14 Minerals

Introduction

14.1 This chapter assesses the effects of the Proposed Development on minerals. The Proposed Development is provided in detail in Chapter 5 of this ES.

14.2 The chapter describes the methods used to assess the likely significant effects, the current baseline conditions at the site and surroundings, the potential direct and indirect effects of the development arising from the environment regarding minerals, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Chris Muir MRTPI of Tetra Tech Limited.

14.3 This Chapter is supported by the following appendix:-

- Prior Extraction Assessment (Tetra Tech) dated January 2025.

Assessment Methodology and Significance Criteria

14.4 The evaluation of significance has been determined by assessing Impact Sensitivity and Magnitude as per the standardised significance criteria shown in Chapter 2. It is considered that it is most appropriate to use a combination of quantitative and qualitative approaches. For example, indicative figures of potential minerals yield are provided as well as descriptions of other considerations.

14.5 The study area for this ES Chapter is the mineral resources within the site boundary.

14.6 The chapter is based on site investigation information obtained within the site and surrounding area and geological information for the site available through the British Geological Survey and Wrexham County Borough Council (WCBC).

Identification of the Study Area

14.7 The study area for this ES Chapter is the mineral resources within the site boundary. This is because it is the mineral resources within the site that could be sterilised by the proposed development.

Surveys and Data Sources

National Planning Policy

14.8 The safeguarding of non-renewable resources, such as minerals, is a key aspect of sustainable development. Paragraph 5.14.7 of Planning Policy Wales (Edition 12)[1], which was adopted in February 2024, emphasises the importance of safeguarding mineral resources to deliver need and prevent sterilisation.

14.9 Paragraph 32 of Minerals Technical Advice Note 1: 'Aggregates'[2] states *"resources must be safeguarded for possible use by future generations."*

[1] Welsh Government (2024), *Planning Policy Wales*
[2] Welsh Government (2004), *Minerals Technical Advice Note 1: Aggregates*, Minerals Planning Policy (Wales)

Wrexham Local Development Plan

14.10 WCBC specifically comment about minerals that underly the site in their Local Development Plan (LDP)[3]. They state the following: -

Paragraph 3.31:-

'The SA/ SEA identifies that these KSS will impact on Best and Most Versatile agricultural land and minerals of national importance, however the need to provide housing, infrastructure and other community facilities in sustainable locations outweighs the need to protect these resources in this instance.'

Paragraph 4.192:-

'Due to the extent and distribution of mineral within the County Borough and the need for non-mineral development such as housing, it is inevitable that some sterilisation will occur and this is accepted and established through the allocation of sites underlain by mineral in the LDP.'

Paragraph 4.194:-

'The need for mineral underneath sites which are allocated for non-mineral development has already been considered through the development of the LDP and the need for the non-mineral development is considered to outweigh the need to protect the resource in its entirety.'

British Geological Survey Data

14.11 The British Geological Survey (BGS)[4] show on their GeoIndex website that the site is mainly underlain by Devensian Glaciofluvial Sheet Deposits, which comprise sands and gravels.

14.12 A small part of the site to the west is shown to be underlain by Devensian Till or Diamicton, which comprises mixed sands, silts, clays and gravels.

14.13 The BGS show these superficial deposits are underlain by the Salop Formation, which comprises mudstone, sandstone, and conglomerate.

14.14 There are no historical BGS borehole records within the site boundary. One record (SJ35SE22) is around 100m southeast of the site. The borehole was 25m deep and shows an overall grading (through particle size density testing) of 92% sand and gravel (83% sand). The testing does however show a higher fines content in the higher lying deposits.

November 2021 Site Investigation Works

14.15 Eighteen trial pits were excavated at the site and surrounding area in November 2021. The location of the trial pits and the trial pit logs are detailed in the Prior Extraction Assessment and the results are summarised in Table 14.1 below.

[3] Wrexham County Borough Council (2023) *Wrexham Local Development Plan*
[4] British Geological Survey (2024) *GeoIndex (onshore)*

Table 14.1 - Site Investigation Log Summary

Trial pit	Topsoil Depth (mbgl)	Strata 1 Depth (mbgl)	Strata 1 Description	Strata 2 Depth (mbgl)	Strata 2 Description
TP101	0.4	1.5	Fine to medium SAND		
TP102	0.3	0.2	Silty SAND	1	Silty CLAY
TP103	0.4	1.1	Slightly silty SAND		
TP104	0.3	1.1	Silty SAND	0.2	Silty sandy CLAY
TP105	0.4	1.3	Slightly silty SAND		
TP106	0.3	1.9	Silty/ very silty SAND		
TP107	0.3	1.7	Slightly silty SAND		
TP108	0.3	2.2	Silty SAND		
TP109	0.25	1.25	Silty/ silty gravelly SAND		
TP110	0.3	0.2	Slightly clayey gravelly SAND	0.9	Coarse SAND and GRAVEL
TP111	0.35	1.55	Slightly clayey gravelly SAND		
TP112	0.35	0.5	Coarse SAND and GRAVEL	1.15	Gravelly SAND
TP113	0.35	0.4	Gravelly SAND	1.25	SAND
TP114	0.3	1.2	Coarse SAND		
TP115	0.3	1.5	Slightly gravelly SAND		
TP116	0.35	1.75	SAND/ gravelly SAND		
TP117	0.4	0.7	Clayey gravelly SAND	0.1	SAND
TP118	0.3	1.1	Gravelly SAND		

14.16 The trial pits were excavated to depths ranging between 1.2 metres below ground level (mbgl) and 2.5mbgl, with an average depth of 1.76m. The logs indicate that sand with varying quantities of fines were encountered immediately beneath the topsoil. With the exception of TP102, at least 1m was of sand/ sand and gravel was recorded in each of the trial pits. Sand/ sand and gravel was also recorded to the base of each trial pit with the exception of TP102 and TP104.

14.17 Particle Size Distribution (PSD) testing was completed on four of the recovered samples. This information is summarised in Table 14.2 below.

Table 14.2 – Particle Size Distribution Tests

Trial pit	Top Depth (mbgl)	Base Depth (mbgl)	Strata Recorded in Logs	Sand	Gravel	Fines
TP102	1.2	1.4	Silty Clay	0%	0%	91%
TP105	1.4	1.6	Slightly silty SAND	92%	1%	8%
TP107	1.4	1.6	Slightly silty SAND	90%	5%	5%
TP117	1.2	1.2	Sand	88%	5%	7%

14.18 The PSD tests indicate that the tested samples include around 90% sand except for a targeted area of clay.

14.19 Groundwater was encountered during the trial pitting works. The log for TP106 denotes the ground was saturated from 1.6mbgl and the log for TP108 denotes the ground was saturated from 1.8mbgl.

14.20 The trial pit logs are also included as an appendix to the Prior Extraction Assessment.

Site Investigation Information for Planning Application P/2021/0436 (Barratt/ Bloor Homes Application on land to the north of application site)

14.21 Barrat and Bloor Homes have submitted a planning application for a residential led development to the north of this application site. The Minerals Environmental Statement Chapter[5] for the application (P/2021/0436) shows that site investigation works in October 2018 recorded average values from 11 samples across 7 trial pits of 95% sand and gravel (84% sand). The ES Chapter proceeded to state on the assumption of a 3m thickness of resource (as it would not be practicable to excavate sand to its 25m depth) there would be a 480,000m^3 volume or 770,000 tonnes of sand and gravel.

14.22 The Minerals ES Chapter shows that groundwater was encountered between depths of 1mbgl and 2mbgl at three locations in the southwest of the site in windowless samples borehole drilled in March 2017.

Need

14.23 The Regional Technical Statement 2nd Review[6] was published in September 2020, and provided the most up to date information on 'need'. The 2nd review document states:-

'The RTS provides a mechanism for encouraging national sustainability objectives to be met by individual planning authorities within each region for a period of 25 years (crushed rock) and 22 years (sand and gravel).' Paragraph 5.25 of the 2nd review document further explains: 'The requirements, as set out in paragraph 49 of MTAN1, are that a minimum 10- year landbank of crushed rock and a minimum 7-year landbank for sand and gravel should be maintained throughout the entire plan period of each LDP. In effect, this means having a minimum landbank for sand & gravel of 22 years, at the start of a 15-year Plan period…'

14.24 Paragraph 4.31 of the 2nd Review RTS states:-

'In North Wales, the highest population density occurs within Flintshire and Wrexham, coinciding with the highest levels of crushed rock and sand & gravel output, respectively, within that region… The road network in these areas also provides ease of access for exports into the conurbations of North West England, including the Wirral, Liverpool and Warrington.'

14.25 Figure 14.1 below shows how the apportionments for each LPA have been calculated.

Figure 14.1 – 2nd Review RTS Table 5.2 Assessed Sub-Regional and LPA Apportionments, North Wales

	OPTION A			OPTION B				
Local Planning Authority	highest of 10-yr and 3yr Ave. Aggregate Sales (total) (mtpa)	% share of Regional total	Resulting Annualised Apportionments for all Land-Won Primary Aggregates[1] (mtpa)	Annualised House Completions over the baseline period (2007 – 2016)	% share of Sub-Regional total	Resulting Annualised Apportionments for all Land-Won Primary Aggregates[2] (mtpa)	Preferred Annualised Apportionments (mtpa) [By default = Option A, but modified in some cases (red figures) to allow for Option B or qualitative observations as noted in column to right]	Qualitative Observations
N. WALES TOTAL (from Stage 2)				7.738				
NE Wales Sub-Region	**4.047**	**65.75%**	5.088	**749.0**	**100.00%**	5.088	**5.088**	**The existing supply pattern here (Option A) provides an appropriate balance between market forces (including substantial exports) and the availability of unconstrained resources.** Flintshire has much higher aggregate sales than Denbighshire, despite similar housing requirements. This reflects local market distortion by exports to NW England. The slight modification shown within the preferred apportionment figures is to make the best use of existing landbanks and thereby reduce future allocation requirements overall. Wrexham supplies only sand & gravel as its limestone resources are largely constrained by the AONB.
Denbighshire	0.329	5.35%	0.414	156.2	20.85%	1.061	0.860	
Flintshire	3.204	52.06%	4.028	288.6	38.53%	1.960	3.582	
Wrexham	0.514	8.35%	0.646	304.2	40.61%	2.066	0.646	
NW Wales Sub-Region	**2.108**	**34.25%**	2.650	**969**	**100.00%**	2.650	**2.650**	**The existing supply pattern in NW Wales is well balanced with the distribution of planned housing provision and is unaffected by exports.** Option A should therefore be used. Supplies are sourced primarily from outside the National Park and AONBs and are well distributed between the main producing areas of Conwy and Gwynedd, with more limited supplies from Anglesey to local markets.
Conwy + Snowdonia NP	0.955	15.52%	1.201	178.6	39.26%	1.041	1.201	
Gwynedd	0.898	14.59%	1.129	170.4	36.60%	0.970	1.129	
Isle of Anglesey	0.255	4.14%	0.321	109.6	24.14%	0.640	0.321	

14.26 Paragraph 5.28 of the RTS 2nd Review states:-

'For land-won sand & gravel, Tables 5.4 and 5.5 reveal that new allocations to meet RTS requirements over the next 22 years will be required within Flintshire, Wrexham, Gwynedd and Ceredigion. Current landbanks, expressed in terms of the new annualised apportionments, are already less than the minimum level of 7 years in three of these areas, demonstrating the urgency for granting new permissions, as well as longer-term allocations for future working. In the fourth area (Wrexham), the landbank is currently adequate, at just under 20 years, but a further allocation is needed to meet the RTS requirement over the full plan period.'

14.27 Table 5.4 from the RTS 2nd Review is displayed in Figure 14.2 below.

Figure 14.2 - 2nd Review RTS Table 5.4 Calculation of Allocation Required for Land-won Sand and Gravel Aggregates - North Wales

Local Planning Authority	Overall 'Preferred' Apportionment (S&G & CR)[1] (mt)	Historic proportion supplied from sand & gravel sources[2]	New Annualised Apportionment for sand & gravel[3] (mt)	Total Apportionment Required over 22 years	Existing permitted reserves at end of 2016 in mt[4, 5]	Existing landbank[6] (years)	Surplus or Shortfall (-) of Existing Permitted Reserves (mt)	Minimum Allocation needed to meet Required Provision[7] (mt)	Additional reserves at Dormant sites, 2016[4] (mt)
Denbighshire	0.860	0.00%	0.000	0.000	0.000	n/a	0.000	0.000	0
Flintshire	3.582	6.23%	0.223	4.912	1.369	6.1	-3.543	3.543	0.5
Wrexham	0.646	100.00%	0.646	14.217	12.652	19.6	-1.565	1.565	0
Conwy + Snowdonia NP	1.201	0.00%	0.000	0.000	0.000	n/a	0.000	0.000	0
Gwynedd	1.129	15.44%	0.174	3.834	1.175	6.7	-2.659	2.659	0
Isle of Anglesey	0.321	0.00%	0.000	0.000	0.000	n/a	0.000	0.000	0
Sub-totals, North Wales	**7.738**	**13.40%**	**1.044**	**22.963**	**15.196**		**-7.767**	**7.767**	**0.5**

14.28 Paragraph 5.28 of the RTS states the *'landbank (in Wrexham) is currently adequate, at just under 20 years, but a further allocation is needed to meet the RTS requirement over the full plan period'.* This differs from the LDP, which states there is no need for new sand and gravel in Wrexham, although this was based off the RTS 1st Review.

14.29 The projections of aggregate needs are based on an agreed methodology as set out in the RTS 2nd Review from paragraph 3.43. The future aggregate provision is based on historical sales information and the planned requirement for housing construction in LDPs. This is because the amount of construction and need for aggregate are intrinsically linked.

14.30 A planning permission (P/2022/0448) was granted in November 2022 at Ballswood for the extraction of an additional 500,000 tonnes of sand and gravel. This reduces the shortfall identified in Table 5.4 of the RTS 2nd review. Extension sites are generally encouraged by Mineral Planning Authorities over new sites.

14.31 As described earlier in this chapter, a planning application has been submitted at another site (P/2021/0436) within the KSS2 allocated site boundary. WCBC include analysis of the applications compatibility with policy MW1 as well as providing a review on the need of mineral. In a letter dated July 2023, WCBC state:-

'The need for the mineral underneath KSS2 has already been considered through the development of the LDP and it has been concluded that the need for the non-mineral development is considered to outweigh the need to protect the resource in its entirety. It is considered therefore that the inclusion of KSS2 within the LDP has already accepted that this sand would be sterilised by any development that comes forward to be proposed on KKS2, and that the need for the development would outweigh the permanent sterilisation of the sand resources beneath the site. As such, it is considered that the application complies with Policy MW1 ii) as it cannot be disputed that there is an overriding need for the proposed development.'

Construction Phase

14.32 The underlying minerals could be sterilised through the construction of the development.

Operational Phase

14.33 The impact on minerals has been scoped out of the operational phase of assessment as they would be sterilised by the construction phase.

Identification of Sensitive Receptors

14.34 WCBC describe the underlying resource as nationally important, although do concede that the allocation for proposed housing development at the site (as outlined in the LDP) outweighs the importance of the mineral, and that sterilisation will occur, and this is accepted.

Characterisation of Effect

14.35 The sterilisation of mineral, in its own right (prior to any consideration of being outweighed by the need of the housing development), would be negative and would be over a large area (circa 40ha).

14.36 The sterilisation of the whole underlying resource would be direct, permanent, and not reversable and would take place over the period of the site's construction.

14.37 Impact magnitude is determined by predicting the scale of any potential change in the baseline conditions, by way of a fully defined qualitative assessment. The assessment of magnitude is carried out considering any 'design mitigation,' i.e.

relevant design features, in the proposal that could reduce impact. This may result in the need for 'additional mitigation' i.e. that which results from the EIA process, to reduce impacts further. Therefore, the magnitude of impacts both before and after 'additional mitigation' are considered.

Significance Criteria

14.38 The below standardised significance criteria will be used:-

- Major Beneficial;
- Moderate Beneficial;
- Minor Beneficial;
- Negligible;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

14.39 For a Minerals ES Chapter, a major impact could be the complete/substantial loss (adverse) or the complete/ substantial recovery (beneficial) of a mineral resource that is in high demand. The significance of impact could be reduced if the mineral resource could either be recovered or was not considered to be in high demand. This is the magnitude of the impact (the amount of mineral) considered against the sensitivity of the receptor (quality/ need of the mineral).

14.40 The minerals broad value and the scale of loss/ gain are key considerations.

14.41 With any mineral safeguarding / sterilisation assessment the impacts would be permanent (if they were built over).

Assumptions / Limitations

14.42 WCBC consider the mineral resource to be nationally important, but at the same time acknowledge the greater importance of the site for housing development and are clear in that this assessment has already been made. The minerals have been considered nationally important prior to any site investigation works and seems to be based on the broad BGS categorisation of glaciofluvial deposits being a Category 1 resource (see Prior Extraction Statement in Appendix 14.1).

14.43 Initial consultations with local mineral operators are described in Table 14.3. One operator considered the deep level or targeted working (say to 3mbgl or 4mbgl) of the resource would likely not be commercially viable and the other operator stated the mineral was uneconomic as it's very fine, silty sands and clays. Both operators did however state that they would benefit from a more comprehensive scheme of minerals investigation, but this is regarding working the site to a much deeper level. The available site investigation information includes trial pits up to 2.5mbgl. WCBC have requested the assessment of mineral working to 3 or 4 mbgl. It is therefore considered that the available information provides a reasonable indication on the viability of working to this extent.

14.44 As the nationally important categorisation almost contradicts the information from the operators it is difficult to define the receptor sensitivity.

14.45 Other limitations include:-

- Estimations of mineral yields are in based on the current available information (trial pit logs up to 2.5mbgl);
- Further assumptions have been made regarding workable areas of the site in the Assessment of Likely Significant Effects section; and
- WCBC have stated that prior commencement of sand could be to depths of 3m – 4m. Mineral estimates and analysis of options in Appendix 14.1 have been based on 3m of sand being recovered, but this would involve recovery of some sand within the groundwater table. It is considered unlikely that WCBC would expect any prior extraction works within the groundwater table but have worked to the scope set by WCBC.

Table 14.3 – Consultation Table

Consultation	Date	Comments	Actions
Wrexham Borough Council – Pre submission feedback	11/01/2023	The full response is appended to the Prior Extraction Assessment. The response included recommendations on scope of a Prior Extraction Assessment as well as commenting: '*…prior extraction could amount to a minimum depth of sand being removed from the site prior to the commencement of construction for example the first 3-4 metres of sand*' and *'The proposed incidental extraction is welcomed.'*	The recommended scope has been reflected in the Prior Extraction Assessment.
Operator of nearest quarry site	26/07/2023	*A national quarry operator does not consider that the Cefn Road site would be commercially viable to be worked as a standalone quarry resource based on the limited information provided. The site investigation works, which were completed by Hydrock in November 2021, included eighteen trial pits and four Particle Size Distribution Tests.* *The operator considers there could be a substantial capital cost to set up a new site in this location. Costs would include planning and licensing costs, the purchase of plant and equipment and a system of managing groundwater through lagoon construction. There would be additional costs at this site for re-routing services, hedgerow removal/ planting and badger mitigation.* *The operator considers it could take around 2-3 years to achieve planning followed by at least 6-years to extract the resource resulting in a programme of around 10+ years to have worked the resource; restoring the site would then take additional time before it was ready for development of an alternative (housing) use.*	The operator's comments and referenced and considered in this chapter and the appended Prior Extraction Statement.

		The operator may consider the recovery of minerals that are incidentally encountered though the course of the built development. This would involve minerals encountered through all preparatory earthworks such as cut & fill/ balancing, foundations, trenching, roads, drainage infrastructure, etc, which would include the 6 large surface water drainage ponds. This would be subject to testing of the minerals to ensure suitability for saleable products. *The operator advises there is currently no restriction on planning permission at their nearby quarry preventing the importation and processing of minerals They may be open to a discussing the opportunity of a partnership with the developer to delivery suitable concrete products produced using the minerals from the development site (subject to testing of mineral proving suitability). This approach may reduce the carbon footprint of the development and go some way to delivering a level of sustainability.* *Therefore, in summary and based only on the high-level information made available, it is not considered unlikely that the site could be worked for a targeted minerals extraction (to any particular defined depth) on the grounds of viability, but that incidental extraction could be achieved to support sustainable re-use.*	
Operator of Ballswood Quarry	24/11/2023	*'Happy to discuss with you and see if we can help. Site investigation only to 1.5 m though which doesn't tell us a lot and what is found there looks uneconomic as it's v fine, silty sands and clays. There could be better mineral at depth but you would need to trisk* (sic) *dig with bigger machines or better still auger drill rigs.'*	The operator's comments and referenced and considered in this chapter and the appended Prior Extraction Statement.
Wrexham Borough Council – EIA Scoping	03/01/2024	*'I have reviewed the document submitted with the letter 'EIA Scoping Report' (9918 – REV: FINAL) dated December 2023.*	This ES has considered and been informed by the previous WCBC response as directed.

		a) It is considered that the paragraph 16.2 of the EIA scoping report identifies the appropriate matters to be included within the scope of the Environmental Statement; *b) I have no comment on whether any matters listed in paragraph 16.2 of the EIA Scoping Report could be excluded from the scope of the Environment Statement;* *c) I have no comment regarding any additional matters that could be included within the Environmental Statement; and* *d) I have no additional comments/advice in respect of this matter.* *I refer the attention of the developers to the previously submitted comments (dated 11.01.2023) regarding the Prior Extraction Assessment'*	

Baseline Conditions

14.46 The site is around 40 hectares and mainly comprises numerous fields, which are predominantly arable agricultural land as well as several sports pitches belonging to Ysgol Morgan Llwyd School. The fields and sports pitches are generally bounded by hedgerows and scattered with trees. A small area of woodland is in the west of the site and surrounds the sports pitches of the school.

14.47 The site slopes from around 80m AOD at its highest point in the northwest to around 60m AOD in the east of the site.

14.48 There are no indications of any previous large scale ground disturbance expect for some underlying utilities. A water main, which requires a 12m easement, traverses through the site from north to south in an 'L' shape and also follows part of the northern boundary of the site. A combined sewer, which also requires a 12m easement, extends from the water main to the northeast corner of the site. A section of foul sewer extends across a small section of the northwest of the site.

14.49 In terms of minerals, the known information at this stage is provided in the 'Surveys and Data Sources' section. In addition to the site-specific information described in that section, information has also been sought from nearby mineral operators.

14.50 The site adjoins urban and primarily residential areas of Wrexham to the west and north. Cefn Road largely defines the western boundary of the site. Houses align the opposite side of Cefn Road as well as Ysgol Morgan School. Hullah Farm Residential Care Home is located to the west of the site on the same side of Cefn Road as the site, and cuts into the site boundary. Bryn Estyn Road defines the western part of the northern boundary of the site. The north-western corner of the site is bounded by houses on Thornleigh and Oakhurst.

14.51 Likewise, to the north of the site, terraced properties (Brentwood), Home Farm and several industrial style units are located to the south of Cefn Road.

14.52 Bryn Estyn Business Centre and Wrexham Rugby Club are located further east along the northern boundary of the site. Several properties and an area of woodland are located further north beyond sports pitches associated with the rugby club. The properties include residential dwellings that share the same access as Wrexham Rugby Club, as well as some commercial and industrial properties, including the Erlas Centre. The Erlas Victorian Walled Gardens are also located in this area.

14.53 A roughly square shaped parcel of land is located further north, north of Bryn Estyn Road, directly north of the wooded area that includes the Erlas Centre and the Erlas Victorian Walled Gardens. This parcel of land currently comprises arable land and, along with the sports pitches associated with Wrexham Rugby Club, form the main remaining areas of the allocated KSS2 site.

14.54 The land to the east and south is more rural in nature and mainly comprises arable agricultural land and golf courses. Commercial/ industrial units at Llwyn Knottia are the general exception to this and are located south of the site.

Embedded Mitigation

14.55 No embedded mitigation measures are proposed.

Construction

14.56 The minerals would be sterilised by the construction of the housing and is the only relevant development phase for this assessment.

Assessment of Likely Significant Effects

14.57 There are no development proposals for mineral extraction at the site, and as provided from paragraph 14.67, and as explained in detail in Appendix 14.1, it is not considered that a targeted minerals extraction, say to a depth of 3m or below, would be viable. It is also considered extremely unlikely that a planning permission would be granted for mineral extraction at the site. On the basis that the mineral reserves would not be recovered as part of the future baseline, there would be no impact above this caused by the development.

14.58 However, the development would sterilise the underlying mineral, whereas if the site was left undeveloped, the minerals could be recovered, for example, if there was a desperate need for this sand and gravel in the future.

14.59 WCBC have indicated the resource could be worked to 'minimum' depths of around 3m or 4m. An exercise has been included in Appendix 14.1 providing an estimated yield. This is summarised in Figure 14.3 and Table 14.4 below.

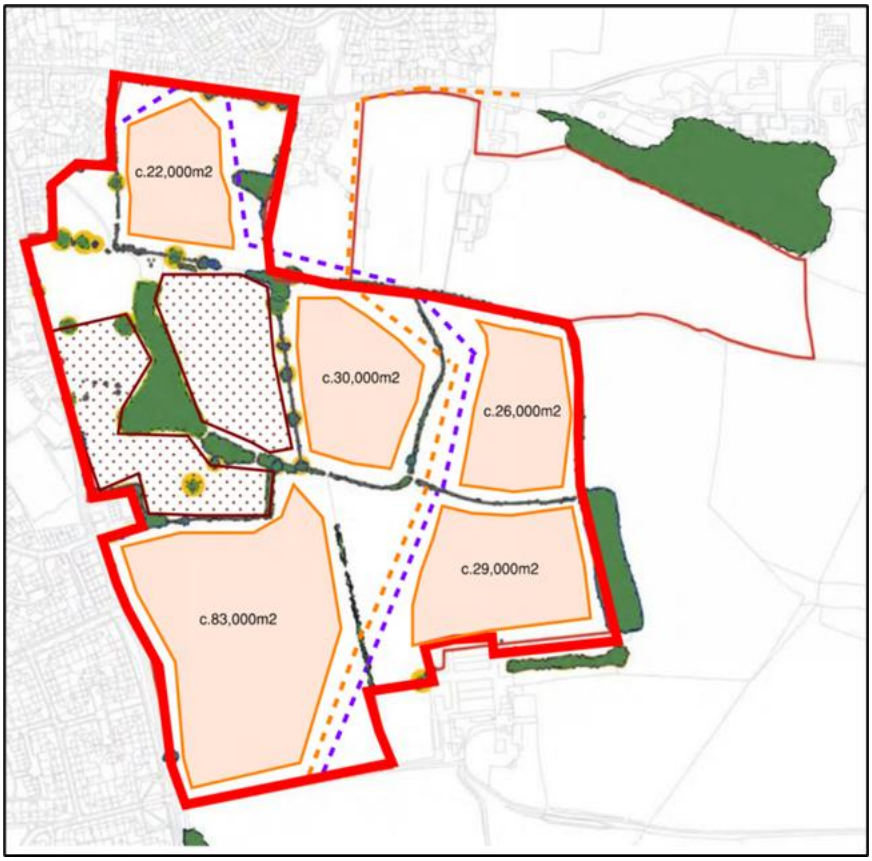
14.60 A high-level estimated quantity of reserves in provided in the table below. This is based on the information included in the headings of the table, as further described in Appendix 14.1.

Table 14.4 - Indicative Workable Parcels

Area (m^2)	Sand and gravel (m)	Total volume of Sand and Gravels (m3)	7% losses to silts and clays	Side slope losses (m^3) assuming 1 in 2 slope	Residual Volume (m3)	Conversion Factor (t/m3)	Tonnes of Mineral
190,000	3	570,000	39,900	34,740	495,360	1.75	866,880

14.61 Based on the above, it is estimated that the combined working of the development parcels to a depth of 3m could generate approximately 867,000 tonnes of mineral. The indicative development parcels are shown below. It should be noted that this yield would likely involve working within the groundwater table.

Figure 14.3 - Indicative Workable Parcels



14.62 As previously discussed, it is difficult to determine the receptor sensitivity of the underlying mineral. The RTS 2nd Review shows that additional reserves are required in Wrexham, but there are some doubts at this stage pertaining to the quality, economic viability, and need of this particular underlying resource.

14.63 Based on WCBC's summation that the resource is nationally important (via high level information from the BGS) it is considered that a circa 867,000 tonnes sterilisation would be a **moderate to major significant adverse** effect. It is also acknowledged that additional sand and gravel is needed to meet the RTS requirement. This assessment is on a low confidence level due to the doubts over the quality and demand of the underlying mineral.

14.64 This impact would be long-term, permanent and of regional level. A regional level has been determined as it is considered 1 million tonnes of sand and gravel would be important regionally but would not be significant on a national level.

Other Considerations

14.65 The indicative workable parcels are based on presumptions that WCBC would expect buffer zones to be implemented and would not expect the existing hedgerows, utilities, and school's sports pitches to be removed and for the ground underneath these features to be quarried. The dotted lines in Figure 14.3 represent the utilities, the green areas represent where hedges or trees would be retained, and the brown hatched area represents where the school's sports pitches are. These features are all proposed to be retained.

14.66 It is considered that this in itself would make a minerals extraction extremely difficult to achieve. The excavation of circa 3m of sand and gravel would render it impracticable or perhaps even not feasible to retain the habitats and field margins/ hedgerows where protected species have been identified and would lead to imposing hedgerows c. 3m above the development platforms. It is considered unlikely this would provide suitable ecological mitigation or provide an acceptable appearance. Badger setts have been identified in the margins of the fields by the hedgerows.

14.67 The sports pitches associated with Ysgol Morgan Lwyd School within the site are proposed to be retained.

14.68 Shallow groundwater has been encountered both at the application site and on the application site to the north between 1m and 2m below ground level. Civil engineers from the project team have advised '*there are areas where I would suggest levels do not change and are in fact lifted slightly to facilitate the drainage design.*' It is unclear whether WCBC would expect working within the groundwater table, but to achieve any meaningful mineral extraction at this site, this would likely be required.

14.69 The extraction of surface mineral deposits, such as sand and gravel, requires the removal of overlying surface soils and vegetation and the winning of mineral deposits can impact on hydrogeological and hydrological water flows. Working within the water table would require dewatering activities and a system of managing groundwater, likely through lagoon construction. A discharge permit and an abstraction permit would be required. The costs of this as well as associated timescales would also need to be considered.

14.70 Due to the constraints (including habitat, utility, and sport pitch retention), it is considered that inert restoration material would need to be brought into the site following the recovery of 3-4m of sand. The importation of material would either require a permit or material to be brought into site under CL:AIRE.

14.71 The site also adjoins urban and primarily residential areas of Wrexham to the west and north and is certainly not a typical location for a quarry.

14.72 In terms of minerals extraction, it is considered the site is heavily constrained. If a minerals planning application was submitted at the site, or if the site was promoted for minerals extraction through a local plan, Tetra Tech would not be confident of the success of the submission. For instance, as part of a local plan process, a stage 1 sieving assessment will often see sites excluded if they border or are close to built up residential areas. This is certainly the case for this site. For comparison, the local quarries, which are around 1.5km and 4.5km to the north of the site, benefit from more rural locations and are more typical of locations of a sand and gravel quarries.

14.73 Based on the current available information, the two nearest mineral operators to the site also agree that it would not be commercially viable to undertake a mineral extraction at the site.

14.74 Any full or deep level minerals extraction would also likely cause a significant delay to the proposed built development and would likely be subject to its own full Environmental Impact Assessment planning application, the minerals extraction itself and the subsequent restoration. This would likely be over a number of years

and would almost certainly rule out any prospect of the houses being built by 2028, which is when they are required by the LDP to be built. A consulted quarry operator stated:-

'...it could take around 2-3 years to achieve planning followed by at least 6-years to extract the resource resulting in a programme of around 10+ years to have worked the resource; restoring the site would then take additional time before it was ready for development of an alternative (housing) use.'

Additional Mitigation / Enhancement Measures

14.75 It is proposed that an incidental approach to minerals extraction is undertaken. Incidental extraction would comprise the excavation of any sand and gravel resource through the preparatory earthworks required for the construction of the development. Incidental extraction at the promoted site would potentially be over a large area as excavation would be required for the construction of the 900 homes and primary school. Deeper extraction of the minerals could be possible in the SuDS ponds where there would be 30,025m^3 of cut material. This would avoid the sterilisation of the whole mineral resource. Due to the circa 20m slope across the site it is however possible that some levelling works would be required, and it would be possible to recover some sand through cut and fill works.

14.76 Excavation would also be required for all roads and drainage systems. An incidental extraction approach would not unduly delay the construction of the development as it is understood that this material would have to extracted in any event (whether it be clay (which would typically be exported as muck-away) or sand and gravel which could be put to a beneficial use both on and off-site.

14.77 The Prior Extraction Statement (Appendix 14.1) makes some estimations of the amount of material that could be recovered through an incidental extraction scheme and from cut and fill works. It is possible that 10 – 20% of the 866,800 tonnes estimated yield could be recovered through these processes, but a detailed cut and fill assessment would be required to establish this. The recovery of some of the resource would reduce the impact to some degree.

14.78 WCBC confirmed in their response document (January 2023), which is appended, that *'the proposed incidental extraction is welcomed'.*

14.79 By way of enhancement measures, a partnership would be explored with a nearby operator, and it may be possible, for example, for any recovered mineral to be processed off site and for the produced concrete to be used in the development site. This will depend on testing the recovered mineral to ensure that it is suitable for use.

14.80 The possible approaches to mineral extraction have been assessed in detail in Appendix 14.1. Whilst, ideally lowering the development platforms would be an option, with the retention of existing important features, such as hedgerows and utilities, it is not considered this would be viable. There have also been high groundwater levels recorded within the site. It is not considered likely that WCBC would expect prior extraction to include working within the groundwater table.

Residual Effects

14.81 The mitigation would reduce the amount of sand and gravel that is sterilised. It is felt that a circa 736,000 tonnes loss would still be a **moderate to major significant adverse** effect. Again, this is based on the underlying resource being considered nationally important.

Table 14.5 Residual Effects Summary

Description of Effect	Embedded Mitigation	Potential Effect (inc. Significance)	Further Mitigation	Residual Effect (inc. Significance)
Construction				
Mineral Sterilisation	None	Moderate to major Significant Adverse	Recovery of sand during preparatory earthworks	Moderate to major Significant Adverse

Conclusions

14.82 This chapter assesses the effects of the Proposed Development on minerals that underly the site.

14.83 The site is underlain by sand and gravels that WCBC describe to be of national importance. The minerals have been considered nationally important prior to any site investigation works and seems to be based on the broad BGS categorisation of glaciofluvial deposits being a Category 1 resource (see Prior Extraction Statement in Appendix 14.1).

14.84 Initial consultations with local mineral operators are described in Table 14.3. One operator considered the deep level or targeted working (say to 3m or 4m) of the resource would likely not be commercially viable and the other operator stated the mineral was uneconomic as it's very fine, silty sands and clays. Both operators did however state that they would benefit from a more comprehensive scheme of minerals investigation, but this is regarding working the site to a much deeper level. The available site investigation information includes trial pits up to 2.5mbgl. WCBC have requested the assessment of mineral working to 3 or 4 mbgl. It is therefore considered that the available information provides a reasonable indication on the viability of working to this extent.

14.85 As the nationally important categorisation almost contradicts the information from the operators it is difficult to define the receptor sensitivity. The RTS 2nd Review does show that additional reserves are required in Wrexham.

14.86 It is proposed that an incidental extraction scheme to minerals is implemented at the site. The Prior Extraction Statement considers this to be the most suitable extraction option for this site, as it is heavily constrained and would likely not be commercially viable to work to any greater extent. The Prior Extraction Statement also explains that WCBC have already considered the KSS2 site against the policy criteria of MW1 and stated in July 2023:

'The need for the mineral underneath KSS2 has already been considered through the development of the LDP and it has been concluded that the need for the non-mineral development is considered to outweigh the need to protect the resource in its entirety. It is considered therefore that the inclusion of KSS2 within the LDP has already accepted that this sand would be sterilised by any development that comes forward to be proposed on KKS2, and that the need for the development would outweigh the permanent sterilisation of the sand resources beneath the site. As such, it is considered that the application complies with Policy MW1 ii) as it cannot be disputed that there is an overriding need for the proposed development.'

14.87 An incidental extraction scheme would recover a small portion of the resource.

14.88 On the basis that the resource is nationally important it is considered that a circa 736,000 tonnes sterilisation would be a **moderate to major significant adverse effect**. This is however on a low confidence level due to the doubts over the quality and demand of the underlying mineral.

14.89 The impacts would be long-term, permanent and of regional level. A regional level has been determined as it is considered 736,000 tonnes of sand and gravel would be important regionally but would not be significant on a national level.

14.90 WCBC acknowledge that sterilisation of mineral will occur. Paragraph 4.192 of the LDP states:-

'Due to the extent and distribution of mineral within the County Borough and the need for non-mineral development such as housing, it is inevitable that some sterilisation will occur and this is accepted and established through the allocation of sites underlain by mineral in the LDP.'

Assessment of Cumulative Effects

14.91 This EIA includes consideration of the cumulative effects of the application with other developments for a robust assessment, as described in full the front-end ES chapters.

14.92 Table 14.6 provides a development which has been included within the cumulative sites assessment. The scoped in receptor for this ES Chapter is the underlying mineral of the application site. It is not considered that the cumulative site could impact on the mineral resources that underly the site subject of this EIA planning application. On this basis, it is therefore considered that the site in Table 14.6 can be scoped out of the assessment. It is noted that the scoped in site is also underlain by the same category sand and gravel deposits and there would also be some sterilisation of the mineral resource at this site as well. If the agreed scoped in receptor had been, for example, 'sand and gravel in Wrexham' it is not considered that the amount of sterilisation from the two sites would increase the impact levels described above anyway. For example, it is still considered the impact of sterilisation from the two sites would only be felt regionally.

14.93 Also, for any site that is within a Mineral Safeguarding Area, the approach to minerals extraction needs to be assessed on its own merits as every site is different regarding constraints, need of that mineral, and extent (quality and quantity) of resource.

Table 14.6 Cumulative Sites

Site Ref.	Application No.	Distance and Direction (Approximate)	Proposal	Scoped-in / Scoped-out	Justification
1.	P/2021/0436 (original application reference) currently subject to a pending appeal (P/2021/0436)	250m	Land South of Holt Road, Wrexham (KSS2 North) 'Outline application for construction of up to 600 dwellings, with social landscaping, public open space and on-site establishment, with all matters retained except for north site access'	Scoped Out	No connectivity

Likely Residual Cumulative Effects and their Significance

Construction

14.94 It is not considered that the development listed in Table 14.6 would have any cumulative effect on the potential sterilisation of minerals with the application site boundary.

References

[1] Planning Policy Wales (2024), Welsh Government

[2] Minerals Technical Advice Note 1: Aggregates (2004), Welsh Government;

[3] Wrexham Local Development Plan (2023), Wrexham County Borough Council;

[4] GeoIndex (onshore) (2024), British Geological Survey;

[5] Minerals Environmental Statement Chapter (2021), Barrat & Bloor Homes

[6] The Regional Technical Statements for the North Wales and South Wales Regional Aggregate Working Parties 2nd Review (Main Document) (2020), Welsh Government