

A9 / A96 Connections Study Combined Option Assessment

2 October 2013

Agenda

- Combined Options Assessment - MFTM
- Options:
 - Option A1/A2 – East Trunk Road Link with Longman GS
 - Option B1/B2 – Combined Inshes to Smithton 1 plus Stevenson Rd 1 plus Longman GS
 - Option C1/C2 – Combined Inshes to Smithton 3 (no new A9 s'bound slips at Inshes) plus Longman GS
 - Option D1/D2 - Combined Inshes to Smithton 4 plus Longman GS
- Indicative Economics
- Operational Assessment

Model Network Improvements

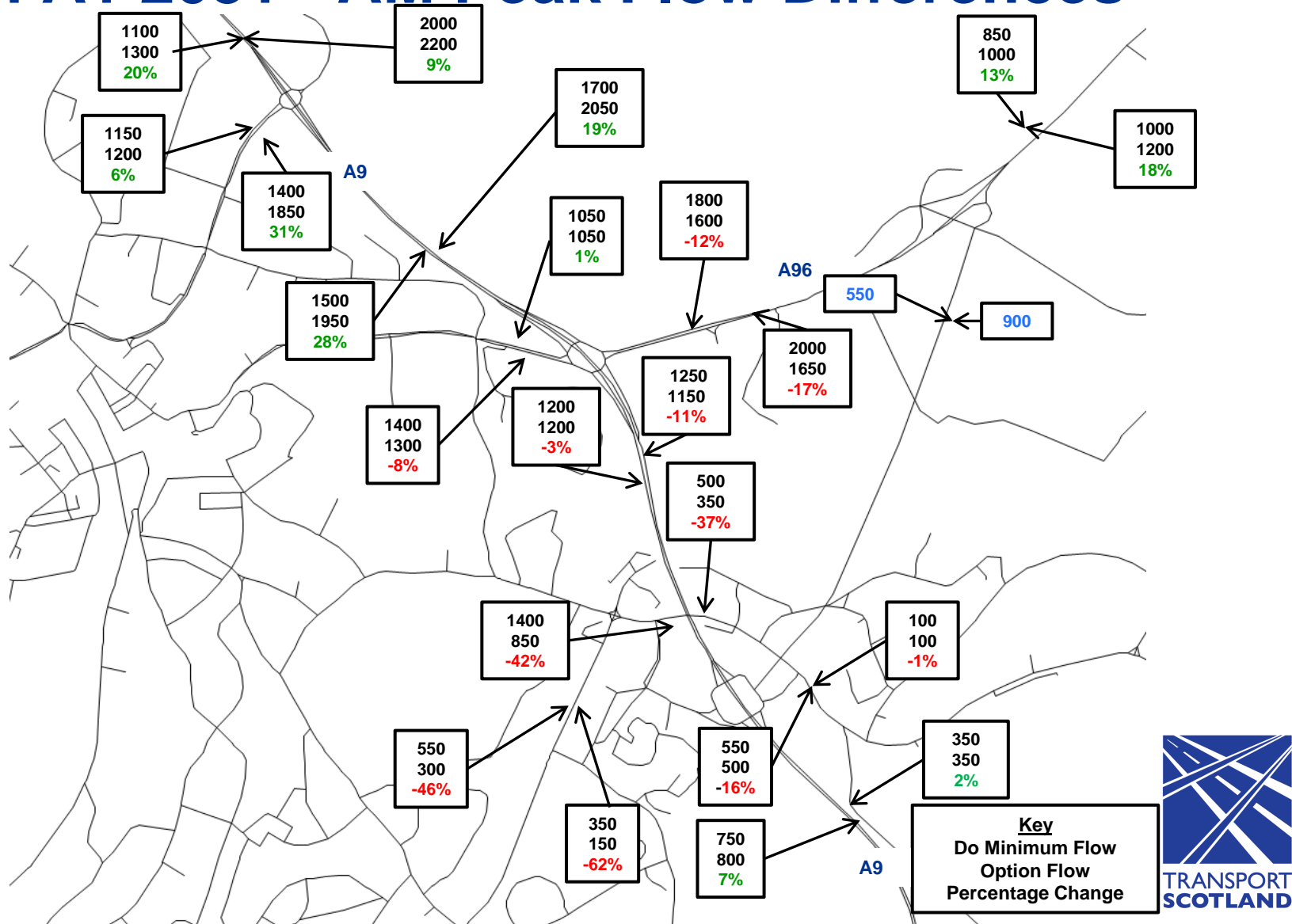
- Introduction of Bus Lane on A96 westbound to Raigmore
- Inclusion of southern access link from Options to Retail Park
- Inshes area - Culloden Rd/A9 Southbound off-slip/Caulfield Rd N signal adjustments
- Junction delay and blocking-back functions
- All options assume GS junction at Smithton is in place



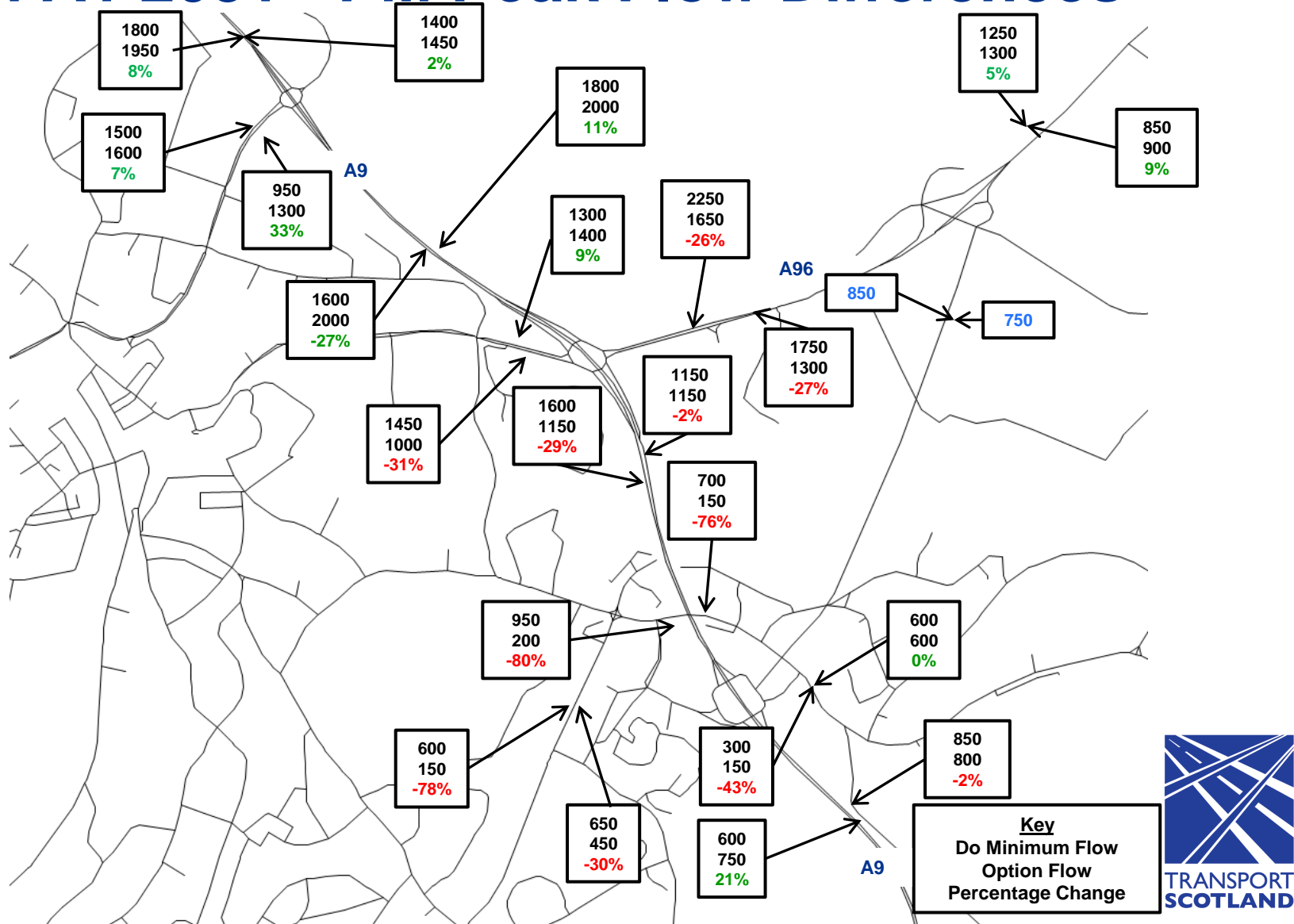
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<p>Project Name: A96 TRUNK ROAD IMPROVEMENTS TO NARH DMRB STAGE 2</p>	
<p>JACOBS <small>Infrastructure & Transport Solutions</small></p>	
<p>THE SCOTTISH GOVERNMENT</p>	
<p>A96 TRUNK ROAD IMPROVEMENTS TO NARH DMRB STAGE 2</p>	
<p>A96/A96 CONNECTIONS STUDY OPTION A</p>	
<p>FOR INFORMATION</p>	
<p>Project No: B1557601</p>	<p>Version: 0</p>
<p>Project Name: B1557601/CST/016</p>	<p>Rev: 0</p>
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Option A1 2031 - AM Peak Flow Differences



Option A1 2031 - PM Peak Flow Differences



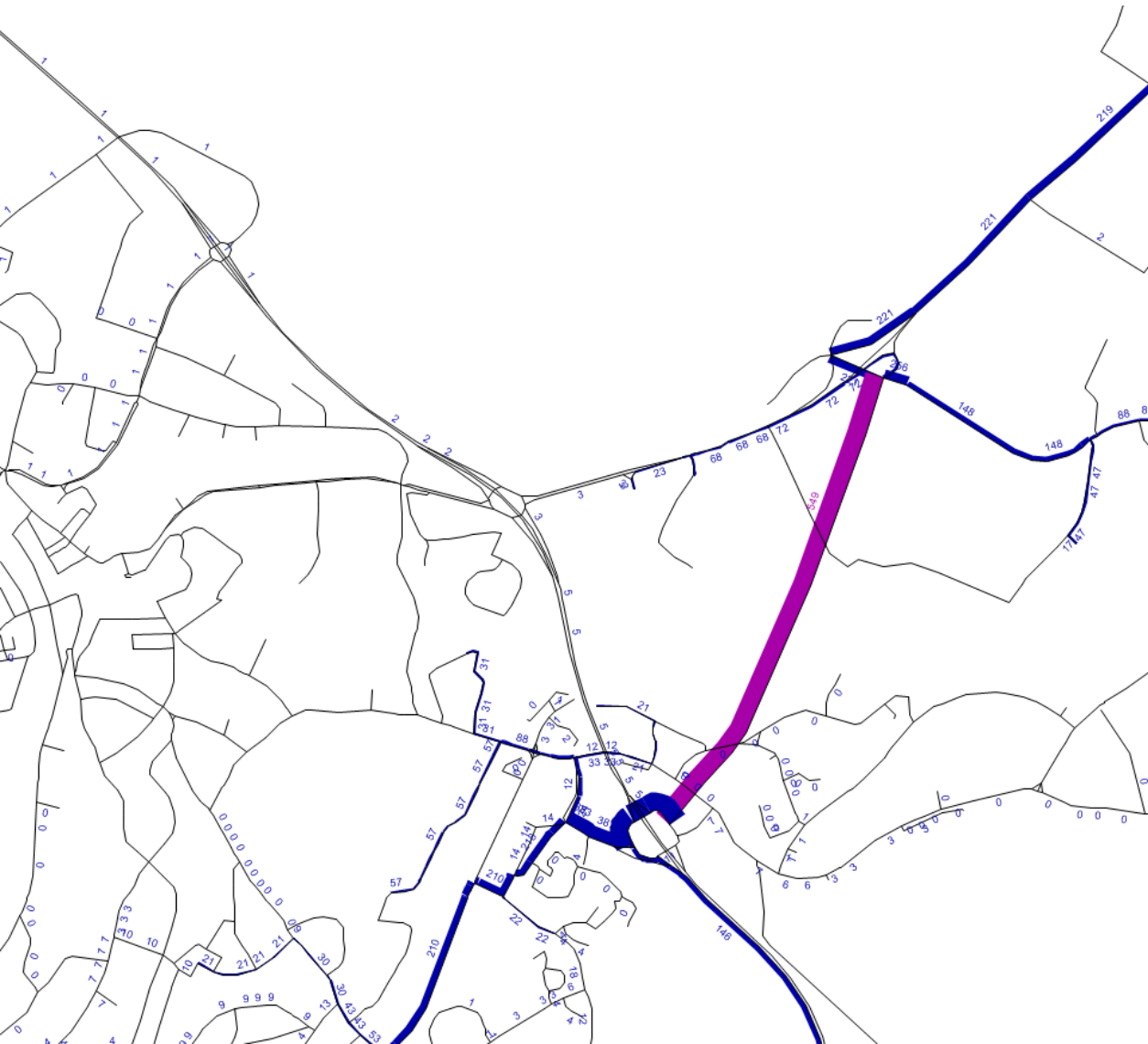
2031 Option A1- AM Peak Level of Service



2031 Option A1- PM Peak Level of Service

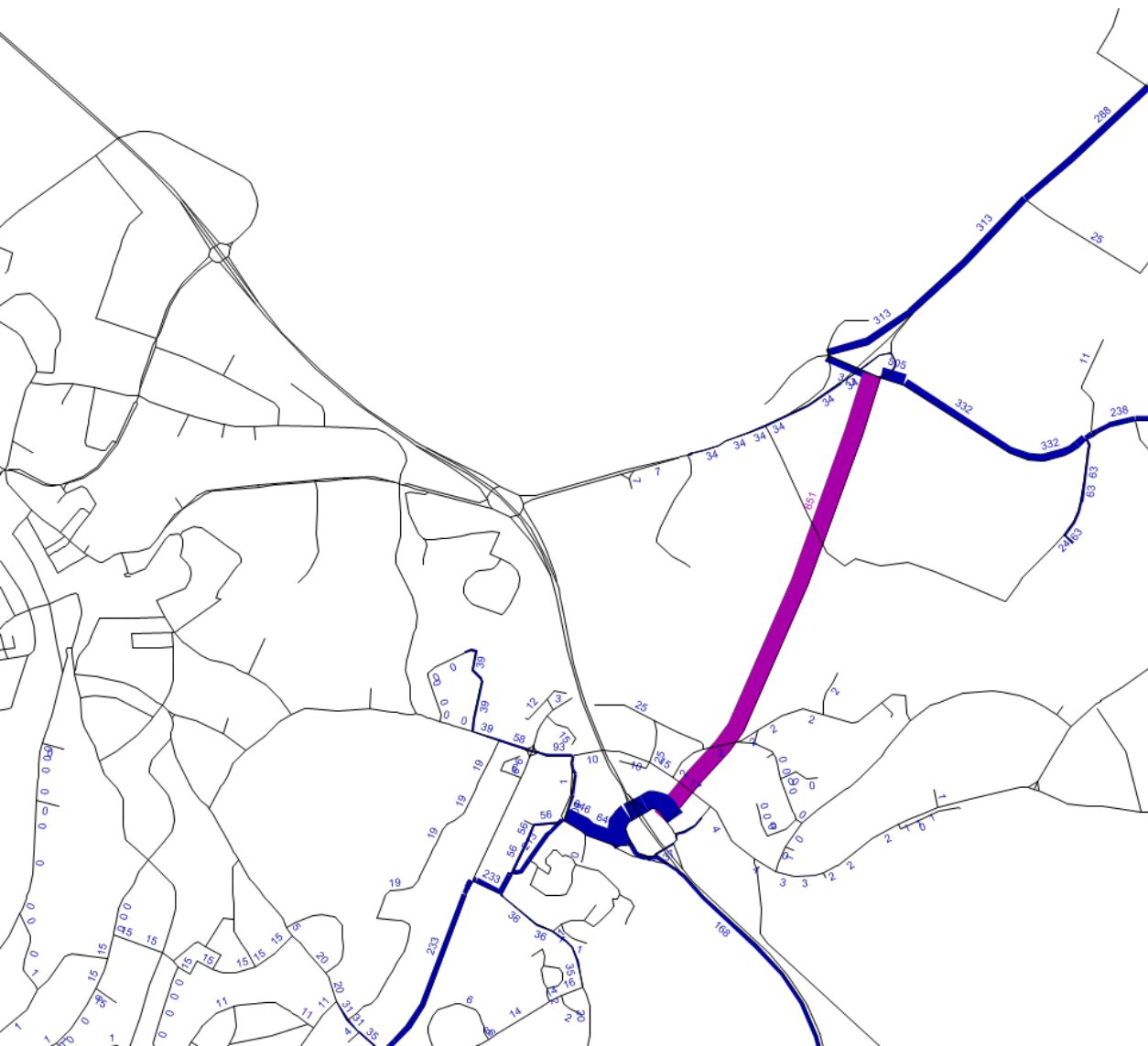


2031 Option A1- AM Peak Select Link Analysis



Inshes to Smithton
Trunk Road Link –
Northbound direction

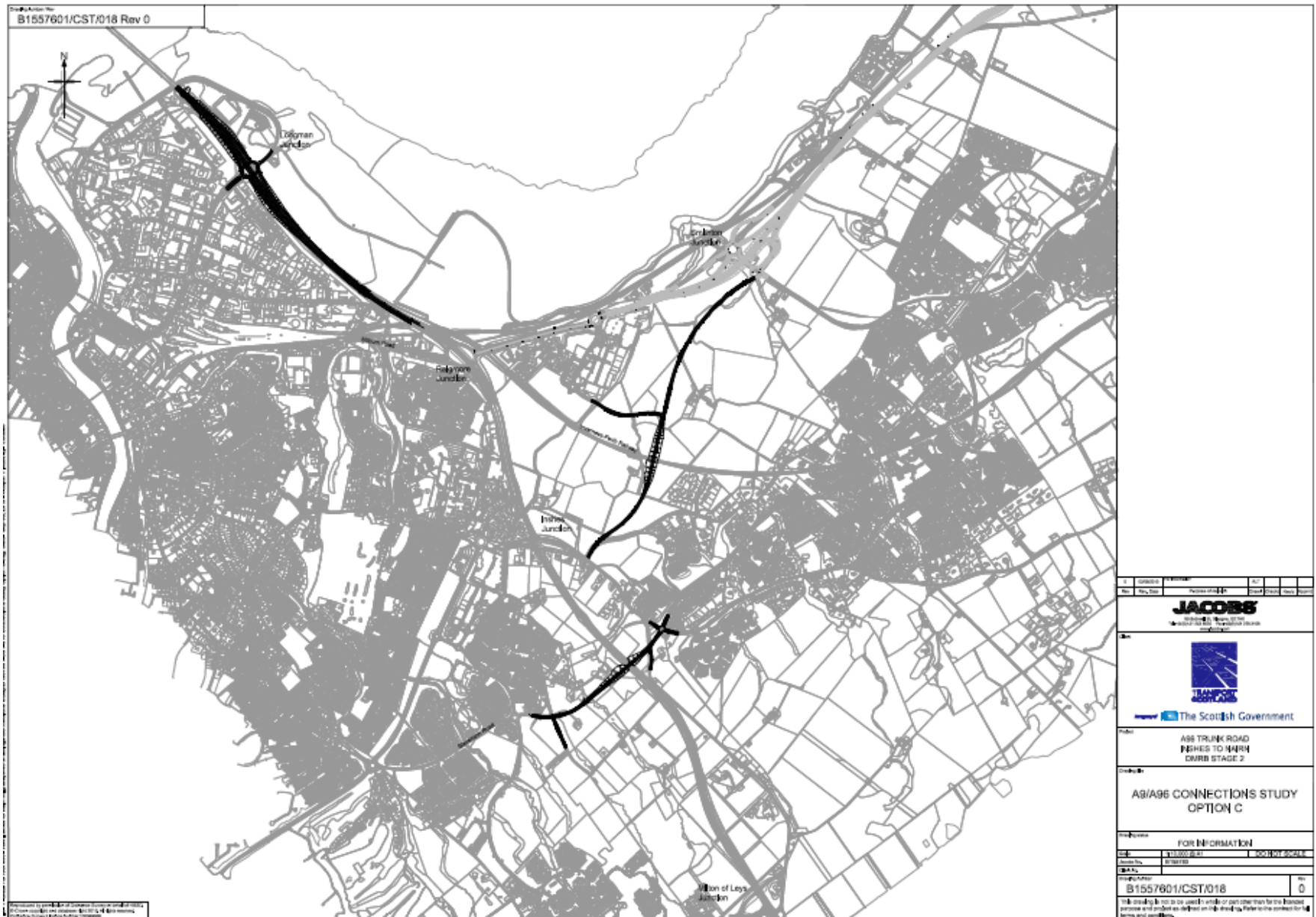
2031 Option A1- PM Peak SLA



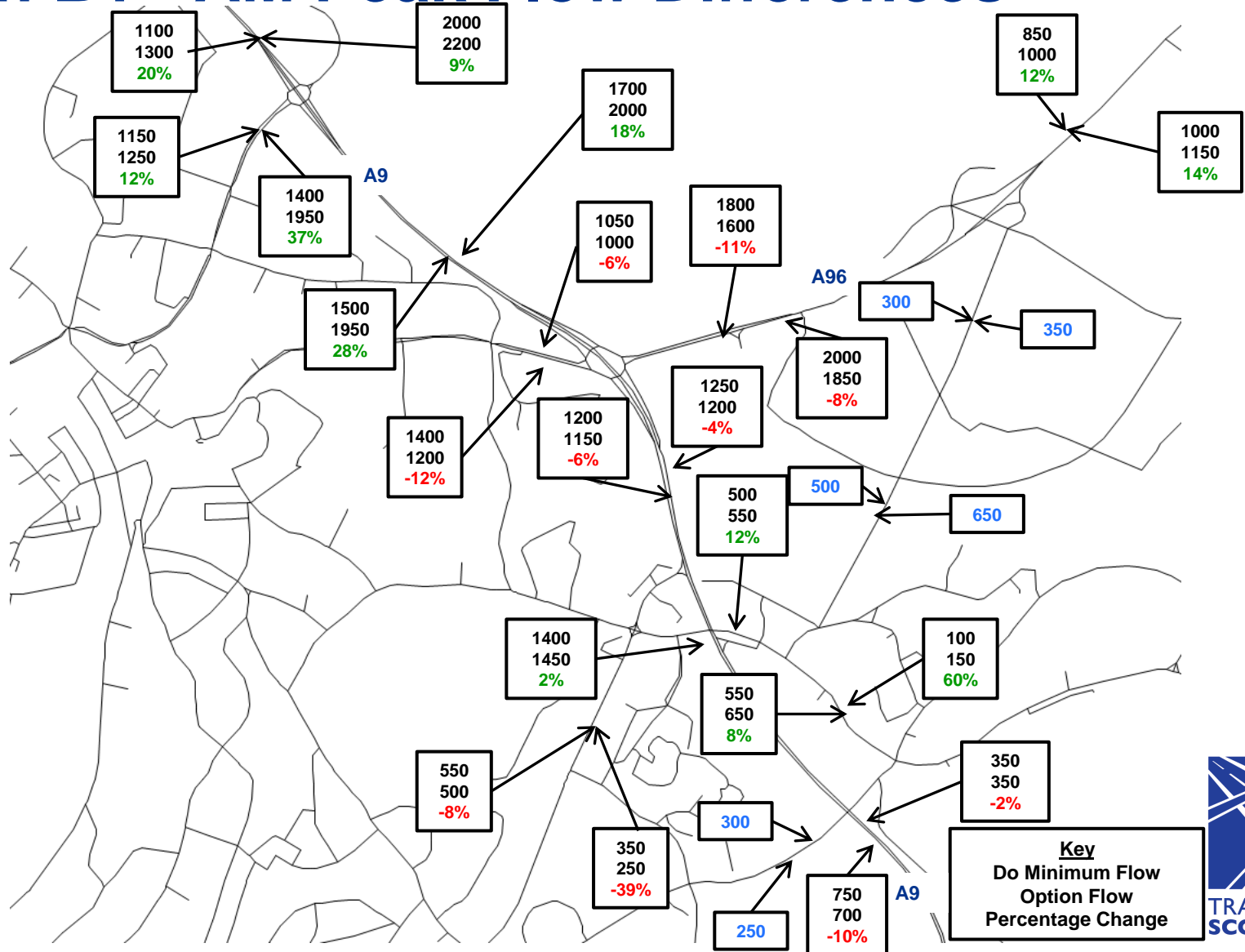
Inshes to Smithton
Trunk Road Link –
Northbound direction

Journey Time Changes (seconds)

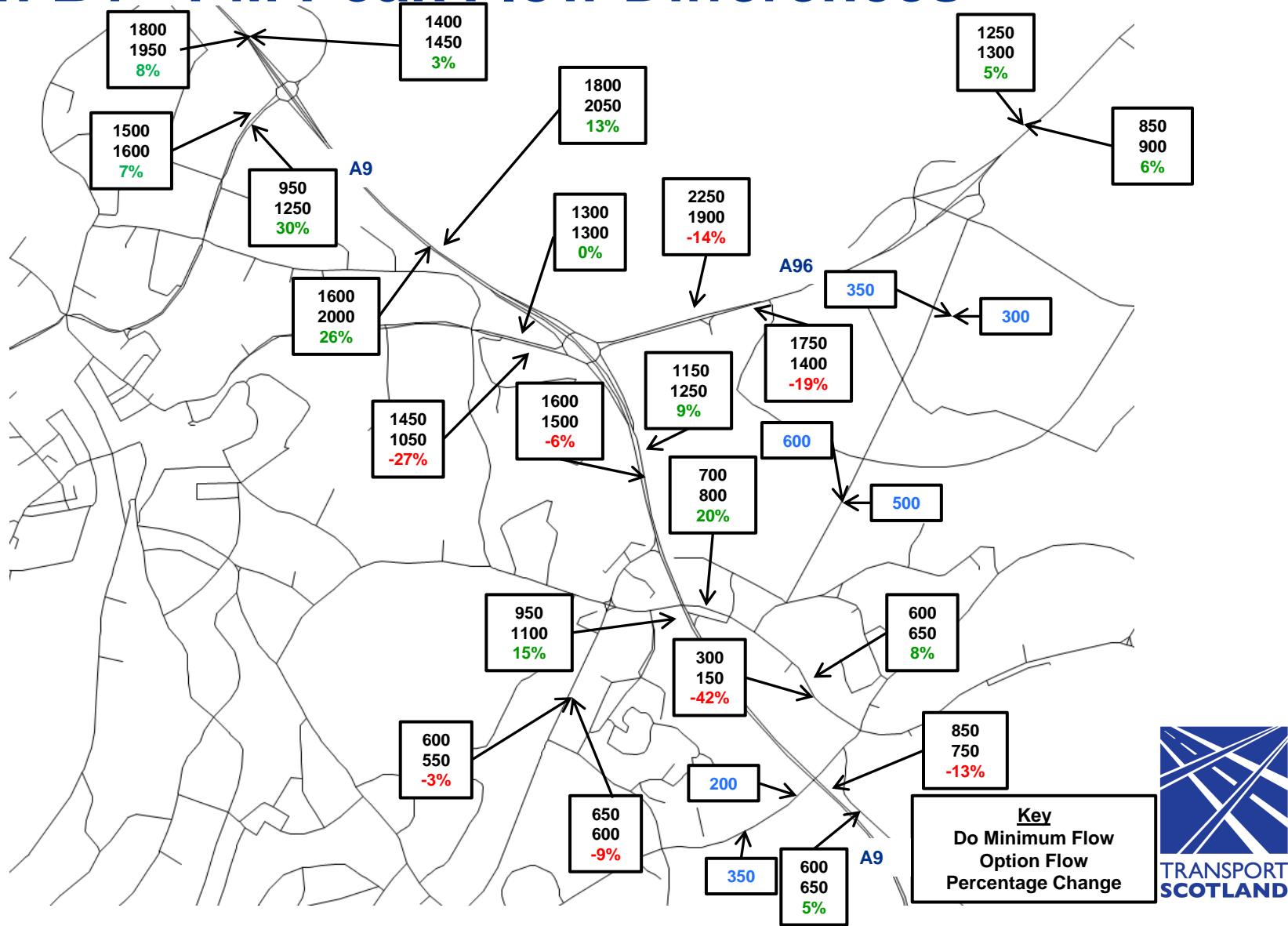
From Point	To Point	Do min		Opt A1		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	A96 East of Smithton	523	343	302	294	-221	-49	-42%	-14%
A9 Kessock Bridge	Barn Church Road	559	391	353	363	-207	-28	-37%	-7%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	292	281	-304	-138	-51%	-33%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	365	366	-247	-31	-40%	-8%
A9 Kessock Bridge	SDR South of Stevenson Road	702	721	437	488	-265	-233	-38%	-32%
A96 East of Smithton	A9 Kessock Bridge	761	492	347	297	-413	-195	-54%	-40%
A96 East of Smithton	Culloden Road east of B9177	502	366	173	171	-328	-195	-65%	-53%
A96 East of Smithton	A9 South of Milton of Leys	518	344	295	305	-223	-38	-43%	-11%
A96 East of Smithton	SDR South of Stevenson Road	607	668	317	377	-290	-290	-48%	-44%
Barn Church Road	A9 Kessock Bridge	809	530	476	366	-333	-163	-41%	-31%
Barn Church Road	Culloden Road east of B9177	549	403	247	199	-303	-205	-55%	-51%
Barn Church Road	A9 South of Milton of Leys	566	382	368	333	-198	-48	-35%	-13%
Barn Church Road	SDR South of Stevenson Road	655	706	391	405	-264	-300	-40%	-43%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	346	336	-352	-219	-50%	-39%
Culloden Road east of B9177	A96 East of Smithton	548	529	279	257	-269	-272	-49%	-51%
Culloden Road east of B9177	Barn Church Road	584	577	297	288	-287	-288	-49%	-50%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	350	355	-220	-129	-39%	-27%
A9 South of Milton of Leys	A96 East of Smithton	420	458	327	338	-93	-121	-22%	-26%
A9 South of Milton of Leys	Barn Church Road	457	506	345	369	-111	-137	-24%	-27%
SDR South of Stevenson Road	A9 Kessock Bridge	718	542	432	471	-286	-71	-40%	-13%
SDR South of Stevenson Road	A96 East of Smithton	576	522	374	398	-203	-124	-35%	-24%
SDR South of Stevenson Road	Barn Church Road	613	570	374	430	-239	-140	-39%	-25%
SDR South of Stevenson Road	Culloden Road east of B9177	346	308	302	299	-44	-9	-13%	-3%
SDR South of Stevenson Road	A9 South of Milton of Leys	458	441	423	458	-34	17	-8%	4%
A96 East of Smithton	Millburn Road/Harbour Road Junction	396	175	208	146	-187	-29	-47%	-17%
Millburn Road/Harbour Road Junction	A96 East of Smithton	179	190	174	190	-5	1	-3%	0%



Option B1 - AM Peak Flow Differences



Option B1 - PM Peak Flow Differences



2031 Option B1- AM Peak Level of Service



2031 Option B1- PM Peak Level of Service

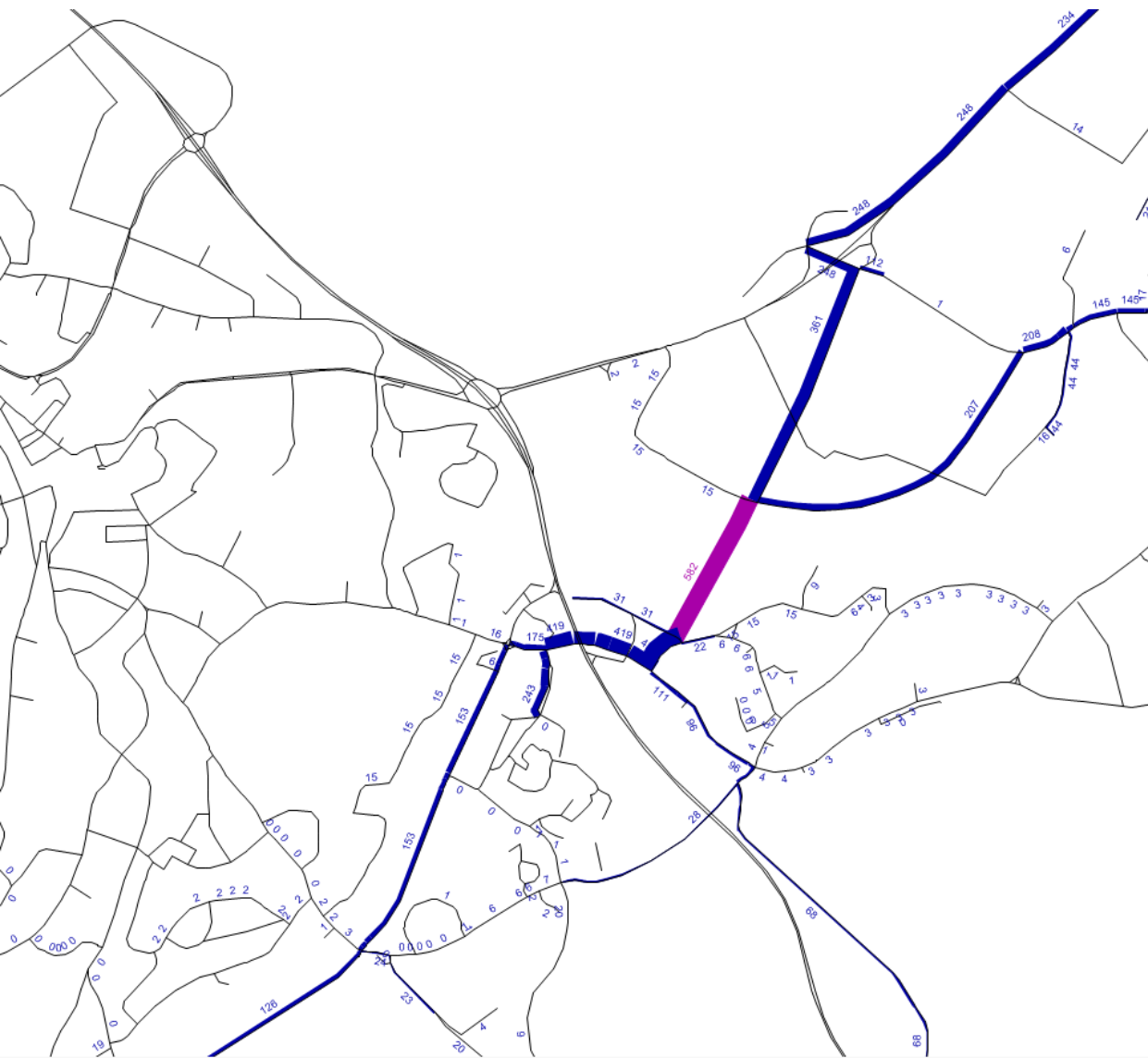


2031 Option B1- AM Peak SLA



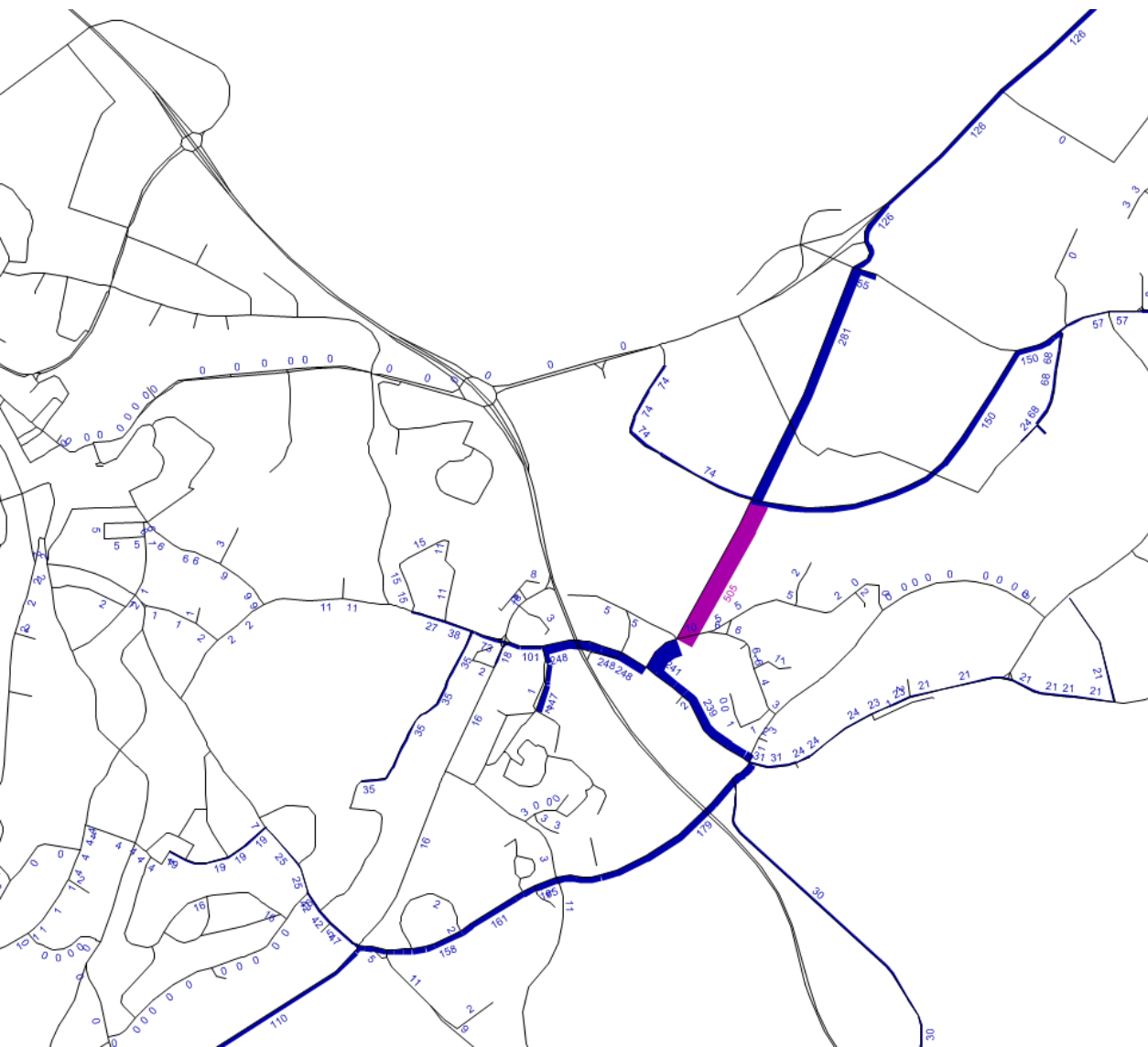
Inshes to Smithton
Link –
Southbound direction

2031 Option B1- PM Peak SLA



Inshes to Smithton
Link –
Northbound direction

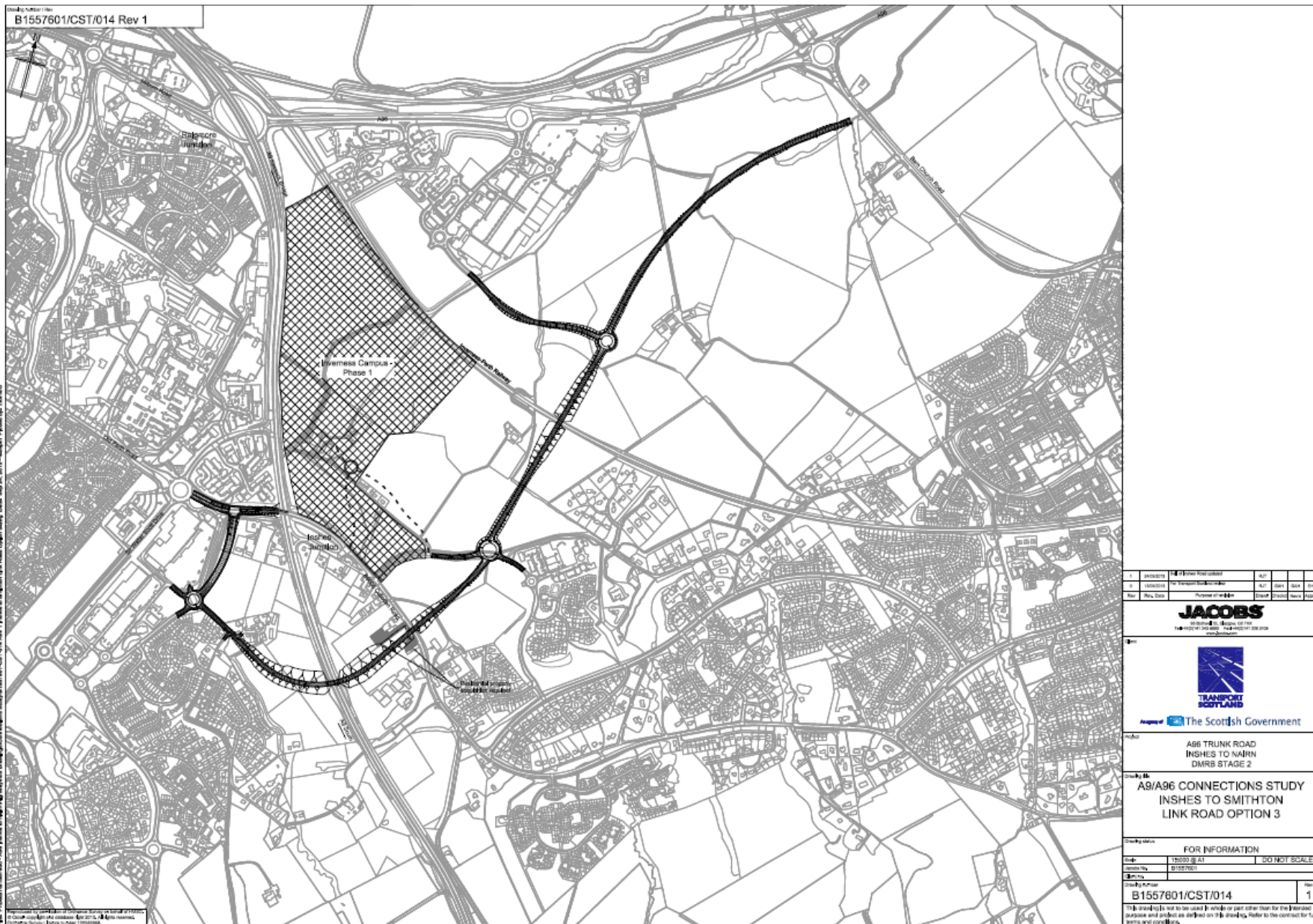
2031 Option B1- PM Peak SLA



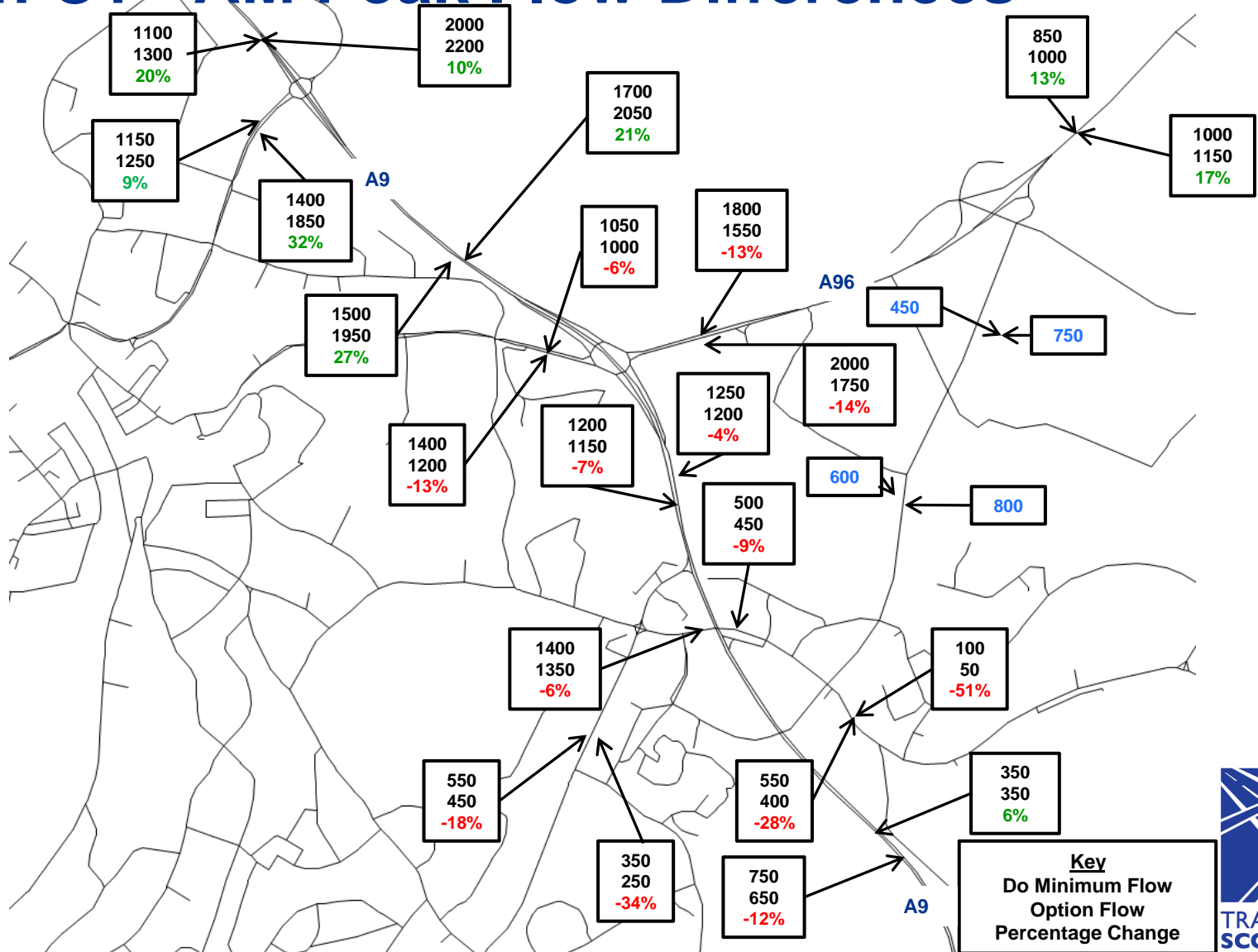
Inshes to Smithton
Link –
Southbound direction

Journey Time Changes (seconds)

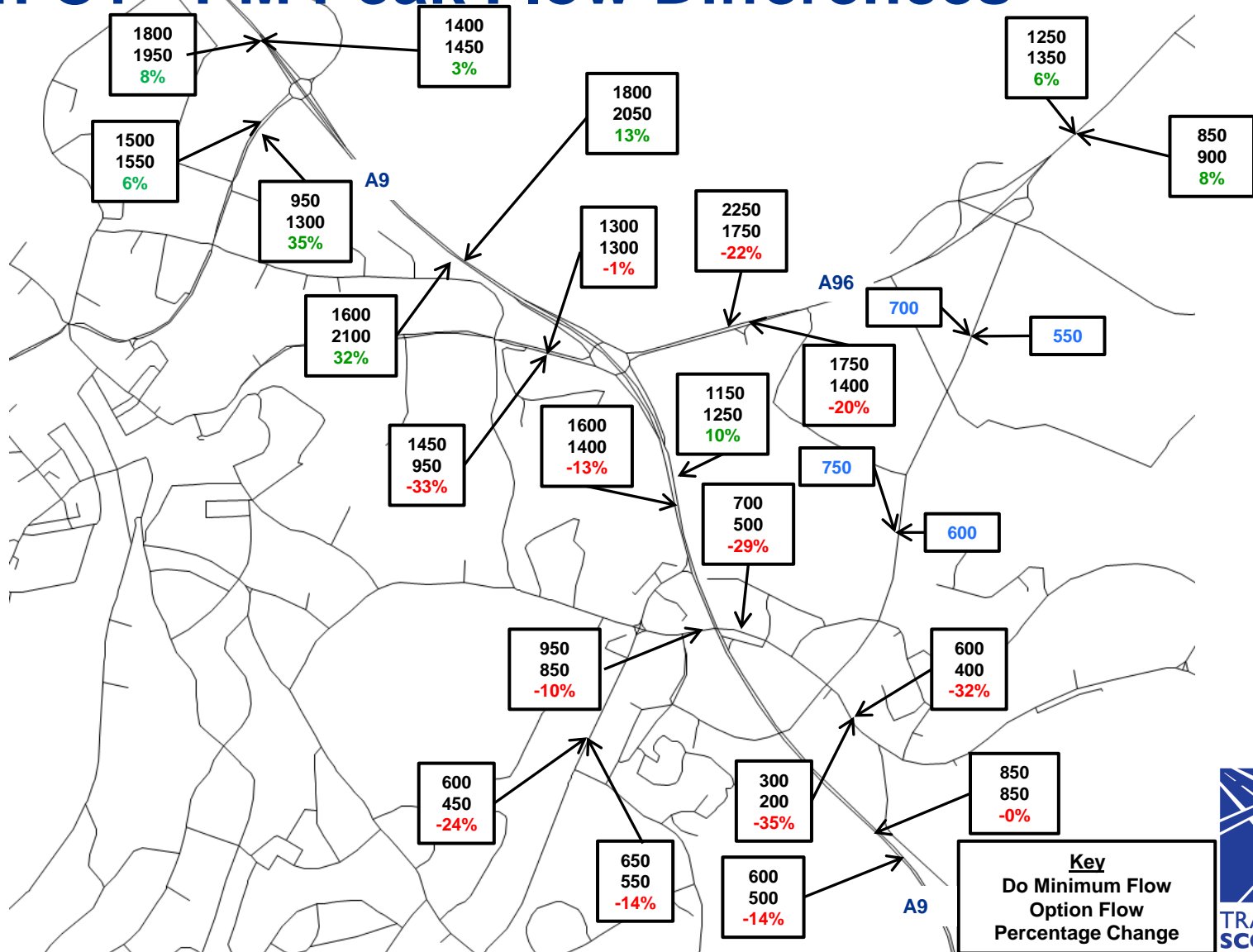
From Point	To Point	Do min		Opt B1		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	A96 East of Smithton	523	343	290	285	-232	-58	-44%	-17%
A9 Kessock Bridge	Barn Church Road	559	391	340	345	-220	-46	-39%	-12%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	319	331	-277	-87	-46%	-21%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	373	367	-239	-30	-39%	-8%
A9 Kessock Bridge	SDR South of Stevenson Road	702	721	486	445	-216	-276	-31%	-38%
A96 East of Smithton	A9 Kessock Bridge	761	492	416	321	-345	-171	-45%	-35%
A96 East of Smithton	Culloden Road east of B9177	502	366	235	237	-267	-129	-53%	-35%
A96 East of Smithton	A9 South of Milton of Leys	518	344	350	322	-168	-22	-32%	-6%
A96 East of Smithton	SDR South of Stevenson Road	607	668	437	438	-170	-230	-28%	-34%
Barn Church Road	A9 Kessock Bridge	809	530	506	389	-303	-141	-37%	-27%
Barn Church Road	Culloden Road east of B9177	549	403	232	234	-317	-169	-58%	-42%
Barn Church Road	A9 South of Milton of Leys	566	382	421	422	-145	41	-26%	11%
Barn Church Road	SDR South of Stevenson Road	655	706	541	467	-114	-238	-17%	-34%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	488	444	-209	-111	-30%	-20%
Culloden Road east of B9177	A96 East of Smithton	548	529	221	257	-327	-271	-60%	-51%
Culloden Road east of B9177	Barn Church Road	584	577	210	253	-374	-324	-64%	-56%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	357	365	-213	-120	-37%	-25%
A9 South of Milton of Leys	A96 East of Smithton	420	458	404	412	-16	-47	-4%	-10%
A9 South of Milton of Leys	Barn Church Road	457	506	475	509	18	3	4%	1%
SDR South of Stevenson Road	A9 Kessock Bridge	718	542	460	403	-258	-139	-36%	-26%
SDR South of Stevenson Road	A96 East of Smithton	576	522	444	450	-133	-72	-23%	-14%
SDR South of Stevenson Road	Barn Church Road	613	570	432	468	-180	-102	-29%	-18%
SDR South of Stevenson Road	Culloden Road east of B9177	346	308	189	194	-156	-113	-45%	-37%
SDR South of Stevenson Road	A9 South of Milton of Leys	458	441	366	372	-92	-69	-20%	-16%
A96 East of Smithton	Millburn Road/Harbour Road Junction	396	175	264	150	-132	-26	-33%	-15%
Millburn Road/Harbour Road Junction	A96 East of Smithton	179	190	165	171	-14	-19	-8%	-10%



Option C1 - AM Peak Flow Differences



Option C1 - PM Peak Flow Differences



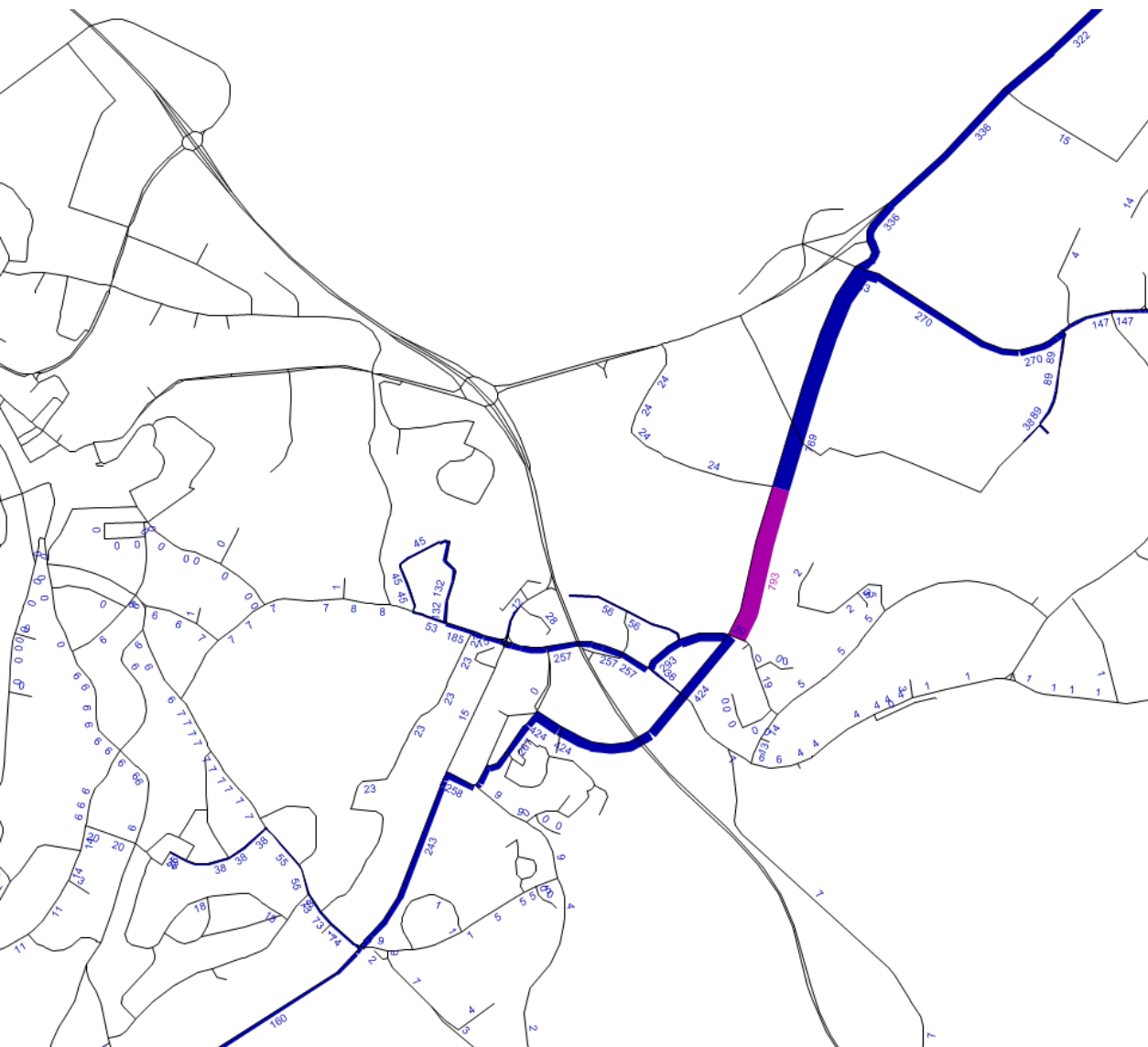
2031 Option C1- AM Peak Level of Service



2031 Option C1- PM Peak Level of Service

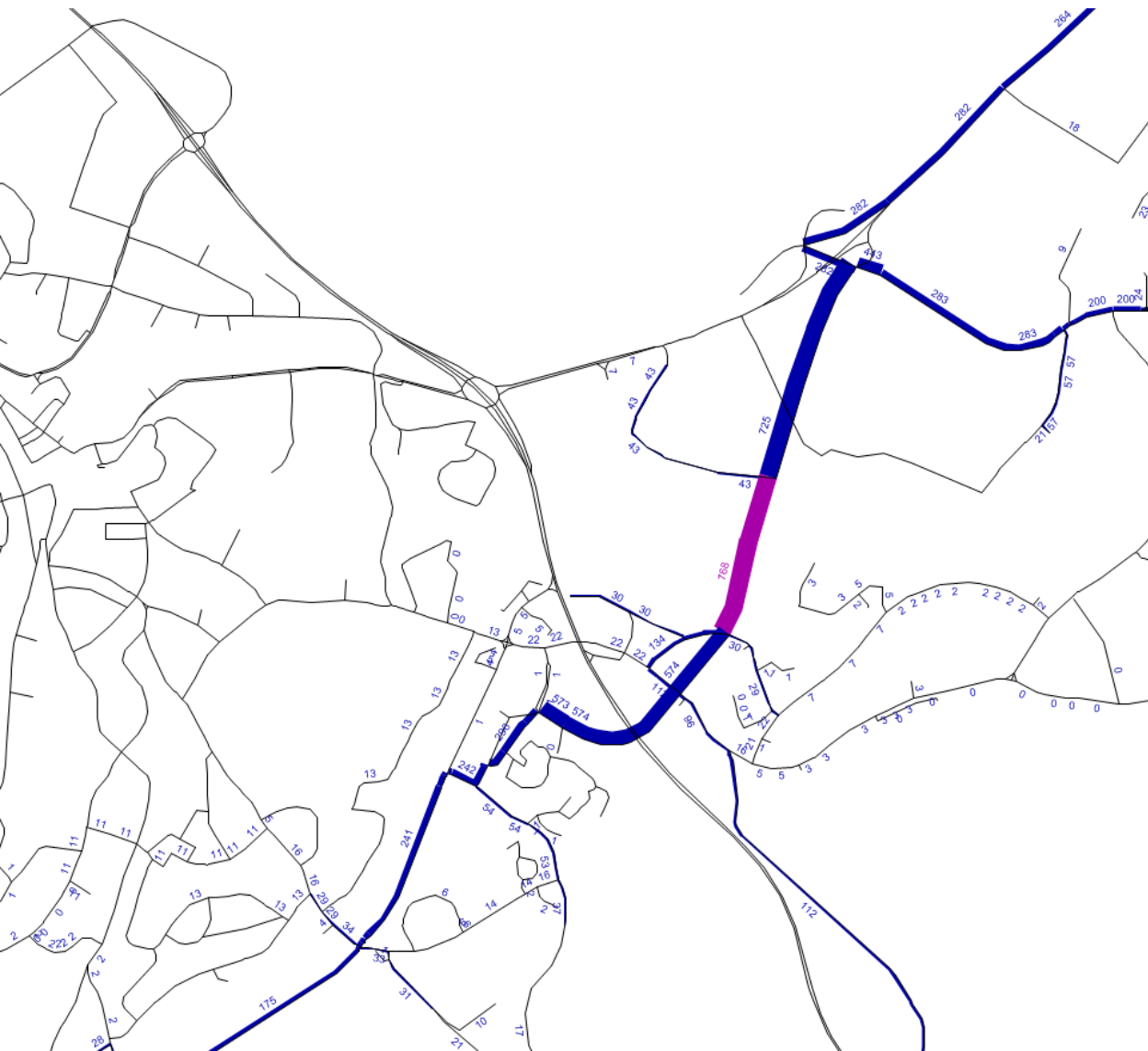


2031 Option C1- AM Peak SLA



Inshes to Smithton
Link –
Southbound direction

2031 Option C1- PM Peak SLA



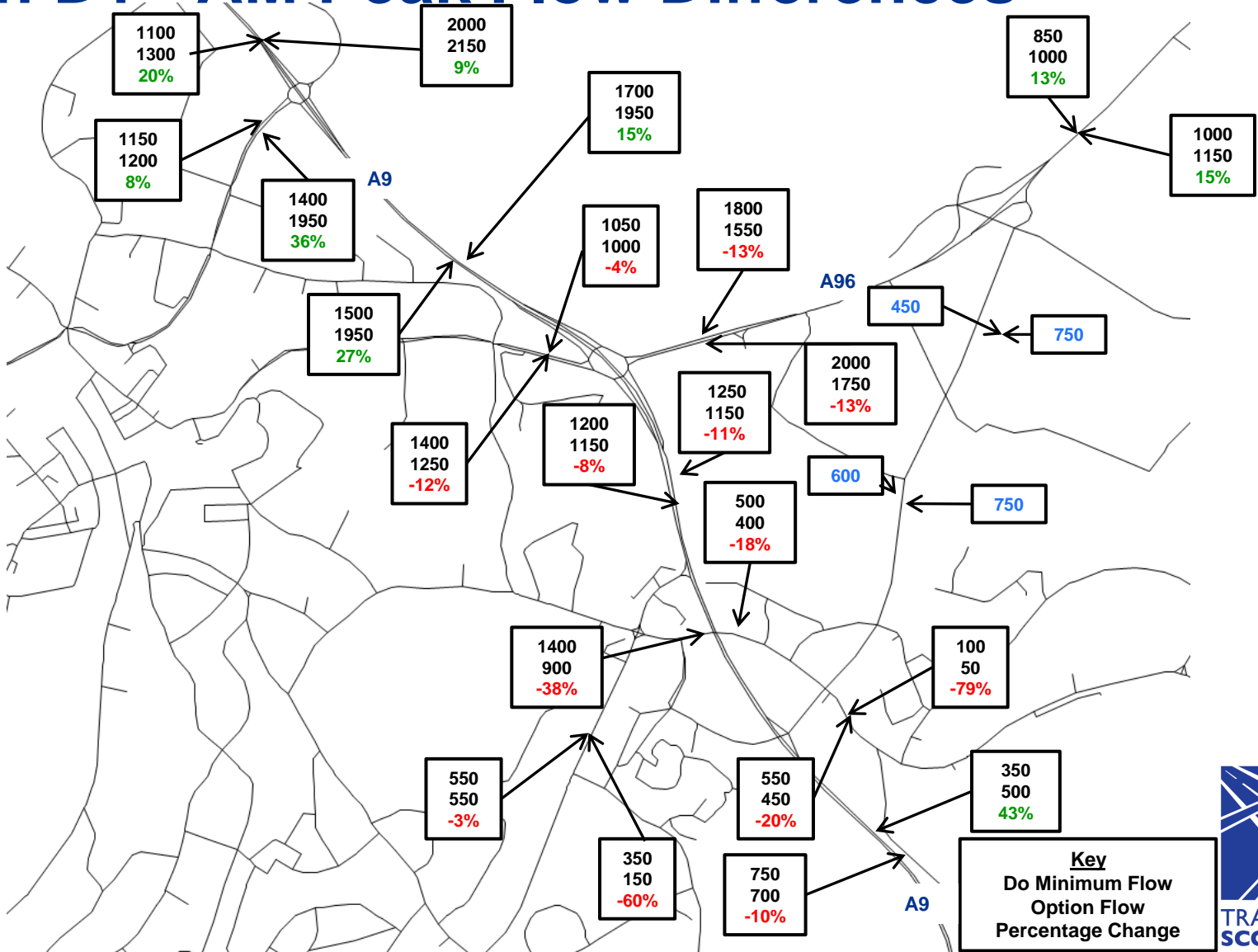
Inshes to Smithton
Link –
Northbound direction

Journey Time Changes (seconds)

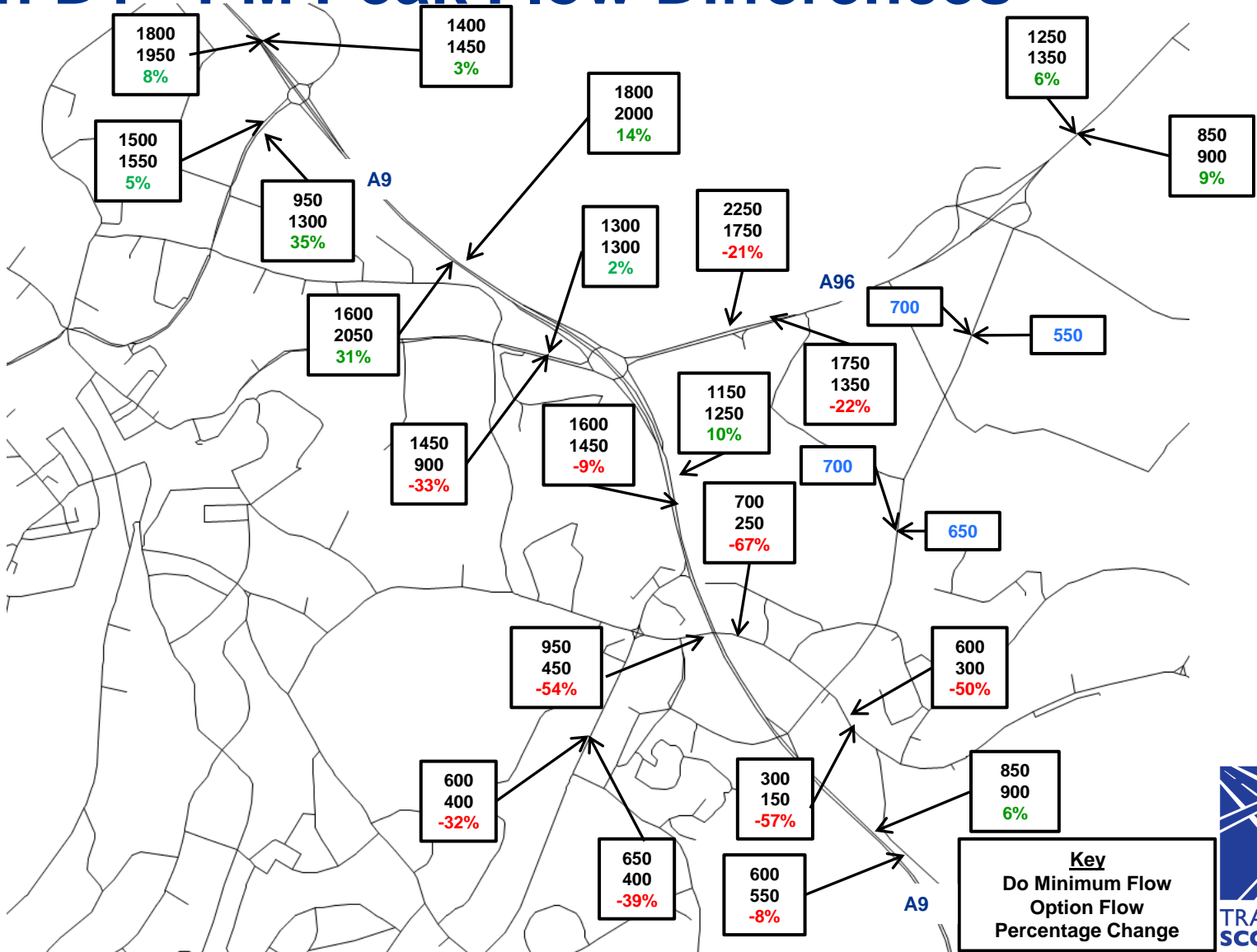
From Point	To Point	Do min		Opt C1		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	A96 East of Smithton	523	343	290	285	-232	-58	-44%	-17%
A9 Kessock Bridge	Barn Church Road	559	391	340	345	-220	-46	-39%	-12%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	319	331	-277	-87	-46%	-21%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	373	367	-239	-30	-39%	-8%
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Barn Church Road	A9 Kessock Bridge	809	530	506	389	-303	-141	-37%	-27%
Barn Church Road	Culloden Road east of B9177	549	403	232	234	-317	-169	-58%	-42%
Barn Church Road	A9 South of Milton of Leys	566	382	421	422	-145	41	-26%	11%
Barn Church Road	SDR South of Stevenson Road	655	706	541	467	-114	-238	-17%	-34%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	488	444	-209	-111	-30%	-20%
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Culloden Road east of B9177	Barn Church Road	584	577	210	253	-374	-324	-64%	-56%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	357	365	-213	-120	-37%	-25%
A9 South of Milton of Leys	A96 East of Smithton	420	458	404	412	-16	-47	-4%	-10%
A9 South of Milton of Leys	Barn Church Road	457	506	475	509	18	3	4%	1%
SDR South of Stevenson Road	A9 Kessock Bridge	718	542	460	403	-258	-139	-36%	-26%
SDR South of Stevenson Road	A96 East of Smithton	576	522	444	450	-133	-72	-23%	-14%
SDR South of Stevenson Road	Barn Church Road	613	570	432	468	-180	-102	-29%	-18%
SDR South of Stevenson Road	Culloden Road east of B9177	346	308	189	194	-156	-113	-45%	-37%
SDR South of Stevenson Road	A9 South of Milton of Leys	458	441	366	372	-92	-69	-20%	-16%
A96 East of Smithton	Millburn Road/Harbour Road Junction	396	175	264	150	-132	-26	-33%	-15%
Millburn Road/Harbour Road Junction	A96 East of Smithton	179	190	165	171	-14	-19	-8%	-10%



Option D1 - AM Peak Flow Differences



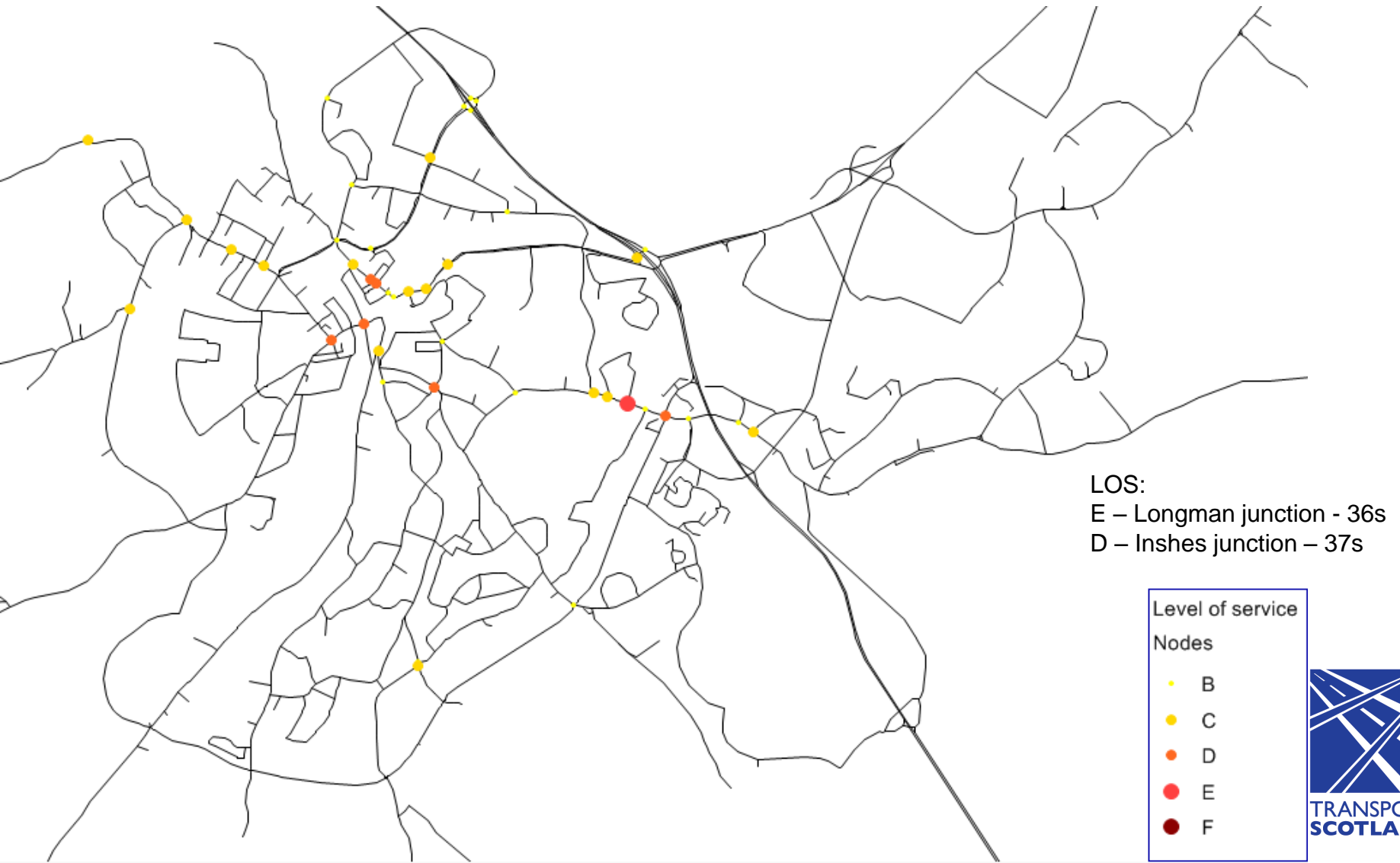
Option D1 - PM Peak Flow Differences



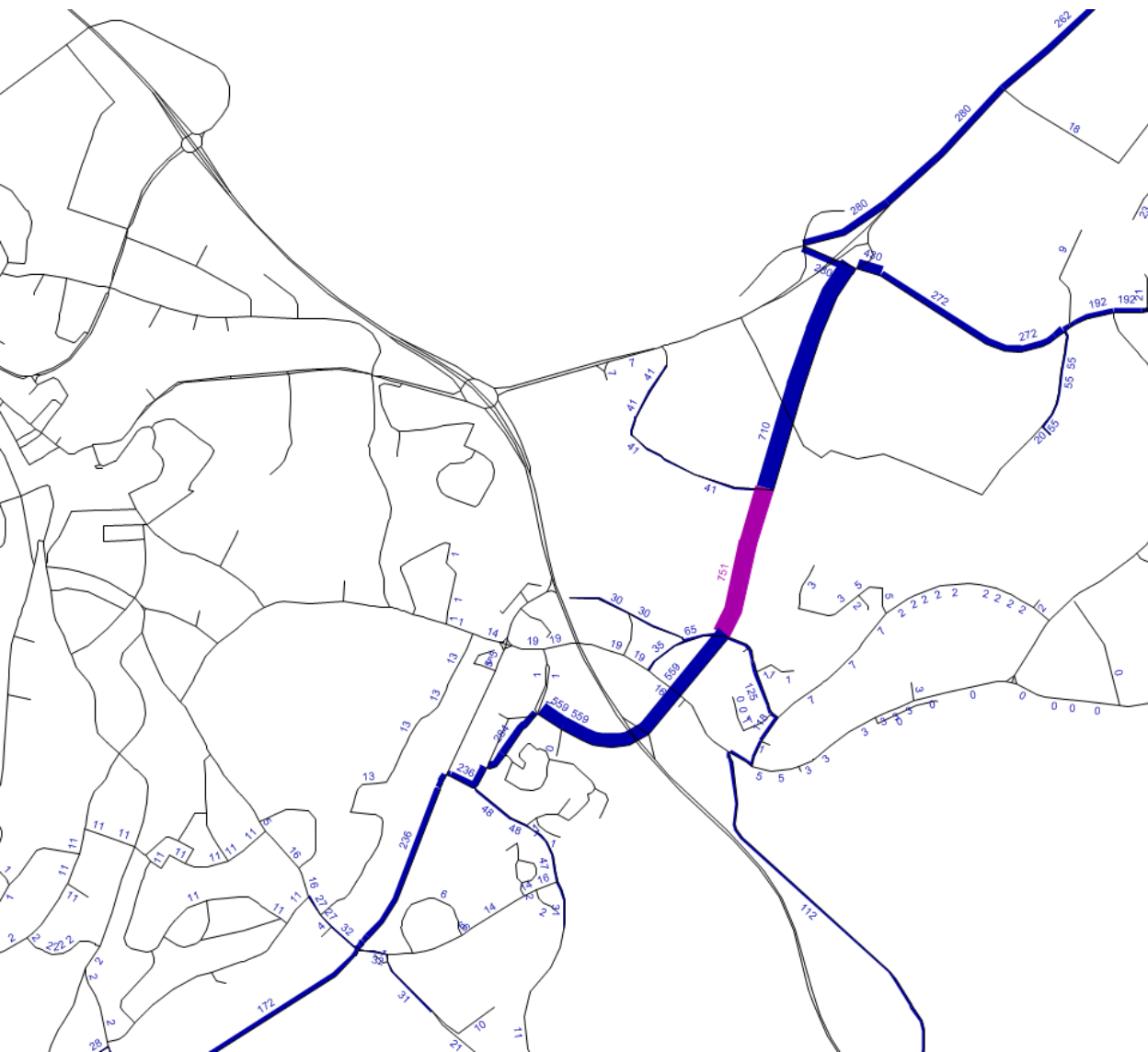
2031 Option D1- AM Peak Level of Service



2031 Option D1- PM Peak Level of Service



2031 Option D1- PM Peak SLA



Inshes to Smithton
Link –
Northbound direction

Journey Time Changes (seconds)

From Point	To Point	Do min		Opt D1		Difference		Percentage Difference	
		AM	PM	AM	PM	AM	PM	AM	PM
A9 Kessock Bridge	A96 East of Smithton	523	343	291	271	-232	-72	-44%	-21%
A9 Kessock Bridge	Barn Church Road	559	391	342	340	-217	-51	-39%	-13%
A9 Kessock Bridge	Culloden Road east of B9177	596	419	310	311	-286	-108	-48%	-26%
A9 Kessock Bridge	A9 South of Milton of Leys	612	397	364	360	-248	-37	-41%	-9%
A9 Kessock Bridge	SDR South of Stevenson Road	702	721	401	443	-301	-278	-43%	-39%
A96 East of Smithton	A9 Kessock Bridge	761	492	387	307	-374	-185	-49%	-38%
A96 East of Smithton	Culloden Road east of B9177	502	366	194	205	-308	-161	-61%	-44%
A96 East of Smithton	A9 South of Milton of Leys	518	344	315	327	-203	-16	-39%	-5%
A96 East of Smithton	SDR South of Stevenson Road	607	668	339	398	-268	-270	-44%	-40%
Barn Church Road	A9 Kessock Bridge	809	530	499	377	-310	-153	-38%	-29%
Barn Church Road	Culloden Road east of B9177	549	403	250	233	-300	-171	-55%	-42%
Barn Church Road	A9 South of Milton of Leys	566	382	371	355	-195	-26	-34%	-7%
Barn Church Road	SDR South of Stevenson Road	655	706	396	425	-259	-280	-40%	-40%
Culloden Road east of B9177	A9 Kessock Bridge	697	555	406	389	-292	-166	-42%	-30%
Culloden Road east of B9177	A96 East of Smithton	548	529	207	212	-341	-317	-62%	-60%
Culloden Road east of B9177	Barn Church Road	584	577	225	212	-359	-365	-61%	-63%
A9 South of Milton of Leys	A9 Kessock Bridge	570	484	348	355	-222	-129	-39%	-27%
A9 South of Milton of Leys	A96 East of Smithton	420	458	403	405	-17	-54	-4%	-12%
A9 South of Milton of Leys	Barn Church Road	457	506	454	474	-2	-33	-1%	-6%
SDR South of Stevenson Road	A9 Kessock Bridge	718	542	463	397	-255	-145	-35%	-27%
SDR South of Stevenson Road	A96 East of Smithton	576	522	374	374	-202	-148	-35%	-28%
SDR South of Stevenson Road	Barn Church Road	613	570	392	406	-220	-164	-36%	-29%
SDR South of Stevenson Road	Culloden Road east of B9177	346	308	295	287	-51	-21	-15%	-7%
SDR South of Stevenson Road	A9 South of Milton of Leys	458	441	360	356	-98	-86	-21%	-19%
A96 East of Smithton	Millburn Road/Harbour Road Junction	396	175	245	148	-151	-28	-38%	-16%
Millburn Road/Harbour Road Junction	A96 East of Smithton	179	190	167	171	-13	-18	-7%	-10%

Indicative Economics Results

- Based on TUBA-only appraisal
- Low growth scenario (worst case)
- Longman GS Roundabout Option (worst case)

Option	Estimated Cost (£m)	PVB (£000s)	PVC (£000s)	NPV (£000s)	BCR
A1	119.2	86,954	108,564	-21,610	0.81
B1	49.7	75,589	45,265	30,324	1.67
C1	59.1	102,805	53,826	48,979	1.91
D1	66.1	97,164	60,202	36,962	1.61

Notes:

Option A1 - East Trunk Road Link

Option B1 - Inshes to Smithton Option 1, plus Stevenson Rd Option 1, plus Longman GS

Option C1 - Inshes to Smithton Option 3 (no A9 S/B slip roads), plus Longman GS

Option D1 - Inshes to Smithton Option 4 (incl A9 S/B slip roads), plus Longman GS