



aimsun.

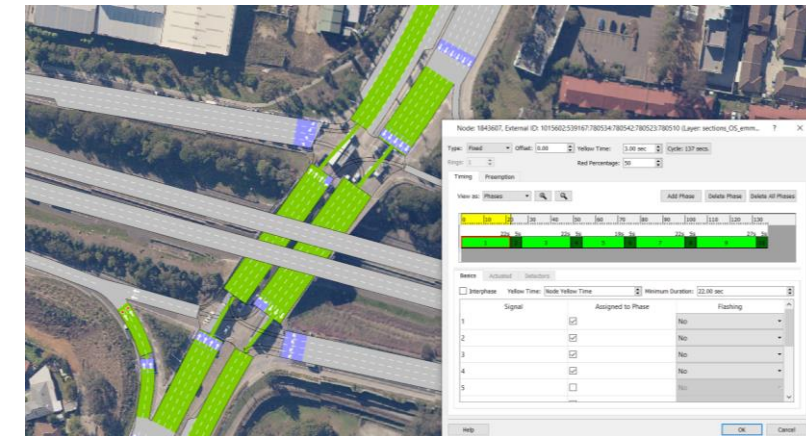
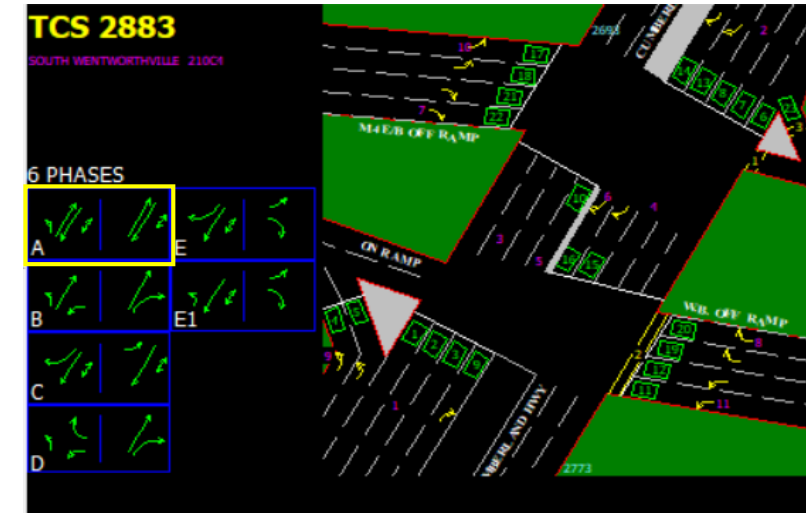
A Siemens Company

Aimsun – SIDRA interface

Speaker: Mohammad Saifuzzaman

Overview of signals in Aimsun Next

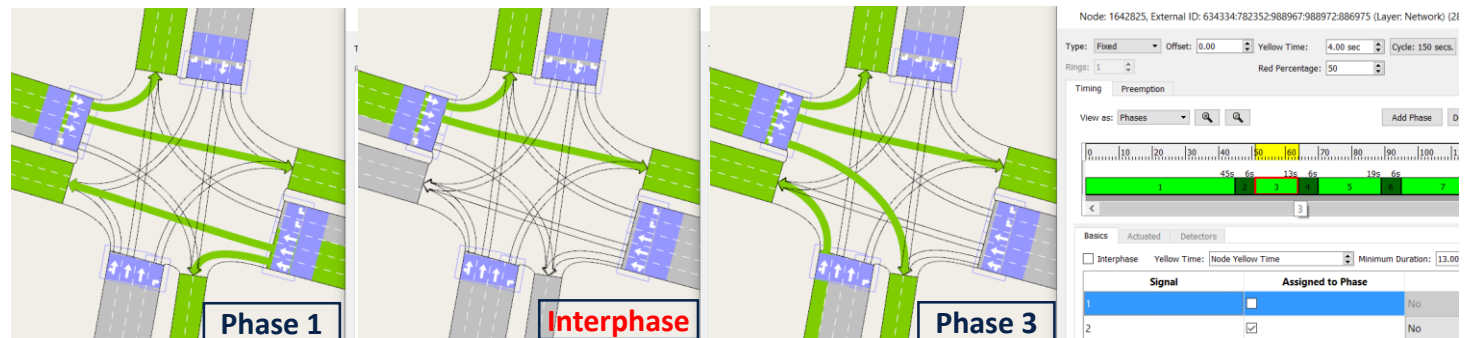
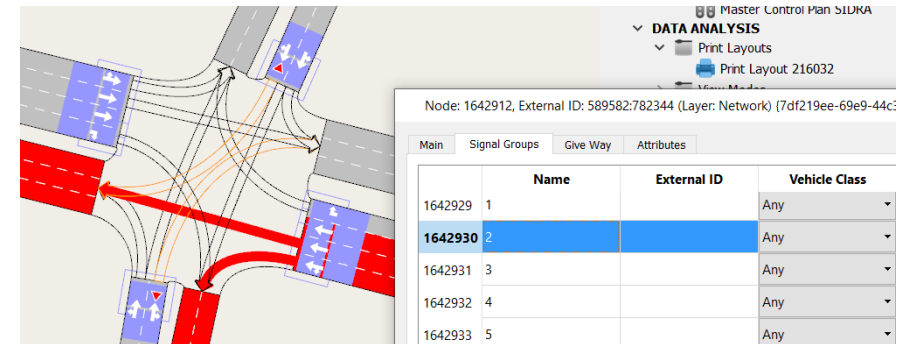
- Simple but powerful way of representing signal control
- Supports different signal types
 - fixed, actuated, co-ordinated etc
- Works SCATS ITS data import
 - Imports signal geometry, groups, phases, detectors
 - Import historical signal timing, and detector counts
- Interface with SCATSim
 - Interface developed with and certified by RMS
 - Available both at meso and micro level



Overview of traffic signals in Aimsun

Few differences with SIDRA

- Signal group
- Red percentage
- Interphase
- Multiple nodes in single CP



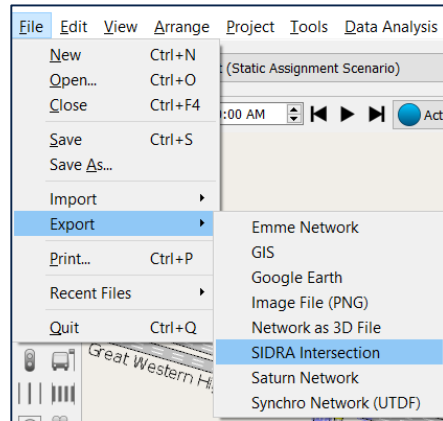


Interface design

Export to SIDRA

Requirements

- Blank SIDRA file
- Simulation result
 - Static experiment
 - Dynamic experiment
 - Mesoscopic
 - Microscopic
- Maximum 20 nodes

A screenshot of the 'Export to SIDRA' dialog box. The dialog has several sections: 'Export' (with a file path 'D:/PS tasks/Aimsun-SIDRA interface/Network'), 'Flow Input' (set to 'RPL 1648265: Original CP' with radio buttons for 'Path Assignment' and 'Turns'), 'Geometry' (with radio buttons for 'Export All Nodes' and 'Export Selected Nodes', and a dropdown for 'Whole Network'), 'Vehicles' (with dropdowns for 'Light Vehicle' set to '53: Car' and 'Heavy Vehicle' set to '65: Heavy Class'), 'Interval Flows' (with 'From' and 'To' time ranges set to '8:00 AM - 8:10 AM' and '8:50 AM - 9:00 AM' respectively, and an 'Aggregated' checkbox), and 'Signal Plan' (with a dropdown for 'Master Control Plan' and a 'Transfer Red Percentage' checkbox). At the bottom are 'Help', 'OK', and 'Cancel' buttons.

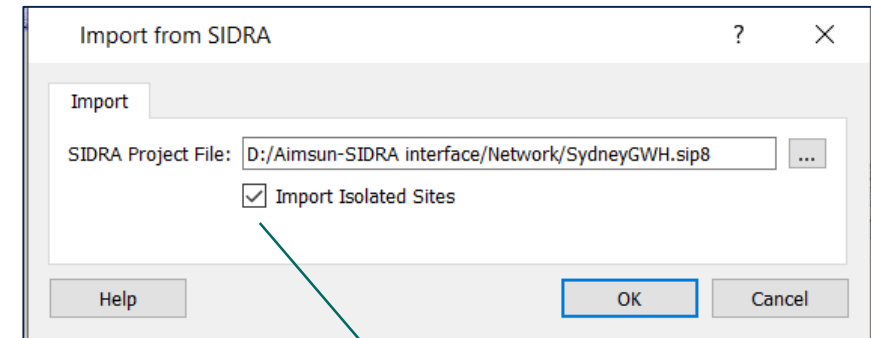
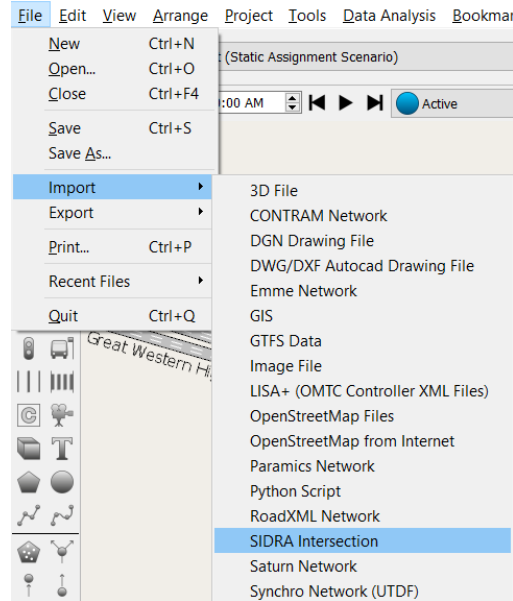
- Blank SIDRA file
- Aimsun Simulation experiment
- Options to generate demand from
- Export all or selected nodes
(Maximum 20 nodes)
- Vehicle type or class
available in the demand
- Duration of the demand
- Signal control plan used
- Option to generate red percentage

Interface design

Import from SIDRA

Requirements

- Same Aimsun network that has been used for export



Uncheck if the SIDRA process has been done at Network level

Example from real case

Export to SIDRA

Export

SIDRA Project File:

Flow Input:

Geometry

☒ Export All Nodes

☐ Export Selected Nodes

Vehicles

Light Vehicle:

Heavy Vehicle:

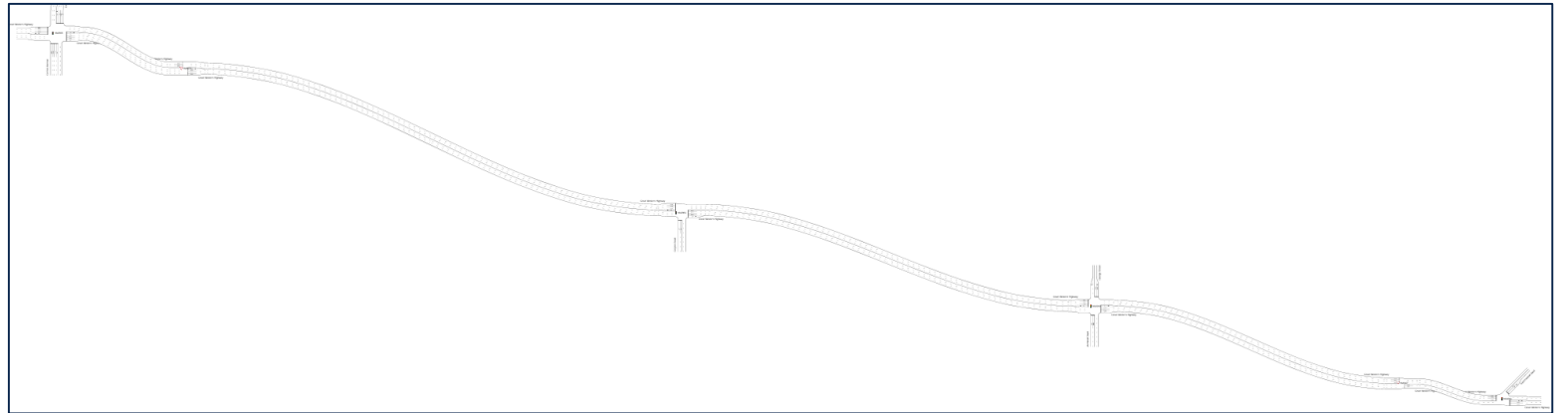
Interval Flows

Interval:

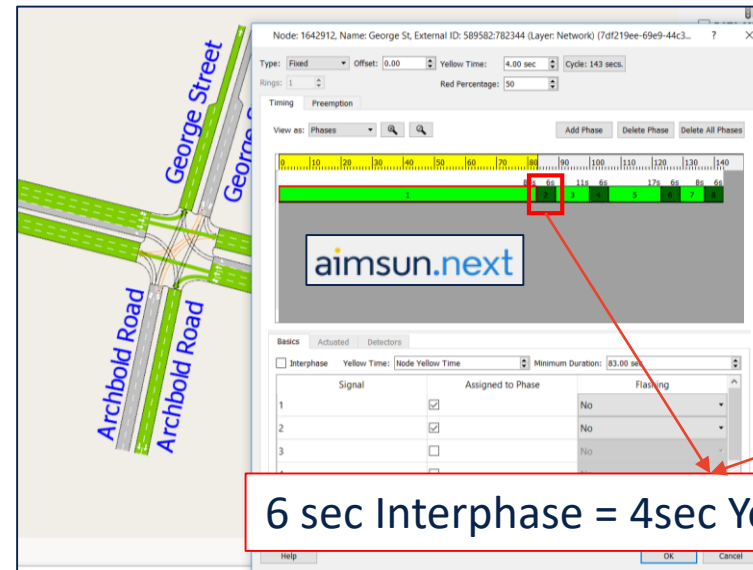
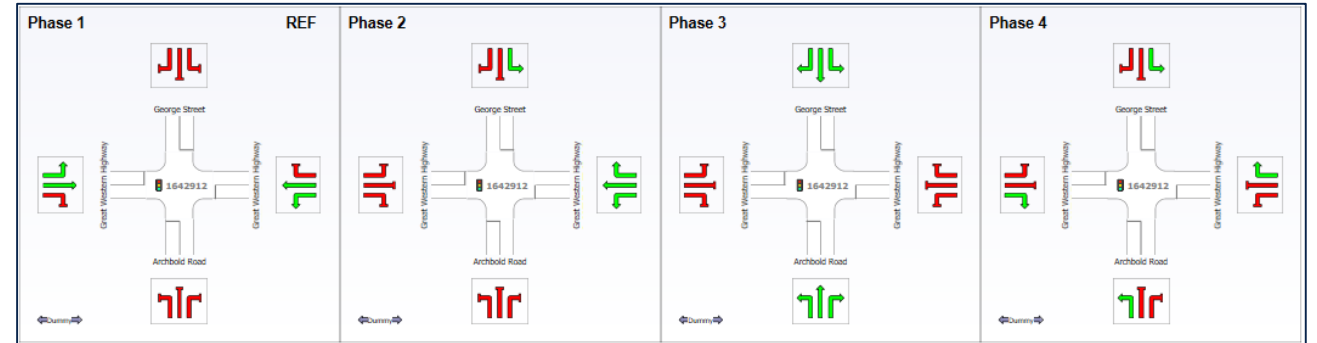
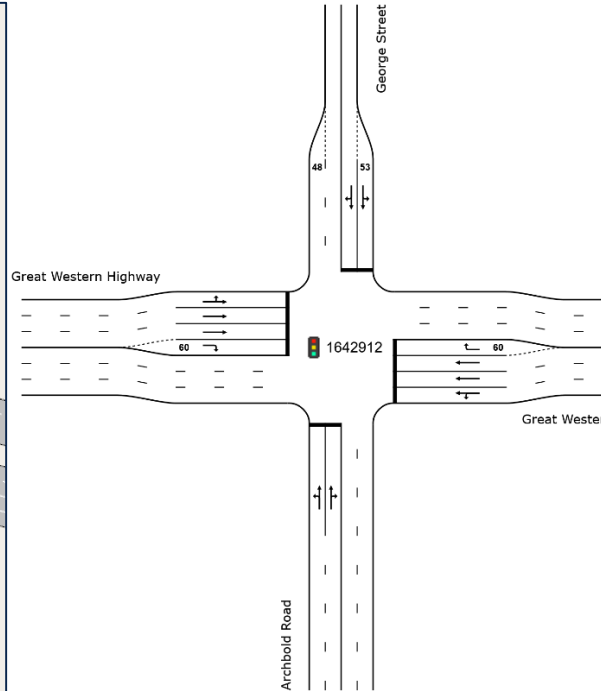
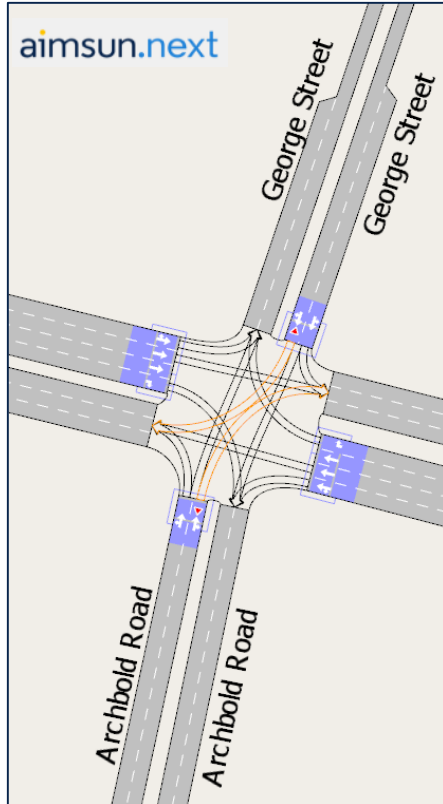
Signal Plan

Master Control Plan:

Help OK Cancel



George St. intersection



PHASING & TIMING - George St

Sequences | Sequence Editor | Phase & Sequence Data | Timing Options | Advanced

Sequence A

Phase Data

Phase	1	2	3	4
Variable Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reference Phase	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phase Time (optional)	89 sec	17 sec	23 sec	14 sec
Phase Frequency	Program	Program	Program	Program
Yellow Time	4 sec	4 sec	4 sec	4 sec
All-Red Time	2 sec	2 sec	2 sec	2 sec
Dummy Movement Data:				
Dummy Movement Exists	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Minimum Green Time	Program	Program	Program	Program
Maximum Green Time	Program	Program	Program	Program

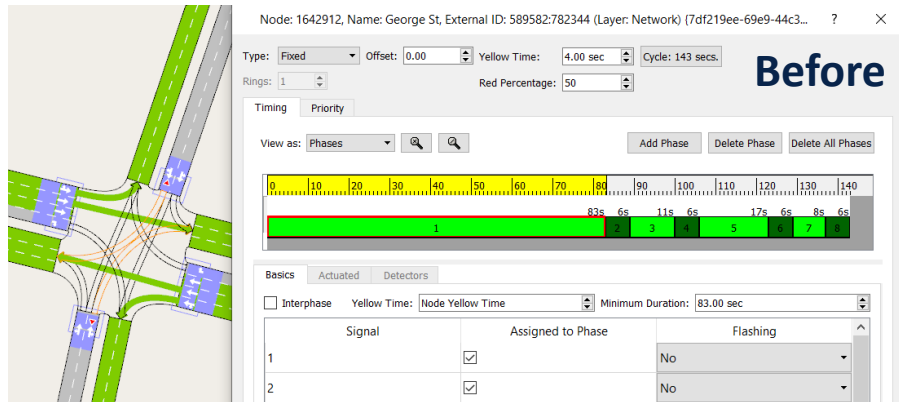
There must always be a phase (and only one phase) checked as the Reference Phase. The first phase will be used as the default Reference Phase.

Minor Movement
4.5 m

6 sec Interphase = 4sec Yellow + 2sec All-Red

Import Quality (George St. intersection)

- Cycle time has been updated
- Yellow time updated per signal groups
- Interphase time unchanged
- Minimum phase duration updated
- Red percentage needs to be checked
- An interphase has been added in between two phases



MOVEMENT TIMING

Site: 1642912 [George St]

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

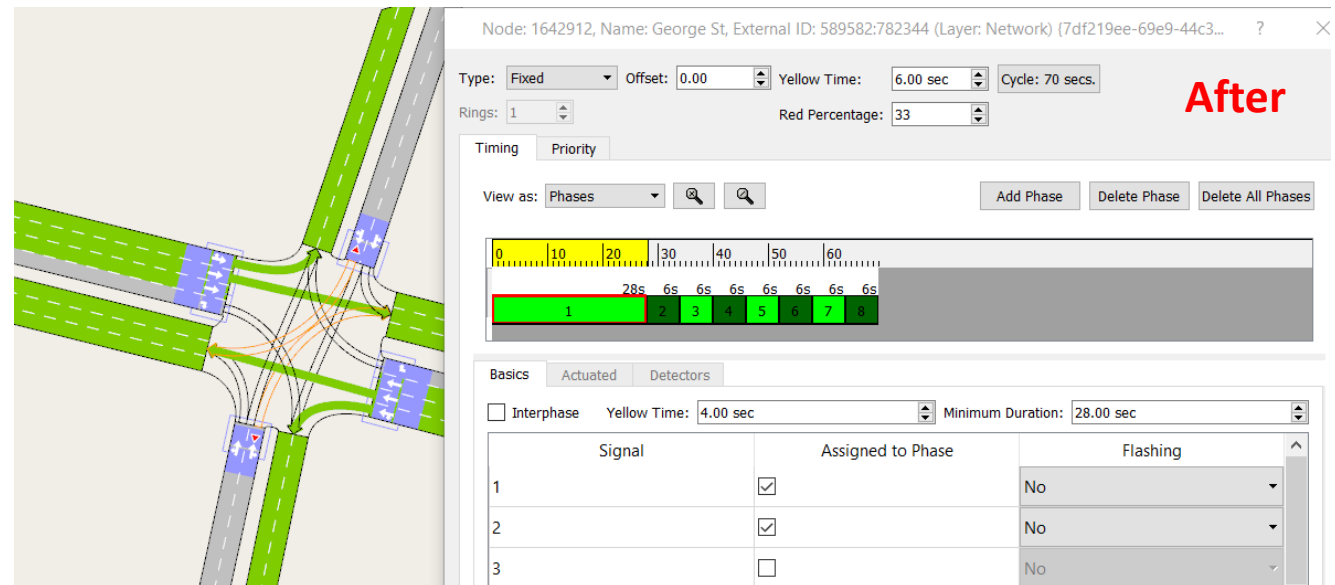
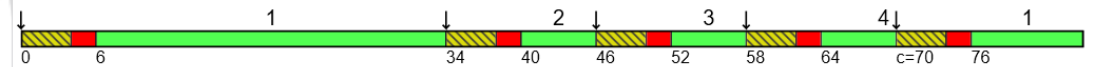
Phase Sequence: A

Reference Phase: Phase 1

Input Phase Sequence: 1, 2, 3, 4

Output Phase Sequence: 1, 2, 3, 4

Displayed Signal Timing - Phases



Import Quality (George St. intersection)

MOVEMENT TIMING

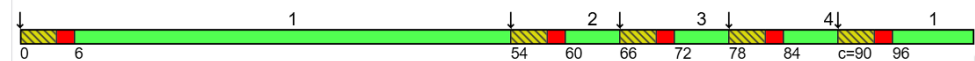
Processed as Network

Site: 1642912 [George St]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Phase Sequence: A
Reference Phase: Phase 1
Input Phase Sequence: 1, 2, 3, 4
Output Phase Sequence: 1, 2, 3, 4

Displayed Signal Timing - Phases



Node: 1642912, Name: George St, External ID: 589582:782344 (Layer: Network) (7df219ee-69e9-44c3... ? X)

Type: Fixed Offset: 0.00 Yellow Time: 6.00 sec Cycle: 90 secs.
Rings: 1 Red Percentage: 33

Timing Priority
View as: Phases Add Phase Delete Phase Delete All Phases

Basics Actuated Detectors
☐ Interphase Yellow Time: 4.00 sec Minimum Duration: 48.00 sec

Signal	Assigned to Phase	Flashing
1	<input checked="" type="checkbox"/>	No
2	<input checked="" type="checkbox"/>	No
3	<input type="checkbox"/>	No

MOVEMENT TIMING

Processed as isolated sites

Site: 1642912 [George St]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: A
Reference Phase: Phase 1
Input Phase Sequence: 1, 2, 3, 4
Output Phase Sequence: 1, 2, 3, 4

Displayed Signal Timing - Phases



Node: 1642912, Name: George St, External ID: 589582:782344 (Layer: Network) (7df219ee-69e9-44c3... ? X)

Type: Fixed Offset: 0.00 Yellow Time: 6.00 sec Cycle: 70 secs.
Rings: 1 Red Percentage: 33

Timing Priority
View as: Phases Add Phase Delete Phase Delete All Phases

Basics Actuated Detectors
☐ Interphase Yellow Time: 4.00 sec Minimum Duration: 28.00 sec

Signal	Assigned to Phase	Flashing
1	<input checked="" type="checkbox"/>	No
2	<input checked="" type="checkbox"/>	No
3	<input type="checkbox"/>	No

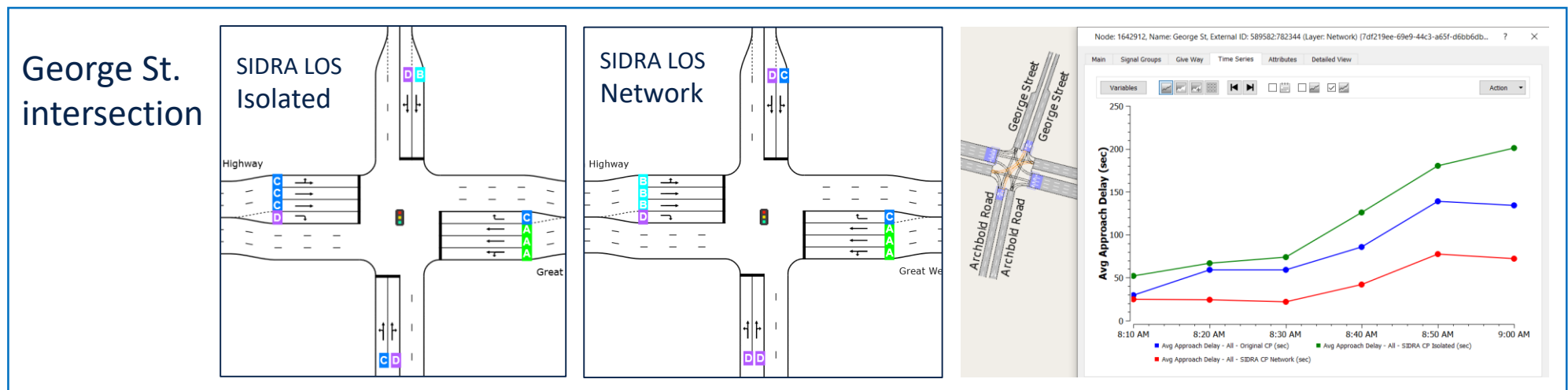
Simulation outcome with the new signals

Original - Isolated - Coordinated

- A quick isolated signal process did not improve the network performance.
- When processed as network in SIDRA (Fixed time coordinated), the new control plan has improved the overall network performance
- 3 out of 4 intersections has improved their LOS and the other remains unchanged

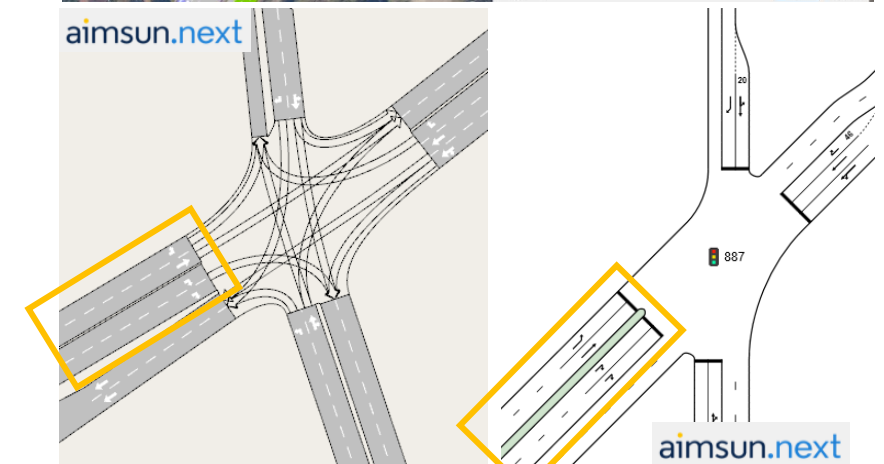
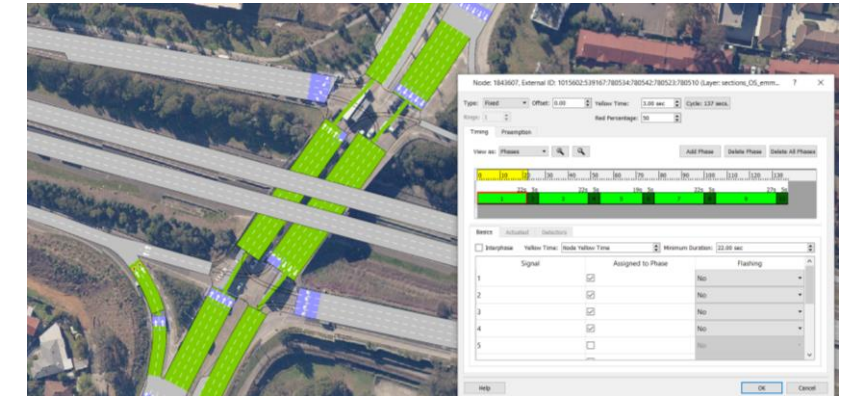
Network performance

	Original CP	SIDRA CP Isolated	SIDRA CP Network	Units
Delay Time	265.2	297.0	224.6	sec/km
Travel Time	314.9	347.2	274.5	sec/km
Mean Queue	241.8	369.0	229.1	veh
Stop Time	234.0	266.5	200.6	sec/km
Density	21.1	29.0	19.8	veh/km
Flow	4188.0	3919.0	4156.0	veh/h
Speed	22.4	21.0	25.9	km/h



Few complicated issues

- For multiple nodes in a CP
 - Aimsun Next considers them under same control plan
 - SIDRA considers it as two different intersections and process under common control group (CCG) option
- If the approach has multiple section
- Vehicle types and classes - use vehicle classes for more than two vehicle types in the demand
- Start lag - covered by the reaction time in traffic light
- End gain - Yellow time * red percentage



From South to Exit:	SW	N	NE
	L3	T1	R1
Total (veh)	142	107	253
Light Vehicles (%) *	98.59 %	92.52 %	77.08 %
Heavy Vehicles (%)	1.41 %	7.48 %	22.92 %
Input Check	OK	OK	OK

Future works...

- Aimsun is open with any suggestions to improve the interface
- Review export/import of complicated intersection geometries