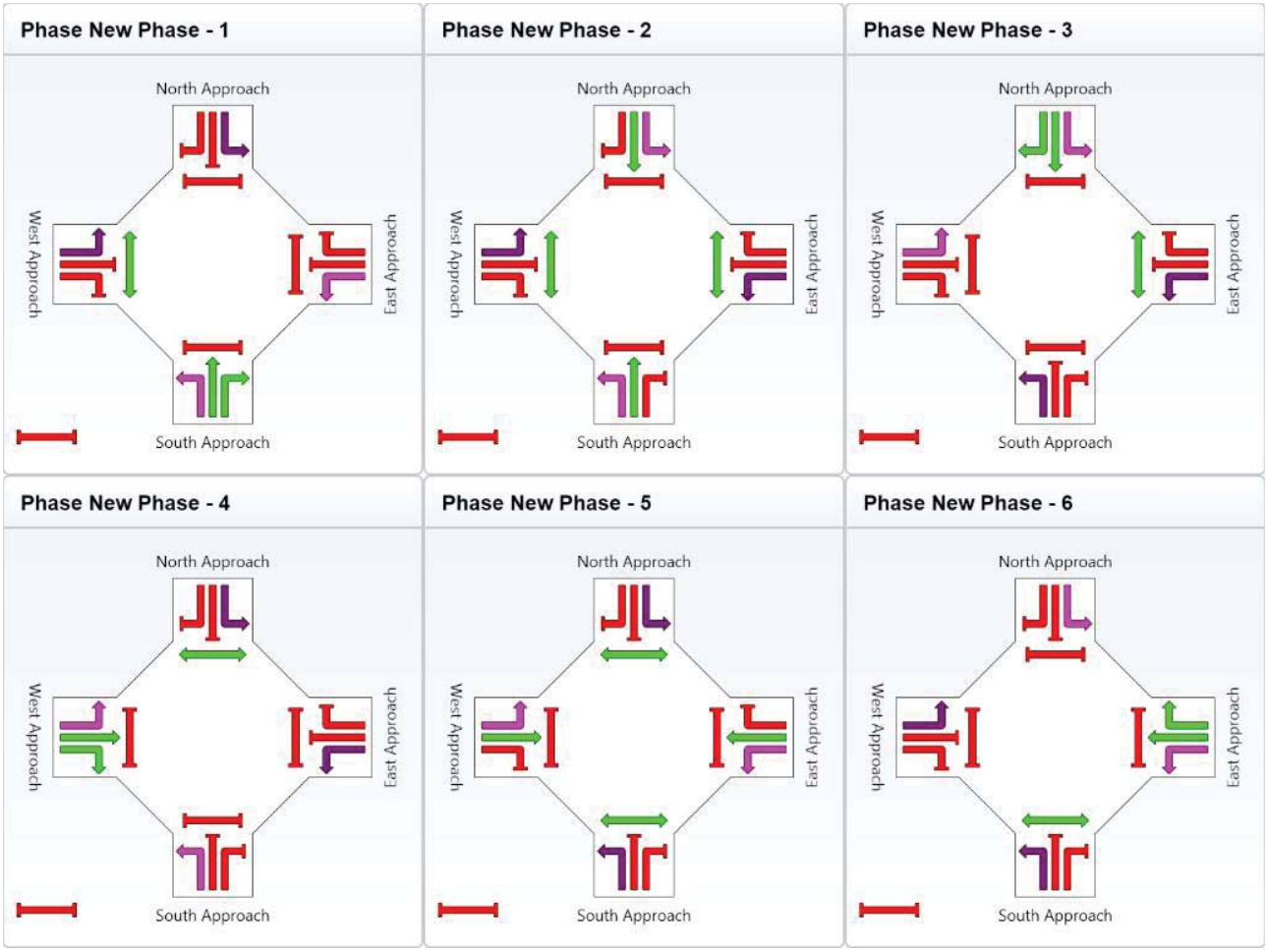
PHASING SUMMARY

IN-89-10 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

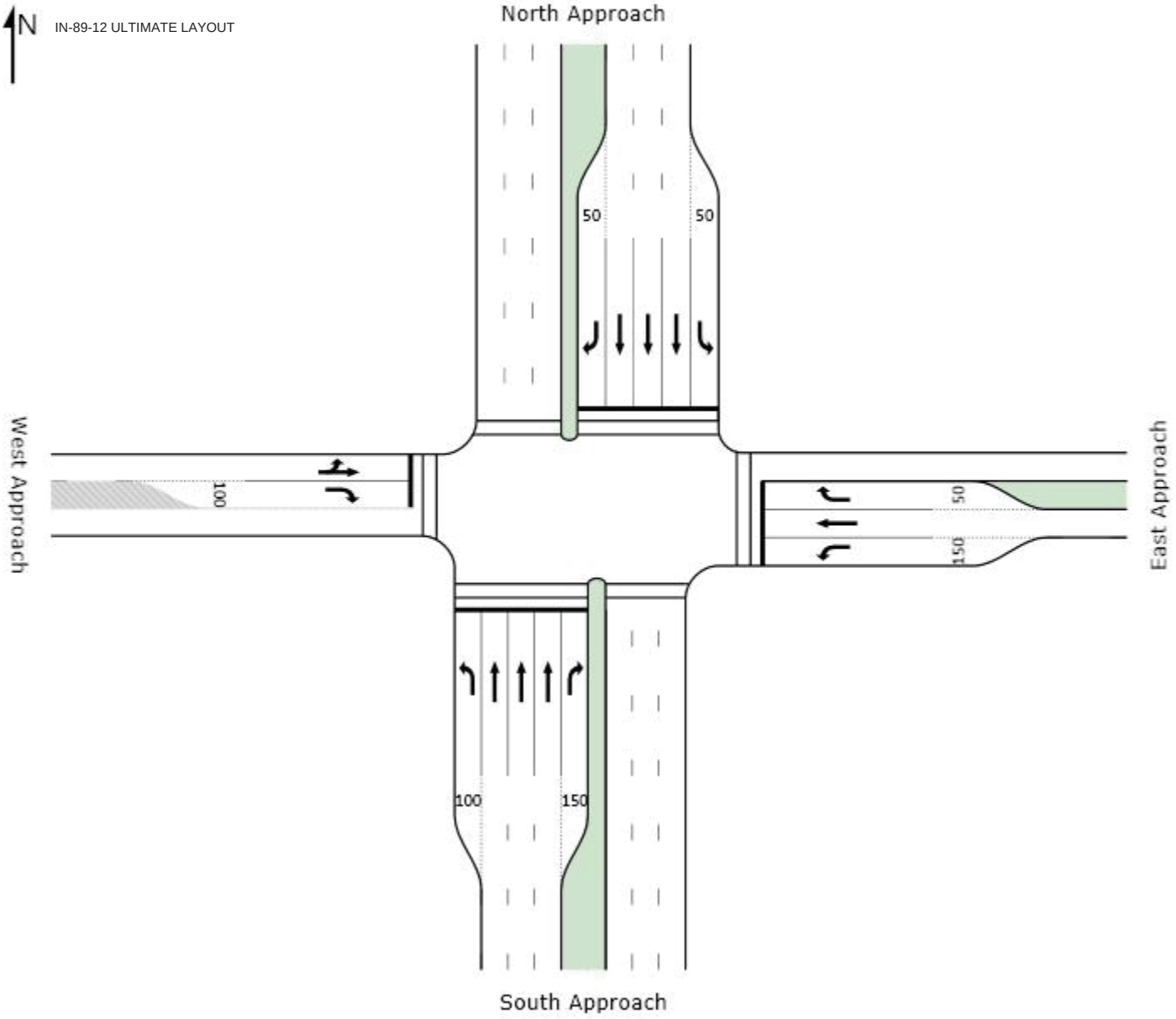
Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	6	27	9	6	18	18
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	33	15	12	24	24
Phase Split	10 %	28 %	13 %	10 %	20 %	20 %



IN-89-12 ULTIMATE LAYOUT



MOVEMENT SUMMARY

Site: IN-89-12 Ultimate AM

IN-89-12 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	128	0.0	0.281	38.0	LOS D	5.3	37.1	0.76	0.77	28.3
2	T	1417	6.0	0.755	39.0	LOS D	24.9	183.4	0.95	0.85	27.7
3	R	227	0.0	0.771	62.9	LOS E	13.6	94.9	1.00	0.89	20.7
Approach		1771	4.8	0.771	42.0	LOS D	24.9	183.4	0.95	0.85	26.7
East: East Approach											
4	L	227	0.0	0.483	47.3	LOS D	11.4	79.6	0.90	0.81	21.9
5	T	59	0.0	0.121	37.2	LOS D	2.7	18.7	0.81	0.62	22.6
6	R	97	0.0	0.316	35.9	LOS D	4.1	28.8	0.81	0.73	24.9
Approach		383	0.0	0.483	42.9	LOS D	11.4	79.6	0.87	0.76	22.7
North: North Approach											
7	L	155	0.0	0.598	38.2	LOS D	6.6	45.9	0.77	0.77	27.6
8	T	1379	6.0	0.727	37.9	LOS D	23.7	174.2	0.94	0.83	28.1
9	R	65	0.0	0.313	55.2	LOS E	3.4	23.5	0.91	0.75	23.0
Approach		1599	5.2	0.727	38.6	LOS D	23.7	174.2	0.92	0.82	27.8
West: West Approach											
10	L	59	0.0	0.232	45.7	LOS D	5.1	35.9	0.84	0.79	25.0
11	T	51	0.0	0.232	39.8	LOS D	5.1	35.9	0.84	0.69	24.0
12	R	187	0.0	0.618	43.5	LOS D	8.3	58.2	0.94	0.86	25.5
Approach		297	0.0	0.618	43.3	LOS D	8.3	58.2	0.90	0.82	25.1
All Vehicles		4050	4.1	0.771	40.8	LOS D	24.9	183.4	0.93	0.83	26.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P3	Across E approach	50	34.5	LOS D	0.1	0.1	0.76	0.76
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	31.5	LOS D	0.1	0.1	0.73	0.73
All Pedestrians		200	43.3	LOS E			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-12 Ultimate PM

IN-89-12 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	289	0.0	0.691	49.1	LOS D	14.9	104.1	0.92	0.84	24.6
2	T	1508	6.0	1.004	120.7	LOS F	49.9	367.3	1.00	1.53	13.6
3	R	367	0.0	0.989	114.3	LOS F	33.3	233.4	1.00	1.23	13.5
Approach		2165	4.2	1.004	110.1	LOS F	49.9	367.3	0.99	1.39	14.4
East: East Approach											
4	L	446	0.0	0.950	84.0	LOS F	34.8	243.3	1.00	1.15	16.0
5	T	114	0.0	0.232	38.5	LOS D	5.3	37.3	0.84	0.67	22.3
6	R	212	0.0	0.694	37.0	LOS D	9.4	65.8	0.89	0.81	24.6
Approach		772	0.0	0.950	64.4	LOS E	34.8	243.3	0.95	0.99	18.5
North: North Approach											
7	L	132	0.0	0.556	44.5	LOS D	6.1	42.6	0.83	0.77	25.4
8	T	1309	6.0	0.863	53.8	LOS D	27.4	201.6	1.00	1.01	23.3
9	R	90	0.0	0.413	50.9	LOS D	4.5	31.3	0.88	0.76	24.2
Approach		1531	5.1	0.863	52.8	LOS D	27.4	201.6	0.98	0.98	23.5
West: West Approach											
10	L	76	0.0	0.364	47.2	LOS D	8.4	58.9	0.87	0.82	24.6
11	T	98	0.0	0.364	41.3	LOS D	8.4	58.9	0.87	0.73	23.6
12	R	208	0.0	0.942	62.4	LOS E	11.6	81.1	1.00	1.12	20.9
Approach		382	0.0	0.942	54.0	LOS D	11.6	81.1	0.94	0.96	22.2
All Vehicles		4850	3.5	1.004	80.3	LOS F	49.9	367.3	0.98	1.16	17.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P3	Across E approach	50	40.8	LOS E	0.1	0.1	0.83	0.83
P5	Across N approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		200	46.4	LOS E			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

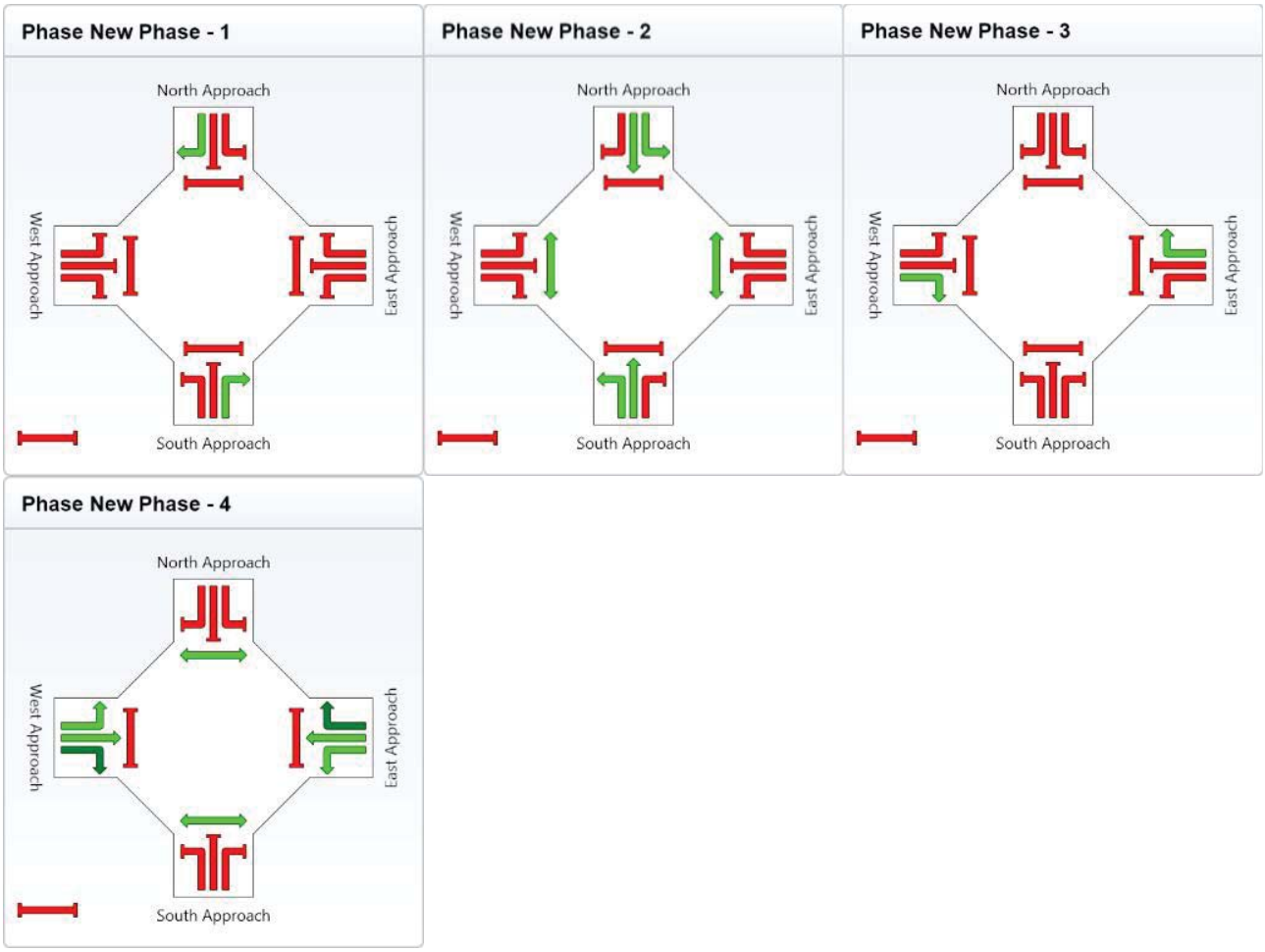
PHASING SUMMARY

IN-89-12 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B - V2
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4
Green Time (sec)	19	40	7	30
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	25	46	13	36
Phase Split	21 %	38 %	11 %	30 %



PHASING SUMMARY

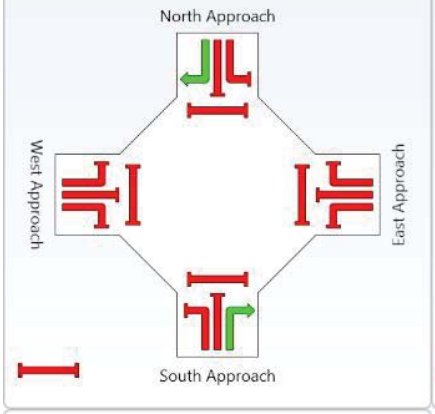
IN-89-12 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B - V2
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4

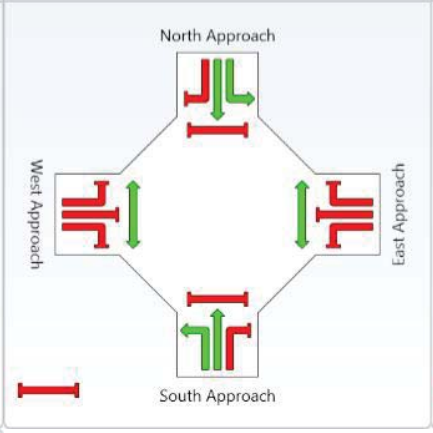
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4
Green Time (sec)	24	32	10	30
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	30	38	16	36
Phase Split	25 %	32 %	13 %	30 %

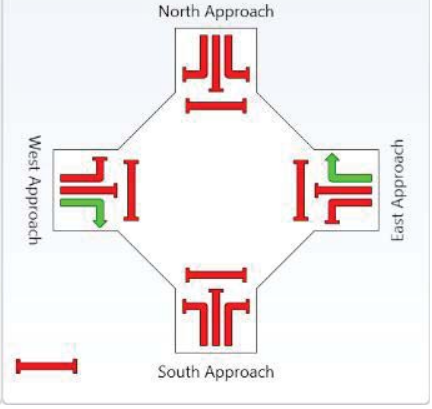
Phase New Phase - 1



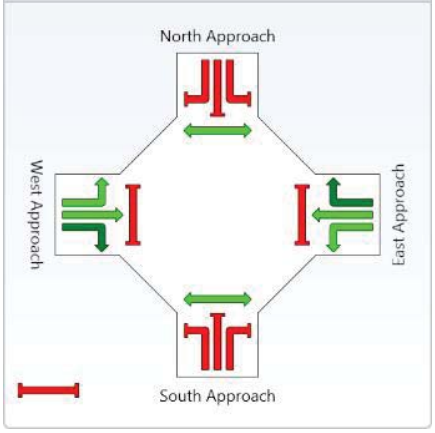
Phase New Phase - 2

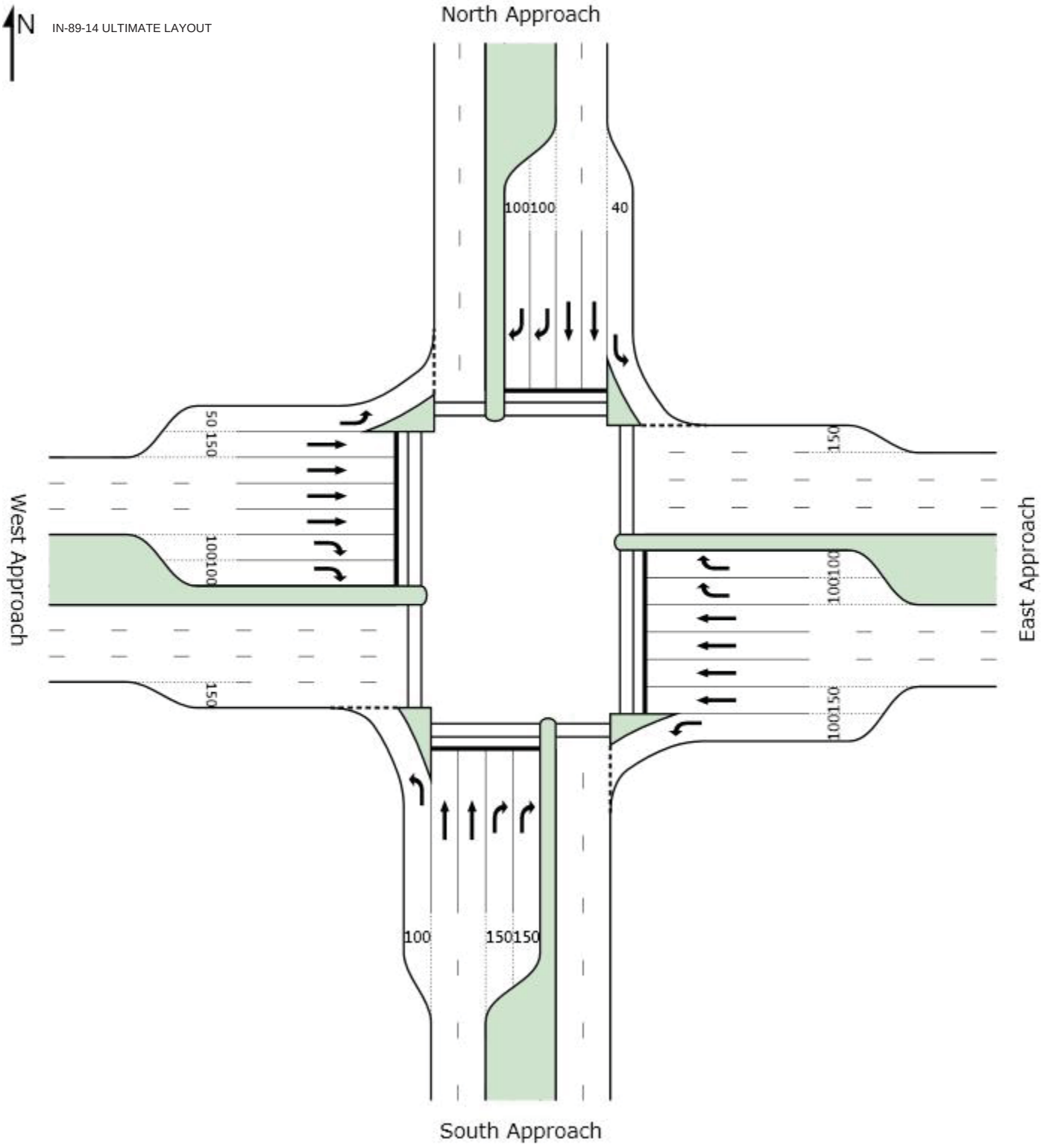


Phase New Phase - 3



Phase New Phase - 4




N
IN-89-14 ULTIMATE LAYOUT
North Approach
100100
40
150
West Approach
East Approach
100100
100150
100
150150
South Approach

MOVEMENT SUMMARY

Site: IN-89-14 Ultimate AM

IN-89-14 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	316	5.9	0.393	18.0	LOS B	7.9	57.9	0.50	0.75	43.3
5	T	298	5.9	0.255	33.3	LOS C	6.5	47.9	0.79	0.65	30.1
6	R	551	6.0	0.875	72.3	LOS E	18.1	133.3	1.00	1.00	22.3
Approach		1165	5.9	0.875	47.6	LOS D	18.1	133.3	0.81	0.84	27.7
East: East Approach											
7	L	242	5.9	0.340	17.6	LOS B	5.2	38.2	0.45	0.74	47.9
8	T	1904	6.0	0.886	52.9	LOS D	31.9	234.6	1.00	0.99	28.1
9	R	51	6.5	0.282	73.1	LOS E	1.5	11.3	1.00	0.71	21.8
Approach		2197	6.0	0.886	49.5	LOS D	31.9	234.6	0.94	0.95	29.1
North: North Approach											
10	L	149	5.9	0.567	24.8	LOS C	4.6	33.5	0.60	0.75	38.7
11	T	820	6.0	0.874	56.8	LOS E	26.4	194.1	1.00	1.03	22.6
12	R	109	6.1	0.262	62.5	LOS E	3.0	22.0	0.95	0.75	24.4
Approach		1077	6.0	0.874	53.0	LOS D	26.4	194.1	0.94	0.96	24.3
West: West Approach											
1	L	143	6.2	0.182	11.1	LOS B	1.1	7.8	0.19	0.69	55.8
2	T	2056	6.0	0.867	47.6	LOS D	32.8	241.7	0.99	0.96	29.9
3	R	255	6.0	0.860	78.5	LOS E	8.4	61.7	1.00	0.94	20.7
Approach		2454	6.0	0.867	48.7	LOS D	32.8	241.7	0.95	0.94	29.4
All Vehicles		6893	6.0	0.886	49.4	LOS D	32.8	241.7	0.92	0.93	28.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
P4	Across S approach	50	33.0	LOS D	0.1	0.1	0.74	0.74
P5	Across E approach	50	46.8	LOS E	0.2	0.2	0.88	0.88
P6	Across E approach	50	41.7	LOS E	0.1	0.1	0.83	0.83
P7	Across N approach	50	33.8	LOS D	0.1	0.1	0.75	0.75
P8	Across N approach	50	30.1	LOS D	0.1	0.1	0.71	0.71
P1	Across W approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P2	Across W approach	50	35.3	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		400	37.3	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-14 Ultimate PM

IN-89-14 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	323	6.1	0.453	21.8	LOS C	10.4	76.9	0.62	0.79	40.6
5	T	927	6.0	0.863	52.5	LOS D	29.0	213.4	1.00	1.01	23.6
6	R	356	5.9	0.848	73.8	LOS E	11.5	84.4	1.00	0.98	22.0
Approach		1607	6.0	0.863	51.1	LOS D	29.0	213.4	0.92	0.96	25.5
East: East Approach											
7	L	591	6.0	0.728	15.4	LOS B	12.5	92.3	0.47	0.77	50.2
8	T	2037	6.0	0.760	34.7	LOS C	27.7	203.7	0.92	0.82	35.5
9	R	263	5.9	0.876	79.9	LOS E	8.7	64.3	1.00	0.96	20.4
Approach		2891	6.0	0.876	34.9	LOS C	27.7	203.7	0.84	0.82	35.3
North: North Approach											
10	L	122	6.3	0.445	22.4	LOS C	3.4	25.2	0.55	0.73	40.2
11	T	612	5.9	0.651	43.7	LOS D	16.2	118.9	0.95	0.81	26.1
12	R	254	6.1	0.856	77.4	LOS E	8.3	61.3	1.00	0.98	21.3
Approach		988	6.0	0.856	49.8	LOS D	16.2	118.9	0.92	0.85	25.7
West: West Approach											
1	L	152	5.8	0.366	18.4	LOS B	3.4	24.7	0.46	0.73	47.0
2	T	2165	6.0	0.866	45.3	LOS D	34.9	256.7	0.98	0.95	30.7
3	R	163	6.1	0.784	77.2	LOS E	5.2	38.4	1.00	0.86	21.0
Approach		2479	6.0	0.866	45.8	LOS D	34.9	256.7	0.95	0.93	30.5
All Vehicles		7965	6.0	0.876	43.4	LOS D	34.9	256.7	0.90	0.89	30.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	30.1	LOS D	0.1	0.1	0.71	0.71
P4	Across S approach	50	26.0	LOS C	0.1	0.1	0.66	0.66
P5	Across E approach	50	46.8	LOS E	0.2	0.2	0.88	0.88
P6	Across E approach	50	41.7	LOS E	0.1	0.1	0.83	0.83
P7	Across N approach	50	31.5	LOS D	0.1	0.1	0.73	0.73
P8	Across N approach	50	28.0	LOS C	0.1	0.1	0.68	0.68
P1	Across W approach	50	42.5	LOS E	0.1	0.1	0.84	0.84
P2	Across W approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		400	35.5	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

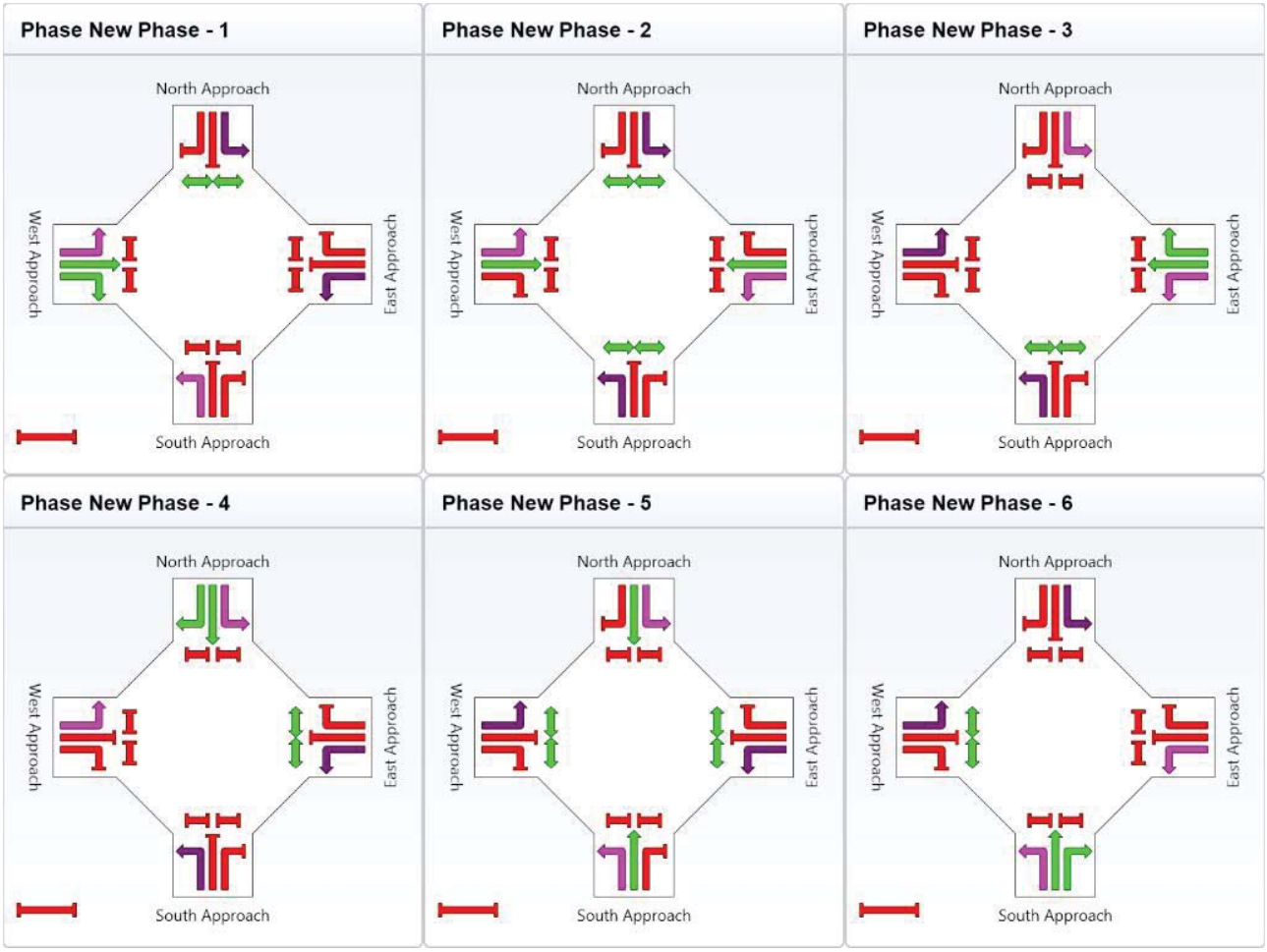
PHASING SUMMARY

IN-89-14 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	10	23	6	14	10	21
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	16	29	12	20	16	27
Phase Split	13 %	24 %	10 %	17 %	13 %	23 %



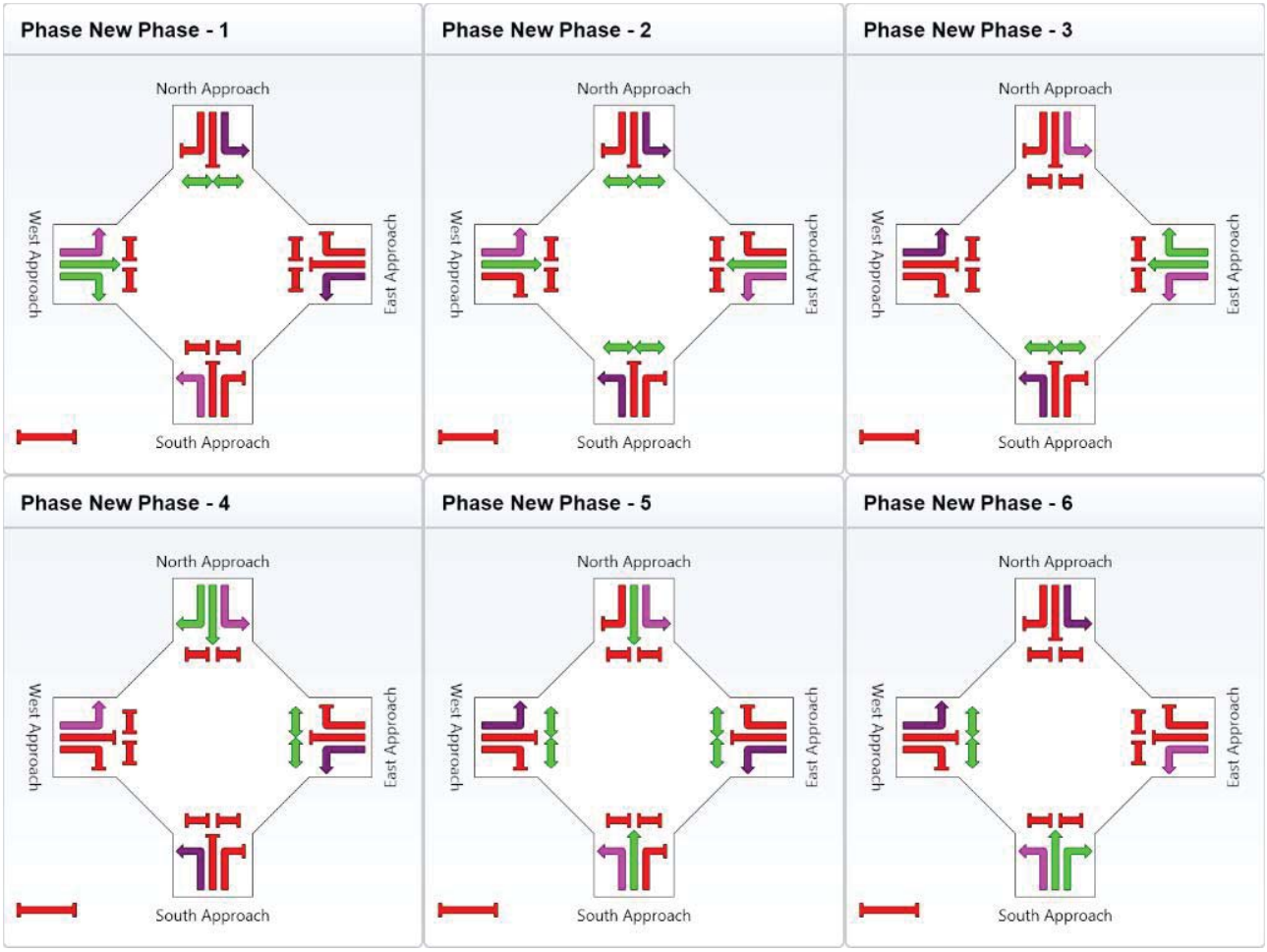
PHASING SUMMARY

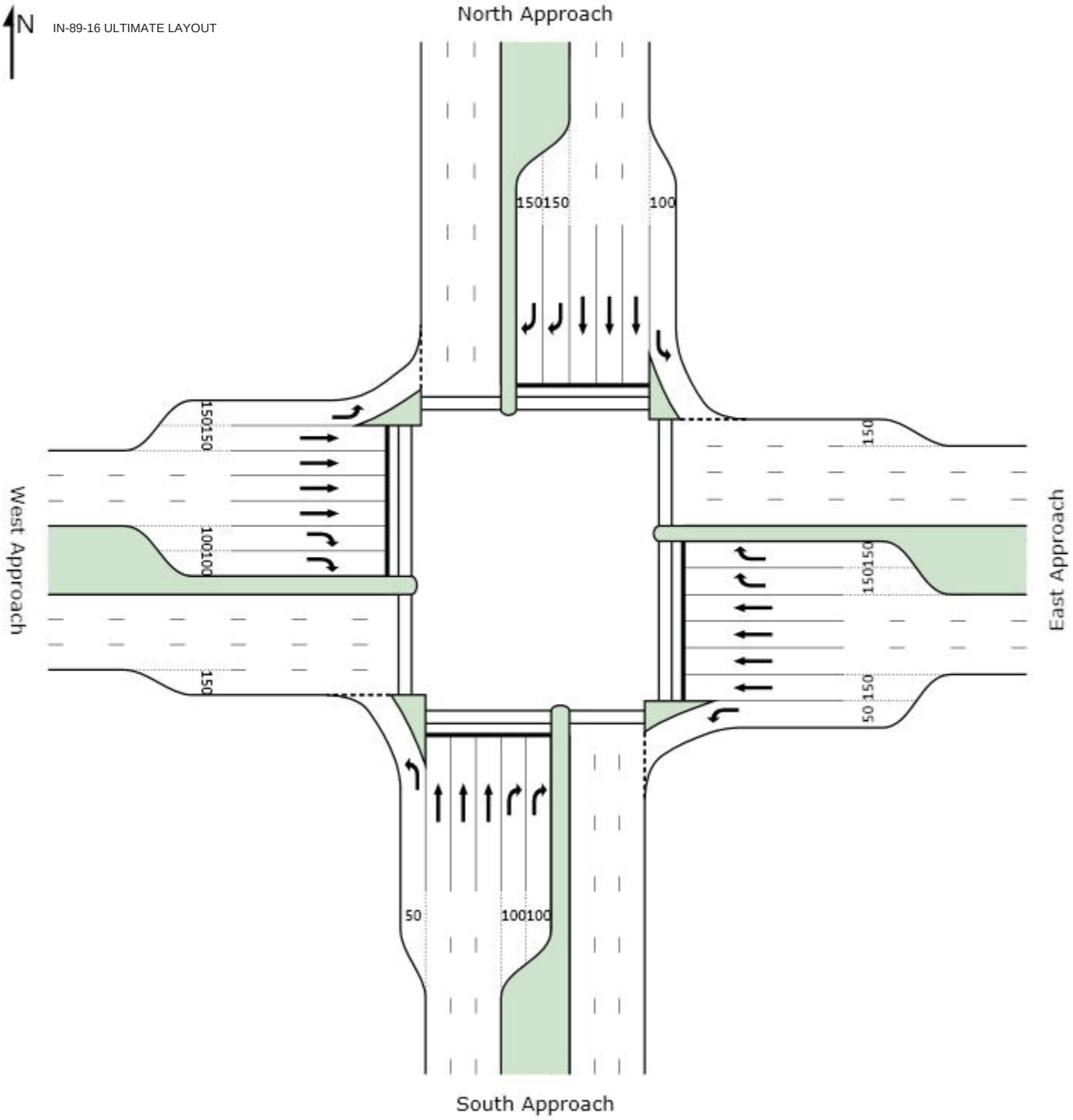
IN-89-14 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	7	29	10	10	14	14
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	13	35	16	16	20	20
Phase Split	11 %	29 %	13 %	13 %	17 %	17 %




N
IN-89-16 ULTIMATE LAYOUT
North Approach
150150
100
150150
150
West Approach
100100
150150
East Approach
150
50 150
50
100100
South Approach

MOVEMENT SUMMARY

Site: IN-89-16 Ultimate AM

IN-89-16 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	76	5.8	0.215	16.5	LOS B	1.7	12.4	0.45	0.69	41.5
2	T	849	6.0	0.787	53.8	LOS D	16.8	123.7	1.00	0.91	27.8
3	R	154	5.7	0.863	83.0	LOS F	5.1	37.7	1.00	0.92	21.8
Approach		1079	5.9	0.863	55.3	LOS E	16.8	123.7	0.96	0.89	27.3
East: East Approach											
4	L	70	6.3	0.139	14.2	LOS B	0.9	6.6	0.28	0.72	54.8
5	T	1802	6.0	0.607	28.7	LOS C	21.7	160.0	0.82	0.73	39.1
6	R	334	5.9	0.857	77.5	LOS E	10.9	80.1	1.00	0.95	22.9
Approach		2207	6.0	0.857	35.6	LOS D	21.7	160.0	0.83	0.76	35.6
North: North Approach											
7	L	537	5.9	0.851	35.4	LOS D	22.2	163.2	0.66	0.87	37.3
8	T	888	5.9	0.551	39.4	LOS D	14.7	108.4	0.90	0.77	33.3
9	R	396	6.1	0.777	69.4	LOS E	12.0	88.6	1.00	0.89	24.7
Approach		1821	6.0	0.851	44.7	LOS D	22.2	163.2	0.85	0.83	31.9
West: West Approach											
10	L	611	5.9	0.591	20.2	LOS C	16.9	124.6	0.59	0.81	48.4
11	T	2210	6.0	0.858	44.0	LOS D	34.7	255.7	0.98	0.95	31.2
12	R	91	6.0	0.513	75.8	LOS E	2.8	20.7	1.00	0.74	23.2
Approach		2912	6.0	0.858	40.0	LOS D	34.7	255.7	0.90	0.91	33.3
All Vehicles		8018	6.0	0.863	42.0	LOS D	34.7	255.7	0.88	0.85	32.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	28.0	LOS C	0.1	0.1	0.68	0.68
P2	Across S approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
P3	Across E approach	50	43.4	LOS E	0.1	0.1	0.85	0.85
P4	Across E approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
P5	Across N approach	50	33.8	LOS D	0.1	0.1	0.75	0.75
P6	Across N approach	50	29.4	LOS C	0.1	0.1	0.70	0.70
P7	Across W approach	50	52.3	LOS E	0.2	0.2	0.93	0.93
P8	Across W approach	50	46.8	LOS E	0.2	0.2	0.88	0.88
All Pedestrians		400	37.1	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

IN-89-16 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	129	6.0	0.430	25.3	LOS C	4.1	30.4	0.63	0.73	35.6
2	T	1101	6.0	0.939	75.6	LOS E	27.5	202.2	1.00	1.20	18.9
3	R	59	5.6	0.333	71.0	LOS E	1.8	13.2	1.00	0.72	20.6
Approach		1289	6.0	0.939	70.4	LOS E	27.5	202.2	0.96	1.13	19.9
East: East Approach											
4	L	186	5.9	0.396	11.7	LOS B	3.0	21.8	0.34	0.68	45.6
5	T	2340	6.0	0.849	40.6	LOS D	35.9	264.5	0.97	0.93	27.1
6	R	503	5.9	0.931	83.8	LOS F	18.3	134.7	1.00	1.13	18.4
Approach		3028	6.0	0.931	46.0	LOS D	35.9	264.5	0.93	0.95	25.7
North: North Approach											
7	L	410	5.9	0.583	16.4	LOS B	10.0	73.8	0.51	0.74	41.5
8	T	1042	6.0	0.578	36.9	LOS D	17.0	125.1	0.89	0.77	28.6
9	R	552	6.0	0.969	101.0	LOS F	22.7	167.2	1.00	1.24	16.1
Approach		2004	6.0	0.969	50.4	LOS D	22.7	167.2	0.84	0.89	24.8
West: West Approach											
10	L	602	6.0	0.618	22.7	LOS C	21.4	157.7	0.73	0.81	37.1
11	T	1997	6.0	0.956	74.4	LOS E	40.8	300.5	1.00	1.22	19.1
12	R	65	6.8	0.366	71.4	LOS E	2.0	14.6	1.00	0.72	20.5
Approach		2663	6.0	0.956	62.6	LOS E	40.8	300.5	0.94	1.12	21.5
All Vehicles		8985	6.0	0.969	55.4	LOS E	40.8	300.5	0.92	1.01	23.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	30.8	LOS D	0.1	0.1	0.72	0.72
P2	Across S approach	50	27.3	LOS C	0.1	0.1	0.68	0.68
P3	Across E approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P4	Across E approach	50	35.3	LOS D	0.1	0.1	0.77	0.77
P5	Across N approach	50	40.8	LOS E	0.1	0.1	0.83	0.83
P6	Across N approach	50	36.0	LOS D	0.1	0.1	0.78	0.78
P7	Across W approach	50	50.4	LOS E	0.2	0.2	0.92	0.92
P8	Across W approach	50	45.1	LOS E	0.1	0.1	0.87	0.87
All Pedestrians		400	38.2	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

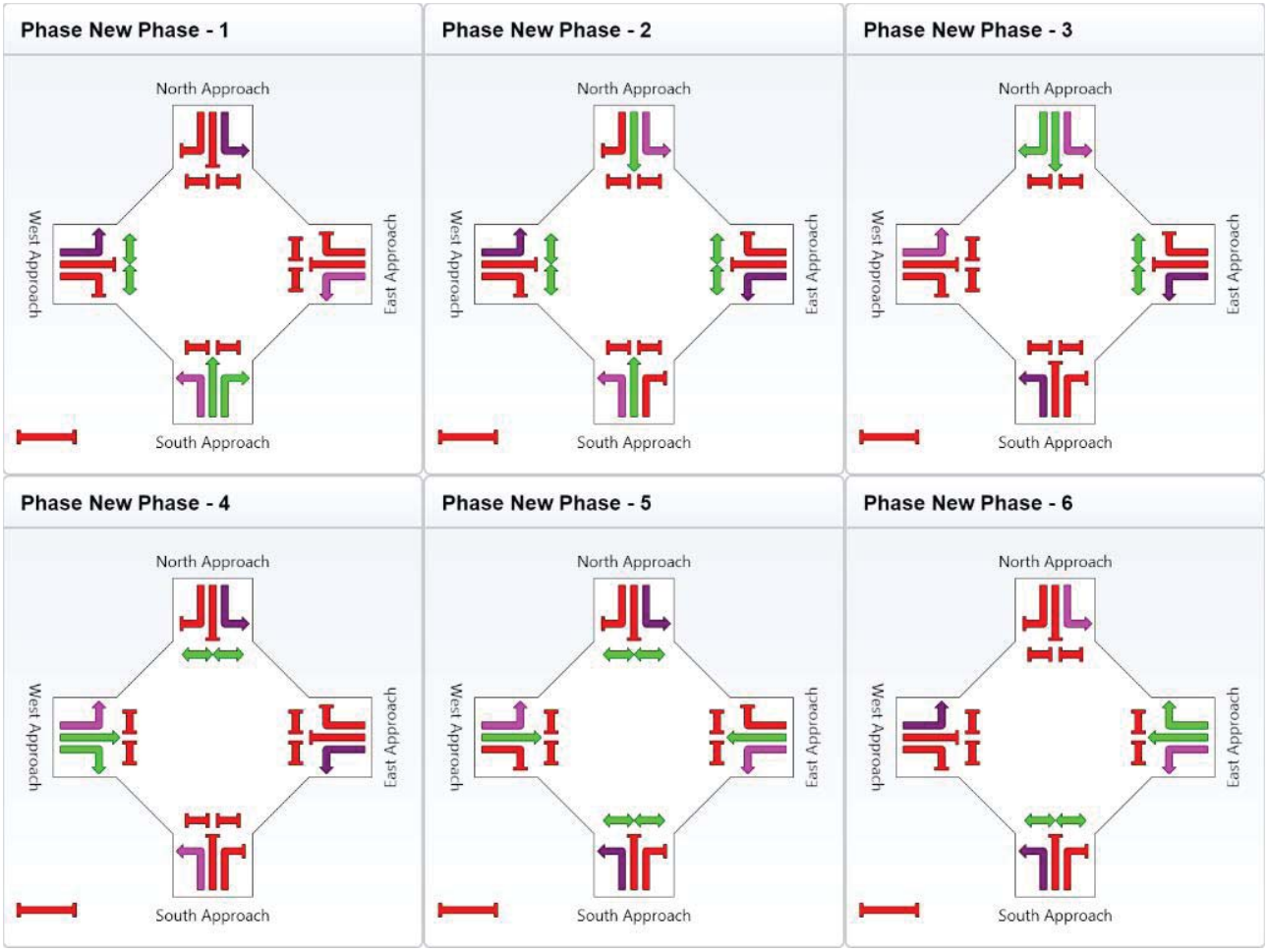
PHASING SUMMARY

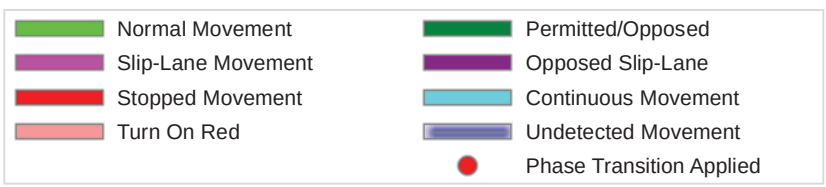
IN-89-16 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	6	11	17	6	31	13
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	17	23	12	37	19
Phase Split	10 %	14 %	19 %	10 %	31 %	16 %





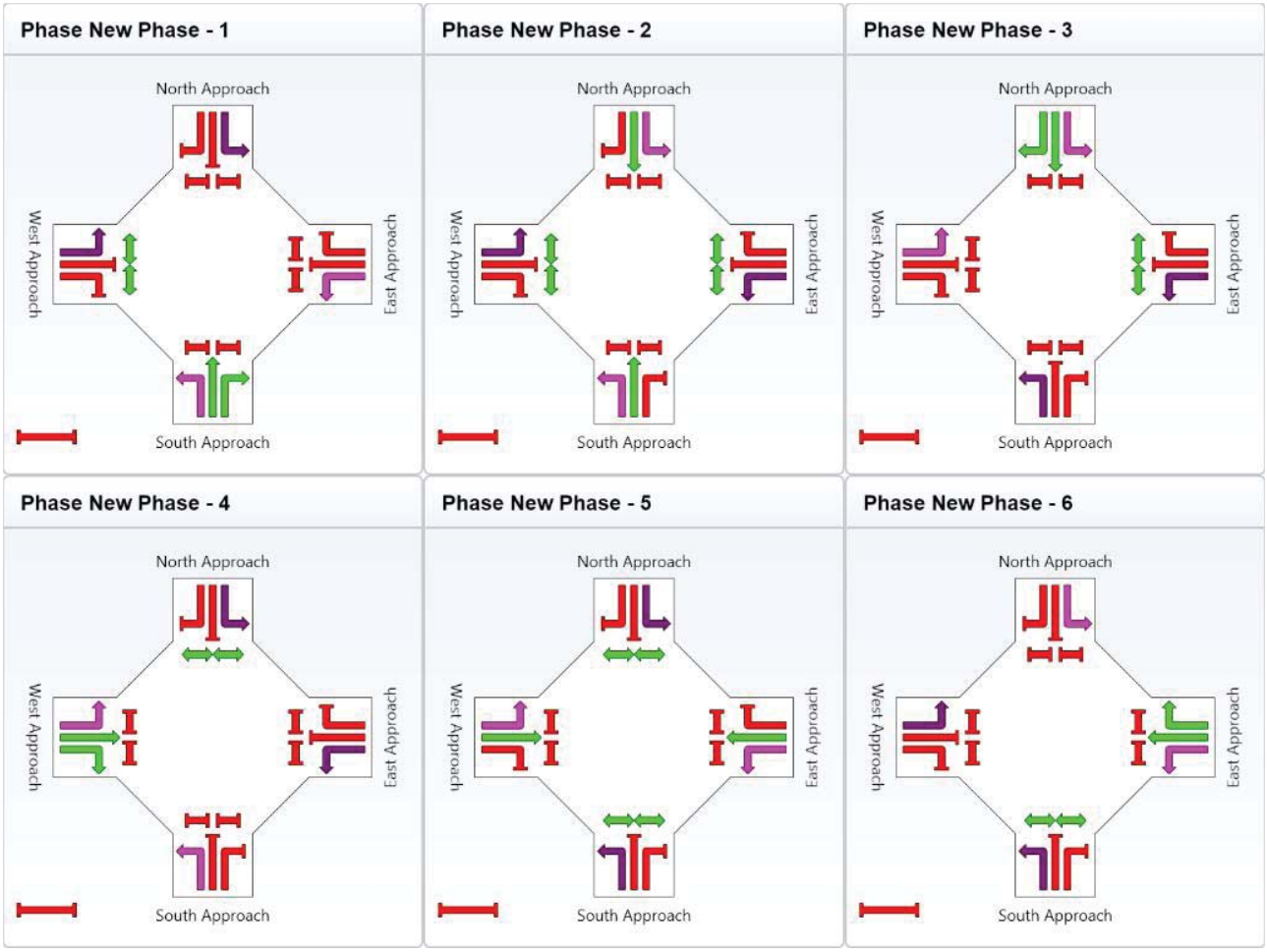
PHASING SUMMARY

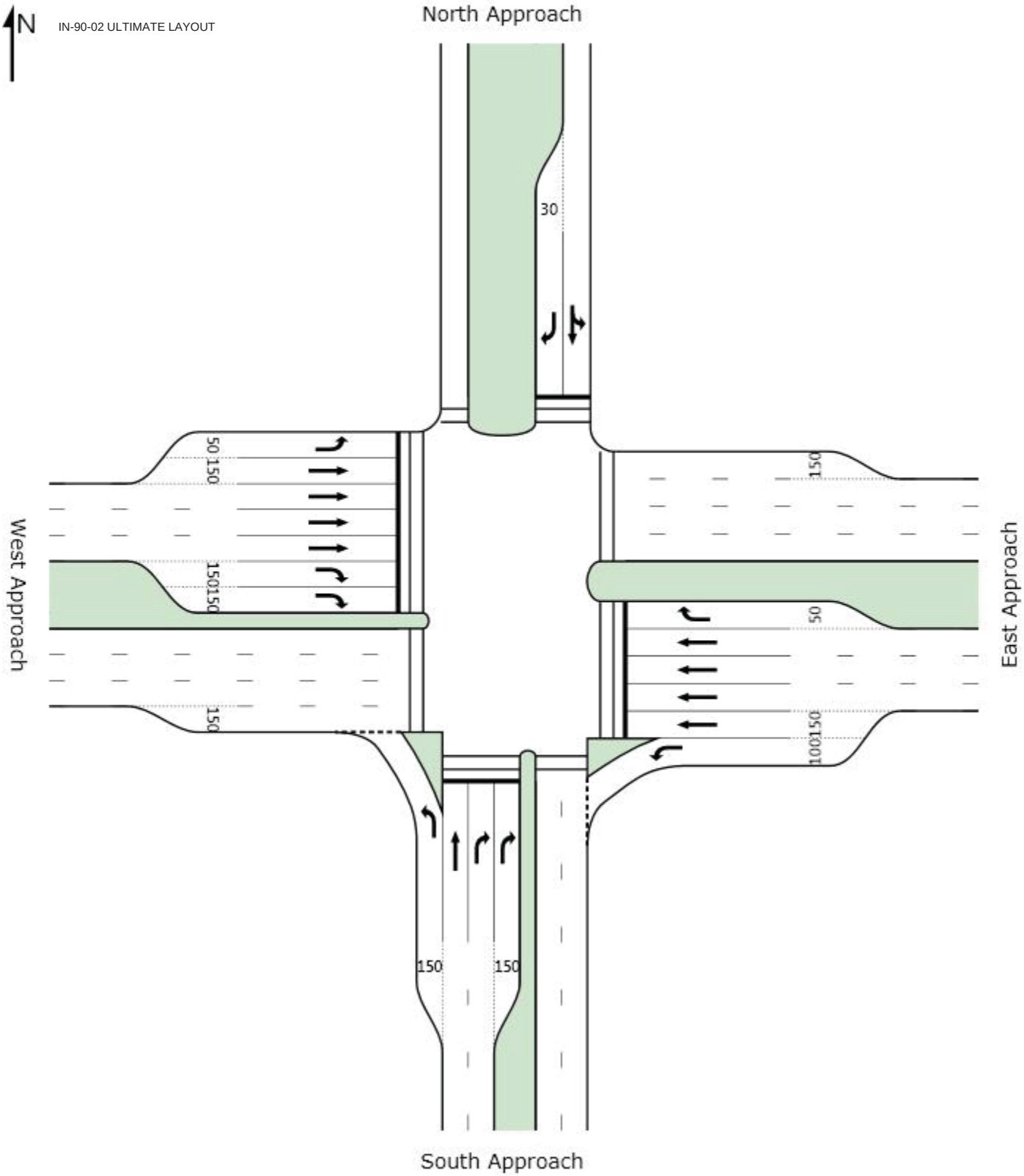
IN-89-16 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	6	13	19	6	22	18
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	19	25	12	28	24
Phase Split	10 %	16 %	21 %	10 %	23 %	20 %




N
IN-90-02 ULTIMATE LAYOUT
North Approach
West Approach
East Approach
South Approach
30
50
150
150
150
150
150
50
150
100
150
150

MOVEMENT SUMMARY

Site: IN-90-02 Ultimate AM

IN-90-02 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	149	5.9	0.151	16.1	LOS B	2.4	17.8	0.36	0.74	52.7
2	T	9	0.0	0.023	45.6	LOS D	0.4	2.9	0.83	0.63	28.8
3	R	591	6.0	0.829	67.6	LOS E	18.3	134.4	1.00	0.92	25.1
Approach		748	5.9	0.829	57.1	LOS E	18.3	134.4	0.87	0.88	28.1
East: East Approach											
4	L	547	6.0	0.637	17.2	LOS B	11.7	86.1	0.46	0.78	51.4
5	T	1593	15.0	1.021	124.4	LOS F	44.1	348.2	1.00	1.37	15.6
6	R	69	0.0	0.739	76.9	LOS E	4.4	30.8	1.00	0.82	20.2
Approach		2209	12.3	1.021	96.4	LOS F	44.1	348.2	0.87	1.21	18.9
North: North Approach											
7	L	41	0.0	0.157	32.8	LOS C	1.9	13.1	0.87	0.75	31.5
8	T	15	0.0	0.157	25.1	LOS C	1.9	13.1	0.87	0.65	31.5
9	R	18	0.0	0.140	53.8	LOS D	0.9	6.5	0.88	0.69	24.8
Approach		74	0.0	0.157	36.5	LOS D	1.9	13.1	0.87	0.71	29.5
West: West Approach											
10	L	11	0.0	0.027	20.2	LOS C	0.3	1.8	0.42	0.71	44.7
11	T	2065	15.0	0.796	35.6	LOS D	29.7	234.6	0.93	0.85	34.7
12	R	772	6.0	1.000[3]	111.2	LOS F	33.3	244.8	1.00	1.12	17.3
Approach		2848	11.8	1.000	56.0	LOS E	33.3	244.8	0.95	0.92	27.4
All Vehicles		5879	11.1	1.021	71.1	LOS E	44.1	348.2	0.91	1.02	23.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	41.7	LOS E	0.1	0.1	0.83	0.83
P2	Across S approach	20	39.2	LOS D	0.1	0.1	0.81	0.81
P3	Across E approach	20	54.2	LOS E	0.1	0.1	0.95	0.95
P4	Across E approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P5	Across N approach	20	24.7	LOS C	0.0	0.0	0.64	0.64
P6	Across N approach	20	23.4	LOS C	0.0	0.0	0.63	0.63
P7	Across W approach	20	54.2	LOS E	0.1	0.1	0.95	0.95
P8	Across W approach	20	45.9	LOS E	0.1	0.1	0.88	0.88
All Pedestrians		160	41.8	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

IN-90-02 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	875	6.0	0.884	32.8	LOS C	33.5	246.8	0.94	0.96	38.8
2	T	59	0.0	0.132	36.0	LOS D	2.5	17.2	0.75	0.67	33.3
3	R	609	6.0	0.855	70.2	LOS E	19.4	142.9	1.00	0.95	24.5
Approach		1543	5.8	0.884	47.7	LOS D	33.5	246.8	0.96	0.94	31.3
East: East Approach											
4	L	613	5.9	0.463	12.2	LOS B	4.8	35.3	0.22	0.73	57.3
5	T	2308	15.0	0.882	44.6	LOS D	39.2	309.4	0.97	0.97	31.0
6	R	17	0.0	0.176	72.2	LOS E	1.0	6.9	0.99	0.69	21.2
Approach		2937	13.0	0.882	38.0	LOS D	39.2	309.4	0.82	0.92	34.2
North: North Approach											
7	L	188	0.0	0.705	61.4	LOS E	12.1	85.0	1.00	0.85	22.9
8	T	22	0.0	0.705	53.7	LOS D	12.1	85.0	1.00	0.85	22.8
9	R	18	0.0	0.197	69.9	LOS E	1.1	7.7	0.99	0.70	21.4
Approach		229	0.0	0.705	61.4	LOS E	12.1	85.0	1.00	0.84	22.8
West: West Approach											
10	L	3	0.0	0.010	26.2	LOS C	0.1	0.7	0.52	0.68	39.5
11	T	1764	15.0	0.681	31.9	LOS C	22.9	181.1	0.87	0.77	37.1
12	R	143	6.2	0.804	80.3	LOS F	4.6	34.2	1.00	0.87	22.2
Approach		1911	14.3	0.804	35.5	LOS D	22.9	181.1	0.88	0.78	35.3
All Vehicles		6620	11.3	0.884	40.4	LOS D	39.2	309.4	0.88	0.88	33.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	20	26.7	LOS C	0.0	0.0	0.67	0.67
P2	Across S approach	20	24.7	LOS C	0.0	0.0	0.64	0.64
P3	Across E approach	20	54.2	LOS E	0.1	0.1	0.95	0.95
P4	Across E approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P5	Across N approach	20	24.7	LOS C	0.0	0.0	0.64	0.64
P6	Across N approach	20	23.4	LOS C	0.0	0.0	0.63	0.63
P7	Across W approach	20	42.5	LOS E	0.1	0.1	0.84	0.84
P8	Across W approach	20	35.3	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		160	35.3	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

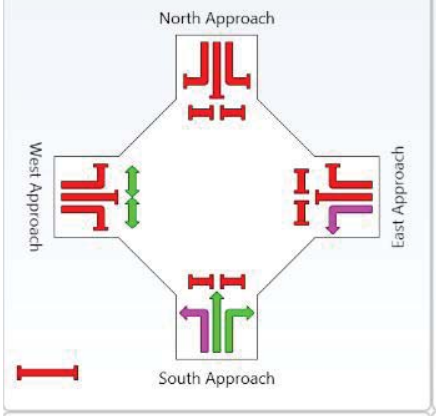
IN-90-02 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 3, New Phase - 4, New Phase - 5, New Phase - 6

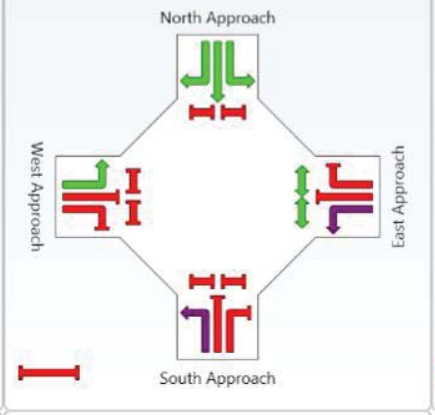
Phase Timing Results

Phase	New Phase - 1	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	24	19	26	15	6
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	30	25	32	21	12
Phase Split	25 %	21 %	27 %	18 %	10 %

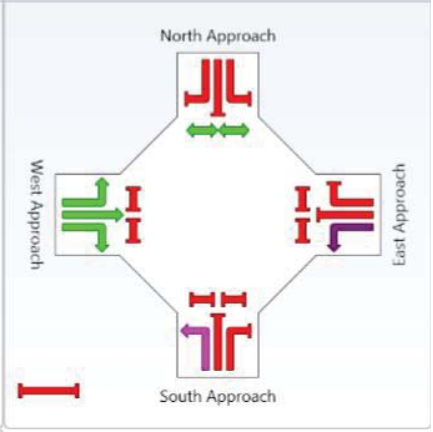
Phase New Phase - 1



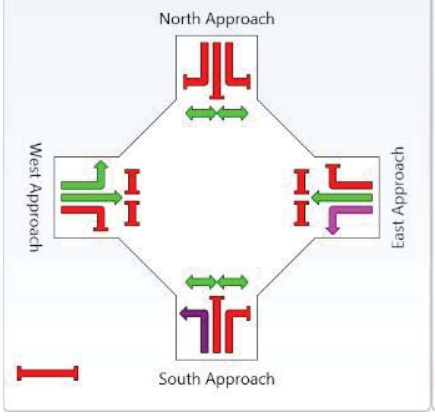
Phase New Phase - 3



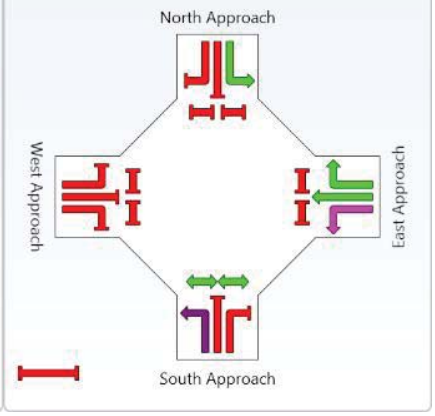
Phase New Phase - 4



Phase New Phase - 5



Phase New Phase - 6



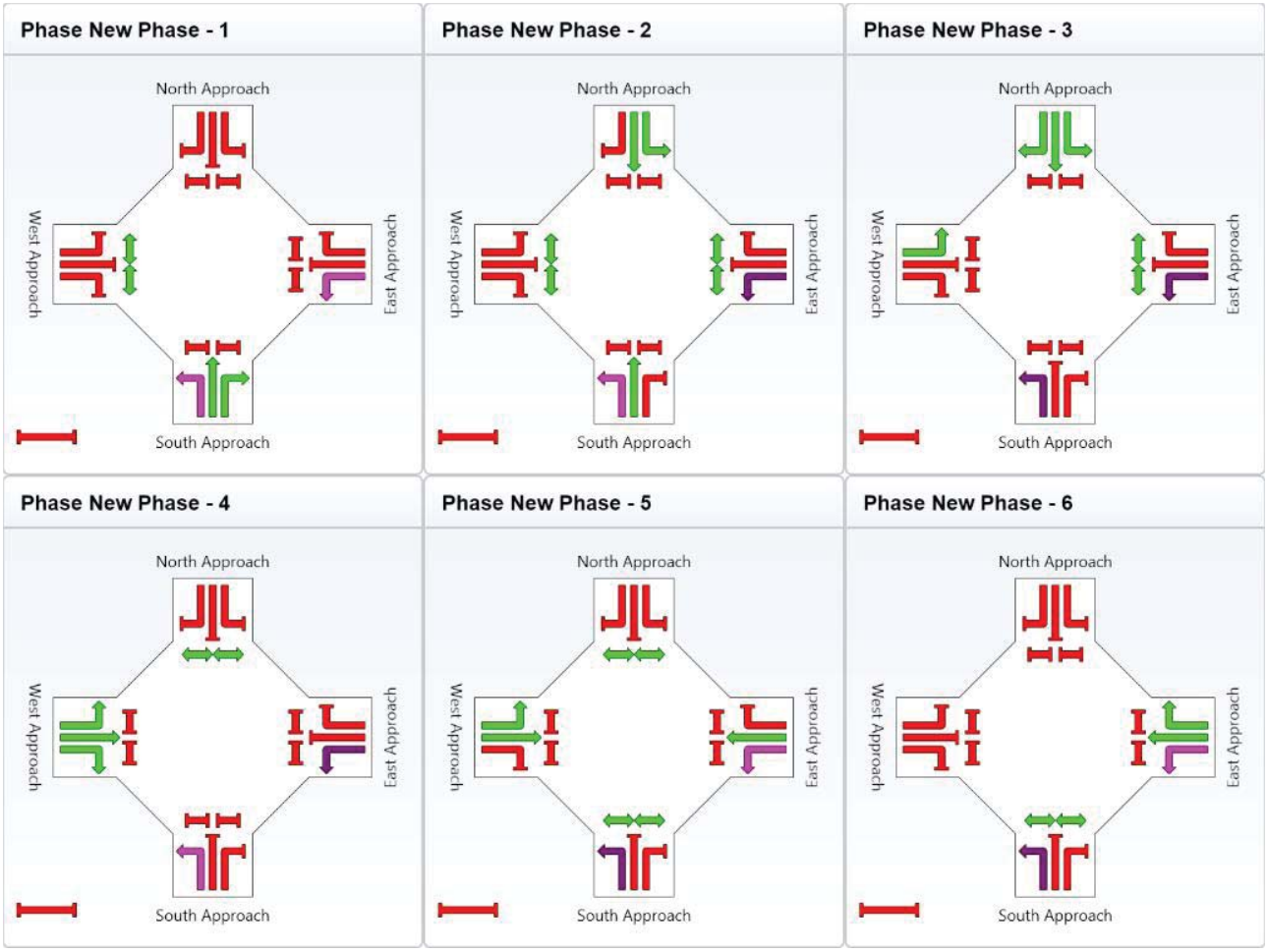
PHASING SUMMARY

IN-90-02 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

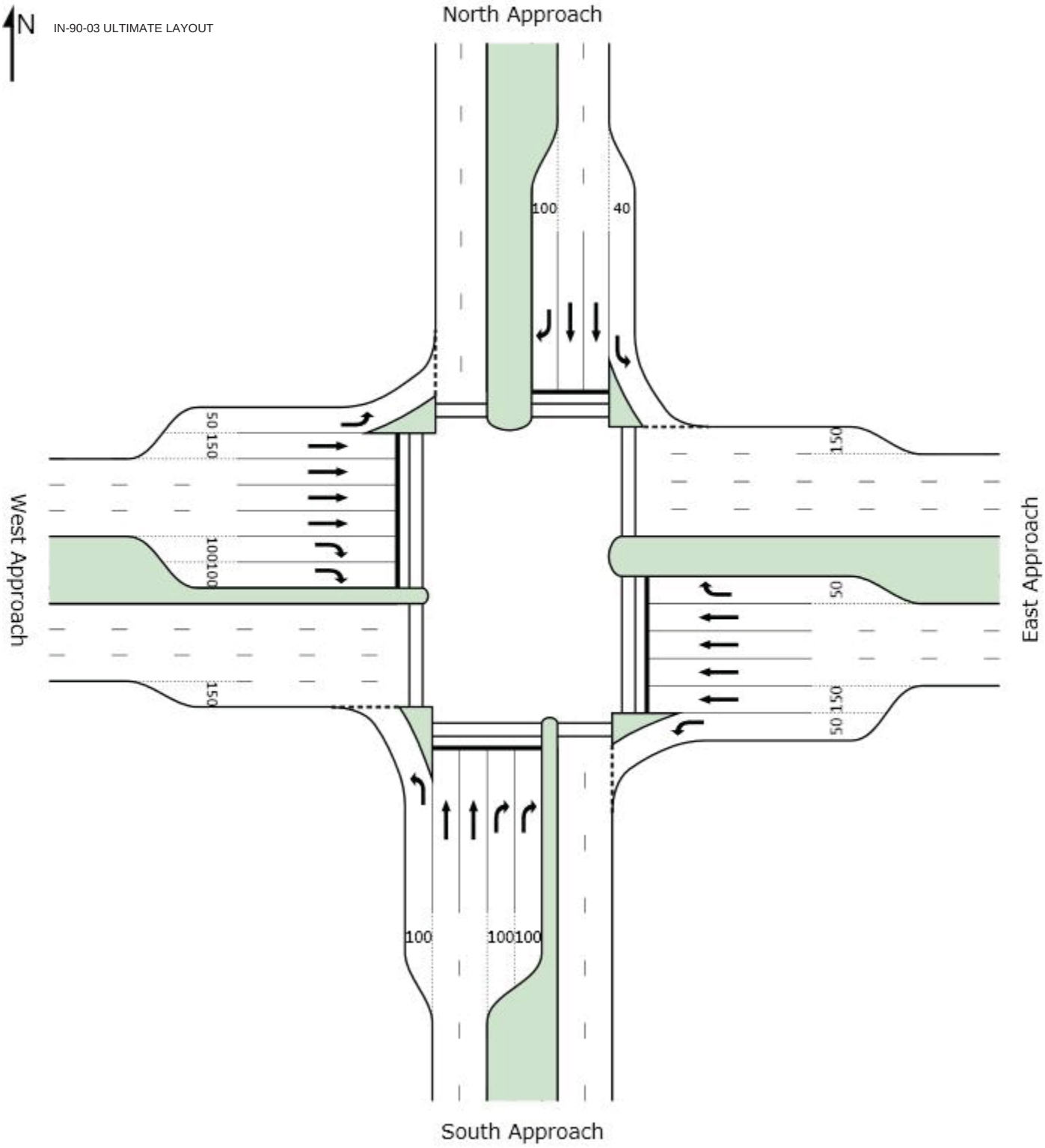
Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5 , New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5	New Phase - 6
Green Time (sec)	24	7	6	6	35	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	30	13	12	12	41	12
Phase Split	25 %	11 %	10 %	10 %	34 %	10 %



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied


N
IN-90-03 ULTIMATE LAYOUT
North Approach
West Approach
East Approach
South Approach
100
40
50
150
150
100
100
100
50
150
50
150
100
100
100

MOVEMENT SUMMARY

Site: IN-90-03 Ultimate AM

IN-90-03 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	161	6.2	0.260	25.4	LOS C	5.3	39.2	0.63	0.77	38.3
5	T	161	6.2	0.242	46.4	LOS D	4.1	30.2	0.90	0.70	25.4
6	R	295	6.0	0.468	57.9	LOS E	7.9	58.1	0.95	0.80	25.5
Approach		616	6.1	0.468	46.4	LOS D	7.9	58.1	0.85	0.77	28.0
East: East Approach											
7	L	337	5.9	0.607	14.5	LOS B	5.7	41.9	0.37	0.73	51.3
8	T	1884	15.0	0.759	35.7	LOS D	25.9	205.0	0.93	0.83	35.0
9	R	36	6.1	0.404	73.9	LOS E	2.2	16.3	1.00	0.73	21.6
Approach		2257	13.5	0.759	33.2	LOS C	25.9	205.0	0.85	0.81	36.2
North: North Approach											
10	L	25	4.3	0.090	21.1	LOS C	0.6	4.6	0.50	0.69	41.1
11	T	574	5.9	0.798	54.4	LOS D	17.2	126.6	1.00	0.93	23.1
12	R	288	6.1	0.845	67.6	LOS E	18.2	134.0	1.00	0.96	23.2
Approach		888	5.9	0.845	57.8	LOS E	18.2	134.0	0.99	0.93	23.5
West: West Approach											
1	L	128	6.0	0.142	10.8	LOS B	0.8	5.9	0.17	0.69	56.1
2	T	2224	15.0	0.869	43.7	LOS D	36.4	287.9	0.97	0.95	31.4
3	R	166	6.0	0.699	74.1	LOS E	5.2	38.0	1.00	0.82	21.6
Approach		2518	13.9	0.869	44.0	LOS D	36.4	287.9	0.93	0.93	31.2
All Vehicles		6279	11.9	0.869	42.3	LOS D	36.4	287.9	0.90	0.87	31.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	20	30.8	LOS D	0.0	0.0	0.72	0.72
P4	Across S approach	20	26.7	LOS C	0.0	0.0	0.67	0.67
P5	Across E approach	20	50.4	LOS E	0.1	0.1	0.92	0.92
P6	Across E approach	20	47.7	LOS E	0.1	0.1	0.89	0.89
P7	Across N approach	20	27.3	LOS C	0.0	0.0	0.68	0.68
P8	Across N approach	20	25.4	LOS C	0.0	0.0	0.65	0.65
P1	Across W approach	20	54.2	LOS E	0.1	0.1	0.95	0.95
P2	Across W approach	20	48.6	LOS E	0.1	0.1	0.90	0.90
All Pedestrians		160	38.9	LOS D			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-90-03 Ultimate PM

IN-90-03 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	241	5.9	0.388	30.0	LOS C	9.2	67.5	0.71	0.79	35.8
5	T	661	6.0	0.872	60.3	LOS E	21.4	157.5	1.00	1.03	21.8
6	R	336	5.9	0.860	75.7	LOS E	10.9	80.5	1.00	0.99	21.6
Approach		1238	6.0	0.872	58.6	LOS E	21.4	157.5	0.94	0.97	23.6
East: East Approach											
7	L	317	5.9	0.425	11.4	LOS B	3.0	22.1	0.23	0.71	55.2
8	T	2604	15.0	0.904	45.7	LOS D	46.4	366.4	0.97	1.00	30.6
9	R	26	4.2	0.290	73.1	LOS E	1.6	11.5	1.00	0.71	21.7
Approach		2947	13.9	0.904	42.3	LOS D	46.4	366.4	0.89	0.97	31.9
North: North Approach											
10	L	42	5.3	0.145	18.4	LOS B	0.9	6.9	0.46	0.70	43.0
11	T	220	6.0	0.293	44.3	LOS D	5.5	40.6	0.89	0.71	26.0
12	R	160	6.2	0.828	73.2	LOS E	10.2	74.9	1.00	0.95	22.1
Approach		421	6.0	0.828	52.7	LOS D	10.2	74.9	0.89	0.80	25.3
West: West Approach											
1	L	402	6.0	0.706	14.4	LOS B	6.9	50.7	0.38	0.74	51.4
2	T	1948	15.0	0.670	27.8	LOS C	24.3	191.8	0.83	0.74	39.6
3	R	179	6.1	0.864	81.0	LOS F	6.0	43.9	1.00	0.93	20.2
Approach		2529	13.0	0.864	29.4	LOS C	24.3	191.8	0.77	0.75	38.5
All Vehicles		7135	11.7	0.904	41.2	LOS D	46.4	366.4	0.86	0.88	31.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	20	25.4	LOS C	0.0	0.0	0.65	0.65
P4	Across S approach	20	21.6	LOS C	0.0	0.0	0.60	0.60
P5	Across E approach	20	49.5	LOS E	0.1	0.1	0.91	0.91
P6	Across E approach	20	46.8	LOS E	0.1	0.1	0.88	0.88
P7	Across N approach	20	22.8	LOS C	0.0	0.0	0.62	0.62
P8	Across N approach	20	21.0	LOS C	0.0	0.0	0.59	0.59
P1	Across W approach	20	51.3	LOS E	0.1	0.1	0.93	0.93
P2	Across W approach	20	45.9	LOS E	0.1	0.1	0.88	0.88
All Pedestrians		160	35.5	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

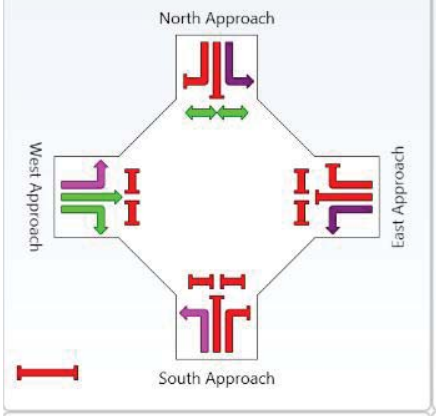
IN-90-03 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 6, New Phase - 4
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 6, New Phase - 4

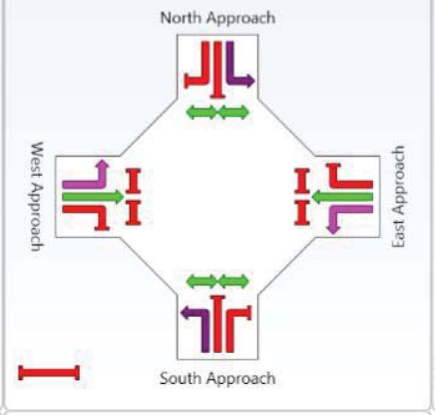
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 6	New Phase - 4
Green Time (sec)	8	32	6	23	21
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	14	38	12	29	27
Phase Split	12 %	32 %	10 %	24 %	23 %

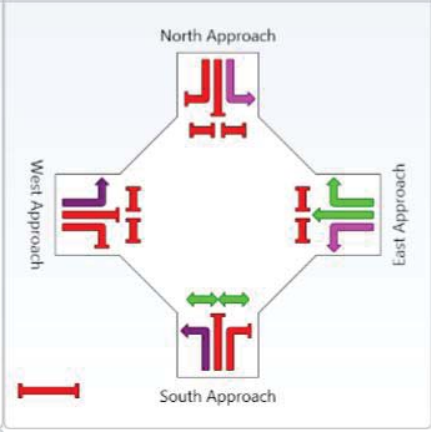
Phase New Phase - 1



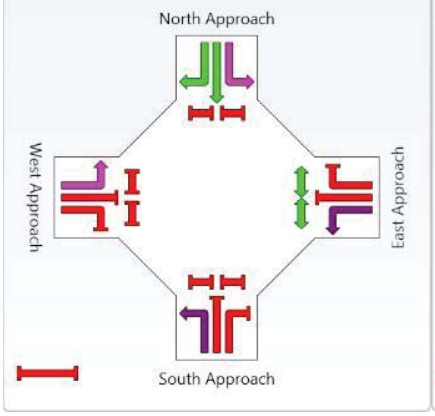
Phase New Phase - 2



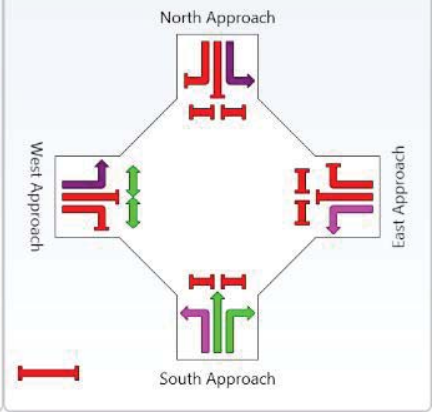
Phase New Phase - 3



Phase New Phase - 6



Phase New Phase - 4



PHASING SUMMARY

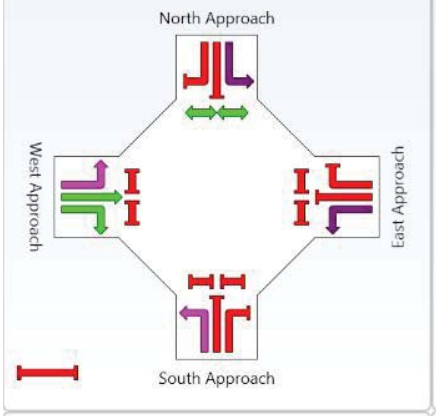
IN-90-03 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

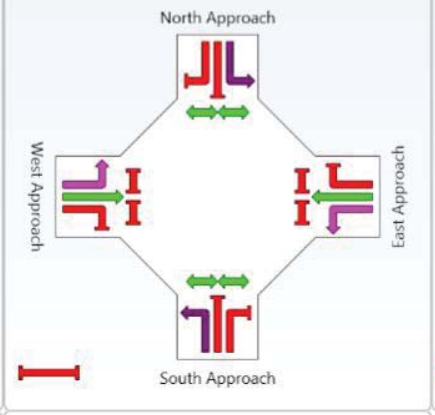
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	7	40	6	13	24
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	13	46	12	19	30
Phase Split	11 %	38 %	10 %	16 %	25 %

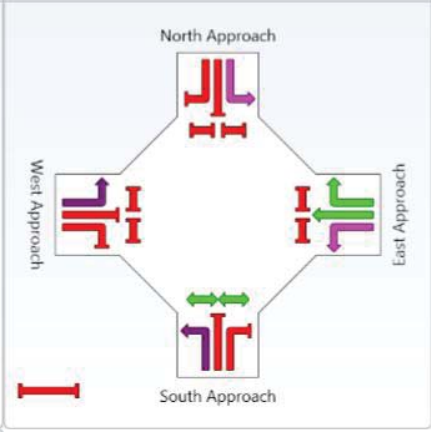
Phase New Phase - 1



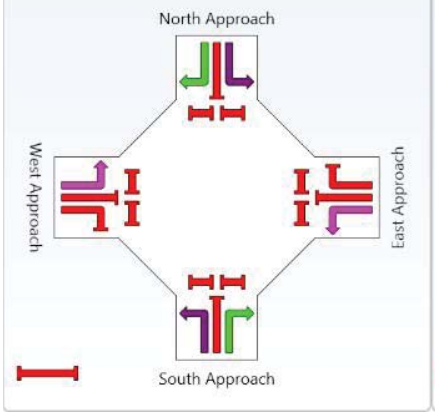
Phase New Phase - 2



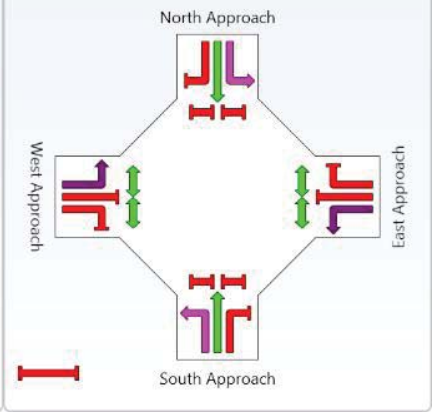
Phase New Phase - 3

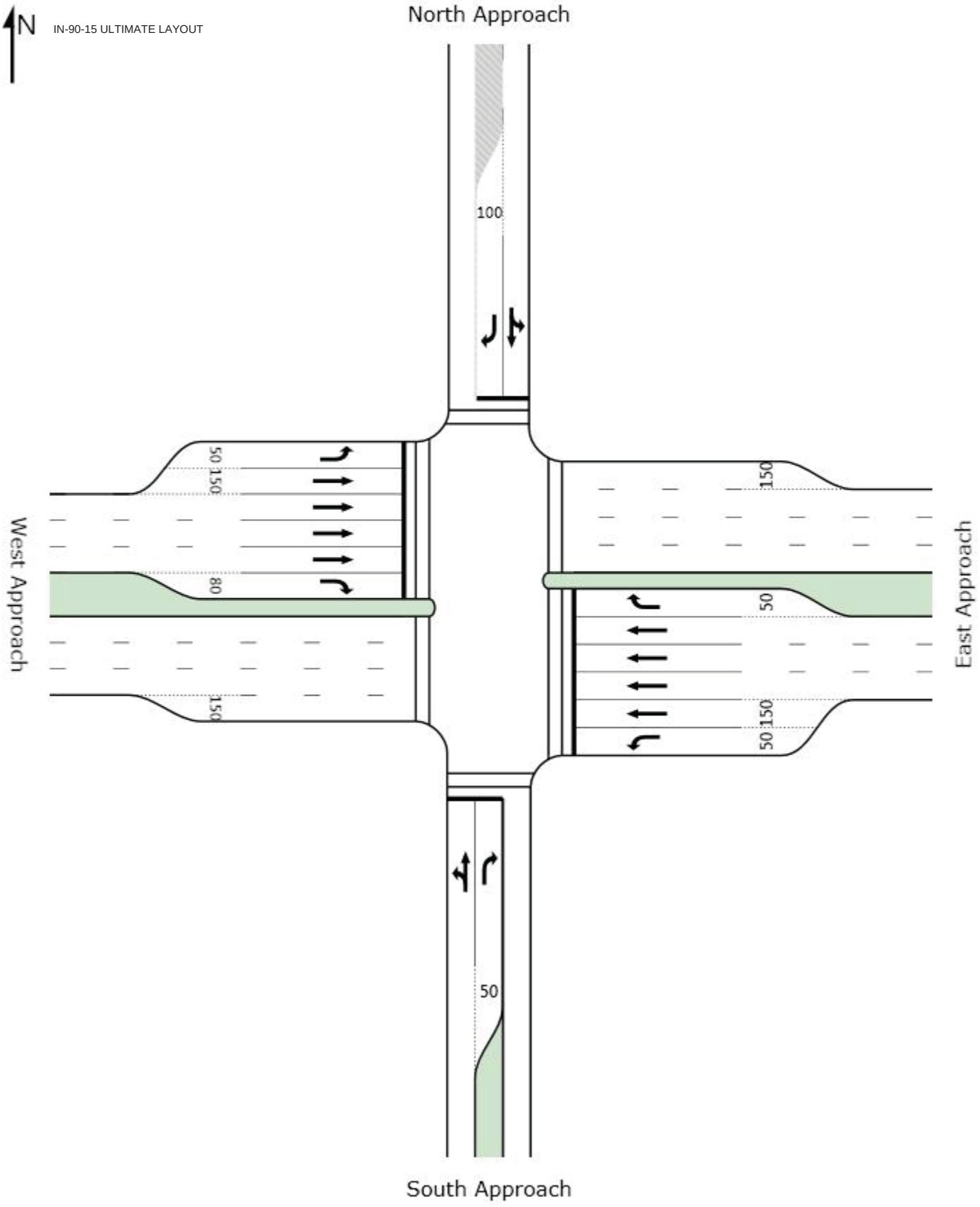


Phase New Phase - 4



Phase New Phase - 6




N
IN-90-15 ULTIMATE LAYOUT
North Approach
100
50
150
80
50
150
50
150
150
50
West Approach
East Approach
South Approach

MOVEMENT SUMMARY

Site: IN-90-15 Ultimate AM

IN-90-15 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	96	0.0	0.327	54.1	LOS D	5.8	40.8	0.91	0.79	24.6
5	T	18	0.0	0.327	46.3	LOS D	5.8	40.8	0.91	0.73	22.2
6	R	94	0.0	0.747	72.4	LOS E	5.9	41.0	1.00	0.87	20.9
Approach		207	0.0	0.747	61.7	LOS E	5.9	41.0	0.95	0.82	22.6
East: East Approach											
7	L	87	0.0	0.263	27.2	LOS C	2.7	18.6	0.56	0.75	38.8
8	T	2097	6.0	0.623	23.2	LOS C	24.6	181.3	0.77	0.69	43.0
9	R	87	0.0	0.794	77.2	LOS E	5.6	38.9	1.00	0.86	20.2
Approach		2270	5.5	0.794	25.4	LOS C	24.6	181.3	0.77	0.70	41.3
North: North Approach											
10	L	41	0.0	0.147	52.2	LOS D	2.5	17.5	0.88	0.75	25.1
11	T	10	0.0	0.147	44.5	LOS D	2.5	17.5	0.88	0.67	22.8
12	R	102	0.0	0.826	75.3	LOS E	6.6	46.2	1.00	0.95	20.3
Approach		153	0.0	0.826	67.2	LOS E	6.6	46.2	0.96	0.88	21.6
West: West Approach											
1	L	215	0.0	0.654	29.0	LOS C	7.2	50.1	0.61	0.79	37.6
2	T	2806	6.0	0.842	30.1	LOS C	41.5	305.4	0.90	0.85	38.1
3	R	65	0.0	0.599	73.7	LOS E	4.0	27.9	1.00	0.77	20.9
Approach		3086	5.5	0.842	30.9	LOS C	41.5	305.4	0.89	0.85	37.5
All Vehicles		5716	5.1	0.842	30.8	LOS C	41.5	305.4	0.84	0.79	37.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	17.6	LOS B	0.1	0.1	0.54	0.54
P4	Across S approach	50	16.5	LOS B	0.1	0.1	0.53	0.53
P5	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across E approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
P7	Across N approach	50	17.6	LOS B	0.1	0.1	0.54	0.54
P8	Across N approach	50	16.5	LOS B	0.1	0.1	0.53	0.53
P1	Across W approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P2	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		400	34.0	LOS D			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-90-15 Ultimate PM

IN-90-15 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	87	0.0	0.293	54.6	LOS D	5.0	34.9	0.91	0.78	24.5
5	T	10	0.0	0.293	46.9	LOS D	5.0	34.9	0.91	0.72	22.1
6	R	119	0.0	0.608	63.3	LOS E	6.8	47.6	0.99	0.80	22.6
Approach		216	0.0	0.608	59.0	LOS E	6.8	47.6	0.95	0.79	23.3
East: East Approach											
7	L	127	0.0	0.427	32.6	LOS C	4.5	31.5	0.65	0.77	35.2
8	T	2913	6.0	0.991	86.3	LOS F	75.6	556.7	0.97	1.26	20.4
9	R	42	0.0	0.267	67.6	LOS E	2.4	16.7	0.97	0.74	22.2
Approach		3081	5.7	0.991	83.8	LOS F	75.6	556.7	0.96	1.23	20.8
North: North Approach											
10	L	87	0.0	0.319	54.9	LOS D	5.4	37.9	0.92	0.78	24.4
11	T	18	0.0	0.319	47.2	LOS D	5.4	37.9	0.92	0.73	22.0
12	R	212	0.0	0.980	108.0	LOS F	17.8	124.6	1.00	1.33	16.0
Approach		317	0.0	0.980	90.0	LOS F	17.8	124.6	0.97	1.15	17.9
West: West Approach											
1	L	103	0.0	0.349	32.4	LOS C	3.6	25.4	0.64	0.76	35.4
2	T	2301	6.0	0.790	31.8	LOS C	32.2	237.3	0.91	0.82	37.1
3	R	149	0.0	0.960	98.0	LOS F	11.3	79.4	1.00	1.11	16.8
Approach		2553	5.4	0.960	35.7	LOS D	32.2	237.3	0.90	0.84	34.9
All Vehicles		6167	5.1	0.991	63.3	LOS E	75.6	556.7	0.94	1.05	24.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	22.2	LOS C	0.1	0.1	0.61	0.61
P4	Across S approach	50	21.0	LOS C	0.1	0.1	0.59	0.59
P5	Across E approach	50	55.1	LOS E	0.2	0.2	0.96	0.96
P6	Across E approach	50	49.5	LOS E	0.2	0.2	0.91	0.91
P7	Across N approach	50	22.2	LOS C	0.1	0.1	0.61	0.61
P8	Across N approach	50	21.0	LOS C	0.1	0.1	0.59	0.59
P1	Across W approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P2	Across W approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
All Pedestrians		400	36.7	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

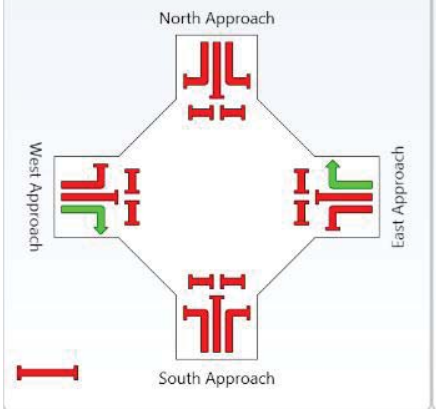
IN-90-15 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 4, New Phase - 5

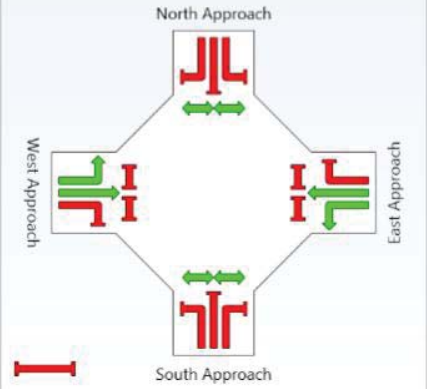
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 4	New Phase - 5
Green Time (sec)	7	59	8	22
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	13	65	14	28
Phase Split	11 %	54 %	12 %	23 %

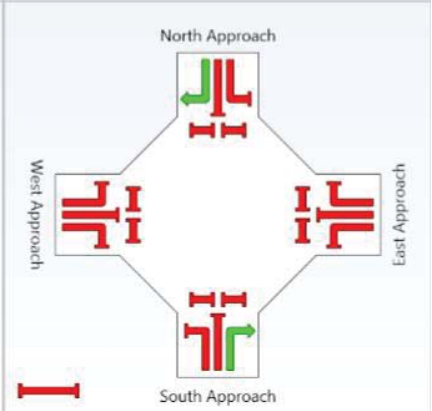
Phase New Phase - 1



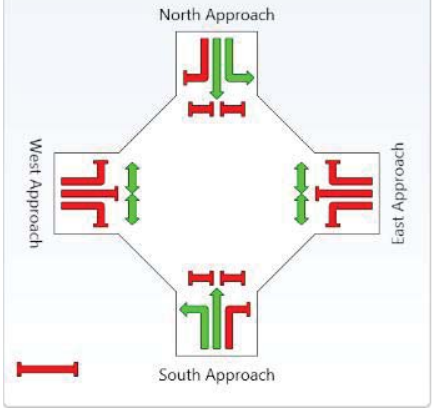
Phase New Phase - 2



Phase New Phase - 4



Phase New Phase - 5



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied

PHASING SUMMARY

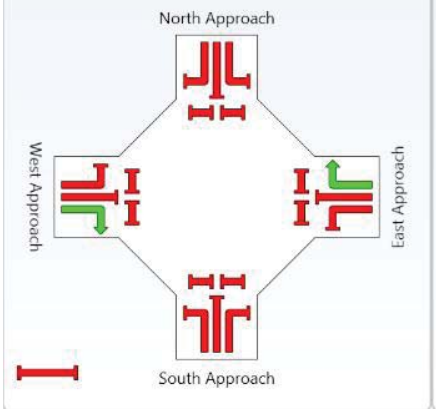
IN-90-15 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 4, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 4, New Phase - 6

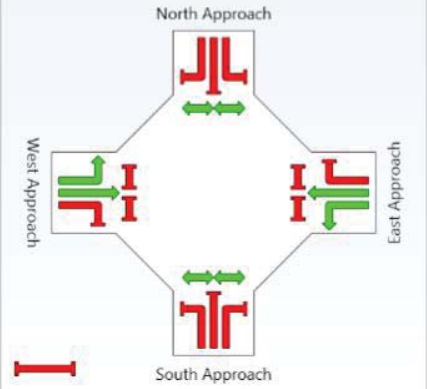
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 4	New Phase - 6
Green Time (sec)	10	51	14	21
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	16	57	20	27
Phase Split	13 %	48 %	17 %	23 %

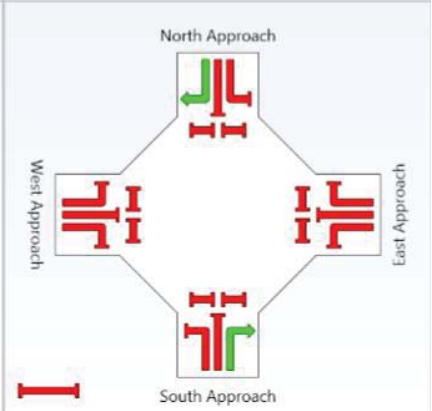
Phase New Phase - 1



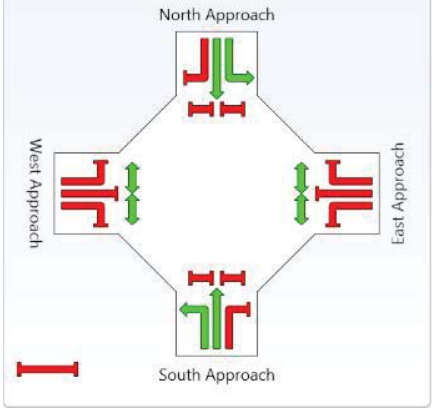
Phase New Phase - 2



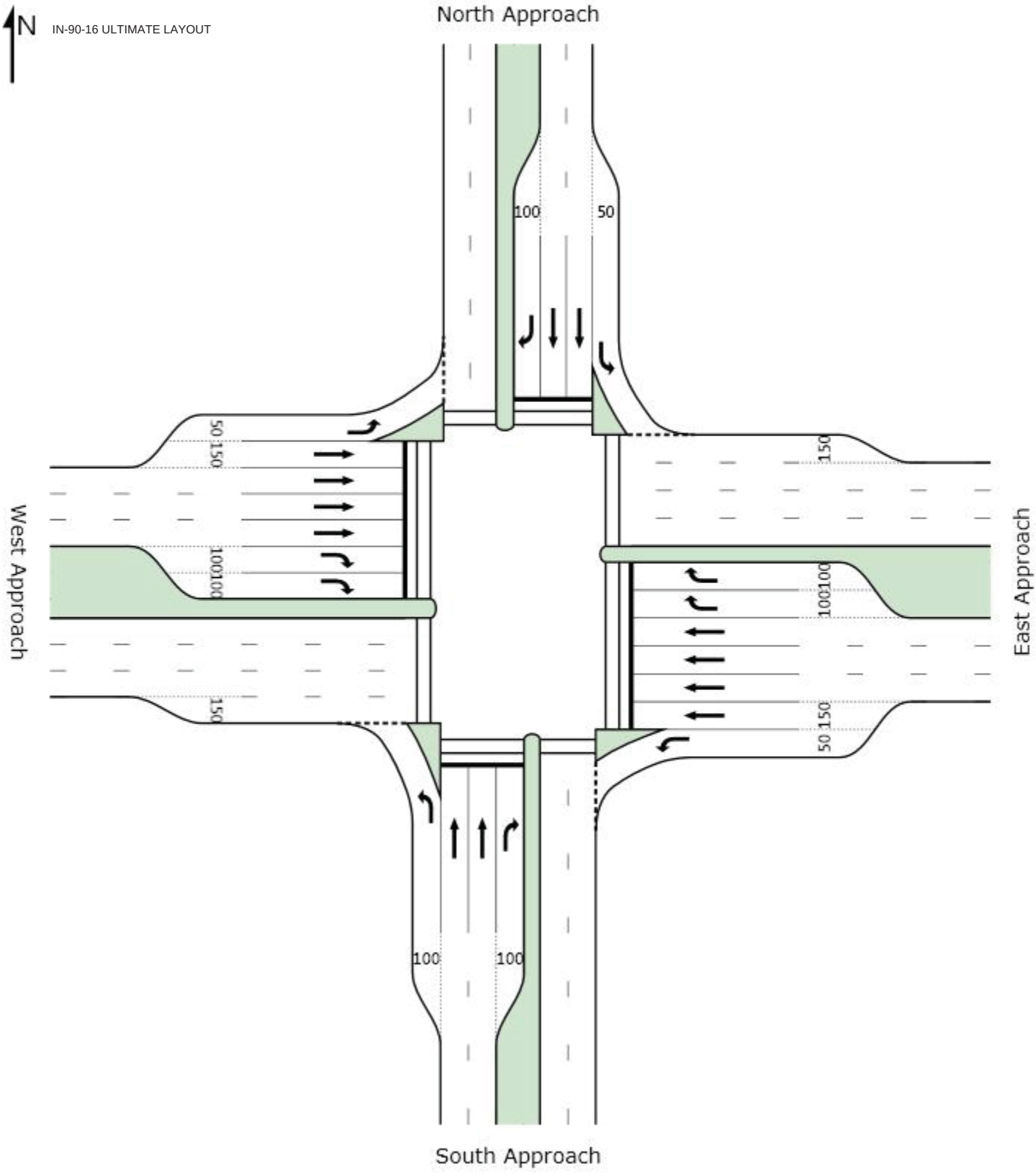
Phase New Phase - 4



Phase New Phase - 6



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied


N
IN-90-16 ULTIMATE LAYOUT
North Approach
West Approach
East Approach
South Approach
100
50
50
150
150
100
100
100
100
150
50
150
100
100

MOVEMENT SUMMARY

IN-90-16 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	263	5.9	0.370	18.5	LOS B	6.6	48.2	0.50	0.75	43.0
5	T	509	6.0	0.733	52.1	LOS D	14.6	107.9	1.00	0.88	23.7
6	R	288	6.1	0.874	71.6	LOS E	18.9	139.3	1.00	1.00	22.4
Approach		1060	6.0	0.874	49.1	LOS D	18.9	139.3	0.88	0.88	26.4
East: East Approach											
7	L	133	5.8	0.276	15.0	LOS B	2.3	16.7	0.36	0.71	50.8
8	T	1846	6.0	0.863	49.7	LOS D	29.7	218.8	0.99	0.95	29.1
9	R	174	5.7	0.826	78.8	LOS E	5.7	41.5	1.00	0.89	20.6
Approach		2153	6.0	0.863	49.9	LOS D	29.7	218.8	0.95	0.93	29.0
North: North Approach											
10	L	205	5.9	0.695	30.9	LOS C	7.6	55.7	0.68	0.80	35.4
11	T	415	6.1	0.603	49.3	LOS D	11.3	83.5	0.97	0.80	24.5
12	R	108	6.1	0.330	55.6	LOS E	5.6	41.0	0.91	0.78	26.2
Approach		727	6.1	0.695	45.0	LOS D	11.3	83.5	0.88	0.80	27.3
West: West Approach											
1	L	204	5.9	0.349	13.5	LOS B	2.9	21.4	0.32	0.71	52.5
2	T	2311	6.0	0.874	44.1	LOS D	38.0	279.6	0.98	0.96	31.2
3	R	425	6.0	0.841	72.2	LOS E	13.5	99.5	1.00	0.93	21.9
Approach		2939	6.0	0.874	46.1	LOS D	38.0	279.6	0.94	0.94	30.3
All Vehicles		6879	6.0	0.874	47.6	LOS D	38.0	279.6	0.93	0.91	28.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	35.3	LOS D	0.1	0.1	0.77	0.77
P4	Across S approach	50	33.0	LOS D	0.1	0.1	0.74	0.74
P5	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across E approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
P7	Across N approach	50	28.0	LOS C	0.1	0.1	0.68	0.68
P8	Across N approach	50	26.0	LOS C	0.1	0.1	0.66	0.66
P1	Across W approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P2	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		400	40.7	LOS E			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-90-16 Ultimate PM

IN-90-16 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	371	5.9	0.583	32.8	LOS C	14.4	105.8	0.77	0.88	34.4
5	T	689	6.1	0.908	66.8	LOS E	23.8	175.3	1.00	1.10	20.4
6	R	127	6.1	0.497	61.6	LOS E	7.0	51.7	0.97	0.80	24.7
Approach		1186	6.0	0.908	55.6	LOS E	23.8	175.3	0.92	1.00	24.2
East: East Approach											
7	L	336	5.9	0.662	15.2	LOS B	6.4	46.7	0.39	0.73	50.5
8	T	2464	6.0	0.906	49.0	LOS D	43.9	323.1	0.98	1.00	29.4
9	R	318	5.9	0.815	73.2	LOS E	10.0	73.7	1.00	0.91	21.7
Approach		3117	6.0	0.906	47.8	LOS D	43.9	323.1	0.92	0.96	29.6
North: North Approach											
10	L	263	5.9	0.706	22.6	LOS C	7.6	56.0	0.55	0.77	40.2
11	T	591	6.0	0.787	53.0	LOS D	17.5	128.6	1.00	0.92	23.5
12	R	230	6.2	0.913	81.2	LOS F	16.1	118.8	1.00	1.08	20.6
Approach		1084	6.0	0.913	51.6	LOS D	17.5	128.6	0.89	0.92	25.4
West: West Approach											
1	L	114	5.8	0.248	16.6	LOS B	2.2	16.1	0.40	0.71	48.9
2	T	2098	6.0	0.843	42.5	LOS D	32.5	239.3	0.97	0.92	31.8
3	R	239	6.0	0.894	82.6	LOS F	8.1	59.5	1.00	0.98	19.9
Approach		2451	6.0	0.894	45.2	LOS D	32.5	239.3	0.95	0.91	30.7
All Vehicles		7838	6.0	0.913	48.7	LOS D	43.9	323.1	0.92	0.95	28.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	27.3	LOS C	0.1	0.1	0.68	0.68
P4	Across S approach	50	25.4	LOS C	0.1	0.1	0.65	0.65
P5	Across E approach	50	52.3	LOS E	0.2	0.2	0.93	0.93
P6	Across E approach	50	46.8	LOS E	0.2	0.2	0.88	0.88
P7	Across N approach	50	30.1	LOS D	0.1	0.1	0.71	0.71
P8	Across N approach	50	28.0	LOS C	0.1	0.1	0.68	0.68
P1	Across W approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
P2	Across W approach	50	45.9	LOS E	0.1	0.1	0.88	0.88
All Pedestrians		400	38.4	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

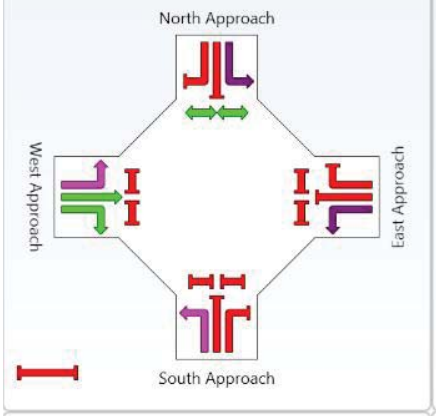
IN-90-16 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

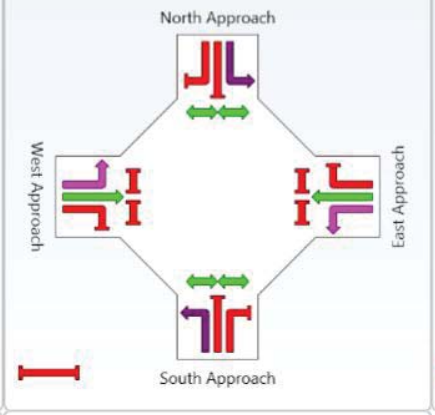
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	17	22	7	22	22
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	23	28	13	28	28
Phase Split	19 %	23 %	11 %	23 %	23 %

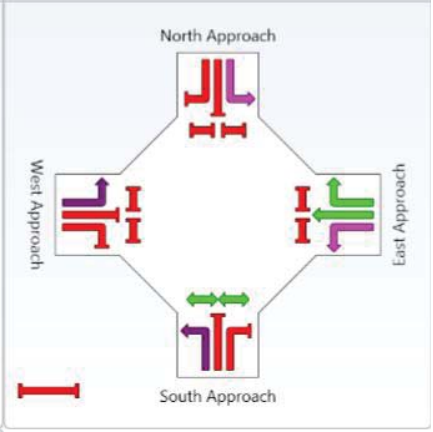
Phase New Phase - 1



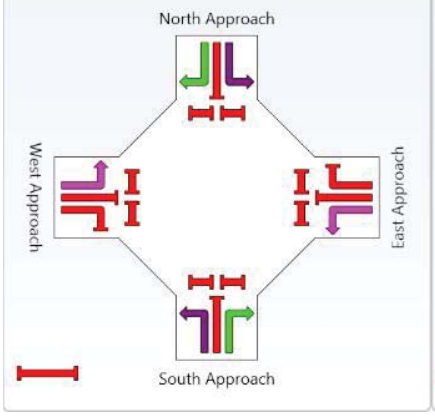
Phase New Phase - 2



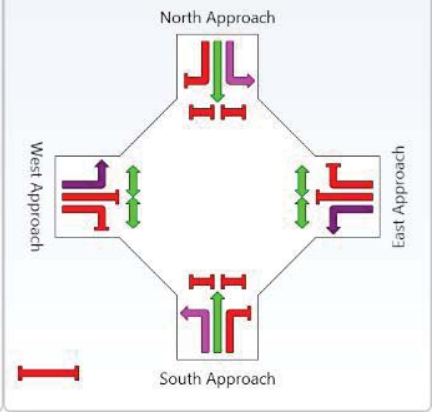
Phase New Phase - 3



Phase New Phase - 4



Phase New Phase - 5



PHASING SUMMARY

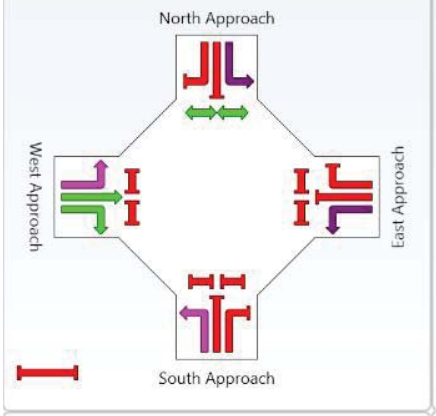
IN-90-16 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

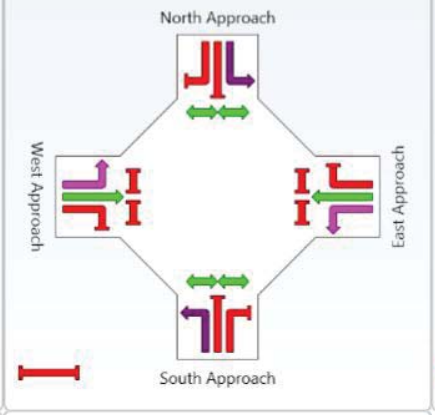
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	9	27	13	17	24
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	15	33	19	23	30
Phase Split	13 %	28 %	16 %	19 %	25 %

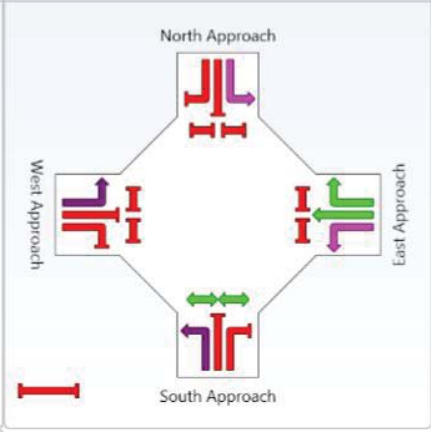
Phase New Phase - 1



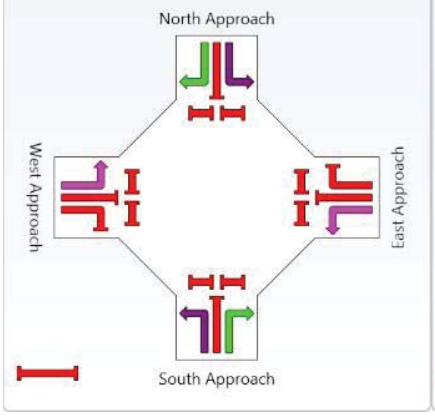
Phase New Phase - 2



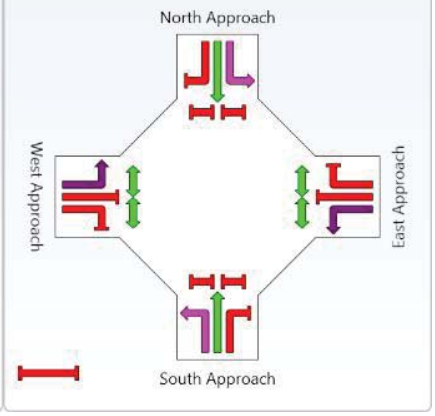
Phase New Phase - 3

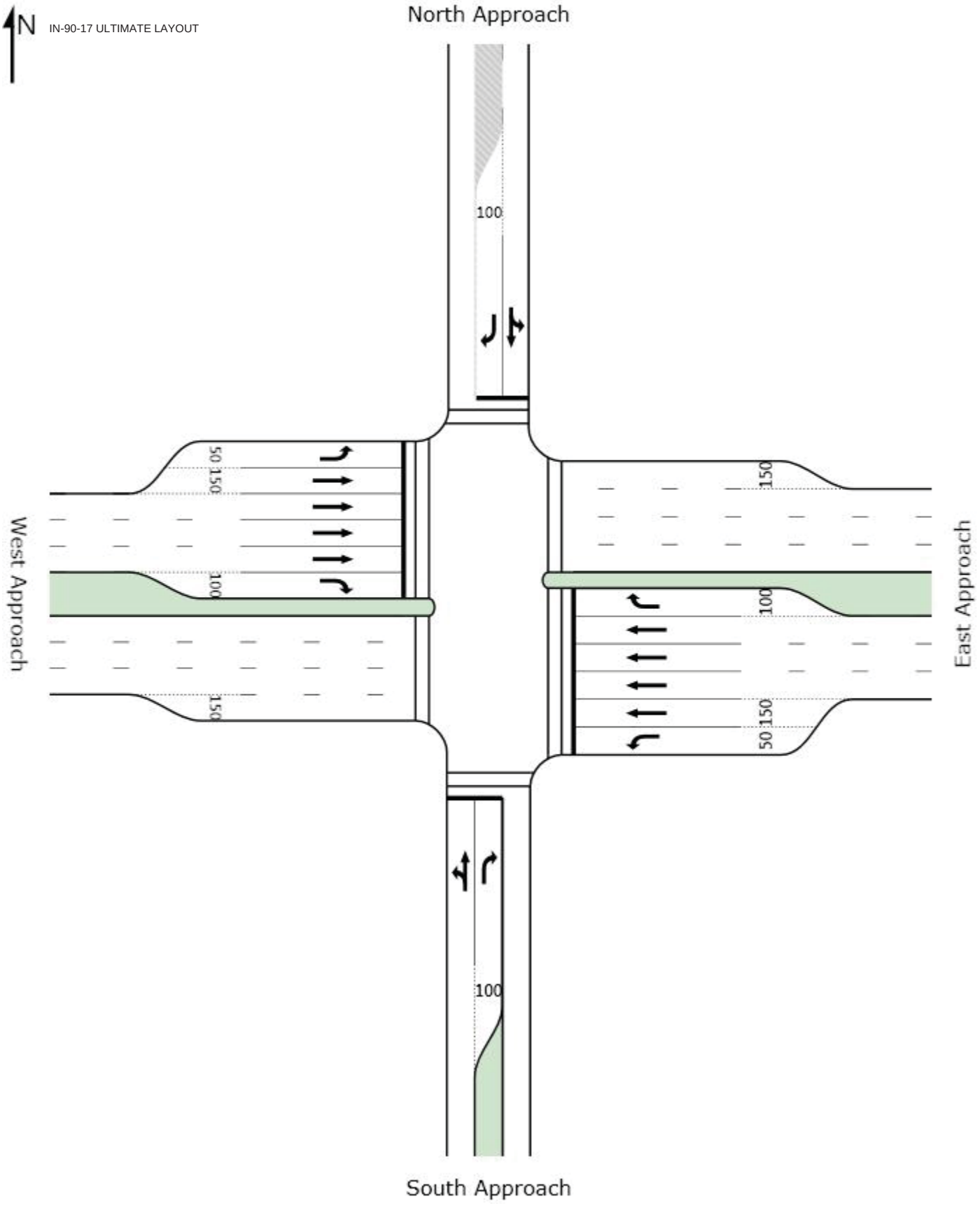


Phase New Phase - 4



Phase New Phase - 5




N
IN-90-17 ULTIMATE LAYOUT
North Approach
West Approach
East Approach
South Approach
100
50
150
100
150
100
150
50
150
100

MOVEMENT SUMMARY

Site: IN-90-17 Ultimate AM

IN-90-17 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	89	0.0	0.268	48.3	LOS D	5.6	39.2	0.86	0.79	26.2
5	T	28	0.0	0.268	40.6	LOS D	5.6	39.2	0.86	0.69	23.8
6	R	239	0.0	0.898	76.2	LOS E	16.2	113.4	1.00	1.07	20.2
Approach		355	0.0	0.898	66.4	LOS E	16.2	113.4	0.95	0.97	21.7
East: East Approach											
7	L	145	0.0	0.374	22.0	LOS C	3.8	26.3	0.48	0.76	43.0
8	T	1917	6.0	0.702	32.1	LOS C	25.5	187.5	0.88	0.78	37.0
9	R	83	0.0	0.879	82.5	LOS F	5.5	38.7	1.00	0.93	19.2
Approach		2145	5.4	0.879	33.4	LOS C	25.5	187.5	0.86	0.78	36.1
North: North Approach											
10	L	172	0.0	0.484	43.1	LOS D	7.4	52.1	0.92	0.89	27.7
11	T	28	0.0	0.484	35.4	LOS D	7.4	52.1	0.92	0.84	25.2
12	R	134	0.0	0.510	60.1	LOS E	7.5	52.2	0.97	0.80	23.3
Approach		333	0.0	0.510	49.3	LOS D	7.5	52.2	0.94	0.85	25.5
West: West Approach											
1	L	134	0.0	0.260	17.2	LOS B	2.4	16.5	0.49	0.76	47.7
2	T	2552	6.0	0.876	40.0	LOS D	42.3	311.6	0.96	0.94	32.9
3	R	102	0.0	0.661	71.0	LOS E	6.2	43.2	1.00	0.81	21.4
Approach		2789	5.5	0.876	40.0	LOS D	42.3	311.6	0.94	0.92	32.8
All Vehicles		5622	4.8	0.898	39.7	LOS D	42.3	311.6	0.91	0.87	32.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
P4	Across S approach	50	23.4	LOS C	0.1	0.1	0.63	0.63
P5	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across E approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
P7	Across N approach	50	22.2	LOS C	0.1	0.1	0.61	0.61
P8	Across N approach	50	21.0	LOS C	0.1	0.1	0.59	0.59
P1	Across W approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P2	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		400	36.9	LOS D			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-90-17 Ultimate PM

IN-90-17 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	140	0.0	0.483	51.6	LOS D	10.3	72.0	0.92	0.82	25.3
5	T	61	0.0	0.483	43.9	LOS D	10.3	72.0	0.92	0.76	22.9
6	R	179	0.0	0.637	60.5	LOS E	10.1	70.9	0.99	0.82	23.2
Approach		380	0.0	0.637	54.6	LOS D	10.3	72.0	0.95	0.81	23.9
East: East Approach											
7	L	183	0.0	0.463	21.8	LOS C	4.7	33.1	0.48	0.77	43.2
8	T	2691	6.0	0.985	83.8	LOS F	67.4	495.9	0.98	1.23	20.8
9	R	176	0.0	0.866	76.6	LOS E	11.5	80.5	1.00	0.95	20.3
Approach		3049	5.3	0.985	79.7	LOS E	67.4	495.9	0.95	1.19	21.4
North: North Approach											
10	L	127	0.0	0.506	45.3	LOS D	7.6	53.3	0.93	0.89	27.2
11	T	74	0.0	0.506	37.6	LOS D	7.6	53.3	0.93	0.85	24.7
12	R	262	0.0	0.940	86.5	LOS F	19.5	136.2	1.00	1.17	18.6
Approach		462	0.0	0.940	67.4	LOS E	19.5	136.2	0.97	1.04	21.2
West: West Approach											
1	L	199	0.0	0.388	19.1	LOS B	3.7	25.7	0.58	0.78	45.7
2	T	2131	6.0	0.852	42.7	LOS D	34.1	251.0	0.97	0.92	31.8
3	R	136	0.0	0.979	108.8	LOS F	11.1	77.6	1.00	1.14	15.5
Approach		2466	5.2	0.979	44.4	LOS D	34.1	251.0	0.94	0.93	30.9
All Vehicles		6357	4.6	0.985	63.6	LOS E	67.4	495.9	0.95	1.05	24.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
P4	Across S approach	50	23.4	LOS C	0.1	0.1	0.63	0.63
P5	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P6	Across E approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
P7	Across N approach	50	27.3	LOS C	0.1	0.1	0.68	0.68
P8	Across N approach	50	26.0	LOS C	0.1	0.1	0.66	0.66
P1	Across W approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
P2	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		400	38.1	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

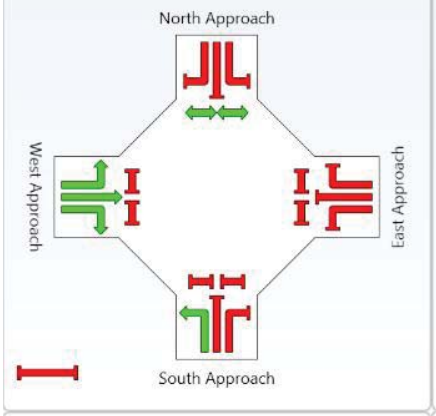
IN-90-17 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

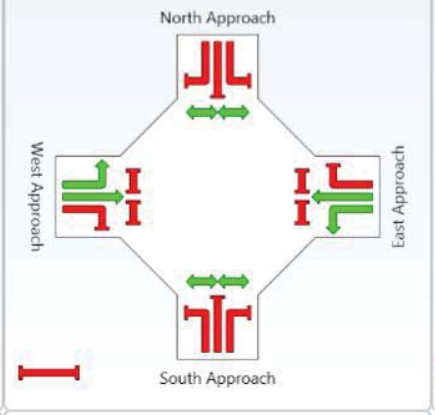
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	10	35	6	17	22
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	16	41	12	23	28
Phase Split	13 %	34 %	10 %	19 %	23 %

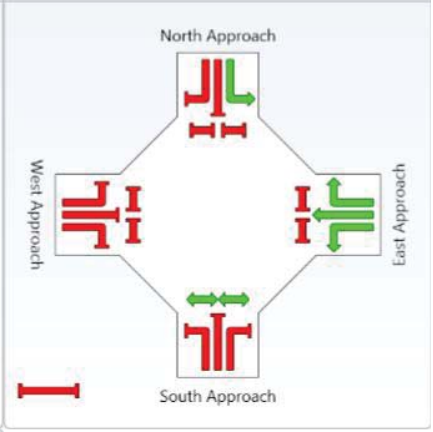
Phase New Phase - 1



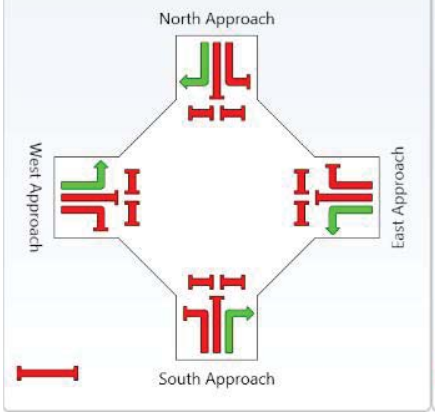
Phase New Phase - 2



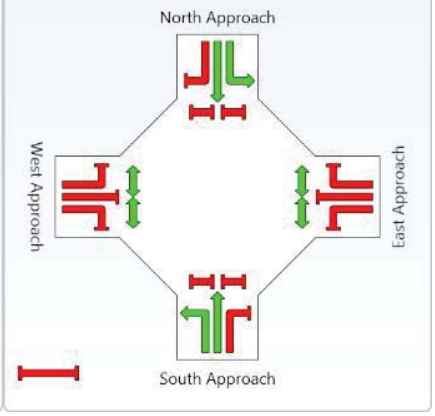
Phase New Phase - 3



Phase New Phase - 4



Phase New Phase - 6



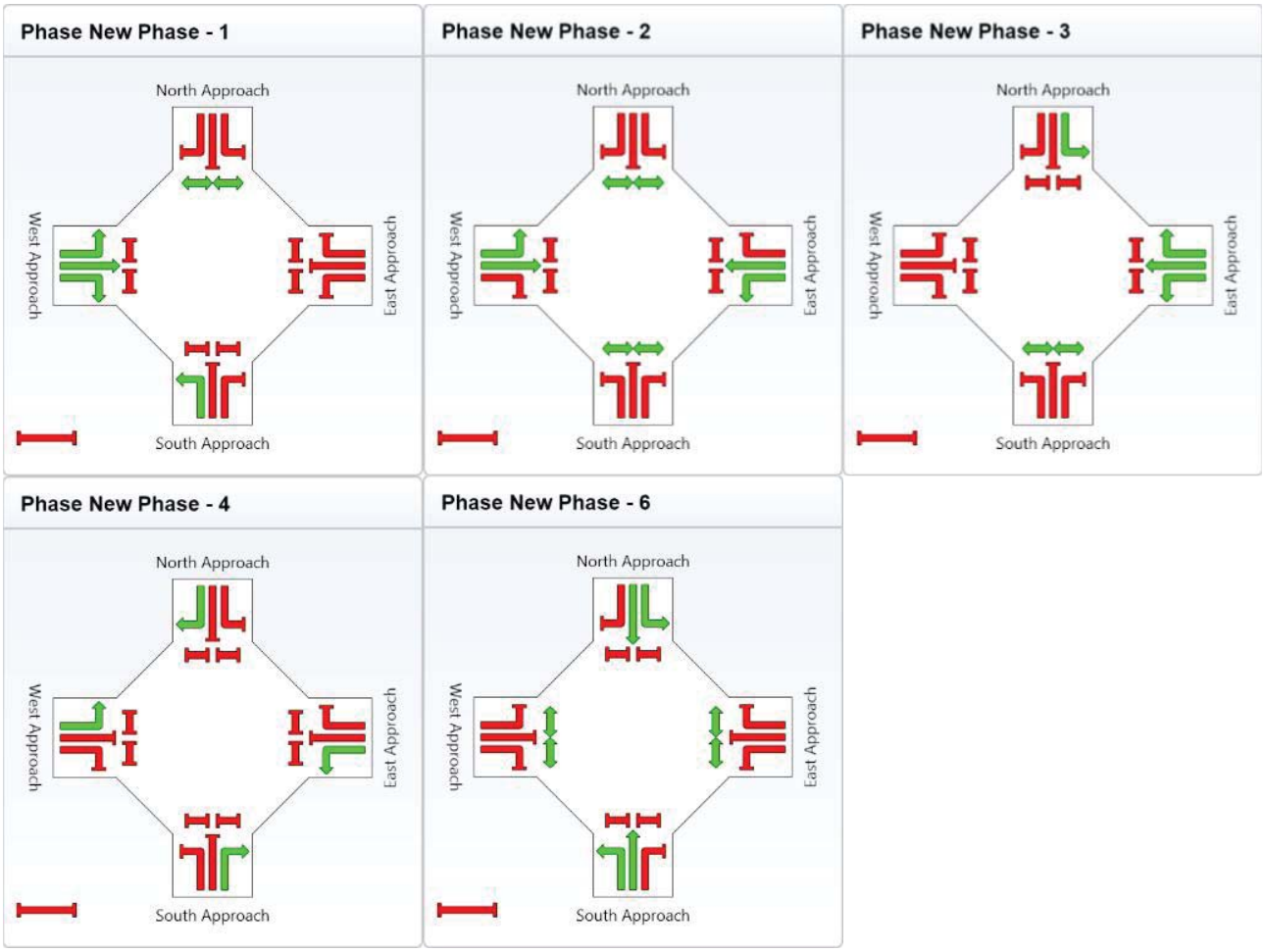
PHASING SUMMARY

IN-90-17 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 6

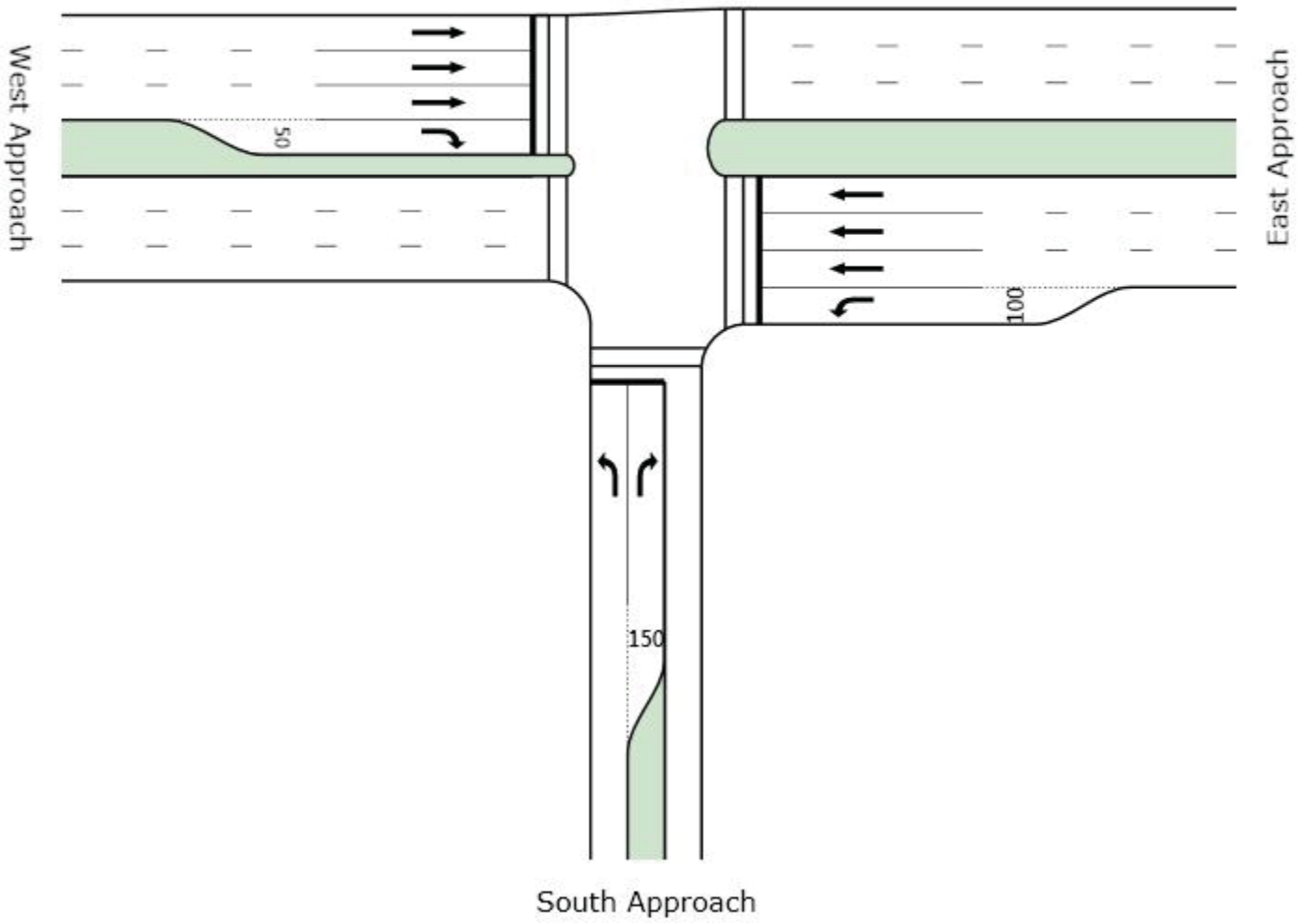
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 6
Green Time (sec)	9	28	13	18	22
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	15	34	19	24	28
Phase Split	13 %	28 %	16 %	20 %	23 %



N

IN-91-01 ULTIMATE LAYOUT



MOVEMENT SUMMARY

Site: IN-91-01 Ultimate AM

IN-91-01 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	26	0.0	0.051	41.7	LOS D	1.1	7.9	0.76	0.72	28.0
6	R	338	0.0	0.654	49.3	LOS D	17.6	122.9	0.94	0.85	25.8
Approach		364	0.0	0.654	48.7	LOS D	17.6	122.9	0.93	0.84	26.0
East: East Approach											
7	L	366	0.0	0.649	29.9	LOS C	13.1	91.9	0.67	0.81	37.0
8	T	744	6.1	0.262	18.3	LOS B	8.2	60.4	0.61	0.52	47.6
Approach		1110	4.1	0.649	22.1	LOS C	13.1	91.9	0.63	0.62	44.0
West: West Approach											
2	T	1441	6.0	0.410	12.0	LOS B	13.9	102.4	0.54	0.48	54.5
3	R	85	0.0	0.608	71.4	LOS E	5.1	35.7	1.00	0.79	21.3
Approach		1526	5.7	0.608	15.3	LOS B	13.9	102.4	0.57	0.50	50.8
All Vehicles		3000	4.4	0.654	21.9	LOS C	17.6	122.9	0.64	0.59	43.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	19.3	LOS B	0.1	0.1	0.57	0.57
P5	Across E approach	50	48.6	LOS E	0.2	0.2	0.90	0.90
P1	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		150	38.5	LOS D			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-91-01 Ultimate PM

IN-91-01 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	120	0.0	0.170	34.3	LOS C	4.6	32.4	0.70	0.77	30.6
6	R	513	0.0	0.808	45.7	LOS D	27.3	190.8	0.92	0.90	26.9
Approach		633	0.0	0.808	43.5	LOS D	27.3	190.8	0.88	0.87	27.5
East: East Approach											
7	L	410	0.0	0.806	42.9	LOS D	19.5	136.6	0.79	0.87	30.0
8	T	1781	6.0	0.737	30.9	LOS C	28.9	212.6	0.90	0.81	37.6
Approach		2191	4.9	0.806	33.1	LOS C	28.9	212.6	0.88	0.82	36.1
West: West Approach											
2	T	921	6.0	0.311	17.1	LOS B	10.0	73.8	0.61	0.53	48.7
3	R	33	0.0	0.355	73.5	LOS E	2.0	14.0	1.00	0.72	20.9
Approach		954	5.8	0.355	19.1	LOS B	10.0	73.8	0.62	0.53	46.9
All Vehicles		3777	4.3	0.808	31.3	LOS C	28.9	212.6	0.82	0.76	36.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	24.7	LOS C	0.1	0.1	0.64	0.64
P5	Across E approach	50	38.4	LOS D	0.1	0.1	0.80	0.80
P1	Across W approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		150	33.6	LOS D			0.74	0.74

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

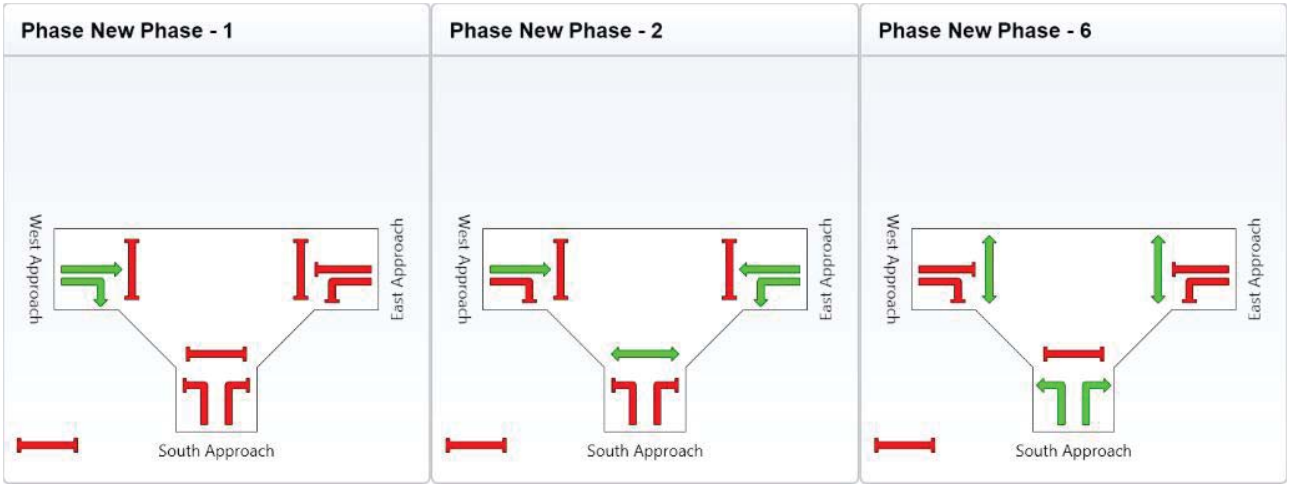
Site: IN-91-01 Ultimate AM

IN-91-01 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 6
Green Time (sec)	9	60	33
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	15	66	39
Phase Split	13 %	55 %	33 %



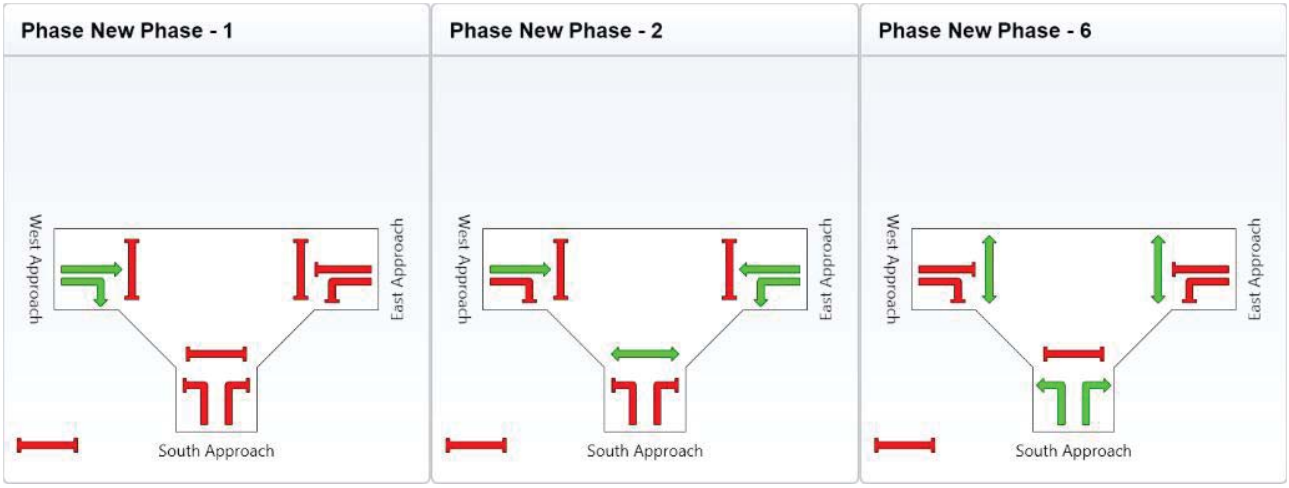
PHASING SUMMARY

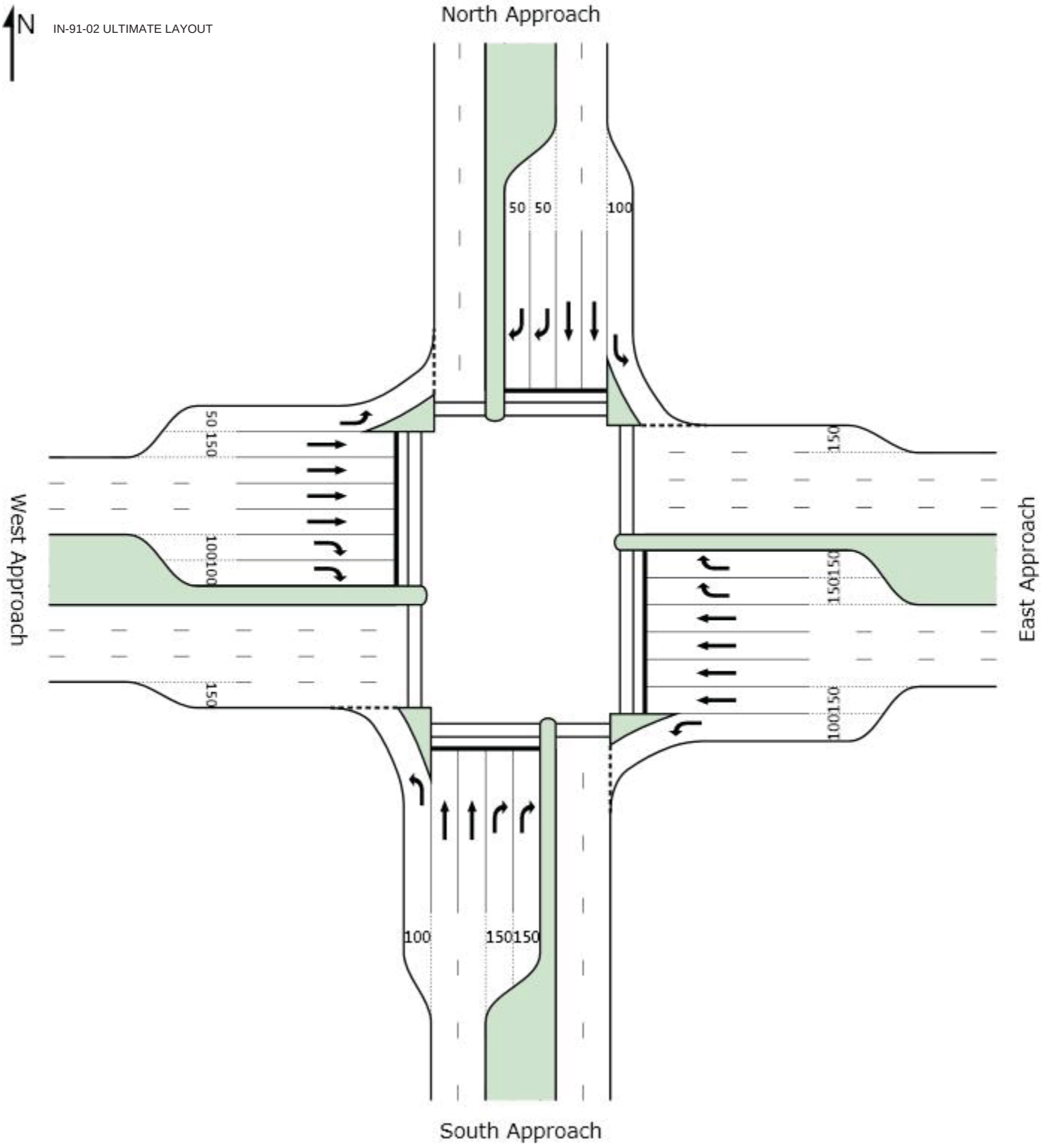
IN-91-01 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 6
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 6

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 6
Green Time (sec)	6	51	45
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	12	57	51
Phase Split	10 %	48 %	43 %




N
IN-91-02 ULTIMATE LAYOUT
North Approach
50 50
100
50150
100100
150
West Approach
East Approach
150
150150
100150
100
150150
South Approach

MOVEMENT SUMMARY

Site: IN-91-02 Ultimate AM

IN-91-02 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	45	4.9	0.058	11.9	LOS B	0.5	4.0	0.27	0.68	48.5
5	T	558	5.9	0.678	47.1	LOS D	15.2	111.7	0.98	0.83	25.1
6	R	617	6.1	0.823	64.1	LOS E	18.9	139.1	1.00	0.94	24.0
Approach		1220	6.0	0.823	54.4	LOS D	18.9	139.1	0.96	0.88	25.0
East: East Approach											
7	L	756	6.0	0.778	24.3	LOS C	22.1	162.5	0.72	0.90	41.9
8	T	990	6.0	0.620	46.1	LOS D	13.6	100.4	0.96	0.80	30.5
9	R	464	5.9	0.814	68.7	LOS E	14.4	105.6	1.00	0.91	22.8
Approach		2210	6.0	0.814	43.4	LOS D	22.1	162.5	0.89	0.86	31.1
North: North Approach											
10	L	264	5.8	0.427	20.2	LOS C	7.0	51.1	0.54	0.75	41.7
11	T	673	6.0	0.828	54.4	LOS D	20.5	151.3	1.00	0.96	23.1
12	R	144	6.1	0.344	51.5	LOS D	3.5	25.8	0.86	0.75	27.4
Approach		1081	6.0	0.828	45.7	LOS D	20.5	151.3	0.87	0.88	26.9
West: West Approach											
1	L	218	6.1	0.476	16.8	LOS B	4.4	32.2	0.43	0.73	48.8
2	T	1309	6.0	0.828	53.2	LOS D	20.6	151.2	1.00	0.92	28.0
3	R	345	6.1	0.613	61.8	LOS E	9.7	71.1	0.98	0.82	24.5
Approach		1872	6.0	0.828	50.5	LOS D	20.6	151.2	0.93	0.88	28.6
All Vehicles		6383	6.0	0.828	48.0	LOS D	22.1	162.5	0.91	0.87	28.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	45.1	LOS E	0.1	0.1	0.87	0.87
P4	Across S approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P5	Across E approach	50	50.4	LOS E	0.2	0.2	0.92	0.92
P6	Across E approach	50	45.1	LOS E	0.1	0.1	0.87	0.87
P7	Across N approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P8	Across N approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P1	Across W approach	50	49.5	LOS E	0.2	0.2	0.91	0.91
P2	Across W approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
All Pedestrians		400	44.8	LOS E			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-91-02 Ultimate PM

IN-91-02 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	277	6.0	0.397	19.7	LOS B	7.4	54.6	0.54	0.76	42.1
5	T	876	6.0	0.866	54.3	LOS D	27.6	203.5	1.00	1.02	23.2
6	R	752	6.0	0.865	65.8	LOS E	24.0	177.0	1.00	0.98	23.7
Approach		1905	6.0	0.866	53.8	LOS D	27.6	203.5	0.93	0.96	25.1
East: East Approach											
7	L	475	6.0	0.546	17.7	LOS B	11.9	87.8	0.51	0.77	47.7
8	T	1619	6.0	0.909	61.0	LOS E	28.8	211.7	1.00	1.03	25.7
9	R	208	5.8	0.769	74.7	LOS E	6.5	48.0	1.00	0.86	21.5
Approach		2302	6.0	0.909	53.3	LOS D	28.8	211.7	0.90	0.96	27.7
North: North Approach											
10	L	284	5.8	0.495	22.7	LOS C	8.4	62.0	0.60	0.77	40.0
11	T	850	6.0	0.849	52.3	LOS D	26.2	192.6	1.00	0.99	23.7
12	R	385	6.0	0.885	62.1	LOS E	11.1	81.6	0.90	0.94	24.5
Approach		1519	5.9	0.885	49.2	LOS D	26.2	192.6	0.90	0.94	26.0
West: West Approach											
1	L	212	6.2	0.476	17.4	LOS B	4.4	32.8	0.44	0.73	48.0
2	T	1258	6.0	0.796	51.1	LOS D	19.1	141.0	1.00	0.90	28.6
3	R	63	5.3	0.350	73.5	LOS E	1.9	13.9	1.00	0.72	21.7
Approach		1533	6.0	0.796	47.4	LOS D	19.1	141.0	0.92	0.87	29.8
All Vehicles		7260	6.0	0.909	51.3	LOS D	28.8	211.7	0.91	0.94	27.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	42.5	LOS E	0.1	0.1	0.84	0.84
P4	Across S approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
P5	Across E approach	50	45.1	LOS E	0.1	0.1	0.87	0.87
P6	Across E approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P7	Across N approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P8	Across N approach	50	40.0	LOS E	0.1	0.1	0.82	0.82
P1	Across W approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P2	Across W approach	50	39.2	LOS D	0.1	0.1	0.81	0.81
All Pedestrians		400	41.6	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

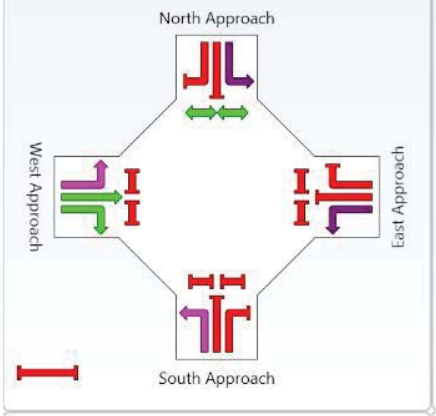
IN-91-02 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

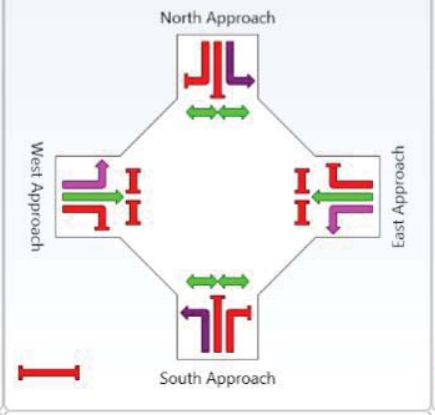
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	19	1	19	25	26
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	25	7	25	31	32
Phase Split	21 %	6 %	21 %	26 %	27 %

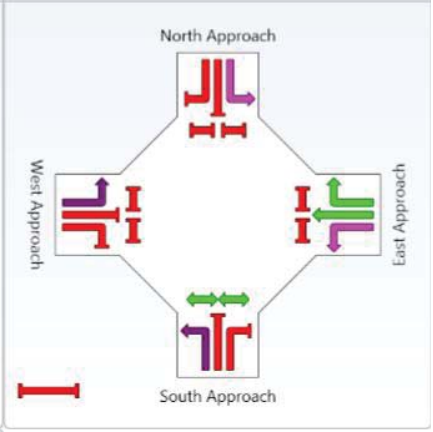
Phase New Phase - 1



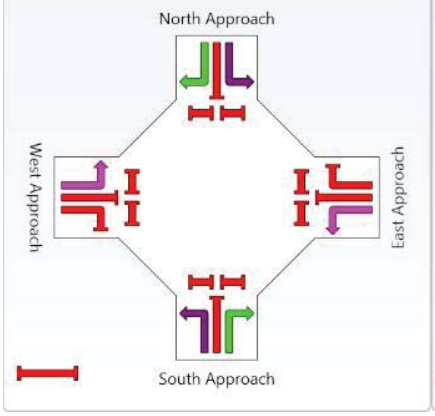
Phase New Phase - 2



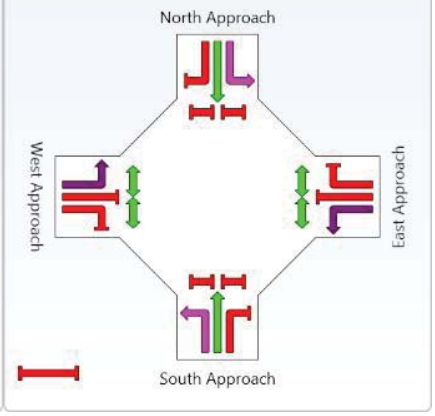
Phase New Phase - 3



Phase New Phase - 4



Phase New Phase - 5



PHASING SUMMARY

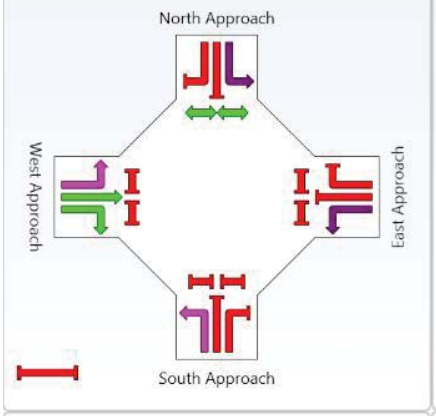
IN-91-02 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4, New Phase - 5

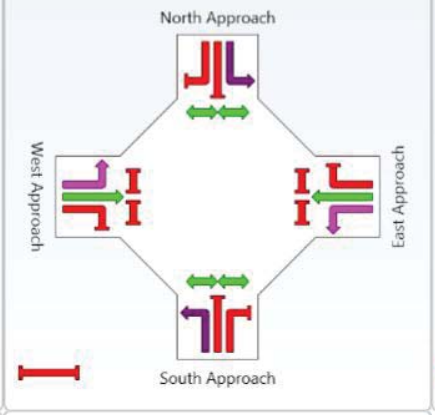
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4	New Phase - 5
Green Time (sec)	6	14	9	29	32
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	12	20	15	35	38
Phase Split	10 %	17 %	13 %	29 %	32 %

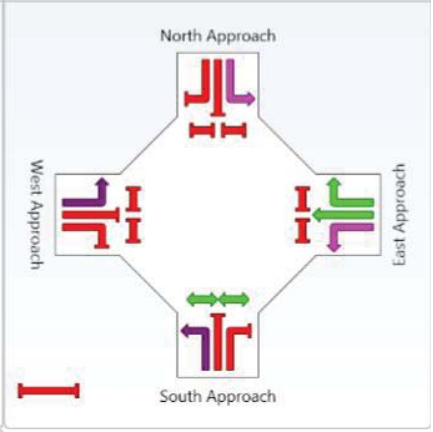
Phase New Phase - 1



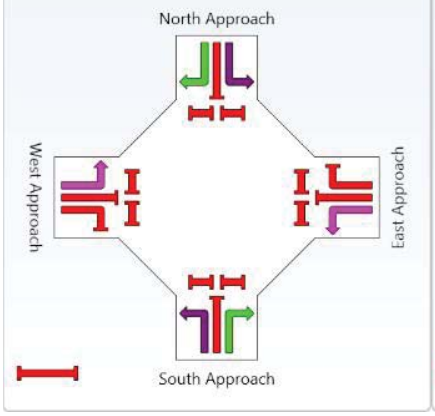
Phase New Phase - 2



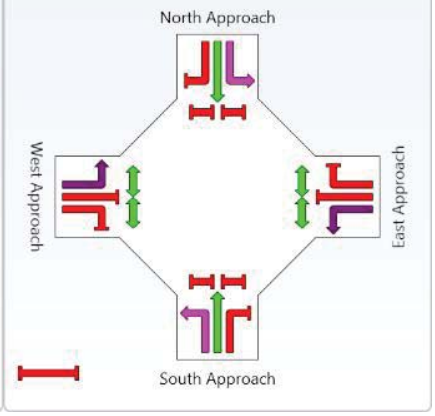
Phase New Phase - 3

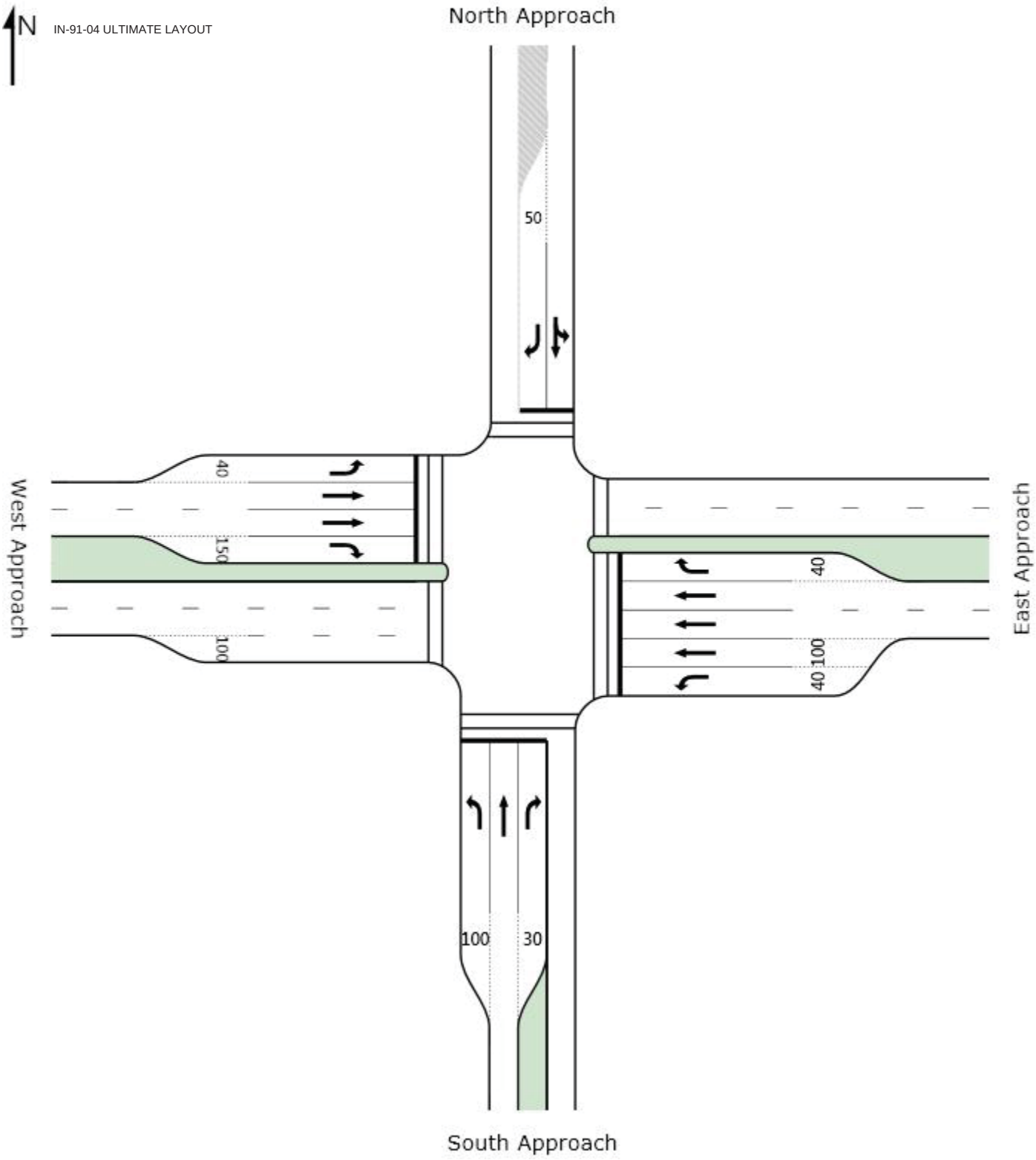


Phase New Phase - 4



Phase New Phase - 5




N
IN-91-04 ULTIMATE LAYOUT
North Approach
50
West Approach
40
150
100
East Approach
40
100
40
100
30
South Approach

MOVEMENT SUMMARY

Site: IN-91-04 Ultimate AM

IN-91-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	149	0.0	0.352	48.1	LOS D	7.4	51.5	0.89	0.79	21.7
5	T	46	0.0	0.104	39.5	LOS D	2.1	15.0	0.83	0.63	22.1
6	R	39	0.0	0.217	38.2	LOS D	1.7	11.7	0.83	0.70	24.3
Approach		233	0.0	0.352	44.8	LOS D	7.4	51.5	0.87	0.74	22.2
East: East Approach											
7	L	14	0.0	0.069	37.7	LOS D	0.6	4.0	0.72	0.68	27.8
8	T	803	6.0	0.570	36.7	LOS D	16.4	120.6	0.88	0.75	28.6
9	R	59	0.0	0.218	26.1	LOS C	1.5	10.7	0.79	0.73	33.8
Approach		877	5.5	0.570	36.0	LOS D	16.4	120.6	0.87	0.75	28.9
North: North Approach											
10	L	33	0.0	0.342	49.4	LOS D	7.3	51.3	0.89	0.81	24.2
11	T	116	0.0	0.342	43.5	LOS D	7.3	51.3	0.89	0.74	23.2
12	R	76	0.0	0.260	40.9	LOS D	3.4	23.7	0.85	0.74	26.2
Approach		224	0.0	0.342	43.5	LOS D	7.3	51.3	0.87	0.75	24.4
West: West Approach											
1	L	67	0.0	0.325	39.2	LOS D	2.8	19.5	0.75	0.74	27.9
2	T	1016	6.0	0.878	52.8	LOS D	32.4	238.7	1.00	1.03	23.5
3	R	490	0.0	0.892	49.6	LOS D	25.3	177.4	1.00	1.02	23.9
Approach		1573	3.8	0.892	51.2	LOS D	32.4	238.7	0.99	1.02	23.8
All Vehicles		2907	3.7	0.892	45.5	LOS D	32.4	238.7	0.93	0.89	25.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	36.8	LOS D	0.1	0.1	0.78	0.78
P5	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across N approach	50	33.8	LOS D	0.1	0.1	0.75	0.75
P1	Across W approach	50	53.2	LOS E	0.2	0.2	0.94	0.94
All Pedestrians		200	44.5	LOS E			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-91-04 Ultimate PM

IN-91-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	310	0.0	0.763	56.0	LOS E	17.9	125.0	1.00	0.89	20.1
5	T	135	0.0	0.317	42.7	LOS D	6.7	46.8	0.89	0.72	21.3
6	R	18	0.0	0.100	37.2	LOS D	0.7	5.2	0.82	0.67	24.6
Approach		463	0.0	0.763	51.4	LOS D	17.9	125.0	0.96	0.83	20.6
East: East Approach											
7	L	26	0.0	0.125	37.3	LOS D	1.1	7.4	0.72	0.70	28.0
8	T	1181	6.0	0.819	42.9	LOS D	28.3	208.4	0.96	0.89	26.4
9	R	45	0.0	0.152	24.2	LOS C	1.1	8.0	0.74	0.72	34.9
Approach		1253	5.6	0.819	42.1	LOS D	28.3	208.4	0.95	0.88	26.7
North: North Approach											
10	L	81	0.0	0.359	50.4	LOS D	7.4	51.7	0.90	0.80	23.7
11	T	66	0.0	0.359	44.5	LOS D	7.4	51.7	0.90	0.74	22.6
12	R	110	0.0	0.532	43.6	LOS D	5.0	34.8	0.98	0.78	25.4
Approach		257	0.0	0.532	46.0	LOS D	7.4	51.7	0.93	0.78	24.1
West: West Approach											
1	L	106	0.0	0.506	39.2	LOS D	4.4	31.1	0.76	0.75	27.9
2	T	902	6.0	0.759	40.7	LOS D	24.2	178.1	0.96	0.86	27.1
3	R	376	0.0	0.796	43.9	LOS D	17.1	119.5	1.00	0.95	25.7
Approach		1384	3.9	0.796	41.5	LOS D	24.2	178.1	0.96	0.88	26.8
All Vehicles		3357	3.7	0.819	43.4	LOS D	28.3	208.4	0.95	0.87	25.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	36.0	LOS D	0.1	0.1	0.78	0.78
P5	Across E approach	50	55.1	LOS E	0.2	0.2	0.96	0.96
P7	Across N approach	50	33.0	LOS D	0.1	0.1	0.74	0.74
P1	Across W approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		200	44.6	LOS E			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

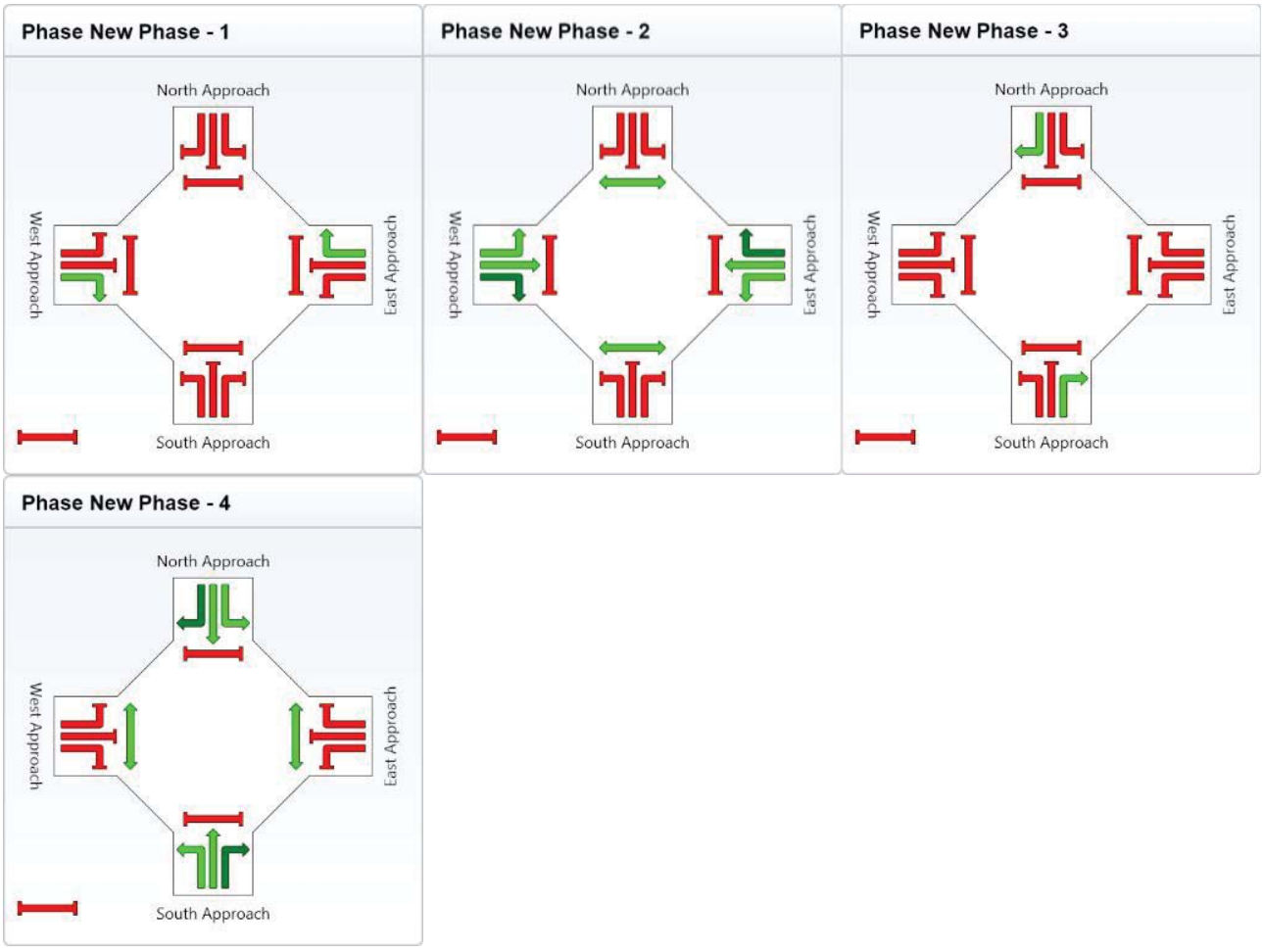
PHASING SUMMARY

IN-91-04 Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B - V2
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4

Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4
Green Time (sec)	26	37	6	27
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	32	43	12	33
Phase Split	27 %	36 %	10 %	28 %



PHASING SUMMARY

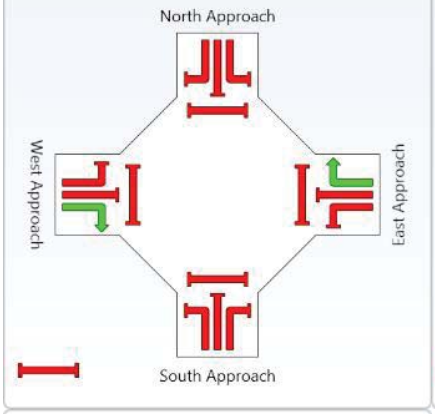
IN-91-04 Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B - V2
Input Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4
Output Sequence: New Phase - 1, New Phase - 2, New Phase - 3, New Phase - 4

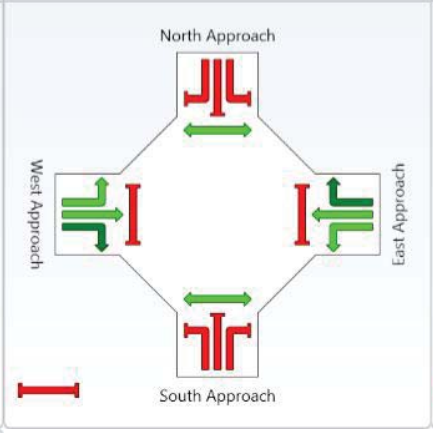
Phase Timing Results

Phase	New Phase - 1	New Phase - 2	New Phase - 3	New Phase - 4
Green Time (sec)	25	38	7	26
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	31	44	13	32
Phase Split	26 %	37 %	11 %	27 %

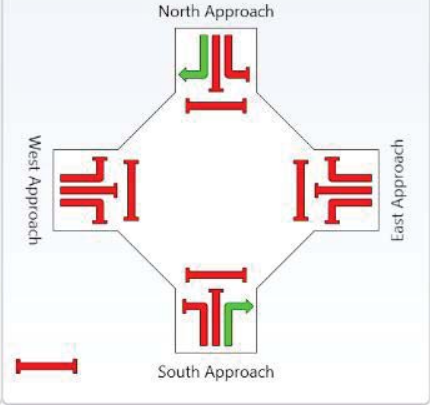
Phase New Phase - 1



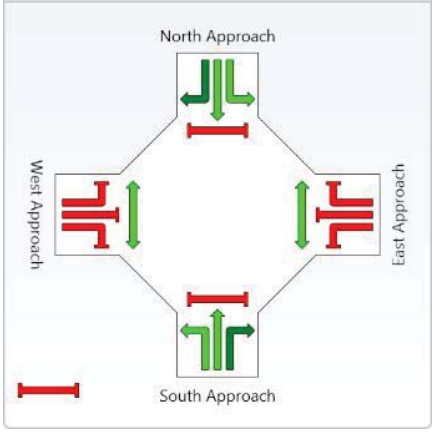
Phase New Phase - 2



Phase New Phase - 3



Phase New Phase - 4



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied

Appendix D

Interim Year (2021) Template Design Intersection Layouts

Appendix D Interim Year (2021) Template Design Intersection Layouts

Number	Road #1	Template Design	Road #2	Template Design
IN-88-01	Boundary	Standard capacity 2 lane arterial on east side / Standard capacity 2 lane arterial without short stand up lane on west side**	Davis	Standard capacity 2 lane arterial. Double right turn and no short stand up lane on south approach.
IN-88-02	Davis	2 lane arterial at connector	East-West connector (north)	Industrial connector
IN-88-03	Davis	2 lane arterial at connector	East-West connector (central)	Standard connector
IN-88-04	Dohertys	Standard capacity 4 lane arterial on east side / Standard capacity 2 lane arterial without short stand up lane on west side	Ison	Standard capacity 2 lane arterial. Double right turn and no short stand up lane on south approach
IN-88-05	Dohertys	4 lane arterial at connector	Gard (connector)	Standard connector
IN-88-06	Dohertys	Standard capacity 4 lane arterial	Davis	Standard capacity 2 lane arterial
IN-88-07	Ison	2 lane arterial at connector	East-West connector Blvd (south)	Standard connector (Boulevard)
IN-88-08	Ison	2 lane arterial at connector	East-West connector (central)	Town Centre connector
IN-88-09	Davis	2 lane arterial at connector	East-West connector (south)	Town Centre connector
IN-88-10	Leakes	Standard capacity 2 lane arterial without short stand up lane. Include left turn slip lane on east approach if it aligns with ultimate location	Ison	Standard capacity 2 lane arterial
IN-88-11	Leakes	4 lane arterial at connector	North-South connector	Standard connector
IN-88-12	Sayers	Standard capacity 2 lane arterial	Ison	Standard capacity 2 lane arterial
IN-88-13	Ison	2 lane arterial at connector	East-West connector (north)	Standard connector
IN-89-01	Boundary	2 lane arterial at connector	North-South connector (west)	Industrial connector
IN-89-02	Boundary	Standard capacity 2 lane arterial**	Tarneit	Standard capacity 2 lane arterial
IN-89-03	Boundary	2 lane arterial at connector	North-South connector (east)	Industrial connector
IN-89-04	Boundary	Standard capacity 2 lane arterial**	Derrimut	High capacity 2 lane arterial**

Number	Road #1	Template Design	Road #2	Template Design
IN-89-05	Tarneit	2 lane arterial at connector	Kenning	Town Centre connector
IN-89-06	Derrimut	2 lane arterial at connector. No left turn slip lane.	East-West connector (central)	Standard connector
IN-89-07	Dohertys	4 lane arterial at connector	North-South connector Blvd	Standard connector (Boulevard)
IN-89-08	Dohertys	Standard capacity 4 lane arterial (ultimate intersection)	Tarneit	Standard capacity 2 lane arterial
IN-89-09	Dohertys	4 lane arterial at connector	North-South connector	Standard connector
IN-89-11	Tarneit	2 lane arterial at connector	East-West connector (south)	Standard connector. Include left turn slip lane on east approach if it aligns with ultimate location.
IN-89-12	Derrimut	2 lane arterial at connector	East-West connector (south)	Town Centre connector
IN-89-13	Leakes	4 lane arterial at connector. No left turn slip lane.	Connector west of Cottesloe Blvd	Standard connector
IN-89-15	Leakes	4 lane arterial at connector. No left turn slip lane.	Crossway Ave	Standard connector
IN-89-16	Leakes	High capacity 4 lanes with double right turn lanes	Derrimut	High capacity 2 lane arterial*. Reflect existing double right turn on south approach. Include double right turn on north approach if space allows on approach of RRL overpass.
IN-90-01	Boundary	2 lane arterial at connector	North-South connector	Industrial connector
IN-90-02	Boundary	Standard capacity 2 lane arterial**	Morris	Standard capacity 2 lane arterial
IN-90-03	Boundary	Standard capacity 2 lane arterial**	Forsyth / Christies	Standard capacity 2 lane arterial without short stand up lane on south side
IN-90-04	Morris	2 lane arterial at connector	East-West connector (north)	Industrial connector
IN-90-05	Forsyth / Christies	2 lane arterial at connector	East-West connector (north)	Industrial connector. Include left turn slip lane on west approach if it aligns with ultimate location.
IN-90-06	Morris	2 lane arterial at connector	East-West connector (central)	Standard connector

Number	Road #1	Template Design	Road #2	Template Design
IN-90-07	Forsyth / Christies	2 lane arterial at connector	East-West connector (central)	Industrial connector
IN-90-08	Dohertys	4 lane arterial at connector	Additional North-South connector	Standard connector
IN-90-09	Dohertys	4 lane arterial at connector	North-South connector	Standard connector
IN-90-10	Dohertys	Standard capacity 4 lane arterial (ultimate intersection)	Morris	Standard capacity 2 lane arterial
IN-90-11	Dohertys	4 lane arterial at connector	Woods	Town Centre connector
IN-90-12	Dohertys	Standard capacity 4 lane arterial	Forsyth / Christies	Standard capacity 2 lane arterial
IN-90-13	Morris	2 lane arterial at connector	Additional East-West connector	Standard connector
IN-90-14	Morris	2 lane arterial at connector	East-West connector (south)	Standard connector
IN-90-15	Leakes	4 lane arterial at connector. No left turn slip lane.	Sunset Views Blvd	Town Centre connector
IN-90-16	Leakes	High capacity 4 lane arterial	Morris	Standard capacity 2 lane arterial
IN-90-17	Leakes	4 lane arterial at connector. Include left turn slip lane.	Woods	Standard connector. Include left turn slip lane on north approach if it aligns with ultimate location.
IN-90-18	Leakes	As per Trug Employment / Trug South PSP	Forsyth / Christies	As per Trug Employment / Trug South PSP
IN-90-19	Forsyth / Christies	2 lane arterial at connector. Include left turn slip lane.	East-West connector Blvd (south)	Standard connector
IN-91-01	Leakes	2 lane arterial at connector. Include left turn slip lane.	North-South connector	Standard connector
IN-91-02	Leakes	Standard capacity 2 lane arterial on west side / Standard capacity 4 lane arterial on east side	Davis	Standard capacity 2 lane arterial on north side* / Standard capacity 4 lane arterial on south side
IN-91-03	Davis	4 lane arterial at connector	East-West connector (north)	Town Centre connector
IN-91-04	Sayers	2 lane arterial at connector	North-South connector (west)	Town Centre connector
IN-91-05	Sayers	Standard capacity 2 lane arterial (ultimate configuration)	Armstrong	Standard capacity 2 lane arterial (ultimate configuration)

Number	Road #1	Template Design	Road #2	Template Design
IN-91-06	Sayers	2 lane arterial at connector	North-South connector (east)	Standard connector
IN-91-07	Davis	Standard capacity 2 lane arterial on south side / Standard capacity 4 lane arterial on north side	Sayers	Standard capacity 2 lane arterial
IN-91-08	Armstrong	2 lane arterial at connector	Additional East-West connector	Town Centre connector (T intersection but consider possible future east leg)
IN-91-09	Armstrong	2 lane arterial at connector	East-West connector (north)	Standard connector
IN-91-10	Armstrong	2 lane arterial at connector	East-West connector (south)	Standard connector
IN-91-11	Armstrong	Standard capacity 2 lane arterial (ultimate configuration)	Hogans	Standard capacity 2 lane arterial (ultimate configuration)
IN-91-12	Hogans	2 lane arterial at connector	North-South connector Blvd	Standard connector (Boulevard)
IN-91-13	Hogans	2 lane arterial at connector	Additional North-South connector	Standard connector
IN-91-14	Davis	Standard capacity 2 lane arterial without short stand up lane on north side / Standard connector on south side	Hogans	Standard capacity 2 lane arterial (ultimate configuration)
IN-91-15	Davis	2 lane arterial at connector	East-West connector (south)	Town Centre connector

* For northern approach of intersection in proximity to RRL overpass, any additional fill required to overpass is to be on one side only (to align with ultimate road location) and to absolute minimum requirements. No deceleration lane for left turn slip lane on northern approach.

** Subject to space constraints

Appendix E

Interim Year (2021) Modelling Design Intersection Layouts

Appendix E Interim Year (2021) Modelling Design Intersection Layouts

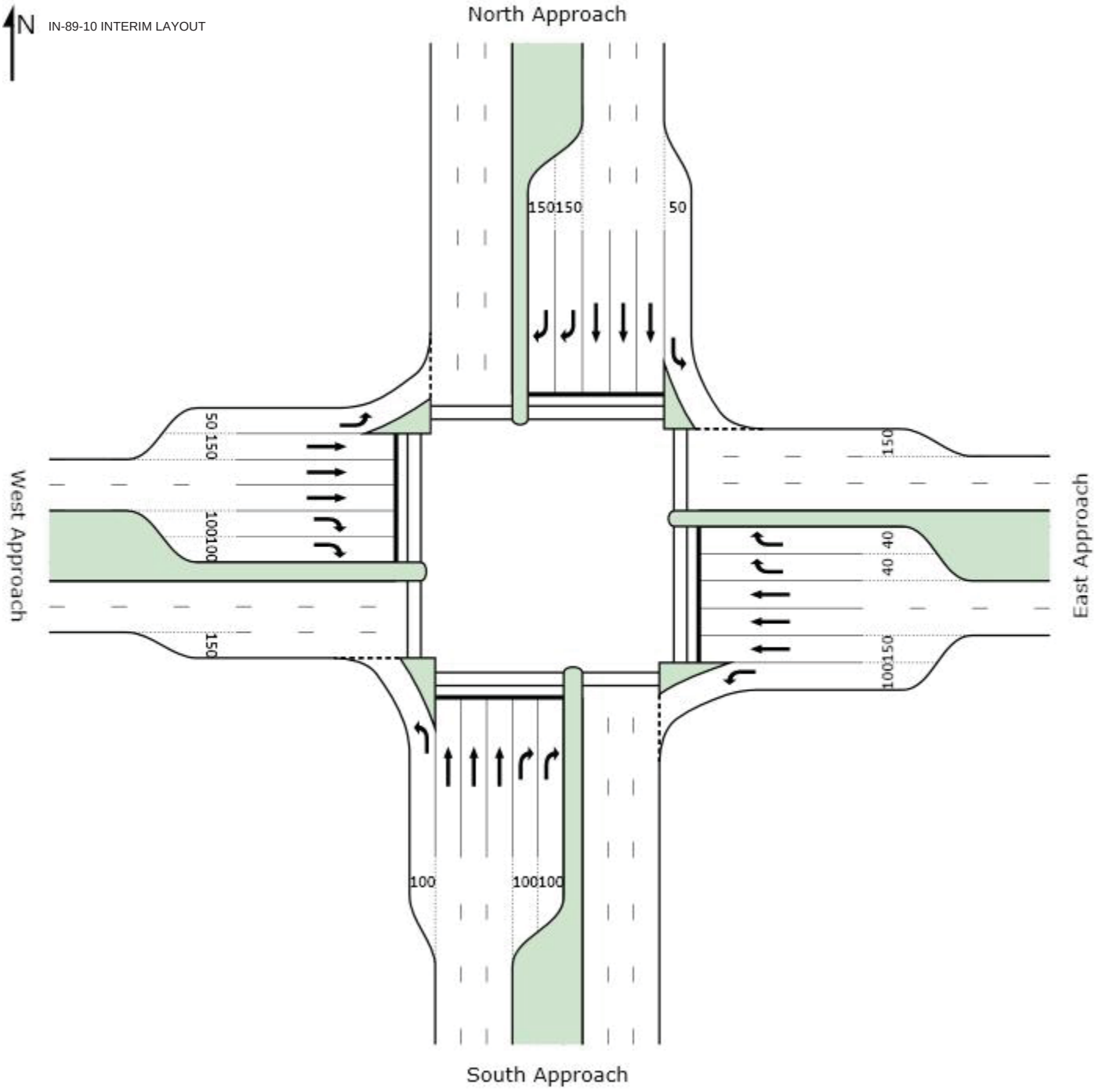
The table below provides a results summary of the intersections design using SIDRA Intersection. Complete SIDRA Intersection modelling outputs, including layouts, movement summaries and signal phasing summaries are provided on the subsequent pages.

Interim Year Intersection Modelling Summary

Intersection Number	Key Issues and Comments
IN-89-10	- The proposed layout is acceptable given the DOS of 0.882 in the AM peak and 0.812 in the PM peak. - Leading and lagging right turn phasing was employed as it resulted in better intersection performance results than diamond phasing.
IN-89-14	- The proposed layout is acceptable given the DOS of 0.811 in the AM peak and 0.917 in the PM peak. - Diamond phasing employed. Leading and lagging right turn phasing was tested but did not improve intersection performance. - Staged pedestrian crossing was employed on all legs of the intersection. - Queuing of through traffic on the east and west approaches expected, however delay results indicate all queued traffic is cleared each cycle.

These SIDRA models were primarily used to determine whether double right turn lanes were warranted at these intersections. The number of through lanes applied to each intersection in the functional design was consistent with those applied to other intersections on these roads.

N IN-89-10 INTERIM LAYOUT



MOVEMENT SUMMARY

Site: IN-89-10 Interim AM

IN-89-10 Interim AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	310	6.0	0.467	19.1	LOS B	7.5	55.5	0.51	0.76	46.4
2	T	1491	6.0	0.882	54.3	LOS D	32.1	236.1	1.00	1.01	27.6
3	R	325	6.1	0.476	57.0	LOS E	8.6	63.2	0.94	0.81	25.9
Approach		2125	6.0	0.882	49.6	LOS D	32.1	236.1	0.92	0.94	28.9
East: East Approach											
4	L	75	5.9	0.086	12.6	LOS B	1.0	7.6	0.30	0.69	47.9
5	T	1022	6.0	0.762	47.1	LOS D	19.8	145.5	0.99	0.88	25.1
6	R	149	5.9	0.825	78.8	LOS E	4.9	35.7	1.00	0.91	21.0
Approach		1245	6.0	0.825	48.8	LOS D	19.8	145.5	0.95	0.87	25.3
North: North Approach											
7	L	160	6.2	0.427	20.0	LOS B	3.9	28.7	0.50	0.74	45.5
8	T	752	6.0	0.529	42.1	LOS D	12.8	93.9	0.92	0.77	32.1
9	R	433	6.1	0.851	72.9	LOS E	13.9	102.5	1.00	0.94	21.8
Approach		1345	6.1	0.851	49.4	LOS D	13.9	102.5	0.89	0.82	29.0
West: West Approach											
10	L	256	6.0	0.632	18.4	LOS B	6.2	45.6	0.50	0.74	43.0
11	T	1449	6.0	0.856	47.6	LOS D	30.3	223.1	0.99	0.97	24.9
12	R	224	5.9	0.540	64.8	LOS E	6.4	47.2	0.99	0.79	23.8
Approach		1929	6.0	0.856	45.7	LOS D	30.3	223.1	0.93	0.92	26.4
All Vehicles		6645	6.0	0.882	48.3	LOS D	32.1	236.1	0.92	0.90	27.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	50	54.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
P7	Across W approach	50	47.7	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		200	50.9	LOS E			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-10 Interim PM

IN-89-10 Interim PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
1	L	226	5.9	0.379	20.9	LOS C	5.9	43.4	0.53	0.76	44.6
2	T	813	6.0	0.541	40.8	LOS D	13.7	100.4	0.91	0.77	32.7
3	R	107	6.2	0.600	75.2	LOS E	3.3	24.5	1.00	0.77	21.4
Approach		1145	6.0	0.600	40.1	LOS D	13.7	100.4	0.84	0.77	32.8
East: East Approach											
4	L	408	5.9	0.538	21.2	LOS C	12.9	94.5	0.62	0.79	41.0
5	T	1498	6.0	0.812	40.6	LOS D	29.5	217.4	0.96	0.89	27.2
6	R	152	5.8	0.722	74.8	LOS E	4.8	35.1	1.00	0.84	21.8
Approach		2058	6.0	0.812	39.3	LOS D	29.5	217.4	0.90	0.87	28.7
North: North Approach											
7	L	150	5.9	0.343	15.7	LOS B	2.8	20.4	0.39	0.72	49.9
8	T	1453	6.0	0.786	41.5	LOS D	26.6	195.7	0.97	0.88	32.3
9	R	304	6.2	0.780	71.5	LOS E	9.4	69.2	1.00	0.88	22.2
Approach		1906	6.0	0.786	44.3	LOS D	26.6	195.7	0.93	0.87	31.0
West: West Approach											
10	L	341	6.1	0.635	13.1	LOS B	5.6	41.6	0.37	0.72	47.4
11	T	1307	6.0	0.673	33.7	LOS C	22.7	167.4	0.89	0.78	29.8
12	R	221	6.0	0.745	72.3	LOS E	6.9	50.4	1.00	0.87	22.2
Approach		1869	6.0	0.745	34.5	LOS C	22.7	167.4	0.81	0.78	30.7
All Vehicles		6978	6.0	0.812	39.5	LOS D	29.5	217.4	0.87	0.83	30.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	50	43.4	LOS E	0.1	0.1	0.85	0.85
P3	Across E approach	50	45.9	LOS E	0.1	0.1	0.88	0.88
P5	Across N approach	50	41.7	LOS E	0.1	0.1	0.83	0.83
P7	Across W approach	50	51.3	LOS E	0.2	0.2	0.93	0.93
All Pedestrians		200	45.6	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

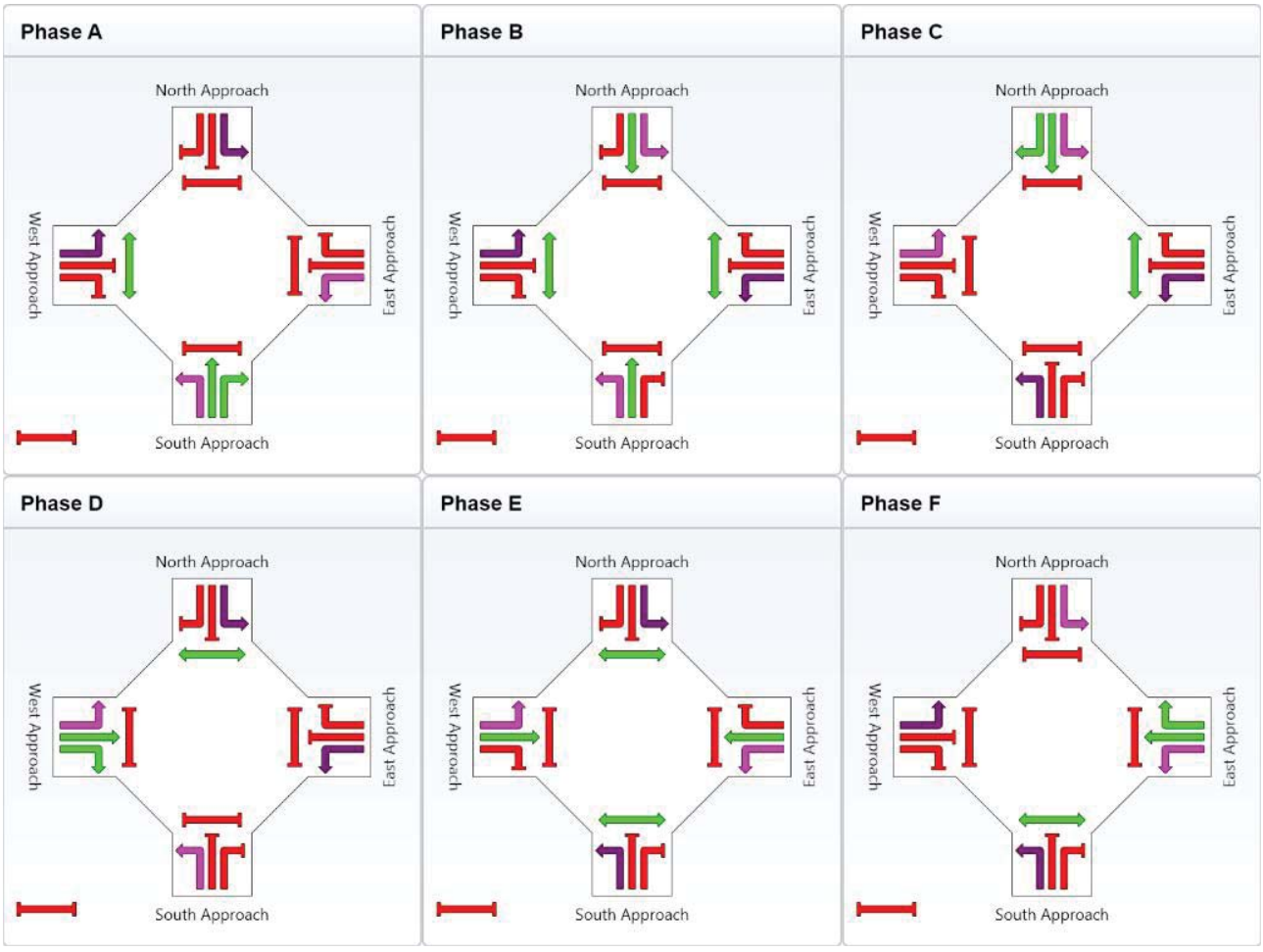
PHASING SUMMARY

IN-89-10 Interim AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: A, B, C, D, E, F
Output Sequence: A, B, C, D, E, F

Phase Timing Results

Phase	A	B	C	D	E	F
Green Time (sec)	23	7	17	14	17	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	29	13	23	20	23	12
Phase Split	24 %	11 %	19 %	17 %	19 %	10 %



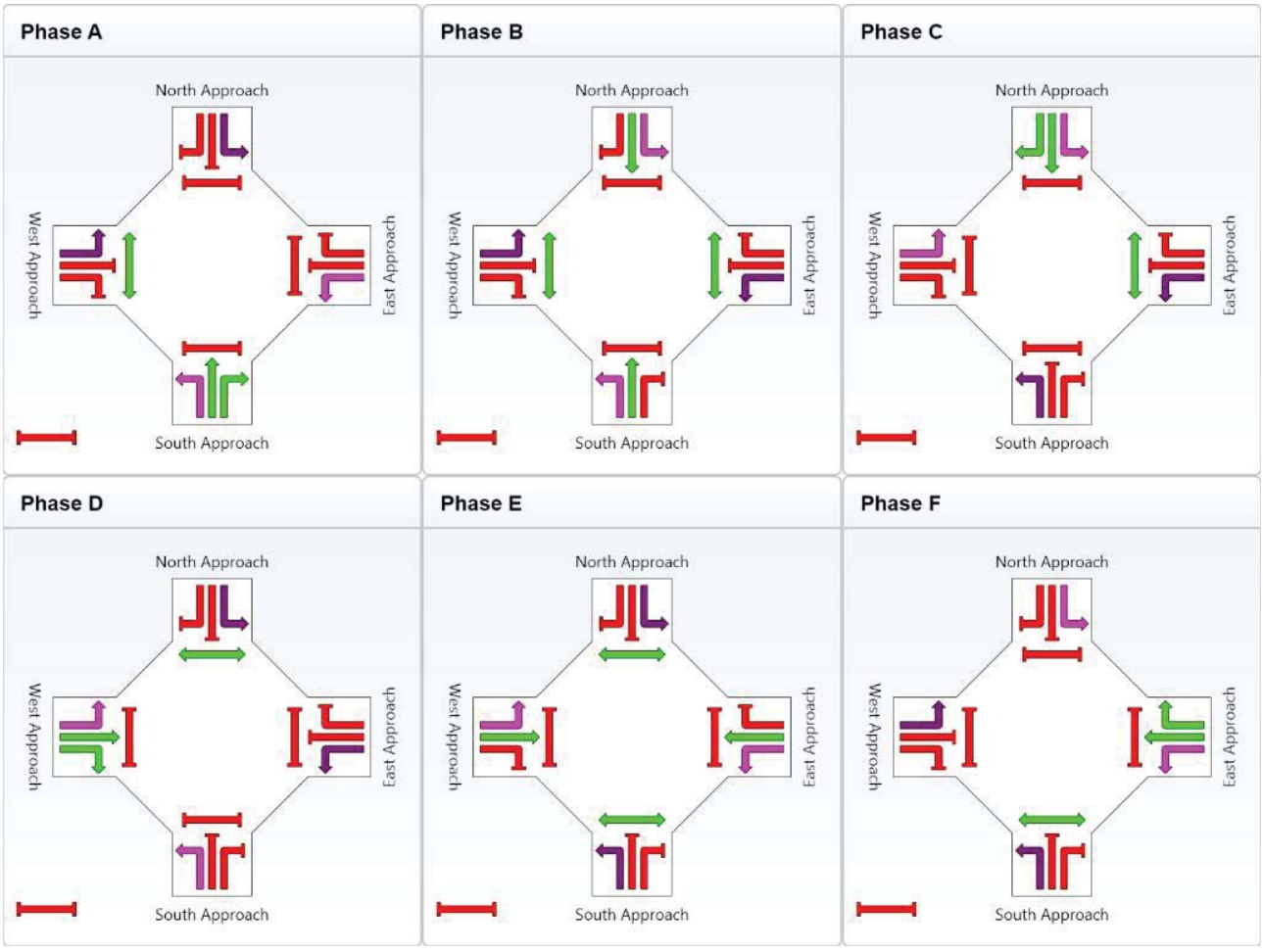
PHASING SUMMARY

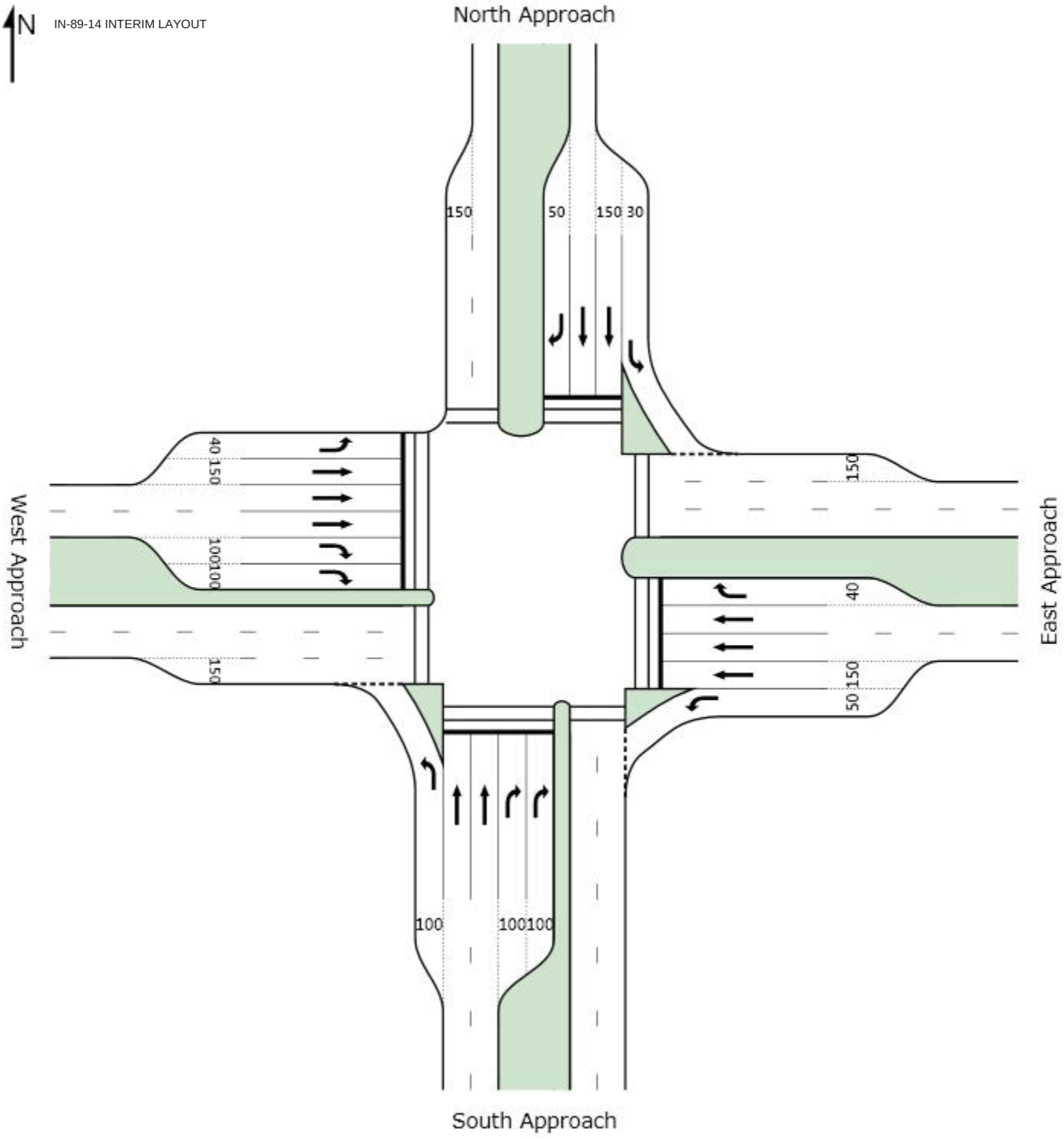
IN-89-10 Interim PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: A, B, C, D, E, F
Output Sequence: A, B, C, D, E, F

Phase Timing Results

Phase	A	B	C	D	E	F
Green Time (sec)	6	20	13	10	28	7
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	12	26	19	16	34	13
Phase Split	10 %	22 %	16 %	13 %	28 %	11 %




N
IN-89-14 INTERIM LAYOUT
North Approach
150
50
150
30
40
150
100
100
West Approach
150
150
40
50
150
East Approach
100
100
100
South Approach

MOVEMENT SUMMARY

Site: IN-89-14 Interim AM

IN-89-14 Interim AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	383	6.0	0.564	22.6	LOS C	12.9	94.9	0.66	0.80	40.1
5	T	503	6.1	0.693	48.6	LOS D	14.6	107.5	0.98	0.83	24.7
6	R	243	6.2	0.811	74.7	LOS E	7.7	57.0	1.00	0.92	21.7
Approach		1129	6.1	0.811	45.4	LOS D	14.6	107.5	0.87	0.84	27.6
East: East Approach											
7	L	281	6.0	0.598	16.3	LOS B	5.7	42.2	0.42	0.73	49.2
8	T	1731	6.0	0.804	33.0	LOS C	33.4	245.8	0.91	0.83	36.4
9	R	63	6.7	0.427	64.1	LOS E	3.6	26.5	0.97	0.76	21.9
Approach		2075	6.0	0.804	31.7	LOS C	33.4	245.8	0.85	0.82	36.9
North: North Approach											
7	L	63	6.7	0.292	18.5	LOS B	1.6	11.7	0.49	0.69	40.0
8	T	602	5.9	0.802	53.9	LOS D	18.0	132.7	1.00	0.94	23.3
9	R	41	5.1	0.275	65.6	LOS E	2.4	17.2	0.97	0.74	21.6
Approach		706	6.0	0.802	51.4	LOS D	18.0	132.7	0.95	0.90	24.1
West: West Approach											
1	L	91	5.8	0.313	21.8	LOS C	2.5	18.0	0.50	0.73	37.6
2	T	1648	6.0	0.772	31.3	LOS C	30.3	222.9	0.90	0.80	37.4
3	R	276	6.2	0.776	72.3	LOS E	8.6	63.1	1.00	0.88	21.9
Approach		2015	6.0	0.776	36.5	LOS D	30.3	222.9	0.89	0.81	34.4
All Vehicles		5925	6.0	0.811	38.3	LOS D	33.4	245.8	0.88	0.83	32.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	16.0	LOS B	0.1	0.1	0.52	0.52
P4	Across S approach	50	22.8	LOS C	0.1	0.1	0.62	0.62
P5	Across E approach	50	33.8	LOS D	0.1	0.1	0.75	0.75
P6	Across E approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
P5	Across N approach	53	14.5	LOS B	0.1	0.1	0.49	0.49
P6	Across N approach	53	22.8	LOS C	0.1	0.1	0.62	0.62
P1	Across W approach	50	37.6	LOS D	0.1	0.1	0.79	0.79
P2	Across W approach	50	44.2	LOS E	0.1	0.1	0.86	0.86
All Pedestrians		406	29.3	LOS C			0.69	0.69

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: IN-89-14 Interim PM

IN-89-14 Interim PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: South Approach											
4	L	206	5.8	0.302	22.0	LOS C	6.2	45.3	0.57	0.76	40.5
5	T	749	6.0	0.917	61.3	LOS E	27.6	203.1	1.00	1.06	21.6
6	R	214	6.1	0.892	82.2	LOS F	7.2	53.4	1.00	1.02	20.3
Approach		1169	6.0	0.917	58.2	LOS E	27.6	203.1	0.92	1.00	23.4
East: East Approach											
7	L	257	5.8	0.535	17.0	LOS B	5.5	40.6	0.43	0.74	48.5
8	T	1731	6.0	0.818	34.7	LOS C	34.3	252.5	0.93	0.85	35.5
9	R	54	5.9	0.360	63.7	LOS E	3.0	22.2	0.97	0.75	22.0
Approach		2042	6.0	0.818	33.2	LOS C	34.3	252.5	0.87	0.83	36.1
North: North Approach											
7	L	51	6.3	0.242	21.0	LOS C	1.4	10.3	0.53	0.68	38.2
8	T	687	6.0	0.814	52.5	LOS D	20.6	151.5	1.00	0.95	23.6
9	R	92	5.7	0.770	73.6	LOS E	5.8	42.6	1.00	0.88	20.1
Approach		829	6.0	0.814	52.9	LOS D	20.6	151.5	0.97	0.92	23.7
West: West Approach											
1	L	48	6.5	0.176	23.0	LOS C	1.4	10.0	0.51	0.71	36.8
2	T	1882	6.0	0.897	44.4	LOS D	44.4	326.8	0.97	0.97	31.1
3	R	323	5.9	0.906	83.0	LOS F	11.1	81.9	1.00	1.02	19.8
Approach		2253	6.0	0.906	49.5	LOS D	44.4	326.8	0.96	0.97	29.1
All Vehicles		6294	6.0	0.917	46.3	LOS D	44.4	326.8	0.92	0.93	28.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across S approach	50	16.5	LOS B	0.1	0.1	0.53	0.53
P4	Across S approach	50	23.4	LOS C	0.1	0.1	0.63	0.63
P5	Across E approach	50	33.0	LOS D	0.1	0.1	0.74	0.74
P6	Across E approach	50	41.7	LOS E	0.1	0.1	0.83	0.83
P5	Across N approach	53	15.0	LOS B	0.1	0.1	0.50	0.50
P6	Across N approach	53	23.4	LOS C	0.1	0.1	0.63	0.63
P1	Across W approach	50	36.8	LOS D	0.1	0.1	0.78	0.78
P2	Across W approach	50	41.7	LOS E	0.1	0.1	0.83	0.83
All Pedestrians		406	28.8	LOS C			0.68	0.68

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

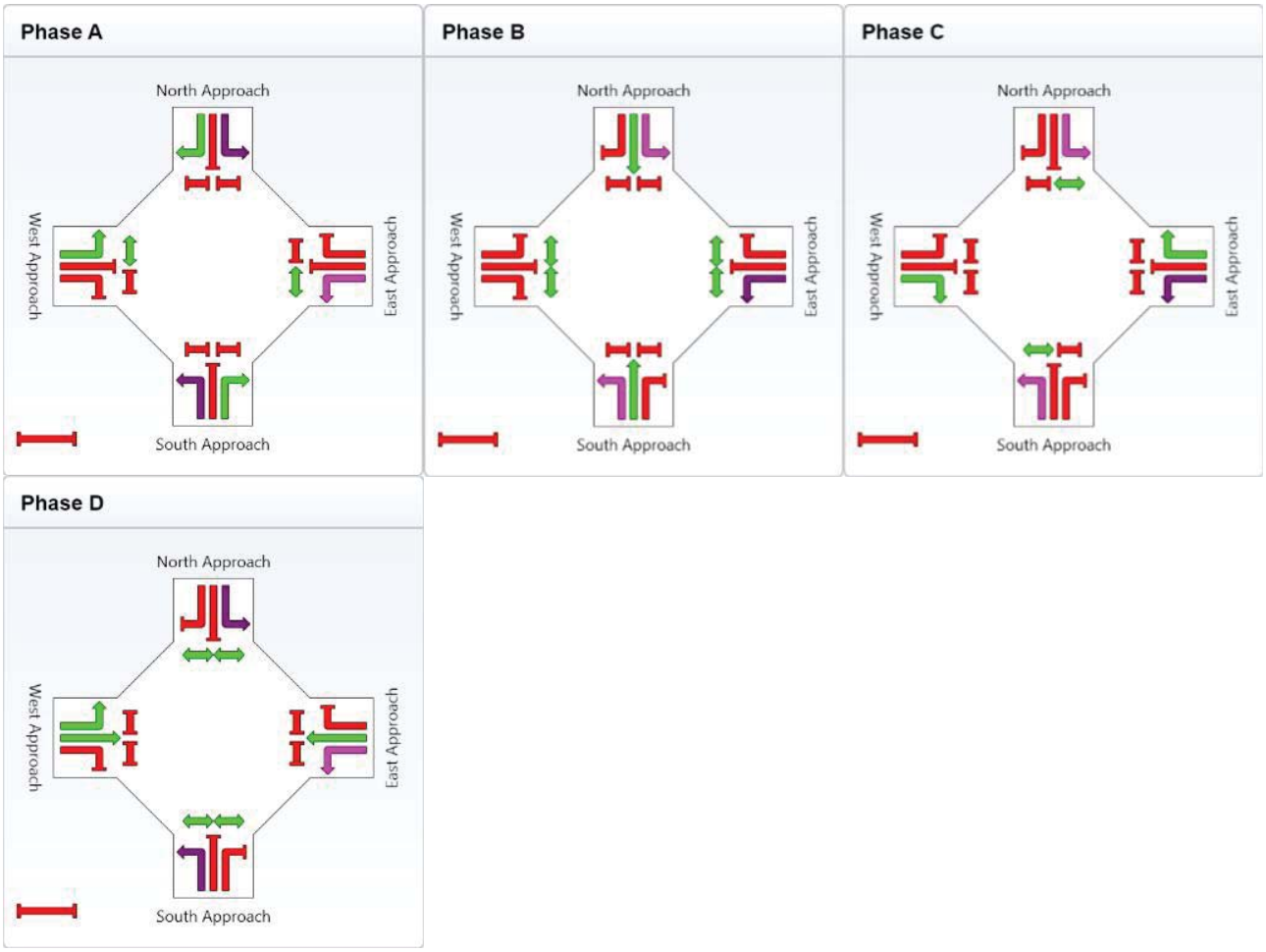
PHASING SUMMARY

IN-89-14 Interim AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	10	24	12	50
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	16	30	18	56
Phase Split	13 %	25 %	15 %	47 %



PHASING SUMMARY

IN-89-14 Interim PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Sequence B
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	8	27	12	49
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	14	33	18	55
Phase Split	12 %	28 %	15 %	46 %