

DECISION STATEMENT

ABSTRACTION LICENCE APPLICATION

Affinity Water Limited

Application number: NPS/WR/027731

Licence number: 28/39/28/0480

EA Area: Hertfordshire North London

Date of Application: 13 September 2019

Decision Date: 06 July 2021

Applicant details:

Affinity Water Limited

Tamblin Way

Hatfield

Hertfordshire

AL10 9EZ

1. Summary of the proposal:

Affinity Water Limited applied to vary their full abstraction licence 28/39/28/0480, which permits abstraction from the Chalk groundwater aquifer for the purpose of public water supply across nine sites in the Colne Valley, collectively referred to as the 'Blackford Group'.

The application comprised of two distinct components:

- A. Renewal of a time-limited annual volume (annual aggregate) which permits an increase in the annual abstraction rate across the group from 29,200,000 to 32,120,000 cubic metres. This variation was originally granted in 2003. This component has been renewed up to 31 March 2025 to align with the end of the seventh Asset Management Period (AMP7), during which alternative supply options will be identified if further investigations under the Water Framework Directive (WFD) find that this abstraction is having an adverse impact on the Chalk groundwater body or dependent surface waterbodies.
- B. Variation [increase] in the peak hourly and daily abstraction rates at West Hyde and Batchworth sites of abstraction, to mitigate a potential reduction in supply from other sites within the Blackford Group as a result of construction works associated with HS2. This proposal forms part of a wider strategy put forward by Affinity, which includes the variation granted to the Watford Group licence 28/39/28/0270 on 21 May 2021.

Works associated with HS2 risk causing spikes in turbidity (suspended chalk particulates) in the Chalk aquifer. Turbidity is the water quality parameter most likely to cause a reduction in supply, though Affinity have identified that there may be other risks to water quality which cannot be established until HS2 works commence. Yield from sites which are less affected by a deterioration in water quality – such as at West Hyde and Batchworth - will need to be increased to enable Affinity to maintain supply and an expected level of service to their customers. In effect, abstraction is

'redistributed' between sites so that reduced abstraction at Blackford, for example, is offset by an increase in abstraction at Batchworth.

At West Hyde, the rates of abstraction will be increased from: 909 to 936 cubic meters per hour, and 20,457 to 21,600 cubic metres per day.

At Batchworth, the rates of abstraction will be increased from: 1,137 to 1,167 cubic metres per hour, and 20,457 to 26,000 cubic metres per day.

The increase in abstraction rates will occur for intermittent 'peak demand' periods (which occur on average 14 days within a year), subject to the following criteria:

- when supply from the Blackford Group sites affected by HS2 construction (Blackford, Northmoor, and West Hyde) cannot achieve 57,460 cubic metres per day (this is the total historic peak output from these sites), due to;
- turbidity levels in the abstraction boreholes at these sites being equal to or higher than 0.8 Nephelometric Turbidity Units (NTU), or;
- if contaminants (which may include micro-organisms, parasites, or other substances) are detected in the abstracted water at these sites, or;
- when commencement of HS2 construction works is at or within 1 kilometre of the Blackford site (due to a high certainty of turbidity being generated).

Abstraction must occur at the existing, lower rates when these conditions do not apply.

Both variations have an expiry date of 31 March 2025.

2. Source of supply:

The unconfined Chalk in Hertfordshire, Middlesex, and Buckinghamshire.

3. Points of abstraction and quantities:

West Hyde, National Grid Reference TQ 04 91:

- Under normal operating conditions: 20,457 cubic metres per day, 909 cubic metres per hour.
- When there is a reduction in supply and the criteria above apply: 650,169 cubic metres per month, 21,600 cubic metres per day, 936 cubic metres per hour.

Batchworth, National Grid Reference TQ 06 93:

- Under normal operating conditions: 20,457 cubic metres per day, 1,137 cubic metres per hour.
- When there is a reduction in supply and the criteria above apply: 711,769 cubic metres per month, 26,000 cubic metres per day, 1,167 cubic metres per hour.

The annual rate of abstraction for the Blackford Group is aggregated across all sites, it is 32,120,000 up to 31 March 2025 and 29,200,000 from 01 April 2025.

4. Means of abstraction:

Abstraction is made from boreholes, each with a pump.

5. Purpose of abstraction:

Public water supply.

6. Abstraction period:

All year (01 April to 31 March).

7. Case history:

The Blackford Group licence was originally issued in June 1987. The variation to the annual aggregate (component A) was first made in September 2003, and has been renewed on three previous occasions: January 2007, November 2013, and February 2017.

Applications for consent to investigate a groundwater source (under section 32(3) of the Water Resource Act) for the purposes of investigating the increase in hourly and daily abstraction rates at West Hyde and Batchworth (component B) were made October 2017 and February 2017 respectively.

The formal application to vary this licence was received July 2019.

8. Justification:

Affinity have a reasonable and justifiable need to renew the higher annual rate of abstraction and increase the hourly and daily abstraction rate at West Hyde and Batchworth. In line with our duties towards water undertakers specified in section 15(1) of the Water Resources Act 1991 and section 38(3)(b) of the Water Resources Act 1991 - which dictates that we must have regard to an applicants' requirements in so far as we consider them to be reasonable - we recognise that Affinity need to maintain supply and an expected level of service to their customers.

9. Resource assessment:

Renewal of the annual aggregate (component A) will not result in an increase in actual abstraction within the Colne Valley because the licence is fully utilised. This means there is no scope to increase the annual abstraction rate above what has been abstracted historically.

The change to peak daily and hourly abstraction rate at Batchworth and West Hyde (component B) is considered a redistribution of the water that may have otherwise been abstracted at sites effected by turbidity; Blackford, Northmoor, and/or West Hyde. A condition has been included on the licence which limits the aggregate quantity of water authorised to be abstracted at Batchworth, West Hyde, Northmoor, and Blackford during a reduction in supply to 79,098 cubic metres per day – this is the sum of the abstraction rates from these sites which is already permitted to be abstracted under normal conditions, ensuring that aggregate abstraction from these sites is restricted to historic licensed rates. Increased abstraction at Batchworth and West Hyde is temporary, and expected to only be required for short and intermittent durations, up to 31 March 2025. The pump tests undertaken at Batchworth and West Hyde, demonstrated negligible impact on the surface water environment.

Consequently, the varied licence will not result in an increase in actual abstraction in the Colne Valley and is therefore acceptable with respect to the Colne Abstraction Licensing Strategy (ALS). Similarly, the varied licence will not prevent

achievement of WFD aims or objectives of any of the connected water bodies (see section 10).

10. Impact assessment of proposal:

Neither of the varied components will worsen the water balance element or cause further deterioration in Quantitative status (currently at 'Poor') of The Mid-Chilterns Chalk WFD groundwater body or prevent it from meeting its overall objective ('Poor' by 2015). This is because the variations will not result in an actual increase in abstraction at waterbody scale. Applying a time-limit to the annual aggregate (component A) of 31 March 2025 will provide an opportunity to review sustainability of the abstraction in conjunction with outcome of the WFD investigations and other pending sustainability reductions.

Affinity, in relation to component B, conclude that temporary increases in the hourly and daily abstraction rates at West Hyde and Batchworth will have a negligible impact on the groundwater and surface water environment in the Colne Valley. We have considered findings of the pump tests undertaken in 2017 in conjunction with the outcome of longer-term and ongoing National Environment Programme (NEP) investigations, which similarly found negligible impact on the surface water environment as a result of specific abstraction at West Hyde and Batchworth. Therefore, we also do not consider that short term increases in abstraction will result in further deterioration of the dependent surface waterbodies, groundwater dependent terrestrial ecosystems, or any of the protected species which depend on them.

However, we do acknowledge that there were limitations in the 2017 tests and have included a monthly abstraction rate at each site which will allow for recovery of the aquifer (to prevent unforeseen lag effects) whilst providing Affinity with the flexibility to meet peak demand. This is calculated as:

- The sum of the proposed rate of abstraction multiplied by 14 days (the duration of the pump test), and the existing rate of abstraction multiplied by 17 days.
- For Batchworth this is (26,000 cubic metres per day x 14 days) + (20,457 cubic metres per day x 17 days) = 711,769 cubic metres per month
- For West Hyde this is (21,600 cubic metres per day x 14 days) + (20,457 cubic metres per day x 17 days) = 650,169 cubic metres per month

Whilst a 28 day month may allow for abstraction to occur at or near the peak rates on each day, the annual abstraction rate – which is not changing - requires abstraction to be maintained at an average of 88,000 cubic metres per day across the whole of the Blackford Group; any instance of higher abstraction must be offset at another time. Thus, continual abstraction at the higher rate severely curtails abstraction under normal operating conditions (because the licence is fully utilised and there is limited scope to offset the higher abstraction rate).

We have also applied an extensive monitoring schedule to the licence, in relation to component B, to confirm our assessment that protected rights, lawful users, and designated sites, are unlikely to be impacted. This monitoring includes:

- Four licensed abstraction boreholes near Rickmansworth.

- Surface water and groundwater monitoring points local to; The Withey Beds Local Nature Reserve (LNR) and Local Wildlife Site (LWS), Stocker's Lake LNR, Springwell and Stocker's Lakes LWS, Stocker's Lake LWR, Rickmansworth Aquadrome LNR, Rickmansworth Aquadrome, Bury and Batchworth Lakes LWS, Croxley Common Moor LNR (and Site of Special Scientific Interest (SSSI)), and Colne Valley Gravel Pits LWS.
- Surface water monitoring point for the Mid Colne Valley SSSI.
- Surface water monitoring points on lakes local to West Hyde; Pynesfield Large, Pynesfield Small, and North Troy.

In the unlikely event that the monitoring data indicates that the temporary increase in hourly and daily abstraction rate at West Hyde and Batchworth is having or will have adverse effects on these features, Affinity will be required to produce a mitigation plan. Alternatively, if the data submitted confirms that these sites will not be affected these monitoring conditions can be suspended.

11. Statutory consultation:

In accordance with our obligations, we consulted Natural England and Statutory notification was served upon Thames Water Utilities (Statutory Water Undertaker) and the Canal and River Trust (Navigation Authority). No objections to the variation were raised, with the conditions applied.

12. External representations:

Notice of this application was publicised twice in the Watford Observer and online at Gov.uk (January 2020 and February 2021). The following sections explain how we considered each matter raised in the representations and the potential impacts of this proposal in relation to our duties and responsibilities within our remit of determining this water resource licence application.

12.1. Concern that this application, if approved, provides permission for works associated with the construction of HS2 to proceed on the basis that impacts to Affinity sources are mitigated

The decision to grant this application (in particular component B, variation to peak abstraction rates at West Hyde and Batchworth) does not provide approval for HS2 works to proceed. The impact of HS2 construction (considered in combination within this proposal in 12.2 below) has been assessed under Schedule 33 of the High Speed Rail Act 2017 (which applies up to defined land limits) and The Environmental Permitting (England and Wales) Regulations 2016. Those assessments have no bearing on the outcome of this application because this decision has to be specific to the proposal put forward by Affinity and assessment of the impacts of this proposal under the Water Resources Act 1991 (and other legislation); this legislation has not been disapplied because neither West Hyde nor Batchworth are within the limits of the land defined by the High Speed Rail Act 2017. HS2 construction could proceed irrespective of the decision on this application, and therefore refusal would impact upon Affinity's ability to mitigate against any impacts on its' ability to supply water without any effect on progress of HS2 works.

Accordingly, we have considered this proposal against section 38(3)(b) of the Water Resources Act 1991, which says that we must have regard to the

applicants' requirements, in so far as we consider them to be reasonable. In this instance we are critically assessing whether the request made by Affinity to redistribute abstraction within its central supply zone, for the purpose of maintaining deployable output (DO) – and thus supply of water to customers - from sources within the Colne Valley during peak demand periods is reasonable. Whilst the impacts of HS2 construction on the Blackford Group are considered in the context of assessing the reasonability of the proposal, we cannot extend this assessment to consider whether HS2 is justified in its own right. Or similarly, whether HS2 should or shouldn't be allowed to proceed due to the anticipated impacts on Affinity's sources, because this is not within the remit of the legislation applied to this assessment of the application made by Affinity, i.e. it is not an assessment of works being undertaken by HS2 Limited or contractors.

Further, granting this application does not permit 'pollution of the aquifer' by HS2, as stated within some representations. Works associated with HS2 have been or will be assessed against The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 where relevant; it is beyond the remit of this determination to reconsider the impact of HS2 works in isolation on WFD Chemical Status. The most likely 'pollution' to have an impact on Affinity abstractions is turbidity generated by piling works near Blackford. The assessment of and decision on this application to increase the abstraction rates at West Hyde and Batchworth must be specific to the potential impact on water quality induced by the proposed changes in the abstraction regimes; we found no evidence that the increase in abstraction rate at either site would contribute to or exacerbate impacts of pollution on the Chalk.

To be clear, reviewing assessments associated with the impact of HS2 construction is beyond the scope of this determination and a positive decision on this application is not a requisite permission for HS2 construction to proceed.

12.2. Comments regarding specific impacts of HS2 on the environment and other receptors

Representations expressed general concern over the potential impact of HS2 construction on the ground and surface water environment, landscape, and to public water supply. The impact of HS2 construction has been assessed under Schedule 33 of the High Speed Rail Act 2017 and The Environmental Permitting (England and Wales) Regulations 2016. Those assessments have no bearing on the outcome of this application for the reasons given in 12.1 above. Further assessment of HS2 is beyond the scope of this determination because this assessment must be specific to the potential impacts that may be caused as a result of either; renewing the time-limited annual volume (component A) or increasing the hourly and daily abstraction rates at West Hyde and Batchworth (component B). Where attention has been drawn to the specific impact of HS2 works, we have considered whether this proposal could act in combination and exacerbate these impacts. These matters are:

- The effects of HS2 construction on Chalk Rivers and Streams [reduction in baseflow and impact on water quality], including the rivers Colne, Chess, and Misbourne. The proposed route of HS2, at its closest point, passes approximately 975 m south-west of the West Hyde, and 4.7 km south-west of Batchworth. The mechanism for accumulative impact would be if abstraction at either West Hyde or Batchworth causes a reduction in

baseflow to the surface waterbodies, subsequently reducing dilution capacity.

Affinity's Batchworth Pumping Test Assessment and West Hyde Source – Pumping Test Appraisal, in addition to NEP investigations undertaken during AMP5 and AMP6, conclude these abstractions have no discernible acute impact on surface water flow or level [of the River Chess or Colne]. Given that the impact upon the surface water regime is expected to be negligible, and the distance between West Hyde and Batchworth pumping stations and the points on the rivers Colne and Misbourne where the HS2 route crosses the rivers (the HS2 route does not dissect the Chess), we do not expect that this proposal could act in combination with any effects of HS2 construction on these rivers to cause deterioration in flow.

Regardless, we have applied a limit to the monthly rate of abstraction to guarantee a period of aquifer – and thus baseflow – recovery. There will be no overall increase in abstraction in the Colne Valley due to the inclusion of a daily group aggregate between Batchworth, West Hyde, Northmoor, and Blackford. Further, renewing the time-limited annual volume will not permit abstraction above historic actual rates (because the licence is fully utilised). In summary, we conclude that this proposal will not act alone or in combination with any impacts attributed to HS2 to cause deterioration in the flow or quality of the Chalk Rivers.

- General 'impact and reduction in quality of the aquifer', taken to mean the physical effects of tunnelling and drilling on geological structure and chemical quality of the Chalk aquifer. There are no physical modifications being undertaken to the boreholes as part of this proposal that could act in conjunction with the works to physically alter the structure of the Chalk or generate significant turbidity (the determinand most likely to limit DO at Blackford, Northmoor and West Hyde). The introduction of any 'pollution' [from unspecified aspects of HS2 works] will not be considered within this determination for the reasons given under 12.1 above. We have considered the specific impacts of this proposal on water quality under section 6 of the Environment Act 1995 and sections 40 and 21 of the Water Resources Act 1991, and on WFD. This proposal does not permit the direct discharge of substances, to the aquifer (which would otherwise be assessed under The Environmental Permitting (England and Wales) Regulations 2016). Therefore, we find no mechanism by which this proposal could act in combination with HS2 works to cause a general deterioration in quality of the aquifer.
- Failure to achieve Good overall waterbody status of the Mid Chilterns Chalk (GB40601G601200) groundwater body under the Water Framework Directive (WFD) due to construction of the Colne Valley Viaduct, tunnelling, and diversion of New Years Green Bourne. It is suggested that these works will cause a deterioration in Quantitative and Chemical status elements. Works associated with HS2 have been or will be assessed against The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 where relevant; it is beyond the remit of this determination to reconsider the impact of these works on WFD. Separate assessments for HS2 have identified that the risks from construction of the

Colne Valley Viaduct and the Chiltern Tunnel are limited to water quality. That is, the works are not likely to cause a deterioration in Quantitative status or prevent any element from meeting its objective within the Mid Chilterns Chalk through a change in level or flow, therefore there is no mechanism for the change in abstraction regime at West Hyde or Batchworth to act in combination to cause deterioration of any Quantitative element.

The pollution plume in the vicinity of New Years Green Lane former landfill site (approximately 3.8 km to the south-east of West Hyde) – the diversion of New Years Green Bourne and piling are considered to influence this plume - is given as a reason for Poor status within representations. We do not consider that a change in abstraction regime at West Hyde (nor Batchworth, being at a greater distance) will exacerbate the existing pollution plume due to the distance between sites and New Years Green Lane and direction of groundwater flow (from north-west to south-east). Therefore, abstraction in accordance with Schedule B will not act in combination with these works to impact on groundwater quality and this proposal will not prevent the waterbody from meeting its Good by 2027 Chemical status objective with respect to this matter.

- The water demands of HS2 [for tunnelling and cement batching] and the supply of water by Statutory Water Undertakers to HS2, and the impacts this would have on Quantitative status of the WFD Mid Chilterns Chalk (GB40601G601200) groundwater body and the availability of water for public water supply. With reference to 12.1, the decision on this application has to be specific to the proposal put forward by Affinity applying section 38(3)(b) of the Water Resources Act 1991. We have not assessed whether HS2's water requirements are reasonable within the course of this determination, only whether there is a reasonable need for Affinity to modify its abstraction regime as proposed for the purpose of mitigating impacts of HS2 on the Blackford Group and improving resilience of supply to customers. All water abstracted under this licence is for the purpose of public water supply and, to the best of our knowledge, there is no commercial agreement between Affinity Water Limited and HS2 Limited (or their contractors) to supply the project with construction water from the Blackford Group that would require us to take HS2 construction water requirements into consideration. This proposal – in combination with the variation made to Watford Group licence 28/39/28/0270 – will not increase actual abstraction within the catchment on an annual basis. Therefore, it will not worsen the Water balance element or cause further deterioration in Quantitative status (currently at 'Poor') of The Mid-Chilterns Chalk WFD groundwater body or prevent it from meeting its overall objective ('Poor' by 2015) irrespective of abstraction being undertaken by other parties, i.e. HS2 Limited.
- The impact of pollution on the aquifer [from drilling chemicals, cement, mobilisation of contaminant plumes, and turbidity] specifically in the vicinity of Harefield. Harefield is approximately 1.4 km south-east of West Hyde pumping station and north of the proposed HS2 route. For the reasons given above, we do not anticipate that this proposal will act to cause a deterioration in chemical quality of the Chalk in the Harefield area (the

representation referred to the aquifer in general, rather than a particular feature such as a conservation feature or protected right) because this Water Resource licence application does not consent the discharge of chemicals to the aquifer.

With regard to turbidity, it is expected that turbidity will be generated by HS2 piling works however the change in abstraction regime at West Hyde and Batchworth is unlikely to induce turbidity to the same degree (localised fluctuations may occur when pumping rate is changed). This is because it is not in Affinity's interest to abstract at a rate that causes turbidity to exceed the limits set-out in The Water Supply (Water Quality) Regulations 2016. If rates exceed 0.8 NTU, pumps automatically shut-off until levels subside. Consequently, there is no way for abstraction in accordance with Schedule B to result in high-turbidity at any point in the aquifer, including at Harefield.

- Statement that HS2 works are not in keeping with our Policy and Practice for the Protection of Ground Water due to the risk to water quality, and quantity, and impact to drinking water supply. A discussion on whether all HS2 works have been undertaken in accordance with Policy is beyond the scope of this report. However, we have considered the impact of this proposal made by Affinity on groundwater resources in line with the principles of our 'Approach to Groundwater Protection' document (February 2018, which supersedes the Policy and Practice document (2006) and can be found online), not least by considering the impact of this groundwater abstraction on;
 - Other abstraction boreholes used for drinking water and protected rights, and;
 - Groundwater dependent ecosystems, and;
 - Water quality and the potential of this proposal to cause pollution, and;
 - Other conservations sites.

On review of the evidence submitted by Affinity, we believe that this proposal in its own right will have negligible impact on these features. We have applied additional monitoring conditions to the licence to confirm this assessment and to be able to mitigate any unforeseen effects.

- The impact of HS2 construction on [quantity and quality of] public water supply, and the permanency of that impact. Fundamentally, component B of this variation is to mitigate the impacts of turbidity and potentially other – as yet unidentified – contaminants on supply. These impacts are anticipated to be for up to a period of 30 months inclusive of a recommissioning period, however specific concerns were raised on the possibility that groundwater quality will not be restored to pre-HS2 construction levels and the implications this may have on long-term water security, and thus the permanency of this licence variation if Blackford site cannot be recommissioned. This variation – and that made to the Watford Group licence – to increase daily abstraction rates at unaffected/less affected sites will ensure that supply and an expected level of service can be maintained in the first instance. However, we acknowledge that there is uncertainty in

the duration and sequencing of HS2 works; for this reason we have given some flexibility in the expiry of the higher daily and hourly abstraction rates to 31 March 2025 (which will also so apply to all conditions associated with this variation). This is to align with a key date within Affinity's Water Resource Management Plan (WRMP) and the end of AMP7 and allow time for other options to be sought should impact be anticipated beyond the approximate 30 month period beginning 2021.

We have been clear that the variation is not a long-term option (i.e. extension of the variation beyond 31 March 2025 is unlikely to be acceptable). Whilst there is sufficient confidence that the existing abstraction regime (i.e. the lower rates of abstraction at West Hyde and Batchworth) and levels of DO at Blackford, Northmoor, and West Hyde can be restored prior to 31 March 2025 (due to either turbidity levels subsiding or treatment capacity increasing) – the eventuality of this not being the case is being considered aside from this application. This variation seeks to mitigate against imminent reduction in DO resulting from HS2 works only; long term options to secure and improve security of supply are within the scope of the Affinity's WRMP (within which risks from HS2 on supply are considered).

- General destruction of the environment, including the Chiltern Hills Area of Outstanding Natural Beauty (AONB) and Ancient Woodland. We have general duties to protect and enhance biodiversity under provisions of the Environment Act 1995. The conservation and enhancement of wildlife forms part of its scope and imposes a duty to take into account nature conservation when considering a proposal. The Natural Environment and Rural Communities Act 2006 requires us to have regard to the conservation of biodiversity. We have considered the potential impact of this proposal alone on conservation features. Here, we consider the potential for this proposal to act in-combination with the physical impact of HS2 construction stated by representors. We conclude that Ancient Woodland (where no groundwater-dependent terrestrial features have been identified) is unlikely to be sensitive to a change in abstraction regime at West Hyde and Batchworth. Similarly, there are no physical modifications being made to either site that could impact on the Chiltern Hills AONB designation (which is more than 2 km from either site). Consequently, there is no mechanism for this proposal to act in-combination with HS2 to cause impact on these sites of conservation [because they are not sensitive to abstraction].

We have identified a number of conservation features that may be sensitive to temporary changes in the abstraction regime. We agree with Affinity's conclusion that the impact on these will be negligible – and in the worst case not unrecoverable -, but have included further monitoring conditions on the licence to confirm this assessment and allow for a mitigation strategy to be developed where abstraction can be demonstrated to be the cause of any impact on sensitive features should this not be the case.

- Increased flood risk. The proposed increase in hourly and daily groundwater abstraction is more likely to increase drawdown in the abstraction boreholes and dewatering of fractures local to them, with any effects rapidly attenuated due to the high transmissivity of the aquifer. There are no

transfers of water (i.e. from ground to surface waterbody) or discharges associated with this proposal, which could result in localised flooding alone and therefore it cannot act in-combination with any HS2 works that could increase flood risk.

12.3. The purpose and justification of this application in relation to HS2

Some representors concluded that the increase in abstraction rates at West Hyde and Batchworth would enable Affinity to supply HS2 Limited (and/or its contractors) with raw water for HS2 construction. This is not the case. This application has been submitted by Affinity to mitigate the potential impact of HS2 construction on its sources. All water abstracted in pursuance of this licence is for the purpose of public water supply (to domestic and non-domestic customers), this purpose is stated on the licence to satisfy section 46(4) of the Water Resources Act 1991. To the best of our knowledge, there is no commercial arrangement between Affinity Water Limited and HS2 Limited for the supply of additional raw water from Batchworth or West Hyde; if this were not the case, a condition would be required on the licence specifying a purpose of abstraction for construction activity and we would assess the justification of this element also. Our assessment is based solely on the reasonableness of Affinity mitigating against the impact to supply.

Other representors inferred this application is not required on the basis that HS2 should not proceed, either because it could not be justified due to impacts attributed to it, or because it had not complied with its requirements under WFD, or because the project has not itself secured the necessary water it needs for construction. We cannot take into account the ability of HS2 to proceed on the basis of whether or not the project has secured the volumes of water it needs, has complied or not with other permissions, or whether the project is justified in a more general sense within this determination. We can only consider the reasonableness of Affinity's proposal against section 38(3)(b) of the Water Resources Act 1991, on the evidence presented by Affinity to mitigate against the potential impacts of HS2 on Blackford, West Hyde and Northmoor pumping stations in the scenario of HS2 proceeding. Licence conditions ensure that higher rates of abstraction at West Hyde and Batchworth may only be used if there is a reduction in DO due to impacts of HS2, otherwise existing restrictions [lower rates of abstraction] will continue to apply; this would also be the case if HS2 does not proceed and therefore the licence accommodates both scenarios.

12.4. Justification for this application by Affinity and sustainability of abstraction within the catchment

Beyond our duty to give regard to the applicant's requirements under section 38(3)(b) of the Water Resources Act 1991, we also have a statutory duty to have particular regard under section 15 of the Act to the duties of water undertakers to ensure that public water supply is maintained. This means we must consider the implications that not granting this proposal will have on Affinity's ability to meet demand. For this reason, we have reviewed existing peak demand and how this proposal will reduce the deficit in DO if Blackford, West Hyde, and Northmoor are impacted, i.e. we have considered what risks HS2 pose to the public water supply from the Blackford Group as a whole as part of our assessment of justification.

We have included a condition in the licence that ensures that the higher rates of abstraction can only be utilised in the event that DO is proven to be compromised. In doing this we have determined that Affinity's request is reasonable and we have met our duty towards ensuring that they can maintain public water supply. We acknowledge increasing the peak daily abstraction rate at Batchworth and West Hyde may only reduce the deficit in DO by 6,600 cubic metres per day (rather than 9,500 cubic metres per day initially sought), however, this is only one of a number of options to replace the potential temporary reduction in peak deployable output which we considered as part of this assessment.

Other options – which must be instigated prior to increasing abstraction at West Hyde and Batchworth – mean that abstraction within the Colne Valley is not increased in the first instance. These are imports of water from outside of Affinity's central supply zone and installation of new turbidity treatment plants. All sites in the Colne Valley have been assessed for their potential of increasing yield. Abstraction at Batchworth and West Hyde (and The Grove, in the Watford Group) is considered technically feasible. Remediating sites affected by water quality issues which are not resultant of HS2 – namely Ickenham and Stockers – to reduce the deficit in supply without a licence variation is not technically feasible at present.

We believe the restrictions applied balance our duty towards ensuring public water supply can be maintained with minimum impact on the environment and other water users as far as can be evidenced by the tests undertaken. For that reason, only proven rates of abstraction have been granted.

This proposal is considered a redistribution of abstraction within the Colne Valley, solely to mitigate against reduced supply from Batchworth, West Hyde, and Northmoor. Neither this application, nor the variation granted to the Watford Group licence, sought to increase annual abstraction rates in relation to component B. This means that an increase in daily abstraction above an average operational rate dictated by the annual rate (for the Blackford Group, this is 88,000 cubic metres per day) has to be offset at another time in the year; this already occurs under the existing abstraction arrangement. For example, peak abstraction (typically occurring June and July) may exceed 88,000 cubic metres per day – up to the theoretical licensed peak daily rate of circa 146,200 cubic metres per day - but this requires abstraction to be reduced to below 88,000 cubic metres per day during other periods to maintain that average. This proposal will not change the 'pattern' of seasonal abstraction or daily or annual quantity abstracted in the Blackford Group as a whole only the points where water is abstracted. We have applied a condition which aggregates the daily quantity that may be abstracted at affected sites equivalent to the sum of existing licensed rates at affected sites (79,098 cubic metres per day) to ensure that the variation does not unintentionally grant abstraction of 'new water' (i.e. above the existing total peak rate) on a daily basis.

Further, this licence and the Watford Group licence are fully utilised; this means that there is limited scope, within either Group or at a catchment scale, to increase abstraction on annual basis irrespective of the peak daily abstraction rate.

It was suggested that a Drought Order would be favourable to a licence variation due to the conditions under which 'peak demand' is likely to occur [peak demand coinciding with hot weather]. However, the use of Drought Orders is limited in that any deficiency in supply must be due to an exceptional shortage of rain (section

73(1) of the WRA 1991 as amended by the Environment Act 1995); in this instance an application to vary the licence has been made as the reduction in supply is due to impacts on raw water quality and not due to a deficiency in volume which does not discern quality.

A number of representations highlighted wider sustainability concerns; namely that continued rates of abstraction with the influence of climate change are unsustainable and that increasing demand on water resource is likely to worsen the current health of the environment (including the effects of groundwater abstraction on Chalk Stream ecosystems). The opinion was expressed that we and Affinity should be taking further action to reduce abstraction to more sustainable levels, and/or that demand should be reduced before granting this variation, and that other [long term] strategies should be implemented first. Over-arching measures – both demand management and supply side options – are detailed within Affinity’s published WRMP, which can be found online. This (in part) is the product of section 3(2)(a) of the Water Industry Act 1991, which requires statutory water undertakers have a duty to conserve water. We have assumed that all reasonable measures have been enacted by Affinity as required by the legislation and have therefore not considered demand-side options further for the purpose of determining this water resource application which is to mitigate the potential, immediate, and short-term impacts of HS2 on DO at Blackford Group sites.

Plans to improve sustainable abstraction across the Colne catchment are in place. These will reduce the deficit between minimum river flows and environmental needs. In the Upper Gade, a 6.4 Megalitres per day reduction was implemented in 2018/19 on an Affinity licence near Hemel Hempstead. Similarly, this licence includes a time-limited annual aggregate (component A) which will reduce licensed abstraction across the Blackford Group by 2920 Megalitres upon expiry, at the end of the AMP7 review cycle, if it is found to be unsustainable. These measures, coupled with supply and demand options detailed in Affinity’s WRMP, aim to advance sustainable abstraction in the catchment. (Our published Colne Abstraction Licensing Strategy (ALS) outlines other actions which have been taken). Other changes are being undertaken through the Restoring Sustainable Abstraction (RSA) programme; whilst the main body of this programme was completed before March 2020, further reductions or significant changes to the existing licences will be pursued separately through RSA using our powers under section 52 of the Water Resources Act 1991, if identified as necessary and reasonable.

Sustainability of this proposal alone, and in conjunction with the variation granted to the Watford Group licence, has been considered with respect to the Water Framework Directive and indeed the Colne ALS. Neither application seeks to increase annual abstraction (in relation to mitigating the impact of HS2 on the Blackford Group) and similarly Affinity are not seeking to increase actual abstraction on a daily basis within the catchment overall. Thus, these proposals will not prevent or reduce the effectiveness of sustainability actions completed or being carried out in the Colne Catchment and will not result in an increase in unsustainable abstraction at a waterbody (The Mid-Chilterns Chalk (GB40601G601200) in particular) or catchment scale and do not conflict with the sustainable policies embodied within the ALS.

12.5. Comments on our process and clarity of advertising and the content of the reports made available

Some representors were concerned that the content of our first notice consciously misled the reader on its intent, in that it did not mention HS2. The content of our notice is set-out in accordance with Regulation 6(6) of the Water Resources (Abstraction and Impounding) Regulations 2006, which describes the content of an application that must be included. Nothing within the regulation requires us to specify the name of the project the application is associated with unless it is considered the 'purpose of the proposed abstraction or impounding' (regulation 6(6)(b)(ii)) or a necessary 'particular' (regulation 6(6)(c)) to allow a reader to determine impact of the abstraction. In this case the 'purpose' is not changing from 'public water supply' (as licensed) and the water abstracted will not be used for HS2 construction and therefore is not a 'particular' which was required to be given. To ensure that such doubt did not occur again, we have included words of the following effect on subsequent notices of this application and also when providing notice of the changes to this application:

"All water abstracted is for the purpose of public water supply and the variation will contribute to maintaining resilience of supply during episodes of peak demand. This proposal is not to enable Affinity Water Limited to supply High Speed Two (HS2) Limited with construction water."

The application and supporting documents were criticised on the basis that redactions made them difficult to understand. However, these redactions made by Affinity were to remove any personal information in line with the Data Protection Act 1998 and details [including 12 figure National Grid References of the points of abstraction] which could compromise the security of public water supply assets in accordance with Defra document 'Guidance to Water Companies on the release of security sensitive information' (2012). (This did not preclude individuals from requesting un-redacted documents or specific information (as some did) which may be released under the Freedom of Information Act 2000 and/or the Environmental Information Regulations 2004, where circulation could be controlled). The redactions, in our view, did not impair the ability of the viewer to comment on the proposal or prevent them from asking for those specific details if it was needed to aid their response.

There were further concerns that we had not fulfilled our legal obligations in notifying the public of this proposal, and that we had not provided sufficient information, or duration, for the public to comment on by failing to publish all information online and un-redacted. We publicise water resource applications in accordance with our statutory duties set-out in section 37 of the Water Resources Act 1991, Regulation 6 of the Water Resources (Abstraction and Impounding) Regulations 2006, and Regulation 34 of the 2006 Regulations which specifies what documents we need to place on the public register and thus made available to the public. As far as the application is concerned, this is 'the name and address of the applicant, the date of the application and brief particulars of its proposals'. We complied with these requirements and indeed extended our initial consultation period for this application at the request of stakeholders.

In all regards, we consider that our obligations concerning notice of the proposal have been met. Nonetheless, we acknowledge the ability to readily view all application documents online (and not just the notice which appeared online and in

the Watford Observer newspaper in accordance with Regulation 6) would be welcomed by many stakeholders and members of the public. In consequence, we made provisions to make the supporting documents of any further related applications available through our consultation hub.

12.6. Extent, quality and validity of reports submitted by Affinity in support of their application.

Aside from the comments regarding redactions made by Affinity to the supporting documents (see section 12.5), concerns were raised that the information provided did not adequately demonstrate the impacts of the proposed abstraction on the environment due to timing or limitations of the pump tests.

We have sought further evidence (and clarification) where necessary, this resulting not least in the submission of Affinity's document West Hyde Signal Test Note (March 2021) and instigation of further site investigations during the course of the determination. Other supporting documents, including Affinity's West Hyde Source – Pumping Test Appraisal, Batchworth Pumping Test Assessment, and Technical note to support Batchworth, West Hyde and The Grove temporary licence variation, were sufficient in allowing us to determine the impact of the proposal on surface water features and terrestrial habitats, principally by demonstrating that there is likely to be some discontinuity between the Chalk and overlying surface waterbodies. Ultimately, we have curtailed the proposal where we do not believe the evidence provided substantiates the requested terms. Affinity have amended their application such that only proven rates of abstraction have been considered; further pumping tests and analysis will be required to demonstrate no impact on receptors (like that being undertaken at Batchworth under consent TP21/003), if Affinity wish to pursue increasing abstraction above already proven rates.

There was some criticism on the timing of the pump tests, in that these did not occur when peak demand was most likely (i.e. June and July). However, antecedent groundwater levels in the Chalk between February 2017 and November 2017 (pumping test periods for Batchworth and West Hyde respectively) were low to exceptionally low. Consequently, it is likely that any effect on levels seen at monitored sites is reflective of 'worst case' scenario. As part of this determination, we have considered the effects of the proposal to increase the hourly and daily abstraction rates on the surface water flow regime of the Colne at Q95 (this is taken to be the low flow indicator), especially upstream of Thames Water United Utilities' Maple Lodge Sewage Treatment Works discharge, and found that the temporary increases in abstraction rates at both the pumping sites is likely to have a negligible impact on the surface water environment in the Colne Valley. Never-the-less, due to limitations of the pump test (in particular the limited duration that the peak rate at either site was maintained) we have applied the monthly abstraction restrictions, outlined in section 10. These restrictions on abstraction allow for recovery of the aquifer (i.e. to attenuate any lag effects on the surface water environment which will be most critical during Q95 conditions) whilst providing Affinity with the flexibility to meet peak demand when deployable output from sites is affected by HS2 construction.

12.7. Impact on receptors specific to abstraction at Batchworth and West Hyde

We have considered the impacts of this proposal in combination with those attributed to HS2 by representors in 12.2 above. This section focusses on matters which have been raised with respect to an increase in abstraction at Batchworth and West Hyde specifically. These matters are:

- Increasing abstraction at Batchworth and West Hyde will affect surface water flow and/or level of;
 - the River Gade.
 - the River Chess.
 - the River Colne.
 - Chalk Rivers and Streams (more generally).

Monitoring undertaken during the course of the 2017 Batchworth and West Hyde tests has also been considered in conjunction with tests undertaken as part of the NEP. In summary, the temporary increases in the hourly and daily abstraction rate at both the pumping sites is concluded to have a negligible impact on the surface water environment in the Colne Valley. That being said, we recognise that the effects of prolonged abstraction at the proposed peak rates at Batchworth and West Hyde are unproven and could result in a longer-term decline in baseflow to these Chalk rivers. Therefore, abstraction at the higher hourly and daily rates will be restricted by a monthly rate to allow for recovery of the water levels within the Chalk aquifer and overlying deposits, to mitigate any impacts on sensitive surface water features. We believe this restriction will be sufficient to prevent damage to these waterbodies and the species which depend on them.

- The impact on Pynesfield Small, Pynesfield Large, and North Troy lakes, due to abstraction at West Hyde. We found that Affinity's West Hyde Source – Pumping Test Appraisal did not sufficiently demonstrate no impact to these particular lakes. Consequently, we requested that Affinity review all NEP data to determine likely impact of the abstraction and substantiate their assessment on the lakes. In response Affinity produced a consolidated report, West Hyde Signal Test Note (March 2021). Taking all investigations into account, Affinity concluded that the impact of increasing the peak abstraction rate at West Hyde for short and intermittent periods will have negligible impact on all lakes in the vicinity of West Hyde due to the attenuating properties of the superficial deposits from which the lakes are formed and therefore it is unlikely that lawful users of the lakes will be impacted to an appreciable degree on increasing abstraction to 21,600 cubic metres per day at West Hyde. However, we believe that it is prudent to confirm this assessment and have applied monitoring conditions in respect of these lakes. This will allow us to identify any unforeseen impacts and identify relevant mitigation for the purpose of preventing lasting adverse impacts.
- Impact on protected rights due to a change in abstraction regime at Batchworth. These are abstraction licences which permit abstraction from ground and surface water sources of supply, near Rickmansworth. Monitoring of this particular site was undertaken during the course of the 2017 Batchworth pump tests. A low risk of derogation was concluded,

however, sensitivity of one of the boreholes to abstraction was identified (note, a signal of abstraction does not mean derogation). Consequently, further investigation was undertaken to understand the realistic risk and impact of increasing the abstraction rate at Batchworth. In light of the evidence provided, we have applied extensive monitoring conditions to capture baseline conditions (i.e. monitoring undertaken during abstraction at the existing rates) to allow us and Affinity to identify any additional effect if/when abstraction rate is increased to 26,000 cubic metres per day at Batchworth. These monitoring conditions will be effective up to 31 March 2025 and can be discharged with when there is certainty that derogation will not occur. As a precautionary measure (in the unlikely event that the variation to the abstraction rate at Batchworth is proven likely to either result in, or already has caused derogation) a condition has been applied requiring Affinity to reduce abstraction at Batchworth (and this may be to the existing rate of 20,457 cubic metres per day) until flow is restored.

Review of data from the River Chess gauge station at Rickmansworth found no clear signal of abstraction on flow of the River Chess; therefore there is unlikely to be an impact on surface water and thus derogation of the surface water licence is considered unlikely.

In summary, we are satisfied that derogation is unlikely however the conditions applied will confirm this and prevent derogation of either licence if this is not the case. Thus we have discharged our duty not to derogate protected rights under Section 39(1) of the Water Resources Act 1991.

- A representor was concerned about the impacts that cessation of abstraction would have on ecology in proximity to Blackford pumping station [the site most likely to be affected by turbidity and abstraction reduced], if water levels were to rise. There are no obligations on a Licence Holder to utilise their licence. That being said, in this instance a reduction in abstraction is unlikely to cause significant acute impact on surface water levels – and thus to riparian habitat and supported species - in the vicinity of Blackford. In the unlikely event that ‘serious damage to the environment’ occurs due to groundwater flooding, restrictions on abstraction do not apply and parties responsible for maintaining the habitat could abstract for the purpose of land drainage under Section 29 (subsection (2A)(c)) of the Water Resources Act 1991.

13. Protected rights and lawful users:

The licence conditions imposed will ensure protected rights will not be derogated and lawful water users are protected.

14. Conservation:

We undertook assessment on all conservation sites and features identified within a 2 kilometres radius of West Hyde and Batchworth, and extended this to surface water features to Blackford site (approximately 3.5 kilometres downstream of West Hyde). At this point, any impact on surface water is considered neutral given that the proposal is to offset increased abstraction at West Hyde and Batchworth with a reduction in abstraction at Blackford (and potentially West Hyde and Northmoor).

We agree with Affinity's conclusion that the impact of increasing the daily abstraction rates at West Hyde and Batchworth for a limited duration will not result in a measurable impact on the River Colne (or Grand Union Canal) therefore there are limited pathways for the change in the abstraction regime to impact upon conservation features. We have, however, applied the monitoring conditions (outlined in 10 above) to confirm this assessment. Affinity are required to submit a report to us, with further analysis, to enable us to determine if any further action is required.

15. Conclusion and decision:

Full and due consideration was given to all comments and representations made and due regard have been taken of protected rights and other lawful uses. The conditions incorporated on the licence are considered to be necessary and reasonable in the light of the available and presented evidence.

Contact the Environment Agency:

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