Date: 14 October 2014  
Our ref: 116458  
Your ref: 3/08/9020

Mrs Jane Corry  
Development Control Team Leader  
Cumbria County Council  
County Offices  
Bushey Walk  
Kendal  
LA9 4RQ

BY EMAIL ONLY

Dear Mrs Corry

Proposal: Planning Application to Deepen Part of Shapfell Quarry and associated mitigation measures  
Location: Shapfell Limestone Quarry, Shapfell, Hardendale, Shap, Cumbria, CA10 3LQ  
Application Reference No: 3/08/9020

Thank you for your consultation on the above planning application which was received by Natural England on 24 March 2014.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

We had previously commented on this application when it was submitted in 2008 and advised that further information was required in order to characterise the hydrogeology of the site and surrounding area and to assess the potential ecological impacts of the proposals. Natural England has now reviewed the further information submitted in the updated Environmental Statement and planning documents submitted with this application. This includes reports to inform Habitats Regulations Assessments produced by the applicant for both the Asby Complex SAC and River Eden SSSI which we received on 15th April 2014.

Natural England has provided formal advice to the County Council as Competent Authority on the requirements for assessment under The Conservation of Habitats and Species Regulations 2010 (The ‘Habitats Regulations’) in relation to both Asby Complex Special Area of Conservation (SAC) and River Eden SAC in a letter from Dr Paul Glading dated 2 April 2014. Updated scoping advice for the HRA had been provided to the applicant and Cumbria County Council on 19.2.13. We have held subsequent discussions on the proposals with the County Council in meetings on 29th May and 12th June 2014 and more recently with the Environment Agency and WYG on 9th September 2014.

Natural England has welcomed the extensive additional work that has been done by the company and its consultants since the previous submission of the planning application in 2008 in order to increase understanding of the hydrology and hydrogeology of this complex limestone catchment.

We have also welcomed the efforts made by the company and its consultants to keep both our own specialists and those of the Environment Agency (EA) informed and the regular opportunities for input and discussion as the work progressed. This has included the ongoing ground and site investigations, monitoring and data collection, ecological survey work and the development of the conceptual groundwater model and presentation of results.
This is clearly a highly complex and technical case that involves large volumes of data collected over a number of years together with complex modelling approaches. In terms of the planning submission, Natural England has found the extensive amount of material presented and its organisation, structure and presentation challenging to review. We have, for example, found it difficult to find full details of the proposed mitigation, information about which is spread across different documents and appendices to documents. The numbering of documents and appendices has also presented additional challenges.

There is very little non-technical information other than in the Non-Technical Summary and this has made it difficult for non-specialists to access the information and review it in order to understand the proposals and potential impacts. The terminology is complex and frequently requires careful interpretation. A more extended non-technical explanation of the proposals, assessment process, impacts and mitigation would have been helpful.

As a result of our review of the proposals we wish to provide the following comments:

- **Hydrogeology - Conceptual and Mathematical Modelling.** Natural England’s groundwater specialists have significant concerns about the level of certainty around the conceptual and mathematical modelling work underpinning the characterisation of the hydrogeology of the area. This includes issues around model calibration which may be significant in relation to the upper karst-influenced limestone levels and also the lack of model validation using the most recent data from the winter of 2013/14. This has significant implications for the environmental assessment work which is reliant upon this modelling and its outputs.

- **River Flow and the River Eden SAC.** Natural England is concerned that the modelling issues referred to above raise significant questions about the level of certainty in the calculation of river flows in the headwaters and tributaries of the River Eden SAC and the prediction of impacts from quarry dewatering. In order to assess potential impacts from quarry dewatering (before mitigation), and in carrying out the required Habitat Regulations Assessment, it will be necessary to understand what the likely flow changes will be in relation to the flow objectives for each of the River Eden SAC tributaries across the whole flow regime. We have not found this information easy to interpret in the reports provided, including within the report to inform an Appropriate Assessment for the River Eden SAC.

- **Asby Complex SAC and impacts on alkaline fens and flushes.** Natural England is concerned that clear evidence of a hydrological impact on certain flush groups within Asby Complex SAC has been dismissed as not being ecologically significant in terms of the protection of these as European site interest features. No mitigation is proposed and Natural England does not consider any mitigation is possible. The potential for a hydrological impact is clearly identified. However it is the ecological interpretation of this impact that we challenge including the conclusions about the ‘temporary’ nature of impacts, quality, area and restorability of the features. These are key issues for the assessment required under the Habitats Regulations.

- **Mitigation proposals – practical issues.** Natural England has significant concerns about the proposed mitigation for impacts on flow in the tributaries of the River Eden SAC. These include the level of confidence in the model outputs underpinning the flow augmentation scheme; the proposals for reference to ‘analogue’ flow gauges in 2 other river catchments in determining target flows in the 3 SAC tributaries; the triggers which have been set for defining flow augmentation rates, timings and frequencies; the need for greater clarity in terms of reference to the conservation objectives for the SAC; the long timescales predicted for operational impacts (and therefore mitigation requirements) during quarry deepening and recovery periods; the effectiveness of the quantities, timings, durations and locations in the provision of flow augmentation; the level of confidence in calculations for water storage requirements in the quarry, including during extended periods of dry weather and drought; and the need for greater clarity around controls on water quality in the quarry void, mitigation
storage reservoirs and receiving waters. In addition, there needs to be more information on the ongoing monitoring and review process required to ensure that the measures were meeting their objectives at all times and could be adjusted as required.

- **Mitigation proposals – legal and regulatory issues.** Subject to the issues above being satisfied, Natural England is concerned that there is no information on how such a complex mitigation scheme could be legally and financially secured, particularly over the long timescales required. In view of the requirements of the Habitats Directive there would need to be high levels of certainty around the securing of such mitigation at all stages of the project in terms of the legal, financial and practical mechanisms to prevent damage to the SAC tributaries before the County Council could consider granting of planning permission.

- **Water Quality.** The Habitats Regulations Assessment for the River Eden SAC will need to provide a robust assessment of water quality issues in relation to the discharges and flow augmentation proposals. These should relate to the site conservation objectives and key chemical parameters (including the high levels of sulphate already identified in the quarry pool) together with other issues such as temperature and dissolved oxygen content.

- **Timescales.** The proposals and the impacts associated with them take place over extended timescales including the quarry deepening and dewatering operations and then the eventual rebound and recovery of groundwater and surface water systems. The duration of impacts is a key consideration alongside the nature and extent of them and there needs to be a high level of certainty around this issue.

- **The Conservation of Habitats and Species Regulations 2010 (as amended)** As advised in our previous letter dated 2 April 2014, Cumbria County Council will need to carry out Appropriate Assessments of the implications of the proposals for both the River Eden SAC and Asby Complex SAC in relation to the conservation objectives for these sites. When the County Council is considering whether site integrity is affected, you should review whether the proposed mitigation could prevent an adverse effect on site integrity. Natural England will comment further once these Appropriate Assessments are available. Specific comments on the applicants’ reports to inform the Appropriate Assessments are contained in Annex 1.

Further details on these and other issues are provided in Annex 1 and Annex 2 below.

We would be happy to comment further as required but if in the meantime you have any queries please do not hesitate to contact us.

To provide further information on this consultation please send your correspondence to consultations@naturalengland.org.uk.

Yours sincerely

Alison McAleer
Lead Water Adviser – Cumbria Area Team
ANNEX 1 -
Natural England comments on the Planning Application to Deepen Part of Shapfell Quarry and associated mitigation measures.

Hydrogeology - Conceptual and Mathematical Modelling
Natural England's groundwater specialists have significant concerns about the level of certainty around the conceptual and mathematical modelling work underpinning the characterisation of the hydrogeology of the area. This includes issues around model calibration which may be significant in relation to the upper karst-influenced limestone levels and also the lack of model validation using the most recent data from the winter of 2013/14. This has significant implications for the environmental assessment work which is reliant upon this modelling and its outputs. For example, the application submission does not appear to include updated groundwater and flow data/hydrographs relating to the winter of 2013/14 but appears to be limited to data only up to the end of 2013 and 2012 respectively (groundwater baseline report App 6.4). In our view the winter of 2013/14 represents a critical period in understanding groundwater recovery patterns, especially as it was a wet winter. Data from this period is likely to be significant in understanding what final water levels would be reached in practice. Therefore we cannot be confident that the modelled recovery is sufficiently accurate, with consequent implications for the level of mitigation required and analysis of environmental impacts.

We consider there are uncertainties regarding the adequacy of the model for assessing 'baseline' condition (restoration condition) due to the karstic nature of near surface limestone strata. The Upper Knipe Scar Limestone is assigned a single permeability value for the whole depth. However, we would suggest that the upper levels may be more permeable than has been assumed. Ordnance Survey maps show a number of high level karstic features such as shake holes and springs. Direct observations of the quarry faces above the lagoon water level (by Anna Wetherill in June 2014) identified evidence of solution features in the quarry walls at or around current water levels. Further evidence that the upper layers of limestone do exhibit karst features is also demonstrated by the presence of the alkaline fens and flushes in the surrounding area. Anecdotal evidence from local inhabitants (see comments below) may also provide additional information to suggest higher permeability values.

The karstic nature of the upper sequences of limestone may be an important factor in determining impacts on features which are related to these structures, and it will also influence the water levels that may be achieved in practice (rather than as modelled). Quarry water levels are only now likely to be approaching this point, following prolonged recovery from previous dewatering. The modelled groundwater behaviour does not take this into account and it is recognised that this characteristic is difficult to model adequately. However, it does mean that there are significant uncertainties about the impacts of the quarry on features that rely on these conduits. This can include features like Trainrigg Sike, as well as springs and the alkaline fens and flushes. We accept that this probably only applies to the upper few metres of limestone rather than the full sequence. However, it still raises concerns with respect to confidence in the model outputs and therefore the accuracy of predictions.

Natural England is aware that additional information has been provided through the submission of the Parish Council and statements from local farmers and landowners. It is not Natural England's role to undertake a thorough assessment of this information but we would advise the County Council to do so. However, it is clear from the high level review that has been carried out by our hydrogeologists that there is information contained in these reports that may be pertinent to these proposals, in terms of understanding the complex hydrogeology of the area and potential impacts on groundwater and surface water systems. If this is the case then it is important to determine whether this has been fully accounted for in the information provided by the applicant and if so, why it may have subsequently been dismissed or not considered significant. By way of an example, in our discussions with the applicant to date, the alkaline flushes and area of high ground to south of
quarry had not been given priority. However this new evidence may suggest otherwise.

River flow
Natural England has previously provided the applicant and the County Council with the conservation objectives for the River Eden SAC including river flow targets and additional advice in relation to existing flow conditions on the River Leith. Natural England has also previously agreed with the applicant and EA, that it was appropriate to use the ‘restoration condition’, as defined, as equivalent to ‘naturalised flow’.

What we understand is that at the time of the application, full groundwater rebound had not yet occurred and it was therefore necessary to model the ‘restoration condition’ and hence calculate the ‘restoration condition’ flow baseline that would occur in each of the SAC tributaries and their headwater streams. It appears that the analysis of the baseflow component of the rivers is based on data to the end of 2012 (App 6.4) rather than a full dataset and this may have limitations. In order to have sufficient certainty for assessment purposes, it will be necessary to have a clear understanding of the modelling of these flows including how the flow impacts and mitigation has been calculated in this respect.

In order to assess potential impacts from quarry dewatering (before mitigation), and in carrying out the required HRA, it will be necessary to understand what the likely flow changes will be in relation to the flow objectives for each of the SAC tributaries across the whole flow regime. This must be assessed ‘alone and in-combination’ and must therefore take into account existing flow impacts. We have found this information challenging to interpret in the reports provided, including within the report to inform an Appropriate Assessment for the River Eden SAC.

Mitigation proposals
The mitigation proposals are a significant aspect of the application and a key issue for the Habitats Regulations Assessment for the River Eden SAC. We note that no mitigation is proposed in relation to Asby Complex SAC and comment on this further below.

There is clear identification of the need to address the adverse hydrological and ecological impacts on the River Eden SAC which would occur as a result of quarry dewatering. The impact of previous dewatering during quarrying activity at the site has been identified in the hydrological monitoring data. This is demonstrated by the recovery of baseflow in the SAC tributaries, especially Dalebanks Beck, during the period since dewatering ceased and the consequent rise in quarry water levels. The lack of presentation of more recent data raises uncertainty in whether there is a complete understanding of what happens when groundwater levels are fully recovered, for example in terms of the full impacts of proposals on Trainrigg Sike. But in any event, the mitigation proposed in terms of flow augmentation to the derogated tributaries must be subject to robust scrutiny as part of the Habitats Regulations Assessment.

Natural England’s groundwater specialists have some experience of flow augmentation schemes and advise that each case has to be dealt with on its own merits. We are however concerned about the significant limitations of any mitigation scheme such as this. A fundamental concern is that any flow augmentation regime inevitably cannot replicate the natural hydrological regime in the SAC. We have not been able to determine clearly how the proposed mitigation scheme has been designed in relation to ‘restoration condition’ flow for the three SAC tributaries. Neither have we been able to ascertain how effective the use of analogue flow gauges would be in regulating and triggering the flow augmentation proposed. However it is clear in any event that the report indicates the potential for residual impacts even after mitigation. This represents a significant level of uncertainty to be addressed in terms of potential impacts on the European designated site, meeting the conservation objectives for the SAC and being compliant with the requirements of the Habitats Regulations.

In our view the proposed mitigation scheme is dependent on the accuracy and robustness of a
number of issues which we would expect to be addressed sufficiently in the Habitats Regulations Assessment of the proposals:

- the level of confidence in the modelling outputs and application of that data in determining the groundwater and river flow baselines (ie restoration condition) and impacts during all phases of the works;
- the groundwater and surface water data collected to date during site investigations;
- the proposals for reference to ‘analogue’ flow gauges in 2 other river catchments in determining target flows in the 3 SAC tributaries;
- the triggers which have been set for defining flow augmentation rates, timings and frequencies;
- the timescales predicted for operational impacts during quarry deepening and recovery periods;
- the effectiveness of the quantities, timings, durations and locations in the provision of flow augmentation;
- the calculations for water storage requirements in the quarry, including during extended periods of dry weather and drought, and size/capacity of storage reservoirs and pipelines;
- the calculations for water quality in the quarry void, mitigation storage reservoirs and receiving waters.

Mitigation – monitoring issues
The mitigation scheme would have to be subject to a robust monitoring and review programme to ensure it was achieving its objectives and operating as required and allow for adjustments and fine-tuning. We have found only limited information on this in the application reports. In any event, the Habitats Regulations Assessment will need to ensure that any reliance on monitoring for success of the mitigation is appropriate and meets the relevant guidelines. It is essential that there must be sufficient certainty about the ability of any mitigation scheme to avoid adverse effects on the integrity of the site before any planning permission could be granted. It is not appropriate to simply rely on future monitoring to address significant levels of uncertainty at this stage.

Mitigation - legal and regulatory issues
Natural England would highlight the need for clear information on how such a complex mitigation scheme could be legally and financially secured, particularly over the long timescales required. We have no directly comparable experience of such a scheme and in view of the requirements of the Habitats Directive, there would need to be sufficient levels of certainty around the securing of such mitigation at all stages of the project before the County Council could consider granting of planning permission. In effect, there would need to be legal, financial and practical mechanisms in place to ensure the delivery of the flow augmentation required to prevent damage to the SAC tributaries at each stage of the project. Our understanding is that this would include a ‘restoration bond’ or similar and associated legal agreement(s) plus clarity and security around the other necessary consents and permits required to deliver the flow augmentation. These would need to include the ongoing monitoring required to ensure that the measures were meeting their objectives at all times and adjusted as required.

Timescales
The proposals involve estimates of the timescales involved in the quarry deepening operations and then the eventual rebound and recovery of groundwater and surface water systems. The duration of impacts is a key consideration alongside the nature and extent of them. Natural England is concerned that there needs to be a sufficient level of certainty around this issue, for example to ensure quarry operations were not extended beyond the period specified and/or groundwater recovery periods took significantly longer than predicted. This will need careful consideration by the County Council. We would expect the full hydrological and hydrogeological monitoring plan for the operational, (and 10+ years post operation), periods to be presented along with monitoring methods, telemetry, frequencies, review periods and so on.
**Water Quality issues**

"The Habitats Regulations Assessment will need to provide a robust assessment of water quality issues in relation to the discharges and flow augmentation proposals. Natural England has previously advised on the scope of issues to be addressed in this respect including the in-combination effects of reduced flows in the watercourses as well as issues relating to the storage and flow augmentation scheme including key chemical parameters and the elevated levels of sulphate already identified in the quarry pool together with other issues such as temperature and dissolved oxygen content. It will be important to ensure there is sufficient certainty in the prediction of potential effects and any proposed measures to address these, including the use of other consenting mechanisms such as discharge consents. It will also be important to set this in the context of existing water quality in the tributaries. In the report to inform the Appropriate Assessment for the River Eden SAC there is reliance on future separate consenting mechanisms to secure this aspect of the assessment. However, reliance on future consenting alone would not be appropriate in this context and it will be necessary to demonstrate that there would be mechanisms for dealing with any water quality issues that could reasonably be anticipated to occur. (Ref para 6.6.8 of Chapter 6 of main report and 6.7.1 of the report to inform the Appropriate Assessment for example).

**Other consents and permissions required**

Natural England would welcome clarification of the range of consents and permissions required for these proposals and how the relevant competent authorities will work together on the Habitats Regulations Assessments.

**The Conservation of Habitats and Species Regulations 2010 (as amended) - “The Habitats Regulations”**

The quarry deepening proposals have the potential to adversely affect both nationally (SSSIs) and internationally designated (Natura 2000) sites including the River Eden and Tributaries Site of Special Scientific Interest (SSSI) and Crosby Ravensworth Fell SSSI. These SSSIs form part of the River Eden Special Area of Conservation (SAC) and Asby Complex SAC respectively.

As advised in our letter dated 2 April 2014 concerning the requirements of the Habitats Regulations, Cumbria County Council, as the ‘competent authority’, will need to carry out Appropriate Assessments of the implications of the proposals for both the River Eden SAC and Asby Complex SAC in relation to the conservation objectives for these sites and the ‘likely significant effects’ already identified (Regulation 61). When your Authority is considering whether site integrity is affected, you should at that stage review whether the proposed mitigation could prevent an adverse effect. Natural England must be consulted and your Authority must have regard to any representations made so we will comment further once these assessments are available.

**River Eden SAC – Report to Inform a Habitats Regulations Assessment**

Natural England has reviewed the report provided by the applicant to inform the County Council’s Appropriate Assessment for the River Eden SAC. We had previously provided scoping advice to the applicant and County Council to guide the content of this report and assessment process. Our comments below are not comprehensive but intended to provide some general advice in relation to the report.

In early 2014, the Joint Nature Conservation Committee published new Common Standards Monitoring Guidance following discussion with Natural England and the other Country Agencies. Essentially the application of the Guidance will mean changes to certain standards for water quality and river flow. As far as this application is concerned, the most relevant of the new targets are for phosphorus and river flows. The new P standards are in many cases more demanding than previously, and this is true of the three tributaries to the River Eden affected by this proposal. The most recent data show breaches of the new targets. However, the change of target should not make
a major difference to the assessment approach where this is reliant on flow mitigation to avoid in-combination effects with water quality.

The report concludes that there would be ‘adverse effects in the absence of mitigation;’ but that ‘a mitigation strategy has been proposed which involves ensuring that flows are maintained within flow objectives as far as possible. With this in place, some short-term breaches of flow objectives are predicted during quarrying and subsequent restoration, but the assessment concludes that these would not undermine the site’s conservation objectives either alone or in-combination with other plans or projects. It is therefore considered that the proposed development would not have an adverse effect on the integrity of the River Eden SAC’.

So the conclusion depends on the success of the proposed flow augmentation schemes and the calculations underpinning them and judgements made about the ecological significance of any breaches that would still occur. We refer to our comments above.

In 2.2.1 Phase 1 describes the lagoon and pipeline arrangements and states that the pipeline development would take place in Phase 1. This would suggest that it is not proposed to provide any mitigation during that period therefore it will be important to clarify when mitigation pumping would begin and the triggers that will be used etc.

In 2.3 (Restoration) the arrangement for supplying water for mitigation is described although it would benefit from greater clarity on how this would work. The text refers to the recovery period lasting until approximately 2036 (having assumed a start date of 2014) and states that ‘during this period, the water levels in the base of the quarry, the sump and the lagoons would be manually monitored on a daily basis. The augmentation of flows in the Eden headwaters would be informed by the continuous telemetry gauging of flows in the vicinity of the mitigation discharge points at the existing flow gauges maintained by Tata’. This indicates both the timescales and efforts that would be required to deliver the mitigation both during quarrying operations and after they have ceased.

Tables 5.1 to 5.3 sets out the screening of likely significant effects for the sites. The interest feature which is the whole river habitat (as classified according to its aquatic plant communities) must be central to the assessment, not just on the basis of the precautionary principle, but because that is the essential feature to which the river flow objectives apply. There should be a clear description of how far down the rivers the impacts would extend as well as the scale and duration of flow impacts. The description of ‘predicted effects on flows’ in column 4 does not appear to relate impacts clearly to the conservation objectives as defined through the flow targets and does not explain the nature and extent of the breaches in this respect. Where relative flow reduction percentages are quoted these do not appear to be related to the relevant Q value.

Where the reader is referenced to Section 5.4.3 of the SEI Appendix 6.6 Shapfell Model Report (and for example all the data in Tables 5.1 and 5.2 in that document) and this section then references for example Appendix B (comparative flow duration curves) which appears to be an appendix of Appendix 6.6 – it would be more helpful to provide a clear summary of the key information in the main HRA document.

Section 6 is the Appropriate Assessment. We recommend that you refer to the new targets for flows in JNCC’s Common Standards Monitoring Guidance (2014). Please note that there is an ongoing discussion between Natural England and the Environment Agency as to how these might be applied in practice. It might be helpful if once WYG have had the opportunity to consider the new Guidance, we might have a discussion about any implications for the assessment of this proposal and the mitigation of adverse effects.

Natural England has previously agreed the use of the restoration condition (as defined) as the appropriate benchmark, being as near as possible to naturalised condition.
The assessment depends largely on the development and results of the Shapfell Model and refers for example to the characterisation of the future river flow regime set out in Appendix 6.6 Model Report Section 4.4. The robustness of these results are dependent on the modelling and therefore subject to the issues and concerns raised above.

6.3.1 River water quality is considered as part of the description of the benchmark condition and we would expect there to be a clear reference to conservation objectives targets in each case and current condition in relation to these. See comments on water quality targets above. In any event where there is an existing breach of conservation objectives targets or a breach that might result from any derogation of flow, it will be important to assess this both before and after any mitigation proposals would be implemented so that the risk is clearly understood.

Section 6.5 sets out the assessment of effects on flow without mitigation in place. The tables summarising the potential effects for each tributary are difficult to follow as they present flow impacts in Ml/d and as % effects but do not in each case relate these to Q values or explain the impacts in relation to the flow targets. However they do identify significant breaches in the conservation objectives flow targets. It will also be important to consider whether the discharges to Force Beck would have any impacts on the flow targets within the SAC in terms of enhancing flows significantly above ‘naturalised’ flow levels. The nature, extent and duration of impacts for each tributary should be described clearly.

Table 6.9 – it is not clear how the assessment of adverse effect on site integrity has been defined as either ‘possible’ or ‘likely’ and the threshold between the two.

6.7 Mitigation measures proposed. Whilst we have not been able to review the separate CRR and OMR approaches, Natural England’s comments on the modelling and outputs used to underpin this assessment are relevant. In addition, the proposals for mitigation through flow augmentation and their assessment as part of the Habitats Regulations Assessment (HRA), are also subject to our general comments on mitigation above. The HRA would need to demonstrate sufficient certainty and level of detail around the delivery and effectiveness of the mitigation proposals in order to conclude no adverse effect on site integrity. The report does not, in our view, demonstrate this on the basis of the information presented. As one example, it is not possible to determine when the flow augmentation would be available and at what point it would first be required.

6.8 Assessment of effects with mitigation. We have not found this section sufficiently clear in terms of reviewing the basis for the conclusions reached. However, it does appear that residual breaches are still anticipated. In any event, this section of the HRA is subject to the general comments we have raised above in relation to the modelling and outputs and the mitigation proposals.

Table 6.11 concludes that ‘no adverse effect on meeting Conservation Objectives is predicted subject to mitigation’ and that this should be ‘subject to a rigorous monitoring programme’. Section 7 further states that ‘it is therefore considered that the proposed development would not have an adverse effect on the integrity of the River Eden SAC’. Natural England does not agree that the report currently provides sufficient information and certainty to reach a conclusion of no adverse effect on site integrity in relation to the River Eden SAC. In addition we would urge caution around the use of monitoring to ensure that any such conclusion does not rely on future monitoring as a form of mitigation in itself but meets the best practice guidelines for the use of monitoring in HRA.

Asby Complex SAC
Natural England is concerned that the clear evidence of a hydrological impact on certain flush groups within Asby Complex SAC has been dismissed as not being ecologically significant in terms of the protection of these key European site interest features. No mitigation is proposed and Natural England does not consider that any mitigation is practically possible.

The potential for a hydrological impact is clearly identified. However it is the ecological
interpretation of this impact that Natural England would wish to challenge, including the conclusions about the ‘temporary’ nature of impacts, quality, area and restorability of the features. These are key issues for the assessment required under the Habitats Regulations.

We have reviewed the information provided and the report to inform the Appropriate Assessment for Asby Complex SAC. We have also carried out our own assessment of the information, including investigations on site by our national habitat specialist in relation to the issues relating to the alkaline fens and flushes.

In summary:

1. Our own walkover survey in July 2014 has found that there are more alkaline flushes than the AMEC surveys located, both within the designated site and outside it.
2. The alkaline fens that we looked at are representative of the interest feature within the SAC, and contrary to what is suggested by AMEC, we did find characteristic species such as the bird’s eye primrose Primula farinosa. We do not agree with the assertion that the sites “are not particularly illustrative of the SSSI!” Some of the fen sites were very good examples, while others that were not as good may have been affected by previous drawdown - yet are still part of the SAC interest feature.
3. The groundwater maps in the main AMEC reports suggest that there are alkaline fens that are groundwater fed, and hence likely to be affected by drawdown.
4. Natural England would welcome the opportunity to meet with WYG and AMEC to attempt to reach a common understanding of where the alkaline fens are located both within and outside the SSSI/SAC, which ones are likely to be groundwater fed (rather than fed by perched water) and which are likely to be affected by the drawdown.
5. AMEC do not dispute that groundwater fed alkaline fen features will be affected by drawdown; they indicate that there are concerns about the practical delivery of mitigation, and no mitigation is offered. Natural England is of the view that mitigation would not be possible.
6. We are not comfortable with the AMEC assertion that the affected M10 communities would recover to a similar quality as groundwater levels rebound post-quarrying. There is no evidence that we are aware of to support this argument. We are not aware of any cases in which M10 vegetation is known to have recovered from having its groundwater supply reduced or removed.
7. AMEC do not dispute that there is a likely significant effect of the quarry deepening on the Asby Complex SAC, and hence an Appropriate Assessment is required. However, the conclusion in the ‘Report to inform an Appropriate Assessment’ for Asby Complex SAC is that this would not constitute an adverse effect on the integrity of the SAC. We do not agree with this assessment, based as it is on an inadequate survey of the affected features in terms of their extent, location and quality.

More detailed comments on these issues by Natural England’s Senior Environmental Specialist are provided in Annex 2 and Annex 3 below.

Protected species
Natural England has published Standing Advice on protected species. The Standing Advice includes a habitat decision tree which provides advice to planners on deciding if there is a ‘reasonable likelihood’ of protected species being present. It also provides detailed advice on the protected species most often affected by development, including flow charts for individual species to enable an assessment to be made of a protected species survey and mitigation strategy. As Standing Advice it is a material consideration in the determination of applications in the same way as any individual response received from Natural England following consultation.

The Standing Advice should not be treated as giving any indication or providing any assurance in respect of European Protected Species (EPS) that the proposed development is unlikely to affect
the EPS present on the site; nor should it be interpreted as meaning that Natural England has reached any views as to whether a licence may be granted.

You should apply our Standing Advice to this application and having done so, if you require further advice on European Protected Species, please could you: (Delete as appropriate)
• Indicate which European Protected Species you require advice on.
• Outline which specific section of the standing advice you are having difficulty in applying in relation to this application.
• Set out what you require assistance with in the form of specific questions.

Once you have gathered together this information please contact us at:
consultations@naturalengland.org.uk.

Designated Landscapes - Proposed boundary changes to the Lake District National Park and Yorkshire Dales National Park

Please note that the proposal on which you are consulting is located adjacent to an area that is included within a tract of land subject to an Order varying the boundaries of the Yorkshire Dales National Park made under s.5 of the National Parks and Access to the Countryside Act, 1949 and submitted for confirmation to the Secretary of State for Environment, Food and Rural Affairs in April 2012. The Orders will not take effect unless they are confirmed (with or without modifications) by the Secretary of State. A Public Inquiry (see www.lakestodales.info for more information) was held in June 2013, following which the Inspector’s Report will be submitted to Defra.

If the Order(s) is/are confirmed by the Secretary of State then the area in question will be:
• ‘National Park’ for planning purposes; and,

• responsibility for strategic planning, development control, listed buildings consents, as well as minerals and waste planning will transfer to the relevant National Park Authority (subject to any transitional arrangements as to transfer of powers and applicability of relevant plans as the Secretary of State may determine).

In the meantime it is Natural England’s expectation that the area being subject to a National Park Variation Order will be treated as a material consideration by the relevant planning authority and the evidence in support of that Order will be considered relevant in determining any impact of the proposed development on the area’s special qualities.

All the relevant documents, including maps, detailed assessments, analysis of consultation responses and relevant Natural England Board papers can be accessed via the following link: www.naturalengland.org.uk/lakestodales.

If you would like to discuss this with a Natural England officer please contact David Vose, Project Manager - Tel: 07900 608492, Email: David.Vose@naturalengland.org.uk.

Biodiversity Enhancements

This application will provide opportunities to incorporate features into the design, in particular the restoration phases, which are beneficial to wildlife. The authority should consider securing measures to enhance the biodiversity of the site from the applicant, if it is minded to grant permission for this application. This is in accordance with Paragraph 118 of the NPPF. Additionally, we would draw your attention to Section 40 of the Natural Environment and Rural Communities Act (2006) which states that ‘Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity’. Section 40(3) of the same Act also states that ‘conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat’. 
ANNEX 2

Natural England Comments on the Report to Inform a Habitats Regulations Assessment for Asby Complex SAC

Page 12 – AMEC highlight the new Conservation Objectives for Asby Complex SAC. It is worth noting the first three sub-objectives

- The extent and distribution of qualifying natural habitat and habitats of qualifying species

- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;

- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely.

Page 13 – Reference is made to the latest condition assessment which suggests that the quality and condition of the Alkaline Fen feature in the affected unit is relatively good (albeit not based on a detailed survey) in contrast to later AMEC statements about the state of the flush vegetation.

Page 16 – I agree that a fall > 10cm in the regional groundwater table could significantly affect (negatively) groundwater-fed vegetation, in particular the Alkaline Fens. It is also worth considering the impact on other vegetation on this complex site that may be influenced by groundwater, in particular the wet heath and calcareous grassland which feature an intimate mosaic of wetter and drier vegetation, with transitions between them and Alkaline Fen, with the result that some parts of the site that appear ‘dry’ also support Alkaline Fen species suggesting at least intermittent or diffuse flushing with base-rich water.

Page 16 – I agree that predicting the nature of the changes on the Alkaline Fen features (indeed all features) is difficult given constraints on modelling and knowledge of small-scale topography.

Page 16-17 – based on site visits made by Natural England in 2014 that showed larger and additional areas of Alkaline Fen, I do not agree that the baseline should be the extent mapped in Jerram (2010).

Page 21 – Vegetation with strong affinities to M9 Carex rostrata-Callichort giganteum/Cuspidatum mire (with abundant Calliergon giganteum, Scorpidium scorpioides and Scorpidium cossunii with Eriophorum angustifolium, Carex nigra and/or Carex rostrata) is also found within the areas potentially affected by the proposal, usually below M10 in hollows at the base of slopes. This is also a component of the Alkaline Fen SAC feature. M9 is equally, or perhaps more, likely to be damaged by a reduction in base-rich groundwater flow/inputs as it requires water levels at or above ground level throughout the year (Wheeler et al., 2009).

Page 21 – it is unclear to me why only these flush groups have been considered for impact assessment. There are more flushes mapped in Jerram (2010) and in the Alkaline Fen inventory, and in other reports. The NE walkover survey in July 2014 also identified more Alkaline Fen vegetation. These omissions mean that impacts on the Alkaline Fen resource potentially affected have not been adequately considered. For this reason, all that follows in the AMEC report does not adequately consider the impacts on the Alkaline Fen feature. I will not comment on the individual flush descriptions for the same reason.

Page 22 – more detailed comments have been made elsewhere on the AMEC October 2013 walkover survey, so it is sufficient to note here that it was not an adequate survey of the Alkaline Fen resource, and findings or conclusions drawn from this are, in my opinion, not reliable. The description of flushes showing "abrupt transition to other vegetation types" reflects the lack of rigour in this survey, as there numerous examples of quite diffuse transitions to several other vegetation types (e.g. rush pasture, wet heath), as well as the discrete areas of Alkaline Fen described.
Summary of Potential Effects
The locations and area figures presented here cannot be relied upon given the findings of Natural England’s 2014 walkover survey and the additional areas of Alkaline Fen identified from previous surveys.

The input of surface water sources is somewhat immaterial here, given the critical nature of the base-rich water supply in supporting Alkaline Fen vegetation. M10, including some very good examples of the community, has indeed persisted during quarrying operations, but its extent has almost certainly decreased, and it is almost certain that there has been some loss of richness and diversity. It is highly likely, rather than ‘possible’, that reduced groundwater levels would result in loss of extent and quality of Alkaline Fen during the term of the quarrying.

AMEC quote Wheeler et al. (2010), as stating that ‘previous studies’ suggest that Molinia-dominated communities (M24 or M25) could establish in situations where M10 is subject to groundwater drawdown. The ‘previous studies’ mentioned in the AMEC report are not based on changes to M10 vegetation, but on observations of the impacts of drying in M13 Schoenus nigricans-Juncus subnodulosus mire, which although similar to M10, is not the same and Wheeler et al. (2009) – upon which Wheeler et al. (2010) is based - state clearly that no comparable data are available for M10. No further references are presented by AMEC to support the contention that these Molinia-dominated communities would develop in dehydrated M10 vegetation.

With regard to the vegetation types that AMEC suggest would develop, M24 is largely a community of southern Britain, and is not known from north-west England. M25 is a relatively species-poor community dominated by calcifuge species and is not a component of the Annex 1 habitat Molinia meadows. It is possible in some situations that vegetation resembling M26 Molinia caerulea-Crepis paudosa mire may develop where flushing with groundwater is reduced to a sub-surface flow, but this would be dependent on nature of the substrate beneath the existing M10 and the nature of the changes to the groundwater regime. In the areas of stony flush where the substrate is skeletal (and often supporting uncommon species such as Schoenus nigricans and Saxifraga aizoides), it is highly unlikely that a Molinia-dominated vegetation would develop following loss or reduction in the supply of base-rich groundwater. If the drawdown results in complete loss of groundwater input then a drier grassland or heath is more likely to develop. It is equally likely that a reduction in supply of base-rich water and year-round groundwater feed would result in the development of species-poor M23 rush pasture, with invasion of rush species and other species of disturbed seasonally dry vegetation.

All of these changes are likely to lead to loss of core M10 species, particularly the rarer species, and will reduce the heterogeneity of the environment which is critical in supporting the full range of Alkaline Fen features and species, particularly associated invertebrates. As far as I am aware, there is no evidence available to support AMEC’s claims that Alkaline Fen and the constituent species will re-establish following recovery of groundwater levels, let alone to ‘be at least the same quality as those currently present’.

It is also worth noting that some areas of existing vegetation with affinities to M26 (i.e. part of the Molinia meadows SAC feature) were found within the areas likely to be affected. The impact on these, if fed by groundwater from limestone aquifer (they appear to be in the areas where groundwater is mapped at or near the ground surface), is likely to be negative, in addition to the impacts on the Alkaline Fen features.

Regardless of these problems with AMEC’s conclusions, the result of the impact is likely to be loss of extent and loss of quality and diversity of the Alkaline Fen feature. The vegetation that results from dehydration will not be Alkaline Fen, and its capacity to be restored to Alkaline Fen vegetation is not known.

AMEC state, somewhat pejoratively, that the ‘affected stands’ are located on the periphery of the SSSI/SAC. The location of the affected stands has no bearing on their status or quality, apart from the fact that in this case, they are closer to the quarry and so are likely to have been subject to some dehydration during previous periods of dewatering. It is also worth noting in this context that some very high quality Alkaline Fen was found just outside the SSSI/SAC boundary in locations that may also be affected by the proposed development.

The affected stands are also said to be ‘poorer quality examples of this vegetation compared to
flushes further to the south within the SAC/SSSI'. I am not aware that any evidence has been presented to support this statement, nor what the nature of the differences is meant to be. The Alkaline Fen features observed by Natural England in the area of potential impact were all referable to M10 or M9, and supported a number of restricted and declining species characteristic of good quality Alkaline Fen, including Equisetum variegatum, Blysmus compressus, Carex dioica, Primula farinosa, Schoenus nigricans, Saxifraga aizoides and Selaginella selaginoides.

On the basis of the above comments, I cannot agree with the conclusions of the Summary Tables (6.1 & 6.2), nor Section 7, Integrity Test which concludes no adverse effect on integrity.

Iain Diack
Senior Environmental Specialist – Terrestrial Wetlands
16 September 2014
ANNEX 3
Natural England Comments on Walk-over Survey for Shapfell Quarry – Tata Steel

1. The aim of the survey is given as "...to describe the vegetation of these habitats [...] a small number of flushes and alkaline fens..." to a sufficient level of detail to allow detailed impact assessment of them...". It is later stated that "The survey was based on NVC survey methodology (see Section 2), which is the most detailed vegetation survey that is used in the UK."

2. Standard NVC methods involve recording of quantitative vegetation data using quadrats and cover scores (Rodwell, 2006), and I would expect this level of survey, given the stated intent "...to allow sufficient detail to allow detailed impact assessment...". There is, however, no mention of quadrat recording in the survey method provided, nor is any quadrat data presented in the report. There is mention of use of the DAFOR scale, "where necessary", in section 2.1. Rodwell (2006) explicitly states "The DAFOR scale ...should never be used in NVC surveys because it has no agreed quantitative meaning." The methods section also states that "data analysis was completed with reference to the NVC volumes". There is no further information on how this data analysis was carried out, and what data were actually analysed, nor are the results of any analysis presented in the report.

3. The surveyor notes that the survey was carried out in late October, and acknowledges that this is 'sub-optimal' for NVC survey. It is indeed far from optimal, and places significant doubt over the accuracy of both attribution of community types and species identification, and consequently any conclusions drawn from the survey results. Because of this, in my view, the survey does not meet its stated aims of either adequately describing the vegetation, or providing a sufficient level of detail to allow detailed impact assessment.

4. While the report recognises that "there were some limitations in regard to the identification of grasses and sedges" it does not acknowledge that some of the key species of the target vegetation (alkaline fen) are not visible or at least very difficult to detect or identify at this time of year, and this is likely to be the reason the that the surveyor failed to detect ‘rare’ species such as Primula farinosa, which was found in many parts of the site in July 2014. This is particularly significant when the absence of this species and other major components of alkaline fen vegetation, particularly sedges, is later used to make judgements on the quality and condition of site features.

5. Overall, I disagree with the entire conclusions section.
   a. The survey does not, as it claims, provide a detailed description of the four sites – see above.
   b. It claims that the four sites are similar, but even with the rather brief descriptions of their character and vegetation provided, it is clear that they occur in different contexts and the vegetation is different in character, with some stony flushes, some runnels, some brown moss flushes etc.; some supporting species such as Schoenus and Pinguicula, others with Scorpium scorpoides, and another with abundant Philonotis calcarea. They do, however, all support examples of EU Habitats Directive Annex 1 habitat Alkaline Fen.
c. It states, *Overall, the survey covered 4.8 ha (0.3%) of the SSSI*, however, this is not the whole resource of alkaline fen in the area subject to impact.

d. The following sentence states that the sites 'have characteristics of base-rich flushes'. It is not clear what this means. My interpretation is that the four flush sites surveyed support vegetation attributable to M10 which is a notified feature of the SSSI and part of the Annex 1 habitat *Alkaline Fen* which is one of the primary reasons for the designation of the site as part of Asby Complex SAC.

e. It is the next part of the conclusion which concerns me most, in which the author concludes, based on a very late survey that the four sites (and by implication the whole area of the SSSI potentially affected by the proposal) are not 'illustrative' of the SSSI. This is based on the fact that 'many of the key species' were not recorded in the admittedly flawed survey. Some of the constant species of M10, particularly the sedges and sedge allies (e.g. *Carex dioica, Eleocharis quinqueflora*) are extremely difficult to identify outside of spring and early summer, and as previously noted *Primula farinosa* is also difficult to spot. Although not all of the four sites were visited by NE in July 2014, many of the characteristic species of M10 and all the associated species listed on the citation and more were recorded across the same broad area of the site, and in those sites that were visited in July the 'specialist' alkaline fen species were found to be present.

f. For the same reasons, little confidence can be attached to the correlations reported between the vegetation and NVC communities. In addition, the degree of correlation between real vegetation and the published NVC tables is not an appropriate measure of the conservation significance or condition of particular vegetation stands, nor is this an appropriate use of the National Vegetation Classification.

It is unclear to me why AMEC have only considered a proportion of the recorded alkaline fen areas (e.g. Figure 6.1) in their assessment of impacts. Their interpretation of the extent and distribution of fens shows both fewer flushes and a smaller extent of habitat than both the Jerram maps (in the same document) and the alkaline fen inventory.

NE’s walkover survey (July 2014) revealed that even those records showing more and bigger areas of flush than AMEC acknowledge did not fully represent the full resource of vegetation attributable to alkaline fen. The reality of the distribution of flushes is that they are extremely widespread across the area, and in many places merge seamlessly into other habitats, occurring within both calcareous grassland and heath, often with transitions between alkaline fen and these drier habitats (also SAC features) that are extremely difficult to map, but are of high ecological value.

The areas of alkaline fen identified on the NE survey additional to those previously recorded are presented in the attached map (below). It is important to note that these do not represent what NE considers to be the full extent of the alkaline fen feature, but that they demonstrate that there is more alkaline fen present within the relevant area than has been previously mapped – the additional areas are merely those that we had time to visit during the walkover survey. There are undoubtedly more areas of alkaline fen present that would be recorded during a detailed, focussed survey.

In terms of the quality and range of alkaline fen vegetation, the areas encountered during the walkover survey in July 2014 exceed what is listed in the SSSI citation, and contain additional uncommon, and in the context of alkaline fen, significant species, such as *Schoenus nigricans* – generally more closely associated with the predominately lowland community M13 – and *Calliergon giganteum*, which is associated more with rheo-topogenous mire. The occurrence of alkaline fen in several different ecohydrological contexts is also of interest, with both the typical ‘soligenous’ permanent and intermittent seepages supporting the habitat as well as examples in and on the edge of soakways, and on flushed slopes below groundwater outflows.
Additional areas of high quality alkaline fen were found both within and outside the SSSI boundary. In addition to the vegetation types recorded previously on the site, NE also recorded examples of vegetation attributable to M9 Carex rostrata-Calliergon cuspidatum/giganteum bottle sedge-spear moss mire in small depressions adjacent to flushes and streams. This vegetation comprised abundant Carex nigra and/or C rostrata, Eriophorum angustifolium and Galium uliginosum amongst other associates, with an abundance of the mosses Calliergon giganteum, Scorpidium scorpioides and Scorpidium cossowii in shallow water. M9 is also a component of the alkaline fen SAC feature, alongside M10 and M13.

References

Target notes – based on waymark points on attached map
003 – High quality M10 on broad shelf alongside stream, on both sides. Outside SSSI/SAC. Continuous moss carpet of Campylium stellatum, Scorpidium cossowii, Plagiommium elatum, Bryum pseudotriquetrum, Pallustriella falcata, Philonotis calcaria, with abundant Pinguicula vulgaris, Valeriana dioica, Carex hostiana, Carex lepidocarpa, and Primula farinosa. On slopes above are stony flushes with Schoenus nigricans, Saxifraga aizoides and Carex dioica.

004 – within same general area as 003 but with more frequent Eleocharis quinqueflora, Primula farinosa and Blysmus compressus.
005 – continuation of M10 away from stream into a small sump below slope with M9-like vegetation, abundant Calliergon giganteum amongst Eriophorum angustifolium (pictured below).

006 & 007 – shallow slopes with heath/grass mosaic with frequent shallow flushes, probably representative of a wider area than mapped in yellow. Complex and species-rich vegetation with calcareous grassland species, heath species and alkaline fen species in intricate mosaic. Main wetland species represented in flushed areas which extend some way into apparently ‘drier’ vegetation (based on very rapid walkover) are Campylium stellatum, Pallustriella falcata, Scorpidium cossonii, Scorpidium revolvens, Sellaginella sellaginoides, Succisa pratenis, Molinia caerulea, Erica tetralix, Primula farinosa, Carex hostiana and Carex plicarlis.

008, 009 & 010 (part of AMEC’s F01) – an extensive area of wetland vegetation, showing transitions from open water/flow tracks through to flushed grassland/heath on slightly higher ground. Base-rich stony runnels and flushes supporting alkaline fen are extensive, with typical brown mosses, including frequent Breutelia chrysocoma on hummocks. Of particular note is the local abundance of Schoenus nigricans and Primula farinosa – see picture below.
011 – picture below taken from S-end of shallow slope above wall looking north. Frequent M10 flushes all along slope above and below the wall. The area below the wall is not part of the SSSI/SAC, but supports M10 and possibly M26 and M9 vegetation with abundant *Primula farinosa*, *Valeriana dioica*, *Eriophorum* spp. (including possibly *E latifolium*) and abundant *Carex rostrata* at the base of the slope – all observed from above wall. Species present in M10 above wall include typical brown mosses *Palustriella falcata*, *Scorpidium cossonii*, *Bryum pseudotriquetrum*, *Ctenidium molluscum*, *Campylium stellatum*, with frequent *Pinguicula vulgaris*, *Carex panicea*, *Carex hostiana* and *Carex dioica*. Areas of more diffuse flushing in the transition between the M10 and drier acid grassland support the characteristic ‘intermediate’ base-status mosses *Sphagnum subnitens*, *Sphagnum inundatum* and *Climacium dendroides*.

012 – Another sump at the base of a slope supporting M9-like vegetation with abundant *Calliergon giganteum*, *Scorpidium scorpioides*, *Scorpidium cossonii*, *Criophorum angustifolium*, *Carex nigra*, *Triglochin palustris* & *Galium uliginosum* in shallow standing water (pictured below). Around margins of sump is species-rich M10 vegetation.
013 – M10 in channel base, representative of the entire area between 012, 013 and 011, which is criss-crossed with numerous channels which support alkaline fen vegetation in their bases (pictured below). They typically support *Scorpidium scorpioides*, *Scorpidium cossorii* and *Campylium stellatum* with abundant *Carex hostiana*, *Carex dioica* with associates including *Pinguicula vulgaris* and *Eriophorum angustifolium*. Raised areas support damp acid grassland with abundant *Carex nigra*, and sides of channels support transitional vegetation similar to that described under 011.

014 – M10 vegetation alongside sinuous stream. Alkaline fen vegetation occurs alongside the vast majority of the length of all the stream channels in this area, mostly referable to M10, but again *Calliergon giganteum* and *Scorpidium scorpioides* occur in areas with standing shallow water, along with *Potamogeton polygonifolius*. Also in stream are abundant *Littorella uniflora*, *Chara* spp and a *Myriophyllum* species (probably *M. verticillatum* – very uncommon this far north, but this id needs confirmation).

015 – Alkaline fen around a springhead, with abundant *Philonotis calcarea*, *Carex dioica* and *Pinguicula vulgaris* – pictured below. M10 occurs along the vast majority of the length of these
streams and surrounding ground, as partially indicated by the alkaline fen inventory, but is more extensive than currently mapped.

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