RESPONSE TO REGULATION 25 REQUEST

EXTRACTION OF SAND & GRAVEL

LOWER HALL FARM

SAMLESBURY

LANCASHIRE

Comments of Environment Agency and

Lead Local Flood Authority

Mineral & Resource Planning Associates Ltd

September 2023

INTRODUCTION

This is a response to comments of the Environment Agency (EA) regarding the above application (LCC/2021/00012) at Lower Hall Farm (LHF) as referenced in the Regulation 25 letter from Lancashire County Council of 18 May 2021. This response also addresses comments made by the Lead Local Flood Authority (LLFA) submitted subsequently to the Regulation 25 letter.

THE EA COMMENTS

INTRODUCTION

The EA does not object to the principle of development at LHF but seeks further detailed information in relation to a number of points.

However, and as noted in the application the precise details of the form of working and restoration as well as planting and drainage are matters that cannot be determined precisely now and if determined now would probably be misleading or inaccurate. This particularly applies to the exact form and extent/depth of extraction across the site and to the resultant restoration landform or shape/depth of water bodies, islands and shallows, extent of individual habitats, and the drainage/flood routing across the excavated site. It also therefore particularly applies to the available flood storage capacity (which will vary over time anyway due to climatic variables).

It also applies to the scale of the multifunctional benefits provided by the Natural Flood Management (NFM) assets provided at LHF flowing from the extraction void and the associated planting etc within and external to the application site, including that on the banks of the Ribble, or in the corridor of the Bezza Brook through the Unilateral Undertaking (clauses 27 and 28 respectively in the UU) and indeed as also provided in the UU (clause 29) for the headwaters of the Hodder.

In that particular respect it is widely acknowledged that while NFM assets (as would be provided here) present optimal 'Working with Nature' outcomes for 'systems-based' asset management (which not only manages flooding but also assists objectives for biodiversity, climate change, air quality, pollution control, etc), they thereby reflect dynamic systems which challenge us, and particularly regulators, to adopt a pragmatic adaptive approach to flood management and those other associated environmental and social goals of society.

Indeed, a recent (2023) assessment by the Rijkswaterstaat, as to the value of the published global guidelines on NFM (the International Guidelines on Natural and Nature-Based Features for Flood Risk Management, US Army Corps of Engineers, 2021, where the EA alongside the US Corps of Engineers, NOAA, the Rijkswaterstaat and the World Bank was one of the global partners in the production of the guidelines), concluded that the primary

factor hindering further application of the substantial multifunctional benefits of natural flood management was that existing permitting or approval processes were not currently structured to support NFM. This is because such processes often require precise answers within a rigid framework when the provision of NFM assets can only normally be determined in a pragmatic manner.

GROUND WATER

Water Management Plan

The EA consider that activity on site could contribute towards pollution of ground water and seeks information on how water will be managed on site

The EA seeks a water management plan which considers the anticipated requirements of water and the disposal or discharge of any effluent and protection of ground water resources from pollution.

However, as advised by the EA and noted in its comments, the abstraction of water for processing etc at LHF will require a water abstraction licence from the EA. The EA confirm that they have no objection in principle to the form of the development at LHF and as such the MPA should leave the question of details of water abstraction to the licence stage and the EA to consider. However, the following sets out further explanation of matters raised by the EA.

Water Feature Survey and Abstractions

The EA requests information on the location of local abstractions and a water feature survey.

The Hydrogeological report describes, and Figures 3 and 14 in that report show, the relationship of the area to all known abstractions within a 2 kilometre radius, other water related data points and water features within that radius.

Abstraction of Water for Processing

The precise quantity of water to be utilised in the processing plant cannot be concluded until details of the precise plant to be erected and its water requirements are determined. This is a matter that should be left to the licence. There is a wide range of suitable processing plant that can be utilised on site and if there is concern as to water requirements then such matters can be addressed at the licence stage.

The processing plant will use water retained on site in the excavations to wash the extracted aggregate. It will not require a borehole or abstraction direct from the Ribble. The water will be extracted from a 'clean' water pond by pump and pipeline to the processing plant and then returned via pipelines using gravity to a silt pond and subsequently to the 'clean'

water pond. The silt will settle in the silt pond leaving the clean water to drain via a pipe to the clean water pond.

This is a typical form of operation of a wet processing plant and demonstrably effective in settling silt. It has no novel or risky elements and the discharge back into the lake system can function by gravity. The discharge silt is that arising from the mineral on site and has no harmful chemical or particulate characteristics that would cause pollution to the aquifers.

The Secondary Aquifer of the river terrace is in any event in direct hydraulic continuity with the River Ribble and there is no significant extent of that aquifer outside the site. The Principal Aquifer of the underlying Sherwood Sandstone is in part not in hydraulic continuity with the extraction area due to underlying glacial till but in any event the aquifer will be protected by the residual sand and gravel deposit left at the bottom of the excavation and the clayey overburden to be emplaced as part of the phased restoration. The Aquifer consists of very fined grained sandstone with beds of siltstone and mudstone.

More significant is that the form of the excavation and restoration will provide for gradual recharge into the aquifer from 'stored' rainwater and flood water. This compares with the present position on the unworked part of the site where rainwater is discharged rapidly into the Ribble, and then lost from recharge, or where flood waters are encouraged to discharge rapidly downstream in the Ribble, again preventing recharge.

This 'recharge' potential complies with EA policy towards the management of surface water both in normal and flood conditions. This positive and compliant aspect of the development at LHF is of considerable value and is to be encouraged but has not been identified or supported in the EA comments.

Silt ponds naturally vegetate rapidly with rushes, reeds and shrubby trees and become valuable 'colonising' habitat for insects, amphibians and their predators. The continual refurbishment of such ponds maintains fresh 'colonising' habitat.

Water from the processing plant collected onto the concrete apron together with rainwater will be collected by boundary ditch/ditches to discharge into the silt pond.

The washed aggregate will initially contain a quantity of water in pore space that will drain out of the aggregate while stocked. That will be collected by the boundary ditch noted above.

Water consumed in other elements of the operations at LHF is negligible and is for the licence to address. The operations involve the extraction, processing and storage of mineral that is wet or damp and the volumes involved in dust suppression will be insignificant. Wheel washing will not be required given the form and length of the access road.

Abstractions

As the report states abstractions outside that 2km radius are unlikely to be affected by the development.

The known abstractions are described in Tables 6, 7 and 8 in the Hydrogeological report, which notes that there may be unrecorded abstractions in outlying properties. However, while the report suggests that this can be checked prior to development, there are only 3 properties which may be in hydraulic continuity with LHF within that radius. To our knowledge there are no abstractions in those 3 properties. Other properties beyond are not in hydraulic continuity with LHF as they are separated from LHF by the Ribble/Bezza or lie in elevated positions.

Water Feature Survey

Water features are shown on Figure 3 and identified in Table 2 of the Hydrogeological report. In that context it has identified water features that are inside the study area but which are not in hydraulic connectivity with LHF (the "Pit lakes at Brockholes"), or are inside the study area but outside the application area and are not likely to affect or be affected by the operations ("Unnamed streams/field drains").

The details of the marl pit ponds located within or adjacent to the application area are fully described in the ecology survey as is the somewhat ephemeral nature of the ponds in the former excavation area.

Other than described above there are no other water features.

FLOOD IMPACTS

Update FRA

The EA require an update of the FRA to consider flood matters as addressed below.

Existing Flood Routes

In strict terms the site lies outside the active alluvial flood plain of the River Ribble and is located on a glacial/post-glacial terrace of the Ribble developed when the river was at a higher level.

The former mineral working excavation into that terrace at LHF has flooded on exceptionally rare occasions due to a combination of rising groundwater levels, incident rainfall on saturated soils, and ingress of flood river water via the lowest part of the bank margin opposite Red Scar. Marginal flood events have been identified along the bank to the south east extremity of the site in the vicinity of and upstream from the Bezza Brook confluence in the alluvial flood plain.

Flooding from bank over-topping occurs outside the site and in particular downstream on the margins of Samlesbury but more particularly and regularly at the location and surroundings of the M6 underpass (cutting off access to Brockholes and Lower Brockholes Quarry and flooding into Brockholes) where there is a more significant area of the alluvial flood plain and a low point.

Historic flood events for the site and the immediate surroundings show that (apart from the marginal flooding around Bezza) river ingress is focussed on the extreme NW part of the site where the bank margin and immediate hinterland is marginally lower, in comparison with the rest of the site, and where the circa 1930's former mineral working worked into this topographic low right up to the river bank.

Flood waters will initially have used that topographic low to return to the river, but the majority of flood waters retained within the former excavation have typically subsequently gradually dissipated potentially by either seeping into the ground as recharge to ground water (a process to be encouraged) or through the poorly porous terrace sediments into the river and with some evaporation.

This feature is typical of the geomorphological development of point bar sedimentation on the inside of a river meander curve where an undulating 'slip-off' slope is formed by a succession of point bars. The bars are created by the river depositing coarse and fine sediment in the relatively low energy environment pertaining in the shallows of such a location both in normal and post flood conditions. This location on the meander is a natural depository for such sediment which not only thereby protects the adjacent bank but would naturally increase the extent of the whole point bar feature. This situation is in stark contrast to the high energy conditions and deep water on the directly opposite bank of the river on the outside curve of the meander creating active erosion instability conditions at Red Scar.

That topographic low thereby represents a broad natural 'channel', enhanced by an adjacent deeper former mineral excavation, and has provided a 'natural' route for flood waters to ingress/egress the site.

This 'channel' will continue as a natural ingress/egress for river water in flood conditions in the future, including as part of any mineral extraction operations.

This 'enhanced' flood route has been in place for circa 90 years, and has provided a route for flood waters to ingress and extend over the former mineral workings and then egress, without enhancing flooding elsewhere. There is no evidence of any identifiable erosion to the bank of the river here nor any evidence of harm to fisheries including fish that might be trapped in the former workings.

However, it should be noted that historical flood events using that channel may have been enhanced by the barrier caused by the former weir holding back flood waters. The highest

recorded flood level (9 February 2020) at the station in Samlesbury (near the church and downstream from the weir and the proposed workings at LHF) was 6.7 metres above the station datum at 6.0 metres aod (giving a flood height of 12.7maod at the station). The weir has now been removed and the frequency of flood waters using the channel may therefore be reduced.

Given its location and the above noted lack of harm, the scheme of working and restoration was devised around utilising that feature to 'naturally' manage ingress and egress of flood waters.

It is however noted that extraction of coarse aggregate was undertaken from the point bar and the downstream beach(s) towards Bezza Brook on the LHF side of the river in the 1920's and up to the mid 1930's. It seems that those operations initially did not work into the terrace deposit itself but may have subsequently.

The amount of material removed is not known but may have been relatively significant given the need to construct a tramway to haul mineral from the site (as shown on the relevant date OS plans). The aggregate was taken by the tramway to a load out facility at the junction of Potters Lane and Dean Lane (now the location to 2 semi-detached properties).

That extraction in the active part of the river will have temporarily de-stabilised and reduced the protection afforded by the point bar and those beaches worked but that protection will have subsequently been replaced by sediment deposited arising from erosion upstream.

Those extraction operations were followed by the more extensive operations within the terrace itself which continued from the 1930's to the 1950's.

While the operations will have initially physically affected the beaches on the point bar etc no evidence of harm to the habitat or species in or adjoining the river has ever been demonstrated.

Potential 'Flood' Routes in the Proposed Scheme

Phased extraction operations will commence in the south east of the site moving clockwise towards the 'channel' noted above and then continue clockwise back to the south east. The extraction operations will enter the former working area, and the area of the potential direct influence of the 'channel' noted above, early in phase 3. However, in any flood event up to that period flood waters will still be able to both ingress and egress via that channel into the former working and, in exceptional conditions, across the site.

In all subsequent stages from phase 3 onwards the form of the extraction and restoration will provide an excavation contiguous with and linking to that 'channel' such that flood waters will both ingress and egress the 'channel' into the whole site, including previous phases.

The relevant phasing and restoration plans show the general layout of extraction and the indicative restoration works, and show the link throughout the extraction and restoration phases towards the 'channel'.

As noted in the application the final form of the restoration at any particular location will reflect the actual disposition and excavation of mineral and the volume of overburden etc that will be directly emplaced in the excavation from subsequent phases.

Nevertheless, the indicative working/restoration plans show the general intention of the works and indicate the potential route for flood waters. Plan PL23 shows the restoration concept for the phases in the area around the 'channel' which will be restored to match the existing bank topography and supported by tree and shrub planting leading to marginal wetland planting including reed beds. This will enable the 'channel' to continue as the ingress and egress of flood waters to serve the whole site, where the planting will naturally control the speed of flood water ingress/egress to reduce the potential for erosion.

Located at the point bar this 'channel' for flood waters is not in the area of high energy for the river (in either normal and flood conditions) or potential/active erosion but is in the area of active sedimentation (both in normal and flood/post flood conditions). In those conditions the ability for the channel to act as the ingress and egress of flood waters for the whole of the site is not compromised and neither is it in a location where that ingress or egress would be exposed to or lead to erosion and instability at the location or elsewhere.

The potential routing of flood water is therefore a simple pattern dealing naturally with flood waters by the existing flood ingress/egress route. It will not require extensive or expensive structures and their maintenance, nor will it require pumping or transfers of water.

However, as noted in the application, once consent is granted, consideration will be given to formalising the natural flood management capacity. This could involve the provision of structures to regulate both an incoming flood and to hold back contained flood waters for a longer period. This may lead to changes in the internal routing of flood waters. That is however, for consideration in the future.

The location of the bund around the plant site does not interfere in any way with the existing flood routes or as would prevail during operations. The bund is to be removed at cessation of operations. The bund itself provides no flood barrier to property adjacent to the nursery as flood waters would circumvent the barrier via the Bezza Brook and adjacent open agricultural land and in a major catastrophic flood the whole of the valley would be flooded regardless. The bund to the east of the extraction operations is for landscape and amenity purposes and would not prevent or increase flood risk to any property. The buildings at Lower Hall Farm are upstream from this bund immediately adjoining the river and at a lower elevation and could be flooded in a flood event that would not reach the

bund. A major catastrophic flood that would affect the whole valley but would affect the Lower Hall Farm complex more significantly. The bunds do not increase flood risk in the immediate area or elsewhere.

The bunds are provided for landscape and amenity purposes. They are not provided to convey or direct floodwaters across the site or the floodplain as suggested by the EA and neither would they act as such inadvertently.

FLOOD STORAGE CAPACITY

The value of the Natural Flood Management facility that would be enabled at LHF is significant in its capacity, its range of other gains for the environment and climate change mitigation as well as its provision of flood alleviation without recall to the public purse.

It represents an exceptional example of 'Working with Nature' outlined in, for example, 'Greater working with natural processes in flood and coastal erosion risk management', Environment Agency, 2012.

Volume of Storage

The volume of flood capacity at LHF is defined generally by the 'air space' above the water level within the excavation and the lowest margin of the excavation area. The water level in the excavation will be affected by seasonal fluctuations in groundwater and/or and residual water retained from a previous rainfall events or flood, so capacity within the site could be highly variable, but that is a common feature of all flood detention assets. However, in any scenario, flooding, which would lead to water being captured and retained in the excavation, would be an infrequent event.

Natural flood management facilities of the type enabled by the development at LHF are not an engineered facility created with hard engineered sides but make use of 'natural' air space arising using the capacity of the re-created topography, which in this case is that created by the mineral extraction. The excavation form and the form of the restored excavation are therefore not a simple or fixed engineered design. Both the depth of mineral and the land habitat topography created that may intrude into that 'air space' are highly variable and, in advance of the completion of extraction not simply defined or capable of conclusive definition now.

The application notes in paragraph 5.62 that the net (minus discards of oversize and fines) extraction volume is circa 2.0 million cubic metres. No soils or other non-mineral arisings are to be moved permanently off site, although (subject to provisions in the UU being agreed) some oversize will be taken off site for use in biodiversity improvement works on the River Hodder in accordance with clause 29 of the UU (and could be used to improve the Bezza in accordance with clause 28 of the UU). Those quantities (20 years x 500 tonnes =

10,000 tonnes for use in the Hodder) are in context very small and do not significantly increase the net flood storage volume at LHF.

The potential flood volume stored on site could include that on unworked land (including the plant site) on the flood plain within the site or provided by the woodland planting on site, which will retain flood water (by slowing it down) to a greater degree than open agricultural land. Again, these will be very small volumes in context and do not significantly increase the net flood storage volume (although this may slow down the downstream progress of a flood and such action is useful, it will not be of great significance).

No material will be imported into the site, which would otherwise reduce flood capacity.

The Hydrogeological study has assessed rest water levels in piezometers located across the site. That rest water level will not be the typical rest water level in the excavation which level will be lower to a greater or lesser degree in the centre or margins of the site. The report concludes that the average water level is circa 8.5maod at the fringes of the site. The low typical level of the margin is 13.5maod.

Given that the water body restored will mainly consist of shallows (due to the emplacement of mineral waste at the margins and at the base of the excavation, with only low-lying created islands intruding into the air space, the potential air space from the maximum excavation area (which might be less if for example an 'island' of non-mineral is found), and hence the flood capacity, subject to the provisos noted above would be in a range from 1.20 million cubic metres to 1.85 million cubic metres.

The volume capable of being stored on site is therefore equivalent to holding flood waters from flooding an area downstream of say some 3.5 square kilometres at a depth of some 0.50 metres and pro rata.

Retaining that volume at LHF reduces the volume that the current or any future downstream Ribble flood improvement works would have to handle and reduces the flood risk downstream.

Cross sections

Indicative cross sections are provided in the submitted plans and include cross sections of the restored site. The site will be worked and restored to provide an attractive landscape with a diversity of habitats. It will not be developed into an engineered form. The floor of the excavation and the boundaries inside the 25-metre stand-off zone will reflect the disposition of mineral and not be bound by an engineered set level or design.

No definitive cross sections can be produced now and if produced would be misleading.

Typical indicative cross sections are shown on plans PL28 and PL42.

DESIGN OF OFFICE

The office facilities will be raised above potential flood levels as described in the Hydrogeological report. This is a matter which can be dealt with by condition.

ACCESS ROAD

Safe Access and Egress

Most of the access road is well above flood levels. The access road between the plant site and Potters Lane is proposed to be constructed at existing ground level to enable agricultural activities across the whole field. If the field were to flood then the access road will be covered by the same flood waters.

In the event of a significant flood warning all on-site operations will cease and, as described in the application, operatives and all the mobile plant and stores would be taken off-site further up the access road to the east of Potters Lane to high ground and well away from flood waters.

No operations would take place in such circumstances. There is no need to keep the access road dry as thought necessary by the EA.

SuDS and Pollution

The EA requests that the proposed drainage network adjacent to the new access road does not have any connectivity to existing watercourses due to concerns as to pollution arising from traffic on the road.

I have already dealt with the negligible risk of pollution from the exceptionally low level of traffic on the access road in my response to ecological comments in which I note that the threshold for treatment of such run-off is where the AADT exceeds 10,000. There will be an AADT of 60 on the access road.

Connecting the drainage systems on the access road to existing watercourses may have considerable benefits in a changing climate world to such watercourses given that the detention ponds will hold run-off and then release that gradually. This is a matter that can be resolved as part of the detailed ground conditions survey required for the construction of the access road.

In any event, if the EA still determines that there shall be no connectivity, there is sufficient opportunity to provide further detention volume on site.

CLIMATE CHANGE ALLOWANCES

The extraction of sand and gravel at LHF is 'water compatible' (NPPF Annex 3) and is to be restored to nature conservation and biodiversity (which are also 'water compatible' uses

NPPF Annex 3) but will also act as a Natural Flood Management Facility during the operational stage and at restoration to hold flood waters in the event of a major flood. The plant and offices on site are of a temporary nature and will be removed on completion of operations. No fixed buildings, people or infrastructure will be present or left on site nor therefore be exposed to risk.

Given the associated purpose of being made available precisely to flood and hold flood waters under any climate change scenario any adjustment to Climate Change Allowances is irrelevant to this form of development in this location.

However, part of the access road is not within the flood risk area. Surface water run-off here has been fully addressed and details of the capacity of the proposed drainage system are provided demonstrating no flood risk. In any case the capacity of the proposed works adjacent to the access road can be expanded if needed within the land under the control of HAL.

FISHERIES AND BIODIVERSITY

Risk to Nature Conservation and Fisheries

The ES comprehensively identifies all the habitats and species present and the potential biodiversity risks and opportunities across the site. The surveys are of high quality and do not rely on a single set of studies but include data from previous years indicating the natural variability in such surveys. There is no justification for requiring new surveys. Further, the operations do not involve any activities within the river systems or the adjacent margins, although the UU provides for biodiversity enhancement of the margin.

There are no proposed discharges into the river nor any abstractions from the river. There are no structures to be constructed in the river or on its margins. It is therefore difficult to conceive of any relationship to fisheries other than in flood conditions which would catastrophically affect biodiversity and fisheries throughout the river and where impacts and effects related to LHF would be insignificant and could never be quantified.

Biodiversity enhancements are across the site and are of an exceptional large scale and considerably above the minimum required by BNG. Such enhancements are also provided through the UU which enhancements are in accordance with EA objectives for improvement of riverine habitat and biodiversity, will not create biodiversity or fisheries risks and which are to be agreed with relevant partners including the EA. Relevant management plans can be required by condition.

None of these significant net gains and their compliance with EA objectives are acknowledged by the EA.

There is no conceivable significant isolated risk effect caused by the proposals at LHF to fisheries that might need to be further considered in the ES, particularly as the effects could not be considered in isolation or attributed to the proposed operations.

The interests of sport fishing on the Ribble are enhanced by access arrangements.

I have dealt with the age of surveys point in a previous response. But to reiterate, the submitted surveys are comprehensive and of a high standard and there has been no change in the environment on site that would justify the need for updating surveys.

Risk of Fish Entering the Excavation

In the event of a major flood there is a possibility of fish being carried from the Ribble into the excavation lake and not being able to naturally escape back into the Ribble. Such events will be rare in any feasible scenario and would have to be of a scale that it would catastrophically affect the whole of the river system and the fish population and not just have an impact by and at LHF.

The extent of such a flood event will therefore not be limited to the application site but will extend widely along the whole course of the river leading to fish being trapped on agricultural land; in urban areas; and notably within the excavations at the nearby former Higher Brockholes Quarry and Lower Brockholes Quarry. There would appear to be no procedures in place to recover such trapped fish in any of those areas.

Historical flood events into the previous working area do not appear to have caused any significant fish capture issues or the need for recovery. No such requirements were sought at the former Higher Brockholes or Lower Brockholes quarries, nor are they required in relation to restoration of those sites or for the current operations at those sites.

However, a specific fish capture and release scheme can be agreed at LHF and would provide a mechanism to return fish to the river. The provision of such a scheme can be required by a condition.

Risks from Silt on Bezza Brook

Silt produced by the washing of the aggregate will be disposed into silt ponds and/or via a silt press.

Silt fences would be provided where necessary as part of the CEMP.

The silt ponds will form part of an internalised discharge system where the silt will be allowed to settle before extraction for use in restoration where it will become stabilised by vegetation. The silt pond area itself will naturally be rapidly colonised by rush and other water plants.

In an exceptionally rare major catastrophic flood the Ribble/Bezza river may flood the whole site and remobilise part of the silt from the silt pond which would then enter the river system.

However, the silt is fundamentally inert and its impact in terms of sediment load and water clarity during and following such rare event would be both insignificant in quantity and insignificant in impact compared to the substantial 'polluted' (polluted by wastes, chemicals, organic debris, etc) sediment load otherwise transported and deposited by that flood from upstream.

A silt press may be provided within the processing site. This would produce a damp silt 'cake' for use in restoration. Water draining from the press will drain into the residual silt pond.

Cross Sections of final Lake Levels and Margins

Typical indicative cross sections are shown on plans PL28 and PL42.

Erosion Potential of 25m Margin

The Scheme of Working and Restoration

The scheme of working of the internal face will leave a sub-vertical face grading to a near horizontal base. The excavation will be restored in line with the relevant restoration plans, however, those plans are indicative and they are not definitive in relation to the final form of the restored excavation at any one location.

In restoration the overburden and oversize will be selectively placed against the excavation margins to produce a backfilled protective slope and/or a 'beach' of varying dimensions. The 'beach' will be formed and then armoured by the coarse oversize available (including gravel, cobbles and boulders) as well as timber (trunks, root pads, brash) from trees removed on site, thereby mimicking a natural 'lag' lake gravel margin beach and creating a diversity of marginal habitats.

This basic structure will then be enhanced by the creation of 'off-shore' gravel bars, and/or by gentle and wide shallows extending out from the excavation margin some of which will be planted (and which in any event will become naturally regenerated), with marginal vegetation, as areas of reed and willow etc, but leaving 'cliffs' at various locations. These features will protect the 'beach' and 'cliff' although some collapse of the 'cliff' by sub-aerial erosion will naturally and gradually occur creating a falling apron and enhancing the beach 'lag' deposit to then enable and enhance the protection of the toe of the 'cliff' and the 'cliff' itself.

Erosion and its Control

The main potential cause of erosion of lake margins in an environment such as at LHF is by wind generated waves working on the stability of the material on the lake margins. However, as Nordstrom states (Nordstrom & Jackson; *Physical processes and landforms on beaches in short fetch environments in estuaries, small lakes and reservoirs: A review*; Earth Science Reviews; 2012) the ability of waves to actually initiate erosion, and then transport away sediment, in small lake systems is limited by the wind energy and the generated wave height.

In 'short fetch' limited environments waves are typically (i) inadequate to either transport coarse sediment away from a 'beach' or falling apron and (ii) often too weak to overcome the growth of shoreline vegetation. Such vegetation can establish itself in the dominant long-term essentially calm normal weather conditions and then together with the beach armour of coarse gravel clasts and timber debris, assisted by the 'off-shore' bars, etc prevent beach change during what are any subsequent, but exceptionally rare, 'storm' conditions.

'Short fetch' or fetch limited environments relate to conditions in enclosed lakes, which have short fetch and are fetch limited by their enclosed morphology, in comparison with the large fetch that can arise on open marine coastlines.

Nordstrom defines 'short fetch' as being <50 kilometres and as such all lakes in the UK would come within the 'short fetch' category. However, waves generated on very short fetch lakes (say <1 kilometre) are and will be proportionately smaller.

Global relevant research into margin erosion of both natural lakes and dammed lakes or reservoirs with such 'short fetch' environments typically include what are in UK terms very large lakes or reservoirs and which are very substantially in excess of the area of the lake proposed at LHF. In that context erosion rates typical of such large lakes are hardly relevant to very short fetch conditions as at LHF.

Such research may consider (but not exclude) confounding and conflicting issues including margin erosion by ice; the variability in lake levels arising from mid-latitude, tropical or arid storms and river inflows; the impact of landslides and other instabilities; as well as significant fluctuations in water level and shorelines due to drawdown caused by climate or by water supply or irrigation or power generation losses.

Relevant UK studies consider fetch distances mainly over a few kilometres and over (in a UK context) large bodies of water (eg Wast Water – fetch distance of 4.5 kilometres; or Loch Lomond – fetch distance of 36 kilometres [the largest lake in Great Britain] , etc) often in UK 'extreme' climatic and/or topographic conditions (in comparison to the LHF location) where high and persistent wind speeds (often funnelled by the surrounding mountains) are more prevalent and which may generate relatively significant waves in terms of height and

frequency of events and erosion potential. Such lakes and reservoirs are not immune from some of the confounding issues noted above.

Such bodies of water are typically located in glaciated montane environments, may well be significantly deep and will have narrow and steeply plunging shores with mainly insignificant beaches, unlike the shallow and wide beach form at LHF. They mainly have few or insignificant marginal or central islands, such that wave development is unhindered by shallow water or any significant 'barrier', before waves strike the margins. Large reservoirs in the UK mainly mimic these topographic and climatic conditions of natural lakes.

Wind at LHF

Typical average sustained (lasting minutes) wind speed on site at LHF are probably less than 15mph which is the average sustained recorded wind speed at Blackpool Airport, with average gusts (which last mere seconds) of less than 35mph. The Airport probably suffers higher wind speeds than would occur at LHF due to its coastal exposed location. Elevated land in the UK receives higher average wind speeds and gusts than coastal areas but the slight increase in elevation at LHF (at 15maod compared with circa 8maod at the Airport) is not relevant in that context.

As noted in the State of the UK Climate Report 2022 (International Journal of Climatology, The Royal Meteorological Society, July 2023) there is no historical basis, or future anthropological induced, compelling trend in storminess when considering maximum wind speeds. In relation to UK extreme events the UK Met Office states that there is little evidence that climate change is affecting storms. Notably, the most stormy recent period in the UK could not be linked to global anthropological induced warming (Explaining Extreme Events of 2014 from a Climate Perspective, Bulletin of the American Meteorological Society, 2015).

For the purposes of considering wind generated wave erosion at LHF it can therefore be concluded that there is no compelling trend in future storminess, be that climate change induced or not, and therefore the future erosion potential can be considered in relation to existing trends and wind speeds.

The Potential for Erosion and its Control at LHF

The lake at LHF is of minor area in comparison and does not share the locational, climatic or topographic conditions of large lakes the subject of relevant research. It will not be drawn-down for irrigation or to supply water or to generate power.

The wind fetch at LHF is dominantly from the south west at right angles to the long axis of the lake to be created at LHF. This is also the direction of the strongest winds experienced. Winds from the direction of and along the long axis are insignificant in intensity and occurrence and are modified by topography.

The maximum (extracted) unrestored width of the lake along the dominant wind axis (the south west) is circa 300 metres. Such width will in reality not be present at any time due to the phasing of working and restoration. That width will also be significantly reduced during the restoration of each phase by the emplacement of overburden from subsequent phases within the excavation and against the excavation margin, by the extensive shallows so produced and the presence of islands, 'gravel' bars and buffering vegetated margins. The maximum fetch distance will therefore be circa 150 metres but mostly typically around 100 metres across most of the site.

The ICE Floods and Reservoir Safety Guide provides a simple relationship chart (figure 5.3 in the Guide) for determining 'significant' wave height (the average of highest one-third of wave heights) due to wind speed and fetch distance per hour across reservoirs at 1 in 50 years. It discounts the effects of islands or shallows as normally such features are insignificant in relation to the area and shape of reservoirs and lakes, but that is not the situation at LHF where such features are a very significant control on the generation, fetch and control of wind waves.

The ICE chart makes an assessment based on storm wind speed across the UK and a minimum fetch distance of 100 metres. The chart indicates that at a fetch of 300 metres with a wind speed of some 23m/s or circa 50 mph (wind speed shown on Figure 5.2 in the ICE guidance) that the 'significant' wave height generated would be just over 200 millimetres. Interpolating for a 150 metres fetch would indicate a significant wave height of circa 150 millimetres and at 100 metres fetch a height of circa 125 millimetres.

However, surveyed data from UK lakes indicate that the ICE guidance errs considerably on the side of caution and over-estimates 'significant' wave height at the given parameters at such short fetch.

Further, the potential for significant period 50mph wind speeds over the lake at LHF is exceptionally low. Waves of that height indicated by the guidance will only occur in short very exceptional storm events. While such events are unlikely, using the guide produces an extreme 'worst case' scenario.

While the frequency and return period of such exceptional storms cannot be concluded such storms represent an exceptionally extreme event not a frequent or seasonally common event.

The margin at risk from wave erosion is the 'lee shore' of the lake. The risk to the up-wind 'windward shore' is negligible. The restored margins of the lake at LHF will be armoured by 'oversize' recovered from the extraction operations and placed directly on the 'beach' and/or by off shore 'oversize' formed bars and/or by vegetation. Any initial erosion of the excavation margin (by wave or sub-aerial process) will create a falling apron toe to the 'cliff', further armouring the edge by the gravel so introduced by that erosion and thereby

inducing further stability and eventually stasis in terms of erosion. This beach armour can be concentrated along 'lee' shores, but sufficient quantity of 'oversize' is available to enable gravel 'beaches' to be reconstructed along the full margins if needs be.

The stability of a such a 'beach' or breakwater (such as an 'off-shore' bar) can be calculated in relation to the maximum wave height ('Shore Protection Manual', Coastal Engineering Research Centre, 4th Edition, 1984). That suggests that the median nominal diameter of the armour at the above maximum wave height needs to be circa 50-60 millimetres to enable stability and prevent erosion. Sufficient oversize at and in excess of this dimension will be produced and be available at LHF and will ensure protection of the beach and the margin even in exceptional conditions.

There are however further specific circumstances at LHF which would suggest that the actual significant wave height generated will be less than that indicated using the ICE guide and that the resultant nominal beach armour size required is less than that needed to stabilise the beach and inhibit any erosion.

First most of the lake at LHF is developed in a distinct topographically sheltered location where the 'arms' of Red Scar at circa 55-60maod with the addition of the dense woodland at Red Scar closely wrap around the Ribble and much of the extraction site at LHF. These 'arms' currently significantly shield the north west part of the site from the dominant wind and will continue to mitigate wind speed and wave generation in that area in the future to below that suggested in the ICE guide.

Further the maximum fetch is only achieved when the lake is full. The lake will vary in depth and extent and the maximum fetch will be limited below that lake full level for various and significant periods. In addition, the lake is relatively shallow and will be provided with significant shallow marginal beaches that will both absorb wave energy and inhibit waves of the maximum significant height striking the margins.

Seiches are unlikely to be of any significance due to the limited fetch, the typically low and variable wind spectrum at LHF and the intervening islands and barriers.

The phased restoration scheme provides for restoration of the SW margin soon after the commencement of operations and the provision of intensive planting on that restored margin. This planting will inhibit wave generation in the immediate downwind direction and effectively reduce fetch. While this is difficult to quantify, and an effect only of significance here due to the limited fetch conditions anyway, it will nevertheless help to reduce the fetch distance, wave generation and subsequent erosion potential.

There are in addition further erosion limiting conditions at LHF. These conditions may elsewhere increase erosion or erosion risk and will have influenced assessment of erosion in published research on erosion in lakes such as Windermere or Loch Lomond.

There will be no recreational use of the water body (and no fishing within the water body) and therefore no wave generation or physical works associated with that activity which might initiate erosion.

Currently stock, particularly cattle, are initiating erosion and causing further erosion on the banks of the Ribble at LHF by their physical action and by the grazing of vegetation. This initiation of erosion affects many rivers and lakes. However, at LHF, all stock will be excluded from the site as workings progress and when restored. The margins of the lake at LHF will therefore be protected from erosion initiated by stock.

Further there will be no streams or rivers or any significant field drain system entering the excavation or lake and therefore no water flows causing erosion at the entry point or 'beach' nor providing regular seasonal inflow of large volumes of water leading to high water against the beach and the margin which might initiate or exacerbate erosion.

There will be no structures or hard surfaces built into or adjacent to the margins that might need protection and/or might thereby initiate erosion.

Due to the size of the lake and the limited fetch, refraction and potential longshore drift (removing and transporting beach sediment and exposing parts of the margin so depleted to enhanced erosion risk) will be insignificant and in any event is incapable of transporting the coarse beach sediment which would armour the beach.

Historically, significant volumes of gravel have been removed from lake beaches in the UK on an unmanaged basis. This will have negatively affected research results to an unknown extent in relation to erosion rates and would have created new or enhanced existing natural rates of erosion or instability of lake beaches. No gravel will be removed from the beaches constructed at LHF.

Ice on lake margins can be a significant source of erosion in terms of physically moving and transporting unconsolidated sediments and destroying vegetation in the lake shallows or lakeside via the condition known as 'ice heave'. This impact is well documented in relation to large and minor lakes across the USA, Canada and elsewhere. The normal winter at LHF would not produce the typical meteorological conditions which can generate these effects. The limited fetch is unlikely to be sufficient to initiate such impacts.

The relevant calculations in the above guidance do not consider such site specific impacts or features. The above indicates that the erosion potential is less than that derived merely by the application of guidance.

'Green Engineering' of the internal shore can offer further protection and this can be achieved by merely using large limbs and stumps of trees (as will be provided from trees removed on site at LHF), or by a mesh of brashings, or by planting (or self-seeded) willow etc. Natural colonisation by marginal water plants, shrubs and trees will enhance this

stabilisation and occurs at all such similar sites. All of these methods are proposed on site at LHF and all of which will not only protect the 25m margin from active erosion by waves, but will provide a diversity of micro-habitats and an enhancement of the biodiversity on the lake margins as well as in the lake itself.

Summary

To summarise; the minimum fetch at LHF together with the provision of beach armour, shallows, plus the buffering effect of vegetation and off shore bars will remove the threat of internal erosion of the 25-metre stand-off margin by the maximum waves at the predicted 'worst case' scenario.

FLOOD RISK OUTSIDE SITE

Ribchester

The works at LHF will create flood retention capacity to protect downstream assets. Ribchester is located circa 12 kilometres upstream and, at its lowest, circa 10 metres above ground level at LHF. There is no feasible position whereby the works will lead to any flooding upstream at Ribchester. The Hydrogeological report notes at 10.1 that the Natural Flood Management facility provided via the excavation will provide betterment in areas of high risk of flooding.

Relationship to Ribble Flood Defence Scheme

The Ribble Flood Defence Scheme includes works along both banks of the Ribble alongside Preston and its surrounding suburbs and settlements. It is primarily focussed on protection of existing built assets. The scheme relies mainly on the raising of existing hard engineered flood walls by circa 1.0 to 1.5 metres (to a maximum of circa 2.5 metres) using 'hard' engineered structures. It will consume considerable volumes of construction aggregate (that might otherwise be provided from LHF) but also substantial volumes of industrial minerals (cement and glass) as well as metals.

No significant areas of Natural Flood Management are provided in the Ribble Defence Scheme, although some relatively small (in LHF terms) areas of flood plain will be allowed to flood to provide natural flood management. The works are primarily designed to in effect increase the volume of the flood channel within the restriction of the built choke point and help discharge the flood downstream as fast as possible.

These works will protect infrastructure and property but do not make any significant contribution to reducing flooding downstream and may create a choke point in the river creating marginal backing up of flood waters. The works are essential to protect assets but do not accord with the concept of 'Working with Nature' and are resource hungry.

The flood capacity provided at LHF will enable a proportion of the flood waters that arrive at Preston to be diverted and held on site potentially delaying and hence lowering the flood peak and thereby reducing the demands on the hard engineered structures downstream provided by the Ribble Flood Defence Scheme. In itself the capacity at LHF will not remove the need for works at Preston but its contribution is still of value and of significance. It will be the largest natural flood management asset upstream and an asset which requires no significant structures or maintenance and is constructed at no call on public monies.

More significantly in a changing climate world it provides a buffer to reduce flood uncertainties at Preston in the future which might otherwise need further 'hard' engineering works. In any event LHF will provide perhaps the largest available feature along the Ribble.

Further, the asset at LHF can also be seen now and in the future as part of a coordinated approach to managing flooding in the Ribble when such a coordinated scheme might eventually be taken forward.

Impact of Ribble Flood Defence Scheme on Samlesbury

This is not a matter for LHF to address. One presumes this has been addressed by the promotors of that scheme (including the EA) who presumably have concluded that there will be no effect on Samlesbury.

I note that the works may provide a choke point in the river which may lead to flooding upstream, but this would affect agricultural land in the immediate vicinity of the works and is unlikely to stretch upstream as far as Samlesbury. Indeed, given the height of the proposed works it would seem that these would be overwhelmed before flooding would back-up to Samlesbury.

If there is a residual concern that is a matter for the promotors of the Ribble scheme to address, but flooding may still occur at Samlesbury regardless unless upstream works, such as at LHF, are progressed.

BRIDGE AT BEZZA BROOK

The application describes the design characteristics of the bridge (founded back from the bank with a concrete slab). There are a range of such structures that can be provided and which will suit the requirements. The developer should be able to select one which meets his needs and not be bound by a specific design as part of the decision and this detail can be resolved by a condition requiring the selected design to be approved by the MPA.

However, the design principles of the bridge are set out in the attached engineering sketch which shows the clear span of both the banks and course of the Brook and where the foundation works do not intrude into the banks.

SUMMARY

To summarise:

1 Many of the details sought by the EA are wholly dependent upon the form of the excavation and the resultant restoration landform. They cannot be defined precisely now nor shown in detailed plans and cross sections and if defined would be misleading. Such details include the exact extent/depth of extraction; the volumes of overburden available for restoring each successive phase; the resultant precise location and size of islands, shallows, etc; the resultant flood storage capacity; etc. However, the submitted plans provide indicative layouts and cross sections, which meet the general objectives of the information sought.

2 The EA seeks details as to the abstraction of water for processing etc. The rate of extraction of water will depend upon the processing plant that is finally selected and to an insignificant degree other uses on site. Any water extracted will be taken from the ponds created by the extraction operations and will not be taken from the river or a borehole, this will use and return water to the ponds on site. There is no significant pollution risk with this methodology and by returning water to the pond system the process can enable excess water to recharge into groundwater, which is a positive objective of the EA. This is not a novel or complex process and is widely used. However, the abstraction of water will require a licence from the EA which will be progressed subsequent to the planning consent. Water requirements can be left to that license stage.

3 All known abstractions and water features within the site are identified. There are only 3 properties in potential hydraulic connectivity with LHF and none undertake abstraction of water.

4 The potential flood routes through the site are described above. The ingress and egress of flood waters currently and through the life of the workings and following restoration will make use of a natural broad channel. This is a simple pattern of flow which does not require any intensive management, built structures or pumping.

5 Depending on various details, the typical flood storage capacity of the site could range from 1.20 – 1.85 million cubic metres.

6 Most of the scheme is designed to allow flooding and to provide management of that flood under any climate change conditions. It is a temporary use of the land and will be resilient to flooding under all climate conditions both during operations and at restoration. The access road surface water management scheme has been devised to deal with the 'worst case' conditions with full climate change allowance and with capacity to extend such facilities, although the road will be removed at completion of operations.

7 The details of the office facilities can be dealt with by condition.

8 The access road will provide safe egress from the site in the event of a flood warning and safe storage of machinery etc above likely flood levels. The EA requests that the drainage network for the access road does not connect to existing watercourses due to the concern of the EA as to pollution. The likely level of pollution arising from the level of traffic on the access road is negligible and the recharge into the wider drainage network of this captured rainfall would be desirable. But in any event the final drainage scheme provides sufficient opportunity to increase contained capacity and does not rely on external connection.

9 The ES comprehensively identifies habitats and species present within the application site. Further surveys are not required nor necessary. The application does not propose any works in or on the banks of the river, although the UU provides for biodiversity enhancements on the bank of the Ribble and along the relevant section of the Bezza Brook, nor does it involve discharges or abstractions from the river. The scheme itself provides extensive biodiversity enhancements both on site and off site.

10 In the event of a major flood fish may enter and be trapped on site. Such an event would be a major catastrophic event for the whole of the river, although historical floods into the previous working do not appear to cause significant fish capture or the need for recovery. Fish recovery can be provided through a condition.

11 The CEMP can deal with silt from the washing plant if. The silt is inert and a natural product uncontaminated by chemicals etc and the potential silt arising from LHF would be insignificant in relation to the catastrophic impact of a major flood event in the river.

12 Due to the limited fetch and the internal construction of the excavation and other associated considerations the extent of internal erosion is contained even at the 'worst case' scenario.

13 The development provides significant flood storage capacity. There is no feasible position where the development would lead to flooding upstream in settlements such as Ribchester. The development at LHF will relieve the flood alleviation demands on the hard engineering of the Ribble Flood Defence Scheme around Preston and can contribute to a coordinated flood scheme for the whole of the Ribble.

14 The details of the bridge across the Bezza can be resolved by condition in accordance with the general design parameters provided.

THE LLFA OBJECTION

INTRODUCTION

The Lead Local Flood Authority (LLFA) objects to the application and recommends refusal as it considers that the application does not meet the requirements of paragraph 30 of the PPG nor paragraphs 163 and 165 of the NPPF (2019) in relation to surface water flood risks and requires the submission of an FRA and a Sustainable Drainage Strategy.

The LLFA states that it is "particularly concerned with regards to surface water runoff from the proposed access road". The indicative details of the route of the access road and the surface water management system are provided in the Planning Statement and the associated plans. These may be subject to minor changes (relocation of a detention pond, etc) following detailed ground condition surveys but represent a workable concept.

The effectiveness of the drainage network to manage surface water run-off from the access road is considerably enhanced (in accordance with 'Working with Nature', the NPPF and PPG), by the very substantial shrub and tree planting to be provided in an extensive linear belt alongside the road. This will itself capture rainfall and further slowdown and absorb surface water run-off as well as providing other multifunctional benefits.

The indicated design provides for management of surface water from the road within the application site and within land under the control of the applicant. The surface water flood risk associated with the road as managed by those systems is assessed in Chapter 9 of the Hydrogeological report. That report concludes that the risk from flooding is 'very low'.

The LLFA comments that the "key principles" set out in policy and guidance should be "demonstrated to be met". As noted above those are met in the application.

The PPG notes (para 059) that applicants for planning permission need to submit only "proportionate information" on drainage systems "having regard to the nature and scale of the development proposed".

LLFA Content that Details can be Considered at a Later Stage by Condition

However, in that context the LLFA also recognises that a detailed sustainable drainage design can be provided "at a later stage in the planning process" and can be conditioned to that effect.

In the light of that conclusion of the LLFA the request for further details and the "concern" of the LLFA regarding on for example the drainage network for the access road, is contrary to that conclusion and does not justify the recommendation to refuse consent.

In any event indicative details included with the application comply with or exceed the key principles set out in both national and local policy or guidance. Final details can be concluded by condition, as accepted by the LLFA and do not need to be resolved now.

As noted above the lack of those details does not justify the LLFA recommendation to refuse consent.

FRA

An FRA is provided in Chapters 8 to 11 in the Hydrogeological Report.

Sustainable Drainage Strategy – Flood Risk Vulnerability

The application site is currently effectively open (agriculture and woodland) land, will be substantially almost all open land for a temporary period during operations (apart from an insignificant area of hard surface at the processing plant and the access road), and will on completion be restored wholly to open land with no buildings or structures or impervious hard surfaces.

Currently the flood risk vulnerability of the site as agricultural land is NPPF Annex 3 'less vulnerable'. During the sand and gravel extraction operations the vast majority of the site will be NPPF Annex 3 'water compatible' and following restoration all of the site will become 'water compatible' as no part will be returned to agriculture but will be restored substantially to wetland with the residual being restored to woodland.

The 'Strategy' for dealing with surface water flooding is fully described in the application and indicatively shown on the various plans. As described the site will be able to act as a flood retention feature for both on-site and off-site flood water, including that from surface water run-off from the access road. The site will therefore exceed the statutory flood risk obligations and will primarily and substantially manage surface waters by promoting groundwater recharge.

That strategy, as described in the application. will ensure that surface water flooding will create a minimum risk to the site and no risk outside the site. There will be no built development or people permanently present on-site during operations and the site will be returned to open land with no persons present and no structures or built features on restoration. The strategy as set out in the application deals with all flood risks to the equipment on site during operations.

Flooding from surface water arisings within the site does not expose any external asset or any person to risk. Surface water run-off, will be negligible and managed within the site. Surface water flooding on the access road is proposed to be managed by indicative works as described in the application.

The phased working and restoration strategy will enable substantial internal storage of surface or flood waters from the site or from off-site, direct infiltration of that storage in to the ground and provides for extensive planting which will control and reduce flood events downstream caused by flood waters arising from surface water run-off etc upstream. These facilities greatly exceed that which would be statutorily required in relation merely to the surface water flows on site.

The development will not generate external flood risk from surface waters on site. It will provide, in context and in contrast (and as identified in the NPPF and national guidance), substantial capacity to hold and store such surface water floods generated outside the site to reduce flood risk downstream and enable groundwater recharge and associated "multifunctional" benefits.

This provision of a Natural Flood Management Facility is to be encouraged. The LLFA conceptually supports in policies and strategies the provision of such features. However, the positive value of the features at LHF and their compliance with policy and strategies is wholly ignored in the comments of the LLFA. In policy terms the LLFA should be wholeheartedly supporting the development at LHF for both the flood control provision and its 'natural' form.

Sustainable Drainage Systems

Sustainable Drainage is concerned with surface water flooding, from/or on, existing or new or redeveloped urban/built development or permanent impermeable infrastructure.

SuDS, as represented in both the NPPF and the PPG, is an approach to try to mimic natural drainage systems in permanent urban development so as to cater for excess surface run-off from the substantial areas of non-porous roads and footways, roofs and services created by such development, where 'greenfield' infiltration is replaced by hard impervious surfaces producing new and significant surface water run-off management problems.

The provision of SuDS typically involves significant site engineering, by the provision of new drainage systems (which typically include an element of hard 'constructed' features and may include the requirement for pumping or sediment/debris removal) , with a permanent site maintenance obligation, be that of vegetation or built structures.

At LHF surface water run-off is to be managed by large natural flood storage and mitigation features including substantial excavation areas and tree planting, enabling effective infiltration into the ground. On the access road this is supported by a system of typical 'natural' low-key and low maintenance swales, ditches and ponds. The site does not require the often highly engineered systems nor the high-cost maintenance typical of SuDS.

In undertaking a SuDS assessment the extent of significant 'green' areas (such as public open space in a housing scheme) can be excluded from the analysis as they are assumed to

have a run-off response similar to that prior to development. In the case of LHF the site is effectively wholly a 'green' area where the proposed run-off management response will, in SuDS terms, not just be similar to the current 'green' position but will substantially exceed that existing.

That underplays the capacity of the site to hold surface water because the development will provide that most of the run-off from incident rainfall will not be discharged by field drains or ditches or surface flow into the Ribble as at present (or into sewerage or surface water drain systems that might be required in urban development), but will be retained on site in the excavations/ponds and the woodland created. The run-off response/control in the future will be more effective than at present.

The NPPF requires (para 169) that SuDS should be provided unless it "would be inappropriate" and should (d) "where possible provide multifunctional benefits". As noted the purpose of SuDS is to manage urban, built and infrastructure sites where the development of hard surfaces is significant and SuDs are not appropriate at LHF where such hard surfaces would be insignificant. If applied to LHF the site should be treated in a SuDS assessment as 'green' space. However, regardless of the applicability of SuDS, the development clearly provides as set out in the application numerous "multifunctional benefits".

The Planning Practice Guidance notes (para 055) that (and where appropriate) "Multifunctional sustainable drainage systems are those that deliver a wide range of additional biodiversity and environmental net gains".

In the majority of SuDS schemes such "multifunctional" gains are minor in nature, but the scheme at LHF will deliver a substantial level of such "multifunctional" net gains as noted in the PPG vastly exceeding that which may be provided via housing or other built development, including:

1 It will amelioration urban heating and air pollution – by the extensive tree planting and the provision of a substantial water body mitigating urban heating and air pollution generated by adjacent urban and commercial development

2 It will replenish groundwater – by infiltration from drainage systems and the water body

3 It will contribute to biodiversity net gain – the whole site will provide very substantial net gains in biodiversity and in habitats which will vastly exceed that sought by BNG

4 It will, where relevant, capture and re-use rainwater – in terms of capturing rainwater and continually re-using that in the processing plant.

5 It will store substantial volumes of carbon in major forest scale tree planting and in reed beds.

6 It minimises carbon intensive construction – and any such construction will be recovered and recycled at the end of the operations – and minimises pumping on site, but in the particular context of SuDS does not require pumping or hard engineering to make the SuDS work.

7 It does not need to release any water to a sewerage system as the surface water will be disposed into the ground by infiltration. This is the primary route for surface water according to the SuDS hierarchy.

8 It creates extensive and valuable new blue-green infrastructure and connects existing fragmented such infrastructure.

9 It creates a feature that does not need any significant future maintenance costs to enable its sustainable drainage features or which might be required to maintain its biodiversity, as are required at Brockholes.

10 It significantly enhances the locality and the landscape by its substantial habitat provision and amenity and by improvements to existing recreational fishing on the Ribble.

Further in relation to ensuring that the development at LHF is "sustainable drainage" (PPG para 063), and provides the wider benefits of natural flood management (PPG para 064), the development at LHF:

1 Maximises infiltration of surface water through extensive permeable surfaces and no permanent impermeable surfaces.

2 Maximises planting and green spaces to increase evapo-transpiration, biodiversity and "wider natural capital benefits".

3 Provides extensive water areas and ponds which in capacity can exceed forecast or any extreme rainfall events.

4 Makes no loading on the existing sewerage network and provides run-off capture systems for the site and surrounding land.

The Access Road

The access road is a temporary feature. It will be surfaced and provided with a drainage system to ponds allowing infiltration. The road will be removed on completion of the operations and restored to woodland, but the drainage system will be kept.

The route and the indicative management of surface water run-off are described in the Planning Statement and in plans. While the Hydrogeological report rightly focusses on matters relating to the excavation operations etc in the flood plain it addresses the risk of flooding from the access road in 9.6 where it states that surface water run-off generated will

be captured and conveyed to drains, ditches, attenuation ponds and basins located alongside the road.

The report concludes in 9.6 that the risk of flooding from the road is considered to be 'very low' and summarises and tabulates that risk in Table 10. 'Very low' is the lowest risk level that can be identified for any flood risk.

As described in the application the road is provided with typical 'natural' swales, ditches and ponds (as would be provided alongside any minor track or road with such a low level of traffic) to manage surface water run-off and will include extensive planting. These features will become valuable 'multifunctional' habitat in addition to serving as surface water drainage systems and will be left in place at the conclusion of the operations and incorporated into the restoration of the route when the road is removed.

The level of particulates and pollutants arising from the insignificant traffic on the road that would be managed by those features is negligible in quantity and toxicity. The pollution potential of the run off is significantly below any relevant threshold (see response to ecological comments).

The typical design and scale of the drainage facilities provided for the access road was concluded as part of the pre-submission design assessment undertaken by the applicants before concluding the details of the development. This involved assessment of the capacity of the proposed works to manage the relevant drainage and it was concluded that the scale of works subsequently included in the application would be sufficient to manage the potential run-off, and/or could be expanded if required, as well as providing 'multifunctional' or 'multiple benefit' in accordance with current (2015) DEFRA standards or the recommendations on updating those standards as now set out by DEFRA in 2021.

The final form of the facilities will be determined by detailed ground condition surveys undertaken in conjunction with surveys for construction of the road itself, but in any event, there is sufficient land in the control of the applicant and capacity on site to expand/amend those facilities, if required, in the light of the conclusions of those detailed surveys.

In that context it is to be noted that the development involves a continuing presence of the developer on site for the construction period, the operational period and the restoration and aftercare period extending for in excess of 30 years. So, over that period the developer at LHF will be able to both monitor and amend/extend surface water management facilities, where necessary, to ensure that they are effective and maintained.

This is very significantly different from a housing or commercial development where the scheme of construction involves a short timeframe and where the developer will not have a presence or an involvement in the site once construction is complete; and where there may be limited or no opportunities to expand or amend the surface water drainage scheme (or indeed any funds or land available to make such changes).

Given the above any concerns as to the adequacy of surface water drainage are already satisfied in the scheme and such facilities can be extended if needed.

However, and given that the final form of the works cannot be determined now, a full assessment of the capacity of the indicated drainage works has been undertaken and is attached to this response. This relates to the 5 potential surface water networks (swales and detention ponds as shown on the attached plans) from the A59 junction to Potters Lane based on the 100 year plus 50% climate change allowance and demonstrates that the indicative networks are fully capable of handling the relevant run-off without any flooding outside of the indicative network.

DEFRA Non-Statutory Technical Standards for SuDS

The DEFRA standards on SuDS are for built development and/or where large areas of impervious surfaces are to be permanently created. The development at LHF is not built development, nor does it involve large areas of impervious surfaces and it is temporary development.

In relation to issues of concern noted in the DEFRA standards the development does not rely on built structures, pumping, the release to sewerage or constructed drainage systems. It does not (as demonstrated in the Hydrogeological report) create flood risk outside the site, but will provide significant flood risk attenuation itself.

While most of the site at LHF is in the flood zone, the development is an NPPF Annex 3, 'water-compatible' use within that zone and is designed to hold flood waters as part of the design and operation.

In so far as the DEFRA standards are relevant to any degree the development accords with those standards and exceeds the protection sought.

Update of DEFRA Standards

DEFRA has funded research on the SUDS standards to reflect practice but also because the current standards do not reflect either the provisions in the NPPF or in PPG that sustainable drainage systems should, where possible, provide multifunctional benefits. Currently, the standards only relate to water quantity and fall short of SuDS best practice.

Recommendations to update the standards have been published by DEFRA to ensure that SuDS always deliver multifunctional benefits. In that context LHF will provide those multifunctional benefits and will comply with the new standards, where relevant.

NPPF 163: Now Paragraph 167

Sand and gravel extraction is specifically identified as being compatible with the flood risk. Contrary to the comments of the LLFA, the FRA in the Hydrogeological report clarifies that

no flood risk will arise elsewhere and further that the scheme provides for works leading to the reduction of flood risk at nearby and more distant communities.

There are no residents on site and the development will not bring people to the site except for those operatives required temporarily to operate the site. No permanent presence of people is proposed at the restored site. Adequate and effective means of escape for both site operatives and mobile equipment is provided for.

SuDS standards are not required for this form of development but the development provides very substantial multifunctional sustainable development drainage systems.

The development at LHF therefore not only complies with paragraph 163, where relevant, but actually exceeds the provisions sought by the NPPF as it provides resources to decrease flood risk elsewhere.

NPPF 165: Now Paragraph 169

There is "clear evidence" that the development at LHF does not provide any significant hard surfaces requiring treatment via SuDS. In any event as a temporary activity all the site will return to permeable surfaces. Further the site will become an important flood storage and reduction feature in its own right and will provide significant "multifunctional" benefits.

In one pragmatic and realistic interpretation the whole site becomes one very extensive sustainable development drainage/flood management feature, in line with 'Working with Nature', for the wider locality. The development does not rely on complex or built drainage systems and will require minimum maintenance.

The development at LHF therefore not only complies with paragraph 165 but considerably exceeds the positive flood management requirements sought by the NPPF.

PPG Paragraph 30

It is recognised in paragraph 30 that "mineral deposits have to be worked" where the mineral is found and that there is no scope to relocate minerals. The paragraph addresses all minerals in all flood situations but specifically recognises the NPPF 'water compatible' nature of sand and gravel extraction. No other form of mineral working is included in that category.

However, as the paragraph advises "mineral working should not increase flood risk elsewhere". The development will not increase flood risk elsewhere and, as noted in the application and the FRA, will provide substantial flood storage with a net benefit in controlling flooding in the wider location, as sought in the paragraph.

The development provides for the processing plant and mobile plant and facilities to be located in a suitable position in relation to flood risk which enables the evacuation of any at risk mobile plant out of the risk zone.

PPG paragraph 30 also specifically acknowledges the value of mineral working in relation to flood storage and attenuation, which will be significant assets provided at LHF.

Contrary to the comments of the LLFA, the development at LHF therefore not only complies with the spirit and purpose of paragraph 30 of the PPG but considerably exceeds the positive flood management requirements sought.

Local Flood Risk Management Strategy for Lancashire

The development at LHF will create substantial new Natural Flood Management storage assets within the excavations and in the significant tree planting. The LLFA has conceptually and fully supported Natural Flood Management as part of controlling flood risk from all sources and references the value of such facilities in the previous and recently adopted strategy documents (Local Flood Risk Management Strategy for Lancashire 2021-2027).

Examples of such works are identified in the latest Strategy (eg at Claver Hill and White Carr Lane) and although these examples only provide very small capacity in contrast to that at LHF, their direct flood alleviation value and the multifunctional value is identified as an excellent example of what can be achieved in a facility that went “above and beyond” statutory requirements.

The facility provided at LHF will not just considerably exceed statutory requirements but will provide a flood alleviation asset and other assets for the wider community. It will be an “Easy Win”, as described in the Strategy, for flood alleviation in that it does not depend on public funding, provides a very substantial asset, will come into operation from day 1, will not consume significant physical resources or require significant management, and will significantly go “above and beyond” statutory requirements.

It is a great pity that the comments of the LLFA concentrate on supposed non-compliance with policy constraints (although the development at LHF complies with such policy, where relevant), but fails to acknowledge the very substantial flood alleviation and associated multifunctional benefits that will be provided in line with its own adopted Strategy.

No consideration is given to how the development at LHF both complies with and exceeds the flood risk management Strategy in the LLFA comments.

John Cowley for Harleyford Aggregates Ltd, 31.10.23