# Arriva Trains Wales
## Proposed to extend services to Manchester Airport
## Performance Assessment

**Summary**

Network Rail does not support the additional services planned by ATW for a number of reasons; one of those is the effect on performance that the proposed services would have. This paper explains the reasons why NR feels performance will worsen.

- Current trends indicate worsening TOC on TOC performance between ATW and TPE
- Current trends indicate worsening TOC on TOC performance between ATW and Northern
- An increase in services between Manchester Piccadilly and Manchester Airport will only worsen this position.
- This will increase the propensity for delay to radiate across the network to a greater extent than currently.
- Network Rail has been unable to model this using a computer simulation but has used data analysis to reach these conclusions.
- Network Rail's expert judgement is that this worsenment will take 0.2% to 0.8% off Northern's PPM MAA.
- It will worsen TPE's PPM MAA but NR cannot say with any certainty by how much.
- This will make it even more difficult for NR to deliver its committed performance targets for CP5.
- Recent experience has shown that increasing the number of trains on a route only leads to a worsenment of performance without any significant mitigating actions, of which none have yet to be proposed in this case.

**Background and assumptions**

In the absence of a network performance modelling tool, an expert judgement assessment of the proposed extension of services has been made drawing on experience from the introduction of the fifth path on the north trans-Pennine Route and a current understanding of the performance dynamics around Manchester Piccadilly and Manchester Airport stations.

Any performance assessment has to be made on a base set of assumptions and in compiling these assessments, the following assumptions have been made:

1. Rolling stock types will continue as class 175 and fleet reliability incident count trends will stabilise at current levels.
2. The inbound traincrew to Manchester Airport will work the outbound service with the stock. No advance sight of traincrew or rolling stock diagrams was available.
3. Infrastructure asset reliability incident count trends on the Manchester Airport route and surrounding network into Manchester Piccadilly will follow current trajectory.
4. Public book differentials, which can be as high as 5 minutes, will transfer from Manchester Piccadilly to Manchester Airport and will be maintained.

5. That Arriva Trains Wales will implement a reasonable service recovery plan common to the other two current operators on the Airport branch, i.e. that any inbound train to the Airport that will not achieve PPM at the Airport will terminate at Manchester Piccadilly to facilitate a right time start back to Chester, or further afield, using Mayfield Loop.
6. That Mayfield Loop remains available as a turnback facility at the times required.

**Current Performance**

As a proxy for the impact the current Arriva Trains Wales service has on First Transpennine Express, the current trends for TOC on TOC as victim are illustrated in Diagram 1, where Arriva Trains Wales are the perpetrator TOC and First Transpennine Express are the victim TOC.

The locations where these interactions most commonly occur are shown in Diagram 2.

As a proxy for the impact the current Arriva Trains Wales service has on Northern Rail, the current trends for TOC on TOC as victim are illustrated in Diagram 3, where Arriva Trains Wales are the perpetrator TOC and Northern Rail are the victim TOC.

The locations where these interactions most commonly occur are shown in Diagram 4.

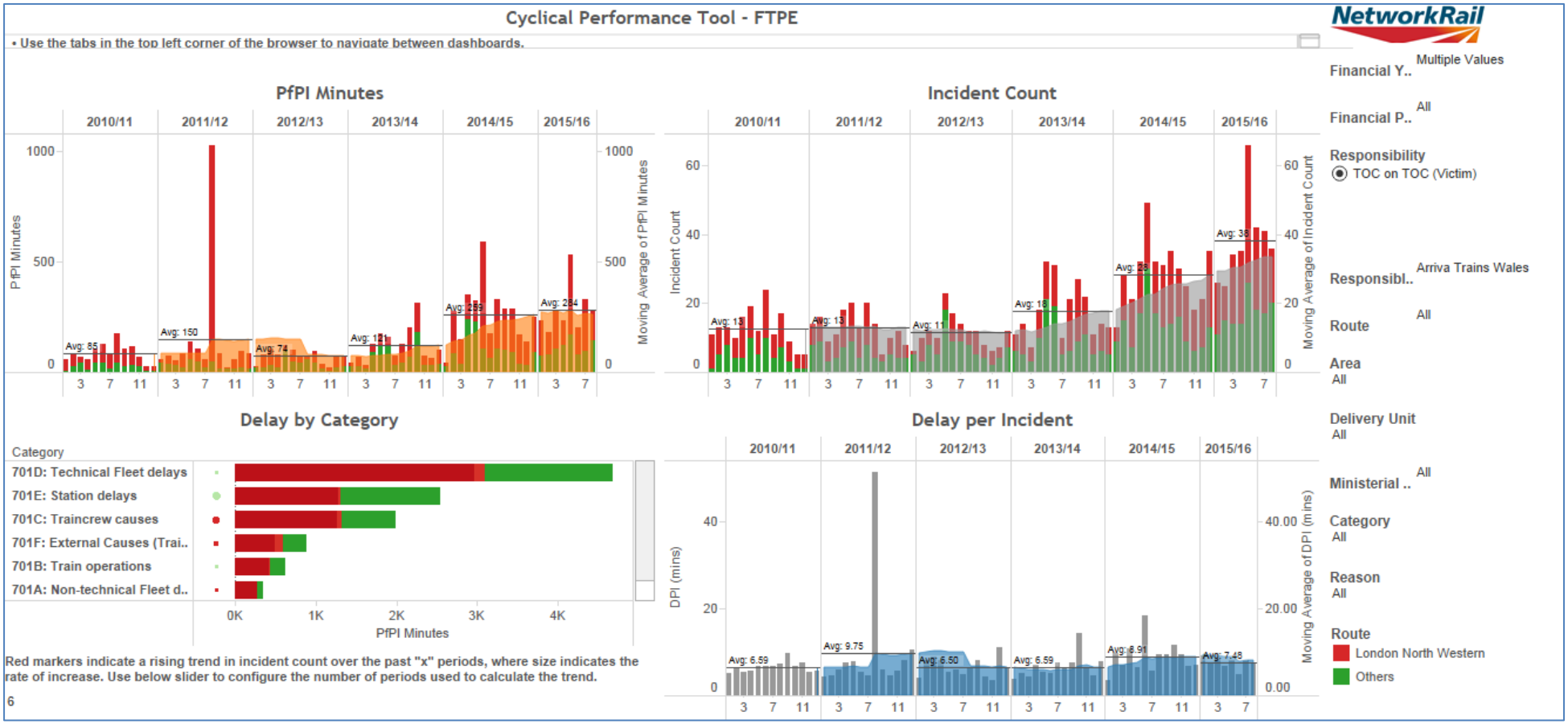



Diagram 1: Impact of Arriva Trains Wales on FTPE, long term trends

It should be noted that the number of ATW incidents affecting FTPE (graph, Diagram 1 top right) has been increasing consistently for 2.8 years with the MAA rising persistently since Period 1 of 2013/14. In that time the MAA for incident count has shown that ATW now cause on average 33 incidents a period to FTPE compared to 12 incidents a period back in Period 1 of 2013/14. No step change is apparent when the TPE fifth north trans-Pennine path was introduced in May 2014 (Period 2 of 2014/15) and the increase shows no sign of stabilising. This represents a 175% increase in incidents.

The delay MAA in that same time period (graph, Diagram 1 top left) has increased from what was once a broadly static position of an average of 121 minutes a period to 262 minutes a period. This is a 116% increase.

A step change in delay per incident (graph, Diagram 1 bottom right) is apparent between periods 5 and 6 of 2014/15, some three periods after the introduction of the fifth path.

Current deteriorating trends are traincrew and external, the biggest impact, though improving, is fleet (graph, Diagram 1 bottom left).

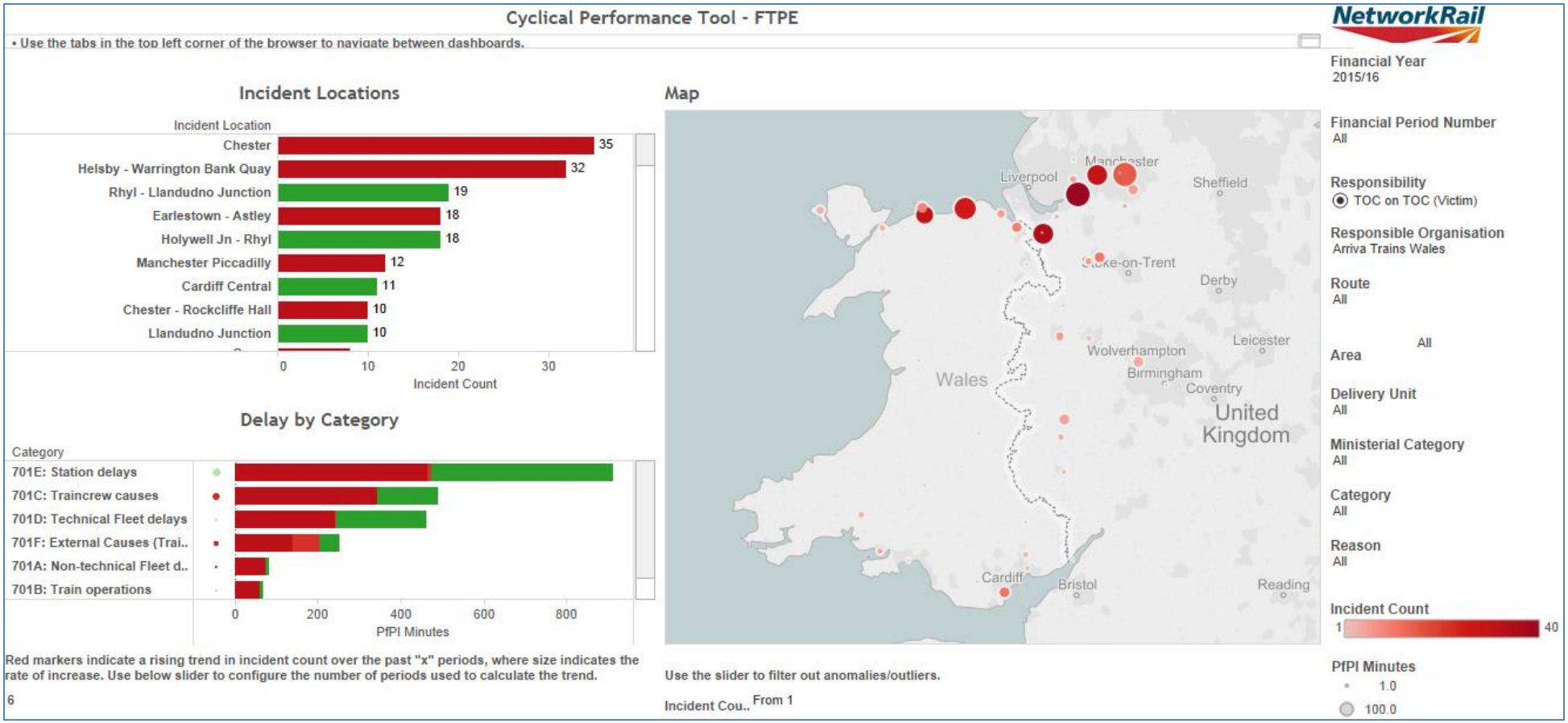



Diagram 2: Current impact of Arriva Trains Wales on FTPE 2015/16 Year to Date, key locations.

It is clear that the principle incidents that Arriva Trains Wales import onto the First Transpennine Express network originate from the North Wales service (map, RHS Diagram 2), with the main locations for incidents being at Chester, between Helsby and Warrington, between Rhyl and Llandudno, between Earlestown and Astley, between and Holywell and Rhyl. These are locations where the two train operators do not share the infrastructure, with the exception of the Astley route over Chat Moss.

Import of delays from the Cardiff services is currently less of an issue. It is clear therefore that extending the services to Manchester Airport will increase the extent of shared infrastructure and therefore interaction and given current trends, it is reasonable to propose that the reactionary impact on FTPE of delays imported into the Manchester Piccadilly to Manchester Airport section will increase where those additional interactions occur.

This analysis is only for TOC on TOC impact and it is reasonable to propose that the same will apply to asset reliability reactionary delay imported into the Airport line.

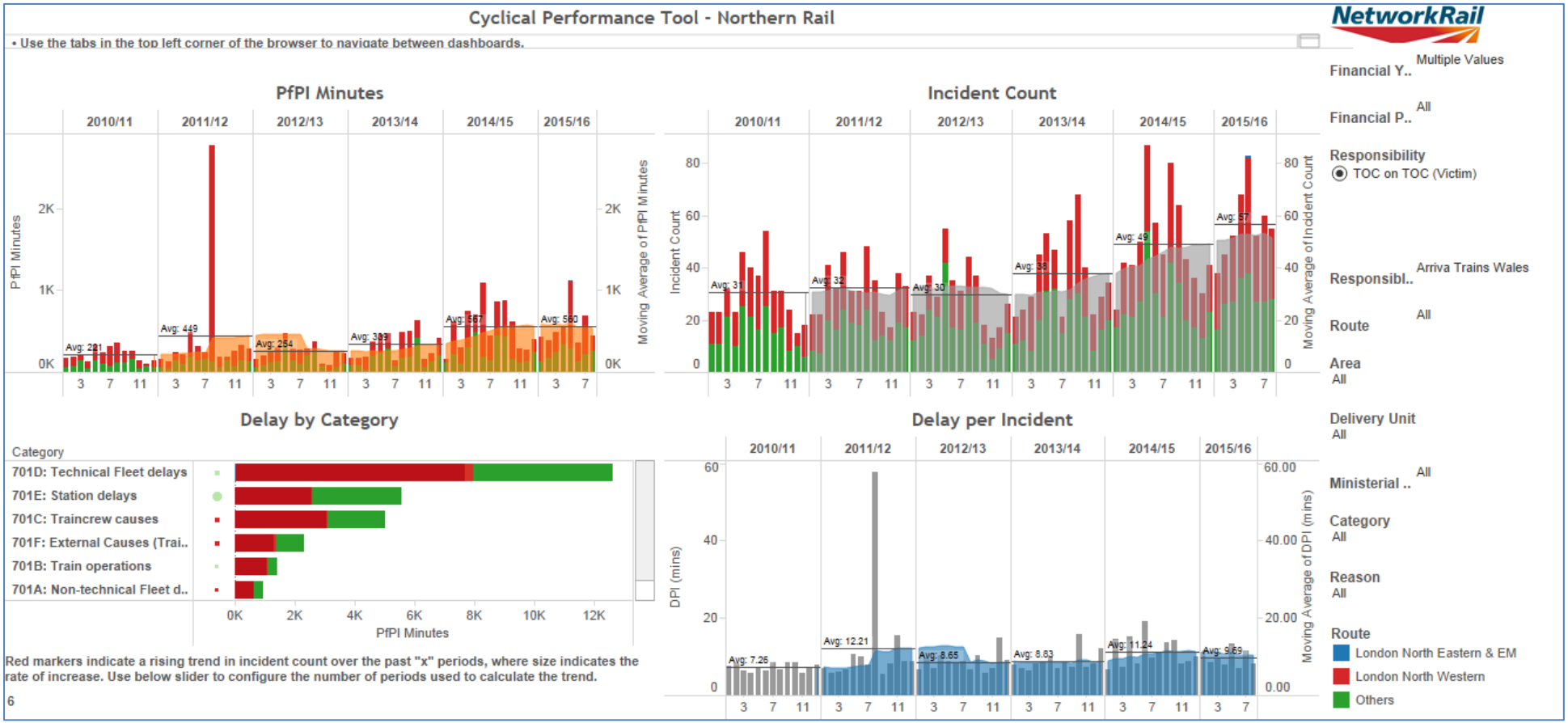



Diagram 3: Impact of Arriva Trains Wales on Northern Rail, long term trends.

It should be noted that the number of ATW incidents affecting Northern Rail has been increasing consistently (graph, Diagram 3 top right) for 2.5 years with the MAA rising persistently since Period 3 of 2013/14. In that time the MAA for incident count has shown that ATW now cause on average 51 incidents a period to Northern compared to 29 incidents a period back in Period 3 of 2013/14. No step change is apparent when the fifth TPE trans-Pennine path was introduced in May 2014 (Period 2 of 2014/15) but the increase shows signs of stabilising in the last quarter. This represents a 76% increase in incidents.

The delay MAA (graph, Diagram 3 top left) in that same time period has increased from what was once a broadly static position of an average of 381 minutes a period to 533 minutes a period. This is a 40% increase.

A step change in delay per incident (graph, Diagram 3 bottom right) is apparent between after period 2 of 2014/15, the same time as the introduction of the fifth path.

Current deteriorating trends (graph, Diagram 3 bottom left) are train crew and external, the biggest impact, though improving, is fleet.

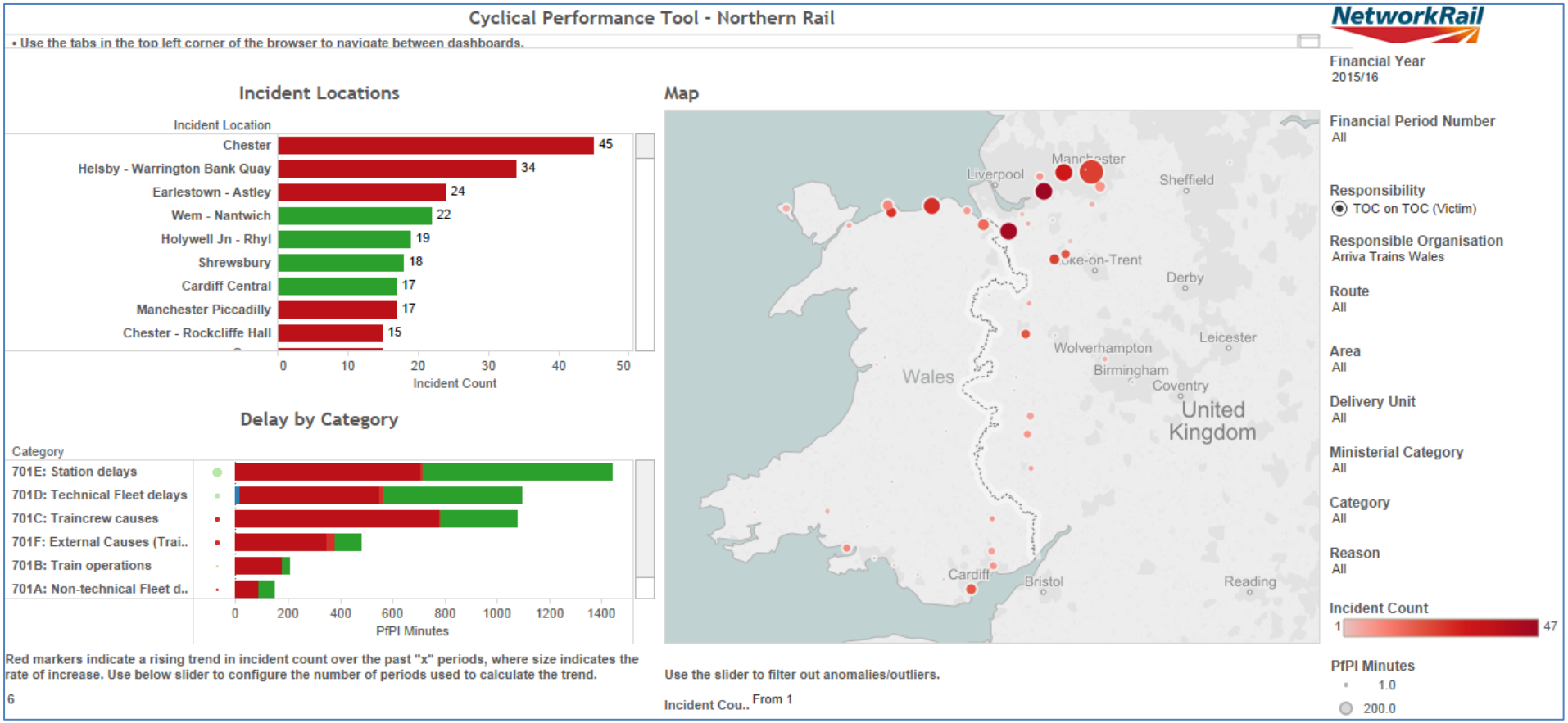



Diagram 4: Current impact of Arriva Trains Wales on Northern 2015/16 Year to Date, key locations.

It is clear that the principle incidents (map, Diagram 4) that Arriva Trains Wales import onto the Northern Rail network are originating from the North Wales service, with the main locations for incidents being at Chester, between Helsby and Warrington, between Earlestown and Astley, between Holywell and Rhyl. These are locations where the two train operators do not share the infrastructure, with the exception of the Astley route over Chat Moss.

Import of delays from the Cardiff services is currently less of an issue. It is clear therefore that extending the services to Manchester Airport will increase the extent of shared infrastructure and therefore interaction and given current trends, it is reasonable to propose that the reactionary impact on Northern Rail of delays imported into the Manchester Piccadilly to Manchester Airport section will increase where those additional interactions occur.

This analysis is only for TOC on TOC impact and it is reasonable to propose that the same will apply to asset reliability reactionary delay imported into the Airport line.

**Case study**

In order to illustrate Network Rail's concerns about the effect of introducing additional services on an already busy route this section includes analysis of the introduction of TPE's fifth north trans-Pennine path and its effect on Northern, a classic TOC on TOC interaction.

This is an example of what can happen on a busy route even if a plan is compliant with the Timetable Planning Rules.

Modelling prior to the introduction of TPE's fifth path suggested a PPM MAA worsenment of about 1%. In practice this turned out to be 2%, a position that has taken two years to recover (see Diagram 9). This illustrates the uncertainty of forecasting. The analysis did not take into account the effect of the tightening of train crew and rolling stock diagrams on the resilience of the plan. With less time in the plan to recover from perturbation when things did go wrong the incidents had a consequently greater effect.

Nearly all the mitigation to recover PPM lay with TPE who introduced an additional unit to the plan and revised 150 train crew diagrams to add robustness and resilience.

The addition of trains to the plan also reduces the opportunities for staff to look at developing faults between trains and increases the number of trains potentially or actually delayed in such circumstances.

See Diagram 5 on the following page.

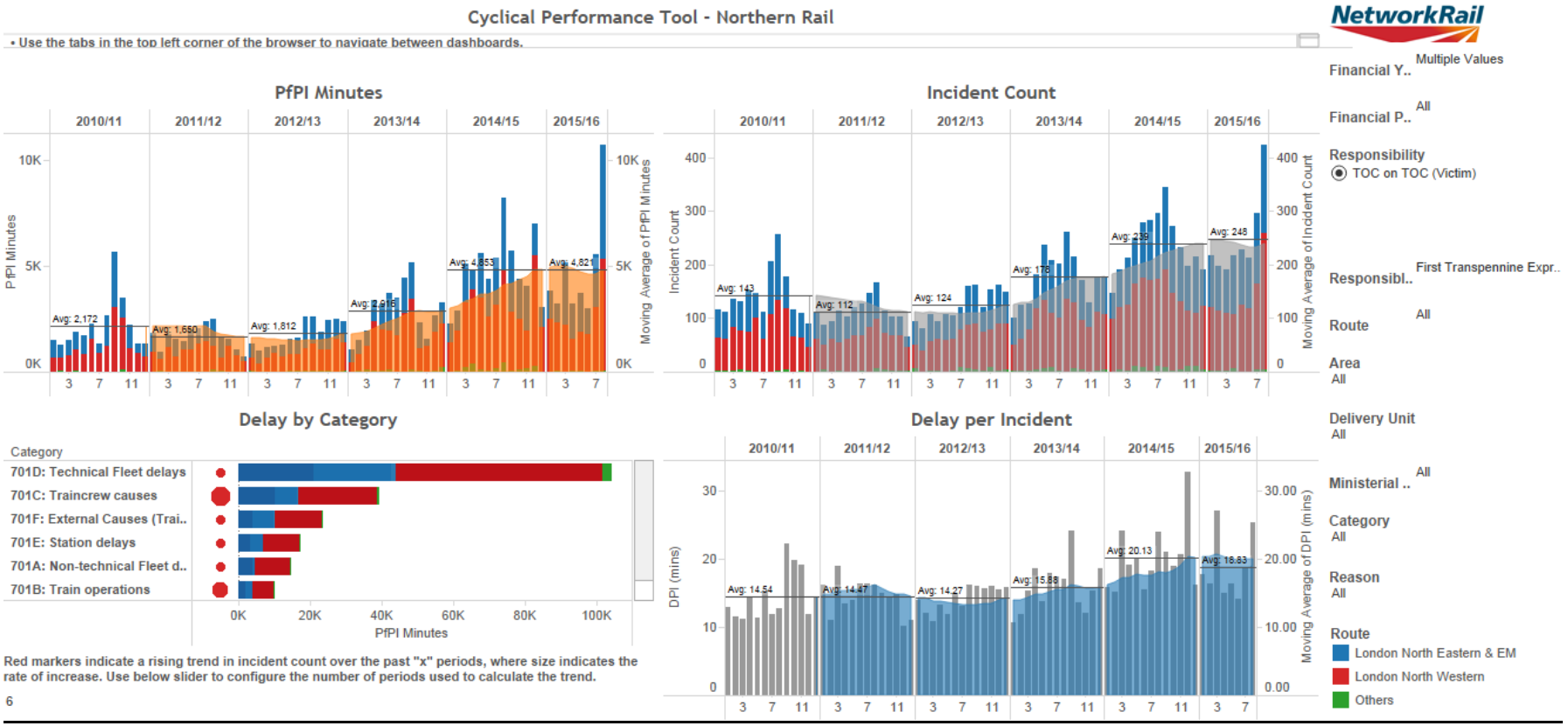
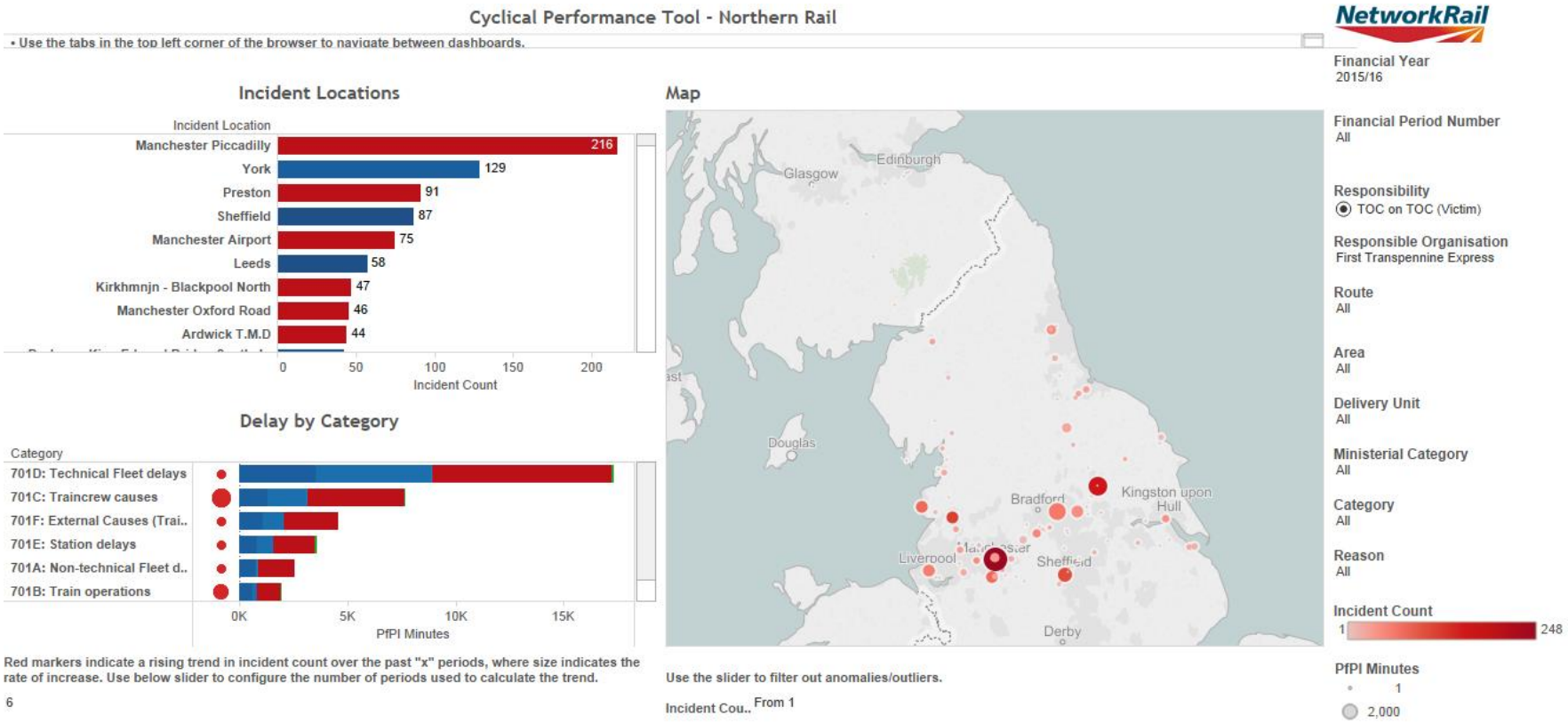



Diagram 5: impact of FTPE on Northern Rail

The fifth path was introduced in Period 2 of 2014/15. The graphs of minutes delay (top left), incident count (top right) and delay per incident (bottom right) all show worsening trends and increasing MAA. This illustrates a very similar dynamic that is evident in the deteriorating relationship shown in Diagrams 1 and 3 earlier between the two operators as is currently seen between ATW and Northern Rail / TPE and that this relationship continued to deteriorate through 2014/15 after the introduction of the fifth path in May 2014.

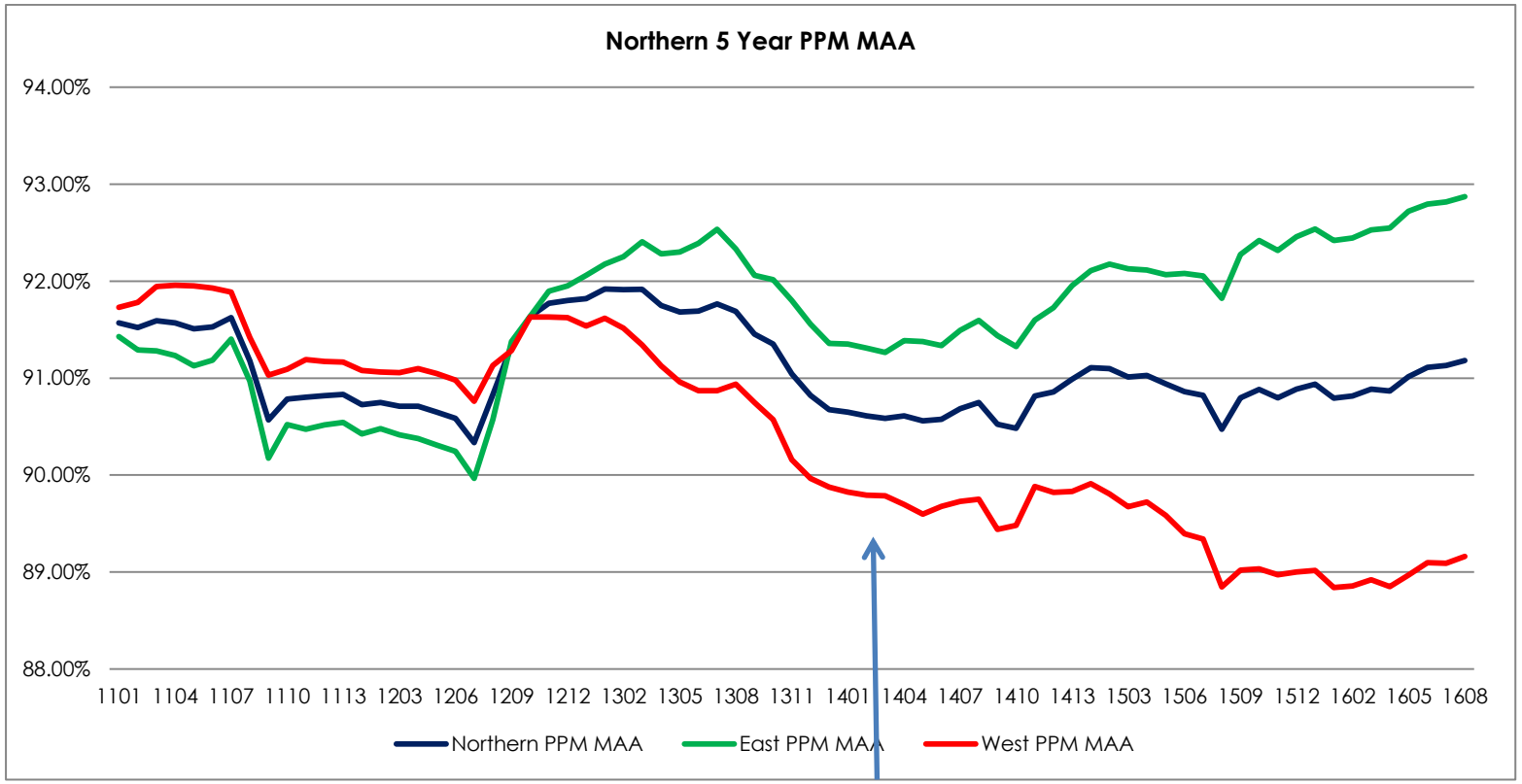
Diagram 6: How TPE TOC on TOC delay affects Northern Rail by location and type




The greatest cause of FTPE delay to Northern Rail is at Manchester Piccadilly with most incidents year to date happening there with the impact of incidents across the FTPE network also having a reactionary delay impact at Manchester Piccadilly. By adding more services into and out of at Manchester Piccadilly this position will worsen.

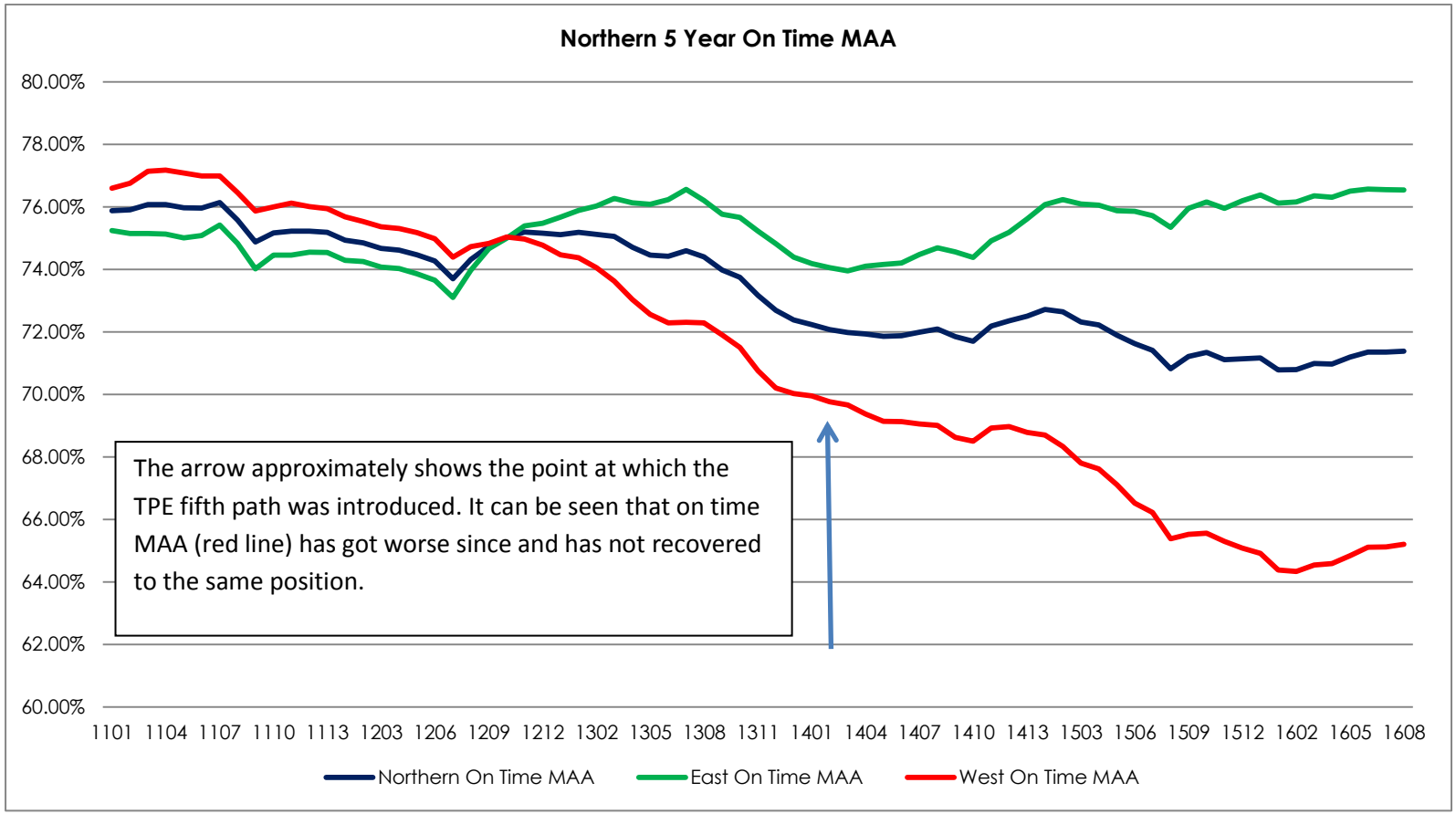
Post fifth path Northern Rail lost 1% on their PPM MAA on their West performance group in the first 13 periods. (See Diagram 7, red line) This has since stabilised. 1% had already been lost in the West in the final year of CP4, in part influenced by that deteriorating TOC on TOC relationship.

Diagram 7



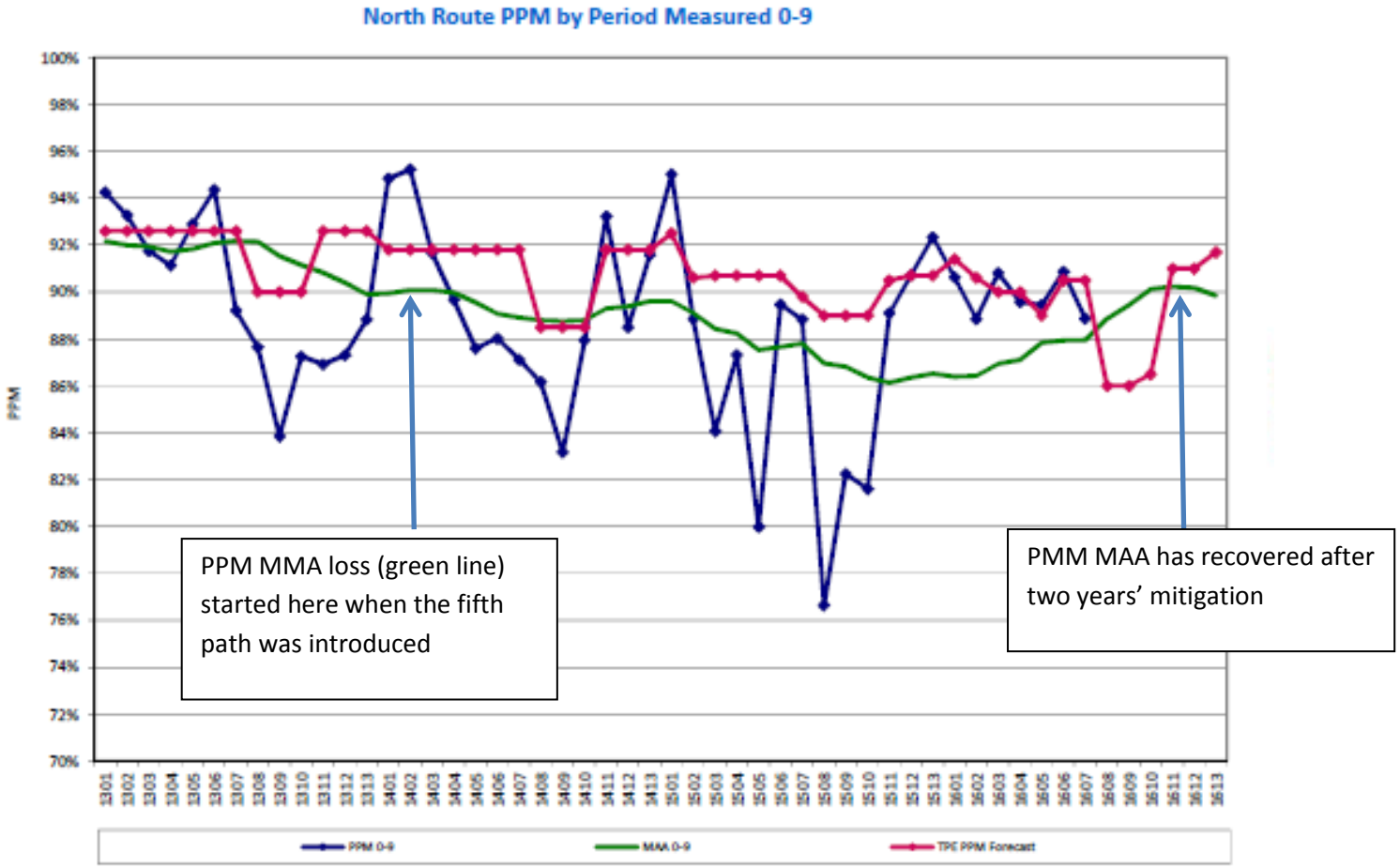

The arrow approximately shows the point at which the TPE fifth path was introduced. It can be seen that PPE MAA (red line) has got worse since and has not recovered to the same position.

Diagram 8




In that first 13 periods after the fifth path, on time performance at destination in the West PMU deteriorated by 4%. It had lost 1.5% in the last year of CP4 prior to the 5th path.

Diagram 9 TPE PPM for their north trans-Pennine route




In the 13 periods after the fifth path was introduced, the FTPE North Transpennine service group deteriorated from an MAA of 88.4% to a low of 86%, but has since recovered to 88%.