1. Introduction

The Abstraction Incentive Mechanism (AIM) is an Ofwat scheme to reduce abstraction from sources that are considered to be environmentally sensitive. Thames Water has implemented AIM since April 2016.

2. Summary

The proposed AIM sites were shared with our Customer Challenge Group in February 2016, with wider stakeholders at Thames Water's Water Resources Forum in April 2016 and with Ofwat and the Environment Agency. This was to enable stakeholders to input to the selection of the proposed AIM sites. Thames Water subsequently agreed the 5 proposed AIM sites with Ofwat and the Environment Agency. These sites are:

- New Gauge
- Pann Mill
- Axford (active from April 2017)
- North Orpington
- Pangbourne
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To implement AIM the following measures were agreed with the Environment Agency:

> Baseline – average daily abstraction that would have taken place from a source if AIM had not been in place during the period that the trigger would have been active.
>
> Trigger points – the critical value determining when a reduction in abstraction should take place

The impact of the incentive will be measured as the deviation in actual use relative to baseline usage.

The agreed measures are:

Line description		Trigger (Ml/d)	Baseline (Ml/d)
A	AIM sites		
1	RIVER LEE AT NEW GAUGE PUMPING STATION POINT B	60	89.6
2	PANGBOURNE	1.02	31.6
3	AXFORD PUMPING STATION	166	7.85
4	PANN MILL PUMPING STATION	5.6	11.4
5	NORTH ORPINGTON PS	11.4	7.16

3. Background

AIM's objective is to encourage water companies to reduce the perceived impact of water abstraction at sites that are considered potentially environmentally sensitive and is designed to complement existing management tools e.g. National Environment Programme Sustainability Reductions, Hands Off Flows. Implementing AIM should not impact security of supply or deployable output and there should be no capital investment for the scheme. Thames Water has implemented AIM at sites where it was not cost beneficial to undertake licence reductions using the existing management tools. To identify the final sites selected a comprehensive review of all potential environmentally sensitive abstractions was completed.

To finalise the list of sites to be included in AIM we completed the following steps:

1. An initial long list of sites was provided by Ofwat based on an EA analysis of potential environmental impact of abstraction from WFD assessment.
    a. This provided a list as follows:
        i. 33 Surface water sites.
        ii. 310 Groundwater sites
2. This list was then filtered by the EA to provide a modified list as follows:
        i. 11 Surface water sites
        ii. 43 Groundwater sites
3. Thames Water then filtered this list to remove duplicate sites (e.g. where a number of different licences exist for the same abstraction site) as follows:
        i. 5 Surface water sites
        ii. 28 Groundwater sites
4. Thames Water reviewed this list to assess the suitability of the sites for inclusion in AIM reporting. The basic criteria for this review are:
    a. Source results in likely environmental impact on flow
        i. 1 Surface water source filtered out
        ii. 11 Groundwater sources filtered out
    b. There is a potential alternative source for use when AIM triggers are in force
        i. 3 Surface water sources filtered out
        ii. 10 Groundwater sources filtered out
    c. 3 Groundwater sources were also filtered out because they are disused, closed or will be closing.
5. This has resulted in a finalised list of 5 (1 surface water and 4 groundwater) sites for AIM reporting as follows:

AIM Sites	Justification
Pangbourne, Kennet Valley WRZ	Investigation demonstrates impacts of Pangbourne abstraction on the Sulham Brook, but it is not cost beneficial to reduce abstraction. Existing flow constraint at Pangbourne restricts abstraction from boreholes but the AIM trigger will introduce this at an earlier stage in flow recession
Axford, SWOX WRZ	Keen stakeholder interest. Abstraction will be reduced to a maximum of 6 Ml/d during low flows from 01/04/2017. Scope to reduce this abstraction earlier than the current trigger
Pann Mill, SWA WRZ	Investigation shows that abstraction at Pann Mill has an impact on the River Wye. A sustainability reduction is proposed for Pann Mill to reduce the licence to 9.6 Ml/d. Reducing the licence further on a permanent basis is not cost beneficial. There is flexibility within the network to support further reduction, subject to demand and water pressure.
North Orpington, London WRZ	It is not cost beneficial to reduce this licence. When all other sources in the area are fully operational there is flexibility within the network to reduce abstraction during low flows. Known stakeholder interest.
New Gauge, London WRZ	Keen stakeholder interest. Reducing abstraction at New Gauge during low flow periods will benefit the environment.

4. Baselines & Trigger levels

The baselines and trigger levels were shared with and agreed with the EA and Ofwat in 2016 and shared with the Customer Challenge Group (CCG).

New Gauge

- Trigger level – Q90 (60Ml/d) at Lee at Rye Bridge (to be revised when a new gauging location is available)
- It is expected that the trigger level for New Gauge will be revised when a proposed new gauging station which is understood to be planned for the reach upstream of the Amwell Magna Loop, which would be a more suitable location to set a trigger level for a reduction in abstraction at New Gauge. It is expected that once this gauging station is operational the trigger level will switch to the new gauging station. In recognition of the requirement to provide a minimum of 20Ml/d through the Amwell Magna Loop, in combination with appropriate weir settings at Tumbling Bay Weir, we suggest that the trigger level is initially set at Q90. The flow in the Lee at Rye Bridge at Q90 is approx. 60Ml/d (calculated 01/04/2006-31/03/2014). At the time the trigger was set no assessment had been made and so Q90 was chosen as a low flow indicator, but this may be reviewed for AMP7 in light of the EA reassessment and if a new gauging station is installed. In the meantime we have been working with the Environment Agency to reduce abstraction flexibly and when possible reducing earlier or when specific issues are predicted e.g. navigation pressures.
- Proposed baseline 89.6Ml/d was calculated by averaging daily abstraction over the last 5 years when the trigger would have been active.

- There is no formal target abstraction volume set within AIM, however a nominal target has been set for each site. The target for New Gauge would be to reduce abstraction to 80Ml/d, this is 20Ml/d below the allowed licence volume and 20Ml/d is the minimum target flow for the Amwell Magna Loop as determined in the low flow investigation.

Axford

- Trigger level – 166Ml/d gauged flow at Knighton, which equates to Q57.
- The low flow investigation into the impact of abstraction at Axford suggests that the most demanding discharge to achieve 50% habitat conditions is in the range of 166.8 - 254.9Ml/d and that flows within this range would ensure that all of the study sites would have flows providing the optimal velocities over 50% of the wetted width. Therefore 166Ml/d was chosen as the trigger level for AIM.
- The baseline of 7.85Ml/d was calculated by averaging daily abstraction over the last 5 years when the trigger would have been active.
- There is no formal target abstraction volume set within AIM, however a nominal target has been set for each site. The target would be to introduce the licence flow constraint, at a flow in the River Kennet of 166Ml/d restricting abstraction at this point to 6Ml/d which is significantly earlier than the licence flow constraint of 100Ml/d.

North Orpington

- Trigger level - Q93 (11.4Ml/d) at Crayford.
- The AMP4 investigation completed for North Orpington investigated the impacts of the abstractions at North Orpington and Orpington on the River Cray. The investigation found that there was a direct impact on flows from the abstraction at North Orpington but the impact of abstraction from Orpington was much less clear cut. Minimum Acceptable Flows were calculated by the EA for macro-invertebrates in the River Cray. The Minimum Acceptable Flows for Arch Footbridge and Crayford gauge equate to Q85 and Q93 respectively, therefore Q93 was chosen as the trigger level for AIM.
- The baseline of 7.16Ml/d was calculated by averaging daily abstraction over the last 5 years when the trigger would have been active.
- There is no formal target abstraction volume set within AIM, however a nominal target has been set for each site. The target is to reduce abstraction to 6Ml/d

Pangbourne

- Trigger Q80 (1.02Ml/d), gauged at Sulham Brook gauging station.
- The AMP4 studies completed for the abstraction at Pangbourne investigated impacts on the River Pang and the Sulham Brook. The investigations concluded that there were impacts from abstraction on the Sulham Brook which lead to increased periods of drying, but that it was not cost beneficial to reduce abstraction and replace it with a new source. The investigation for Sulham Brook estimates a flow of 1.02Ml/d would maintain flows in the brook, even if it continues to lose water to groundwater; this equates to approximately Q80 at Sulham gauging station and therefore Q80 was selected as the AIM trigger.
- The baseline of 31.6Ml/d was calculated by averaging daily abstraction over the last 5 years when the trigger would have been active.
- There is no formal target abstraction volume set within AIM, however a nominal target has been set for each site. The target is to reduce abstraction to 26.6Ml/d.

Pann Mill

- Trigger Q80 (5.6Ml/d) at High Wycombe New Weir Gauging Station
- The recent AMP 5 investigation and options appraisal for Pann Mill indicates that abstraction at Pann Mill does have an impact on flows in the River Wye. When flows are lower than Q70 the impact of abstraction at current licensed rates (22.7 Ml/d) was above the allowable flow reduction (EFI), however it has been agreed that there will be a licence reduction to 9.5 Ml/d during AMP6. Further analysis in the options appraisal suggests that at Q95 the new daily licence limit will have a 10% impact on flows at Q95, which still does not meet the overall water body target in combination with the other abstractors in the catchment. We have assessed using Q95 as the trigger level, but this equates to a very low flow (0.17Ml/d), therefore we have selected Q80 instead which gives a river flow trigger of 5.6Ml/d at High Wycombe New Weir Gauging Station on the River Wye.
- The baseline of 11.4Ml/d was set based on recent abstraction rates. When the baseline for Pann Mill was calculated by averaging abstraction over the last 5 years during periods when the constraint would have been active, the baseline calculated (0.9Ml/d) was not representative of site operation. This was due to the impact of an outage over this period. The site has since been back in supply, but the trigger level for AIM would not been active during this period. Therefore all abstraction since the site was returned to supply was used to calculate the baseline abstraction. This approach was agreed with the Environment Agency.
- There is no formal target abstraction volume set within AIM, however a nominal target has been set for each site. The target is to reduce abstraction to 7Ml/d.

Note
It should be noted that in the case of each site selected for AIM reporting the reduction in abstraction to be implemented when the AIM trigger is in force is dependent on the alternative site being available. If it is not available due to reasons such as outage, high demand, drought or other cause that results in risk to security of supply then the AIM abstraction reduction will not be able to be implemented until such time as the alternative sites is available and the abstraction reduction can be made without compromising security of supply.