From: Kumapley Seyram
To: Cadwell Amanda; Trinder Stefan
Cc: Brady Colin
Subject: RE: WLO actions
Date: 10 January 2019 09:32:05

Hi Amanda,

Stefan asked [redacted] I to undertaken the runs for just the core scenarios as a test I think we wouldn t want them running all the scenarios only to find that it doesn t work

I have updated the spreadsheet (link I sent you yesterday) with the numbers from the core scenarios Comparing this to earlier runs, the trend is more logical - higher benefits within the WLO boroughs (which includes Camden!), a bit lower in the GLA boundary as we would expect and higher model wide The benefits increase when you compare the 8tph vs the 4tph and the plots do not show any obvious oddities I m feeling a bit more positive and starting to think that we could go back to using the model-wide benefits if these trends continue in the test runs

These are my views – and I think Colin shares the same views – it may vary from the what the experts say this afternoon

Hope this helps

Seyram

From: Cadwell Amanda
Sent: 10 January 2019 09:24
To: Trinder Stefan; Kumapley Seyram
Cc: Brady Colin
Subject: RE: WLO actions

Hi Seyram,

Did we ask [redacted] I to rerun the different land use scenarios at all? If not, we ve no indication yet of whether the change in benefits across each of these (as discussed at WG yesterday) is more logical, is that right?

Regards,

Amanda

From: Trinder Stefan
Sent: 09 January 2019 17:17
To: [redacted] Kumapley Seyram; Cadwell Amanda
Cc: [redacted] Brady Colin
Subject: RE: WLO actions

[redacted]

Thank you for undertaking the work and reporting back the promising findings

Seyram and I would like to discuss with colleagues tomorrow and get back to you

Thanks,

Stefan

From: [redacted]]
Sent: 09 January 2019 15:37
To: Kumapley Seyram; Trinder Stefan; Cadwell Amanda
Cc: [redacted] Brady Colin
Subject: RE: WLO actions

Stefan

We ve produced the benefits for the 2 further tests with stricter convergence criteria and the good news is that appears to have addressed the counter-intuitive results

The new benefits are as follows;

4tph Hendon <> Hounslow

Whole Model = 143,614 minutes benefit in the AM Peak period

GLA = 112,116 minutes benefit in the AM Peak period

Hounslow/Ealing/Barnet/Camden/Brent = 181,673 minutes benefit in the AM Peak period

8tph Core

Whole Model = 191,850 minutes benefit in the AM Peak period

GLA = 154,026 minutes benefit in the AM Peak period

Hounslow/Ealing/Barnet/Camden/Brent = 235,099 minutes benefit in the AM Peak period

I ve also updated the plots I produced previously in the attached You can see that in the first figure some of the changes in demand away from the WLO scheme between 4tph and 8tph have reduced which gives a clue that the assignment has become more stable between iterations once converged This then feeds in to the more sensible benefits we see at zonal level in the 2nd and 3rd figures

[redacted]

From [redacted]
Sent: 08 January 2019 10:54
To: 'Kumapley Seyram' ; Trinder Stefan ; Cadwell Amanda
Cc [redacted] ; Brady Colin
Subject: RE: WLO actions

Seyram

Benefits at the GLA wide level are as follows;

- 4tph Hendon <> Hounslow 174,177 minutes benefit in the AM Peak period (Whole Model = 286,328 mins)
- 4tph Hendon <> Hounslow with Baseline Dev 98,797 minutes benefit in the AM Peak period (Whole Model = 96,976 mins)
- 4tph Hendon <> Hounslow with Max Dev 189,369 minutes benefit in the AM Peak period (Whole Model = 267,243 mins)
- Core 8tph (4tph Hendon 4tph West Hampstead) 165,466 minutes benefit in the AM Peak period (Whole Model = 233,802 mins)
- Core 8tph with Baseline Dev 143,944 minutes benefit in the AM Peak period (Whole Model = 150,319 mins)
- Core 8tph with Max Dev 177,538 minutes benefit in the AM Peak period (Whole Model = 197,006 mins)

As we still have the counter-intuitive effects at this level of analysis, I will undertake the 2 further tests suggested by Stefan with stringer convergence criteria

[redacted]

From: Kumapley Seyram [redacted]
Sent: 08 January 2019 10:27
To: Trinder Stefan [redacted] Cadwell Amanda [redacted]
[redacted] Brady Colin <[redacted]
Subject: RE: WLO actions

Hi [redacted]

I tried to call but missed you Chris Porter has asked for the benefits at the GLA wide level Could you please share this with us to compare with the numbers reported in your email below ?

Many thanks

Seyram

From: Trinder Stefan
Sent: 08 January 2019 09:30
To: [redacted] Kumapley Seyram; Cadwell Amanda
Cc: [redacted]
Subject: RE: WLO actions

Hi [redacted]

Many thanks for your explaining the outcomes of your investigation

In a previous email I asked about convergence criteria Having discussed again with colleagues, we are keen for you to try running the do-min, 4tph and 8tph schemes with 10^-4 convergence criteria (can you confirm you are currently using 10^-3?)

Our best guess at the moment is that this tighter convergence criteria may iron out any unintuitive outcomes Could you try this and let me know the outcomes?

Many thanks,

Stefan

From: [redacted]
Sent: 07 January 2019 15:38
To: Kumapley Seyram; Trinder Stefan; Cadwell Amanda
Cc: [redacted] ; Brady Colin

Subject: RE: WLO actions

Seyram,

I ve had a further look into this I don t think it would be worthwhile running the crowding process as I don t think that will tell us much; levels of crowding are a function of demand and actually demand doesn t change much away from the WLO scheme when comparing the Core 8tph scenario with the 4tph Hounslow <> Hendon scheme I ve therefore done some alternative analysis shown in the attached document which I am hoping will better illustrate what is happening – this is based on a comparison of the Core 8tph and 4tph Hounslow <> Hendon schemes

The first figure shows difference in demand between the 8tph and the 4tph scenario This illustrates (a) my point above that demand doesn t change much away from the WLO scheme and (b) more importantly shows logical differences between the scenarios i e in the 8tph scenario higher demand on the central section and West Hampstead branch, lower demand on the Hendon branch as the West Hampstead branch competes for trips, little difference on the Hounslow branch as both scenarios are 4tph and a reduction on most other lines to/from Central London

However, oddities start appearing when we look at changes in generalised times (unweighted by demand) resulting from the above changes in demand flows – refer to the 2nd and 3rd figures which show changes to and from zones respectively Based on the above, we would expect times to be lower in the 8tph scenario across the whole model except on the Hendon branch where the 4tph scenario provides better coverage between Hendon and other destinations In fact, we find that the 4tph scenario provides small improvements in generalised time across large swathes of the model away from the WLO scheme – it is a combination of these improvements which outweigh the higher times along the route of WLO and therefore give the odd outcome of higher benefits occurring overall in the 4tph scenario This is clearly counter-intuitive because, referring back to the first figure, the 8tph scenario provides demand (and therefore crowding) relief on the majority of other lines so we should find mainly crowding benefits in the 8tph scenario to/from central areas

Based on the above analysis, my view remains the same that we should screen benefits to/from Ealing/Hounslow/Brent/Barnet in order to avoid the counter-intuitive effects which are occurring in the production of generalised times from the final assigned demand flows which look logical

[redacted]

From [redacted] >
Sent: 04 January 2019 12:11
To: [redacted] Trinder Stefan [redacted]; Cadwell Amanda [redacted]
Cc [redacted] Brady Colin [redacted]
Subject: RE: WLO actions

Thanks [redacted],

We ve had some internal discussions and agree that there are oddities in the model and there may be a need to screen benefits We would like to look into this a bit further to help us decide reasonable boundaries for screening What convergence criteria is being used in the model? Can you compare crowding on links between the WLO reference case and test scenarios to see if we can work out where the changes in crowding between the WLO ref case and test scenarios occur e g considering the scenarios below

4tph Hendon <> Hounslow
4tph Hendon <> Hounslow with Baseline Dev

If we do spot something odd, hopefully we can agree reasonable screening (e g boroughs or GLA, etc) for the benefits to avoid the oddities

Stefan has provided the attached spreadsheet/macro which could be helpful for this Please let me know if you d like me to call to discuss this,

Regards,

Seyram

From: [redacted]
Sent: 03 January 2019 15:51
To: Kumapley Seyram; Trinder Stefan; Cadwell Amanda
Cc: [redacted]; Brady Colin
Subject: RE: WLO actions

Seyram

Please see my comments below in red

[redacted]

From: Kumapley Seyram <[redacted]
Sent: 03 January 2019 14:28
To [redacted] Trinder Stefan [redacted]>; Cadwell Amanda [redacted]
Cc [redacted] Brady Colin [redacted] >
Subject: RE: WLO actions

[redacted]

Thank you for sending this through It s good to see that the station coding updates have improved patronage at the stations Can you please share with us the impact this has had at Brent Cross West station (Staples Corner)? Total demand (including boardings and alightings) increases from 137 to 528

I have summarized the benefits from previous emails to the table below I m wondering if the changes mean that perhaps, we can include Barnet, together with Hounslow, Brent and Ealing? As Stefan mentioned in his email, it would be challenging to explain why Barnet, in particular, has been excluded Are you able to provide equivalent benefits with Barnet included (just for the scenario with station coding updates, please) I agree it would be feasible to include Barnet List of benefits;

- 4tph Hendon <> Hounslow 185,742 minutes benefit in the AM Peak period (Whole Model = 286,328 mins)
- 4tph Hendon <> Hounslow with Baseline Dev 185,280 minutes benefit in the AM Peak period (Whole Model = 96,976 mins)
- 4tph Hendon <> Hounslow with Max Dev 238,943 minutes benefit in the AM Peak period (Whole Model = 267,243 mins)
- Core 8tph (4tph Hendon 4tph West Hampstead) 222,669 minutes benefit in the AM Peak period (Whole Model = 233,802 mins)
- Core 8tph with Baseline Dev 238,386 minutes benefit in the AM Peak period (Whole Model = 150,319 mins)
- Core 8tph with Max Dev 285,584 minutes benefit in the AM Peak period (Whole Model = 197,006 mins)

Also, in the table below, the 4tph max development scenario benefits in the whole model goes up whereas the 8tph max development benefit goes down Given that the growth scenario is the same, this feels a bit odd Do you think there is a reason for this? This will be linked to the model noise issue hence why it is sensible for us to screen the benefits Note we get the same issue in the Baseline scenarios as well

				With station coding updates		
	Hounslow/Brent/ Ealing Benefits	Whole model	Whole model - selected boroughs	Hounslow/Brent/ Ealing Benefits	Whole model	Whole model - selected boroughs
4tph Hendon <> Hounslow	104,510	250,643	146133	157,577	286,328	128751
4tph Hendon <> Hounslow with Baseline Dev	102,299	45,121	-57178	160,346	96,976	-63370
4tph Hendon <> Hounslow with Max Dev	140,252	167,833	27581	**207,070**	**267,243**	60173
Core 8tph (4tph Hendon 4tph West Hampstead)	125,264	160,005	34741	197,412	233,802	36390
Core 8tph with Baseline Dev	146,396	228,802	82406	212,921	150,319	-62602
Core 8tph with Max Dev	175,628	160,420	-15208	256,886	197,006	-59880

Looking forward to hearing from you

Many thanks

Seyram

From: [redacted]]
Sent: 03 January 2019 12:07
To: Kumapley Seyram; Trinder Stefan; Cadwell Amanda
Cc: [redacted]
Subject: RE: WLO actions

Seyram

We have now reproduced the benefits from the scenarios with the updated station coding The good news is that (a) the benefits have been boosted significantly and (b) they continue to look logical when limited to Hounslow/Ealing/Brent The boost to the benefits is mainly due to a significant number of passengers now using Harlesden (2,800 boarding or alighting in the Core 8tph scenario whereas previously there was next to nothing) and a tripling of passengers using Neasden

- 4tph Hendon <> Hounslow 157,577 minutes benefit in the AM Peak period (Whole Model = 286,328 mins)
- 4tph Hendon <> Hounslow with Baseline Dev 160,346 minutes benefit in the AM Peak period (Whole Model = 96,976 mins)
- 4tph Hendon <> Hounslow with Max Dev 207,070 minutes benefit in the AM Peak period (Whole Model = 267,243 mins)
- Core 8tph (4tph Hendon 4tph West Hampstead) 197,412 minutes benefit in the AM Peak period (Whole Model = 233,802 mins)
- Core 8tph with Baseline Dev 212,921 minutes benefit in the AM Peak period (Whole Model = 150,319 mins)
- Core 8tph with Max Dev 256,886 minutes benefit in the AM Peak period (Whole Model = 197,006 mins)

[redacted]

From [redacted] F
Sent: 02 January 2019 11:05
To: 'Kumapley Seyram' [redacted]; Trinder Stefan [redacted]>; Cadwell Amanda [redacted] >
Cc [redacted]
Subject: RE: WLO actions
Seyram
Happy New Year to you as well
The coding has now been updated and we have run the 6 additional scenarios as agreed
We are now in the process of generating and checking all the outputs and writing up the Railplan modelling report I will provide you with the updated benefits as soon as these are available
[redacted]

From: Kumapley Seyram [redacted]
Sent: 02 January 2019 10:50
To: [redacted]>; Trinder Stefan [redacted] Cadwell Amanda [redacted] >
Cc [redacted] <[redacted]
Subject: RE: WLO actions
Hello [redacted]
Happy new year to you! And thank you for providing this information – it s very helpful
Have you had the chance to update the coding at Harlesden, Neasden & Brent Cross West? Or when is this expected? It would be interesting to see the equivalent numbers in your email below when the coding has been updated Ideally, we would like to make the decision on how to deal with the benefits once we understand how things are shaping up
Thanks for your hard work on this project – particularly during the holiday period on this study
Best wishes,
Seyram

From: [redacted]
Sent: 02 January 2019 10:12
To: Trinder Stefan; Kumapley Seyram; Cadwell Amanda
Cc: [redacted]
Subject: RE: WLO actions
Stefan
Happy New Year to you as well
Please see my additions below in red
[redacted]

From: Trinder Stefan <[redacted]
Sent: 02 January 2019 09:30
To: [redacted] Kumapley Seyram [redacted]; Cadwell Amanda [redacted]
Cc [redacted]
Subject: RE: WLO actions
Hi [redacted]
Happy new year!
Thank you for setting out the outcome of your investigation and thoughts in the email below The outcomes in your email below certainly appear more intuitive
For comparison, could you also state the benefits of the 4tph and 8tph service using the standard methodology? I ve added these next to the adjusted figures below (e g with the spurious benefit in the 4tph scenario, just to see by what proportion the benefit may be reducing)
Can we be as clear as possible on the implications of adopting the approach you suggest to only take into consideration benefits to/from Hounslow/Brent/Ealing

- Does this mean the benefits are only calculated for trips with an O and/or D in Hounslow/Brent/Ealing? Yes It includes, for example, a trip from Hounslow to Westminster? Yes
- Have you tried including Camden and Barnet in your methodology? Do the spurious benefits reappear? (it would obviously be preferable from a communications point of view to be able to say Camden and Barnet are included) Yes – the spurious benefits start reappearing We can take the approach that I have suggested below i e (a) within the appraisal add commentary that we have excluded this major benefit of the WLO scheme within the calculation and that therefore the scheme BCR will actually be higher than stated or (b) develop an appraisal sensitivity with those additional benefits added within the appraisal based on Railplan results from scenarios which don t have the model noise effects evident in the 4tph Hendon <> Hounslow scenario
- When you say "we don t take into account the beneficial effects of (a) crowding relief on rail routes to/from central" do you mean, for example, a trip from Hillingdon to central London on the Piccadilly line may endure slightly less crowding? Yes, however I should qualify that by saying that we do of course take into account these benefits for trips going to/from Ealing/Hounslow/Brent I imagine this kind of impact would be quite small What are your thoughts? These benefits will not be as great as for trips using the WLO, however this is something we included in the presentation on the 12th Dec as an additional benefit of WLO As stated these benefits are captured to/from Ealing/Hounslow/Brent so we could leave it at that Or if we wanted to further boost the BCR we could take the suggested approach in relation to Camden and Barnet and add additional benefits to/from central areas (excluding trips starting/ending in Hounslow/Brent/Ealing) into an appraisal sensitivity using Railplan results from scenarios which don t have the model noise effects

Thanks,
Stefan

From: [redacted]
Sent: 27 December 2018 13:06
To: Trinder Stefan; Kumapley Seyram; Cadwell Amanda
Cc: [redacted]
Subject: RE: WLO actions
Stefan
I have undertaken the step in the first bullet and have found that by sending all 8tph to Hendon we actually get a similar result to the Core 8tph test where we send 4tph to Hendon and 4tph to West Hampstead That does discount my initial interpretation that the issue is to do with crowding through West Hampstead in the Core 8tph and instead points to an issue with excessive benefits accruing in the 4tph Hendon <> Hounslow scenario The benefits are generally significantly higher to central area zones in the 4tph scenario which points towards an issue with model noise related to general crowding effects, as it is clearly counter-intuitive to have higher benefits in a scenario with lesser infrastructure improvements
My suggestion is therefore to simplify the appraisal by only taking into consideration benefits to/from Hounslow/Brent/Ealing Whilst this does have the drawback that we don t take into account the beneficial effects of (a) crowding relief on rail routes to/from central areas and (b) benefits to from Camden and Barnet which are served by the scheme, it means that we don t include the spurious benefits being generated in the 4tph scenario Taking this approach forward to the appraisal, we can add commentary that we have excluded these two major benefits of the WLO scheme within the calculation and that therefore the scheme BCR will actually be higher than stated Or we could develop an appraisal sensitivity with those additional benefits added within the appraisal based on Railplan results from scenarios which don t have the model noise effects evident in the 4tph Hendon <> Hounslow scenario
By taking benefits to/from Hounslow/Brent/Ealing we get the following more realistic effects;

- 4tph Hendon <> Hounslow 104,510 minutes benefit in the AM Peak period (Whole Model = 250,643 mins)
- 4tph Hendon <> Hounslow with Baseline Dev 102,299 minutes benefit in the AM Peak period (Whole Model = 45,121 mins)
- 4tph Hendon <> Hounslow with Max Dev 140,252 minutes benefit in the AM Peak period (Whole Model = 167,833 mins)
- Core 8tph (4tph Hendon 4tph West Hampstead) 125,264 minutes benefit in the AM Peak period (Whole Model = 160,005 mins)
- Core 8tph with Baseline Dev 146,396 minutes benefit in the AM Peak period (Whole Model = 228,802 mins)
- Core 8tph with Max Dev 175,628 minutes benefit in the AM Peak period (Whole Model = 160,420 mins)

Note that the above benefits are not reflective of the updates to coding at Harlesden/Neasden/Staples Corner which we are currently implementing
Regards
[redacted]

From: Trinder Stefan <[redacted]
Sent: 21 December 2018 10:36
To: Kumapley Seyram [redacted]; Cadwell Amanda [redacted]
Cc [redacted]
Subject: RE: WLO actions
Hi [redacted]
Thank you for discussing the final bullet point in the email below (benefit of 8tph service lower than 4tph) with me on the phone
This is obviously counterintuitive and we need to provide a strong logical explanation if we are to have confidence in the modelling

You confirmed that your interpretation of the modelling is that the benefits of a higher frequency WLO service is outweighed by the additional crowding on radial services from West Hampstead E g WLO passengers are interchanging on to Thameslink and Jubilee lines at West Hampstead and making them more crowded As they are both very busy routes (lots of passengers) and already crowded (high up the crowding curve) a bit more crowding leads to sizeable disbenefit

We discussed the following steps to gain a better understanding and enable us to provide a strong narrative to explain the model outputs

- Run a 8tph WLO test that sends all 8tph to Hendon in the north (leave south as per original 8tph test) Hopefully this will prove the concept that the model does return higher benefits with 8tph This would also prove that the cause of the counterintuitive result is at West Hampstead
- Check the West Hampstead station coding against latest thinking from WLO team In particular, are the interchange distances to/from WLO and other services accurate?
- Check base year validation of radial services through West Hampstead For example, if base year Thameslink crowding is overstated it would provide strong rationale that future year crowding is also overstated
- Attempt to disaggregate the disbenefit of additional crowding on Thameslink services from West Hampstead (possibly also Jubilee line?) from the benefit to WLO users of the higher core frequency We can then consider the extent to which it is justifiable to mask the additional crowding impacts from the benefits calculations
- Provide some narrative on the pattern of interchange to/from WLO at West Hampstead by looking at the station matrix

Please let me know if you have had further thoughts since our conversation

Thanks,

Stefan

From: [redacted]
Sent: 20 December 2018 14:30
To: Cadwell Amanda; Kumapley Seyram
Cc: [redacted]
Subject: RE: WLO actions

Amanda/Seyram,

I will be working for the rest of today and tomorrow, the 27th and 28th December and then as normal from the 2nd Jan onwards

As you requested yesterday, here is a summary email outlining what the remaining WLO tasks are and when they should be completed by, as far as the Motts contracted work is concerned

1 Check location of all new stations along the WLO route and consider whether they could be better located with regards to better interchange with other services and local catchment

I have completed this and the results of that work are attached – given the alignment of the track and your desire to maximise usage I think we can relocate the platforms at Harlesden, Neasden and Staples Corner so that they can be part of the existing Harlesden, Neasden and proposed Brent Cross Thameslink stations I don t think there is any scope to change the location of the Lionel Road and Old Oak Common WLO stations as we were provided with detailed designs for the former by LB Hounslow and we agreed the latter with TfL

2 Code up and run the following additional scenarios;

- 8tph Core + adjusted Harlesden, Neasden and Staples Corner WLO Station locations
- As above with Baseline Dev Capacity Growth
- As above with Max Dev Capacity Growth
- 4tph Harlesden <> Hendon WLO scenario + adjusted Harlesden, Neasden and Staples Corner WLO Station locations
- As above with Baseline Dev Capacity Growth
- As above with Max Dev Capacity Growth

3 Provide Railplan outputs from above scenarios to TfL week ending 11th Jan along with suitable explanations thus providing reassurance that the modelling is robust and suitable for use in the Business Case

4 Provide Railplan outputs from above scenarios to [redacted] week ending 11th Jan to input into the Economic Case work

5 Provide TfL with final Railplan modelling and Economic Case work with accompanying reports week ending 18th Jan

Since the meeting I have discussed this further with [redacted] and whilst he is happy to comply with the schedule of tasks above, he wanted to make sure TfL are aware that we do have concerns about some of the modelling results, specifically;

- We are getting significantly lower benefits in the Baseline 4tph scenario compared to the Standard land-use 4tph scenario – I am currently trying to get to the bottom of this
- We are getting higher benefits in the 4tph scenario than in the 8tph scenario This is more of a concern of David s – I have analysed the results in some detail and think this is explainable;

In the 8tph scenario, the two 4tph services effectively duplicate eachother through the central section therefore a doubling of capacity does not result in double the benefits as can be seen by differences in patronage between the two scenarios Any increase in benefits provided by the 8tph scenario through the core section is then outweighed by the disbenefits to Thameslink through passengers of the connection at West Hampstead

Regards