global environmental solutions

Former Huntley Wood Quarry

Phase 1 Contamination Assessment

SLR Ref : 403.03353.00001

March 2011

Argoncroft Limited

CONTENTS

TABLES

APPENDICES

DRAWINGS

1.0 INTRODUCTION

1.1 Background

This report concerns the Former Huntley Wood Quarry located at Coneygreaves Lane, Draycott Cross, Nr Cheadle, Staffordshire (the Site). The indicative location and current site layout plans are shown on Drawings HW1 & HW2. An approximate layout of the former quarrying operations is presented in drawing HW2/a. Drawing HW/3 illustrates the layout of the proposed development.

In March 2011, SLR Consulting Limited (SLR) was commissioned by Argoncroft Ltd to carry out a preliminary contamination assessment of the Site in support of the proposed change of use of the Site to an outdoor recreational facility.

This report has been prepared in response to a letter of objection from the Environment Agency (EA) in connection with a submitted planning application. The EA objected to the redevelopment on the grounds that "there is insufficient information to demonstrate that the risk of pollution to controlled waters is acceptable." Informal telephone discussions between SLR and the EA indicated to SLR that the reason for the objection relates to the potential for contamination to have occurred as a result of the Site's historic use as a sand and gravel quarry, although this report will also consider the potential risk posed by the proposed future use of the Site.

The following sections of this report introduce the Site, the assessment works undertaken and their results, along with a preliminary assessment of the quality of the land under the Site.

This report has been prepared by SLR's Land Quality Group based at the Worcester Office of SLR, Unit 5 Brindley Court, Gresley Road, Shire Business Park, Worcester, WR4 9FD, 01905 751310.

1.2 Scope of Work and Study Limitations

The purpose of this report is to present the findings of the contamination assessment in relation to the historic use of the Site as a sand and gravel quarry, as well its proposed future use as an outdoor recreational facility.

The work comprised the following phases:

1.3 Initial Phase

- A review of historical map records;
- Purchasing current Groundsure® data on Site conditions;
- Undertaking a Site inspection including interviews with former quarry employees; and
- Collating the information about Site conditions and assessing the potential contamination risks.

1.4 Previous Assessments

- SLR is not aware of any previous contamination assessment relating to the Site.

1.5 Assessment and Reporting

A summary of the published information is presented and development of an understanding of the potential contamination issues at the Site has been undertaken.

1.6 Sources of Information

SLR has collected and reviewed various reports and maps in an attempt to characterise the Site and its surrounds. These sources are:

- A Groundsure report on site conditions with historical Ordnance Survey mapping, dated 2nd March 2011 (Appendices A and B);
- Information provided on the Environment Agency website; and
- Geological/hydrogeological data from published British Geological Survey and Environment Agency data.

The information from the above sources is included within the following sections of this report.

2.0 SITE INFORMATION

2.1 Site Details

The following table summarises the background details of the Site. The information populating Table 1**Error! Reference source not found.** has been derived from a desk-based review of published information, a site walkover survey carried out on 8th March 2011 by SLR and information provided by Emma King of Argoncroft Ltd and two former employees of the Quarry Mr Alan Chell and Mr Ron Shaw. Mr Shaw lived at a neighbouring farm and worked at the Site between 1952 (when the site opened) and the mid 1990s. Mr Chell worked at the quarry from the mid-1990s until its closure date. Therefore, between them, the two former employees were able to provide substantial information relating to the majority of the Site's history.

The Site's location and setting is illustrated on Drawings HW/1 and HW/2. The approximate layout of the former quarry is shown on Drawing HW2/a. The layout of the proposed outdoor recreational facility is shown on drawing HW3.

Table 1
Site Details

Site Address	Coneygreaves Lane, Draycott Cross, Nr Cheadle, Staffordshire	
Site Area	Site area extends to approximately 69 hectares.	
Current Site Use	Disused sand and gravel quarry, site is partially covered with woodland and man-made silt lagoons that now resemble ponds.	
Site Details	Buildings	No permanent structures currently on site. Two temporary portacabins and a caravan provide secure site storage and offices.
	External areas	The centre of the Site consists of a large flat quarry floor surfaced with bare sand & gravel, representing the surface levels at which quarrying ceased. The quarry floor is bounded on three sides by upwards sloping restored quarry faces that are colonised by naturally regenerating gorse scrub and woodland. A number of former settlement lagoons and silt beds associated with the former quarrying activities are located in the eastern half of the quarry, within these wooded areas. A small stockpile of what appears to be overburden material is located at the western end of the quarry floor. Beyond this the site floor rises up to an area of undulating sand and gravel before rising again to meet surrounding topography. This west end of the Site is understood to have been the area most recently quarried. Trees line the majority of the Site's boundary. Drawing HW/2a shows the approximate layout of infrastructure associated with the former quarry. An area immediately east of the entrance to the main quarry floor was formerly occupied by a concrete batching plant operated by Tilcon. All infrastructure associated with this facility was removed over 10 years ago.
	Drainage system	The Site is not currently connected to mains drainage. Historically, there was reported to be a septic tank for foul drainage adjacent to the weighbridge office that was periodically emptied via vacuum tanker.

	There are a series of ditches and underground pipes which currently control the run-off of surface waters and channel them towards the settlement lagoons. SLR understands that foul water drainage from the proposed recreation centre will discharge either to mains sewer if a suitable scheme for connecting the Site can be devised or, more likely, will be controlled using a Biorock or similar sealed drainage treatment system.
Underground storage tanks	No underground tanks are known to have been present at the Site at any time.
Above ground storage tanks	SLR understands that during quarrying operations fuel was stored on-site in bunded tanks to re-fuel mobile quarry plant; road-going lorries were re-fuelled off-site. None are currently present. SLR understands that two above ground diesel tanks (approximately 13,500 litre capacity) were present in an area close to the centre of the active quarry floor; these are understood to have been steel construction and bunded. A waste oil tank was present next to the plant shed, also close to the centre of the active quarry; this is also understood to have been bunded and emptied regularly for off-site disposal. A small diesel tank is known to have been present close to the former weighbridge. The tank was sited over a concrete block bund on a concrete slab floor which remains in-situ and appeared to be in fair to good condition during SLR's site inspection. At the time of SLR's site visit, all tanks had been removed from the Site, and SLR observed no evidence of staining or vegetation die-back to suggest that residual hydrocarbon impact remains. The former quarry employees advised that they do not recall any significant leaks or spills occurring at the Site.
Materials usage and waste	In addition to fuel storage at the Site; relatively small quantities of lubricating oil were stored in a building towards the centre of the quarry floor on a concrete slab: typically no more than six to eight 205 litre drums were stored. All waste and wash-out from the Tilcon concrete plant was removed on a regular basis from the quarry. No discarded excavated materials or inert materials have been imported to the quarry for restoration purposes. Small quantities of wood and scrap metal from quarrying plant were observed to have been segregated from the soil stockpile in preparation for disposal by Argoncroft. SLR understands that from time to time small quantities of general waste and rubble had been fly-tipped between the site's closure as a quarry and it's purchase by Argoncroft. The majority of fly-tipped materials have been removed and disposed of by Argoncroft. With the exception of a few sacks of rubbish collected by Argoncroft across the site no evidence of fly-tipping was observed by SLR
Transformers	A small pole mounted transformer is present to the west of the weighbridge about 4m above ground level.
Site permits, licences,	There are no active permits, licences or consents in place relating to the Site.

	consents, etc	
Known Underground Features	A coal mine and railway tunnel formerly ran beneath the western end of the Site. A coal mine shaft is understood to have surfaced in the northwest corner of the Site. SLR understands the railway tunnel has been closed off and that the shaft has been capped and concrete filled.	
Surrounding Land Use	North	Farmland, Huntley Lane & Harplow Lane beyond.
	East	Farmland, Huntley village beyond,
	South	Farmland, a pumping station is located 400m southwest of the Site.
	West	Farmland, Cheadle Road beyond.
Site History (Historic Map Review)	1879-80	Two thirds of the Site (the north-eastern portion) is occupied by Huntley Woods and Draycott Common Wood. The remainder of the Site is occupied by fields. Old Coal Shafts are marked in the northwest corner of the Site. The surrounding land is largely fields. There is evidence of coal mining to the northwest of the Site with Commonside Colliery located 350m distant. The majority of roads are present in the modern day positions.
	1898-1900	Site unchanged. A railway line (Cheadle branch of the North Staffordshire Railway) is under construction running approximately north-south; part of this railway includes a tunnel which is to be bored underneath the western end of the Site. A disused quarry is shown 400m southwest of the Site. Commonside Colliery now shown as an “old colliery”
	1922-25	Site is unchanged. Railway and tunnel are complete, and a brickworks is located 350m northwest.
	1949	Site unchanged. A gravel pit is located 100m northwest. A reservoir is located 400m northwest. A mineral railway has been constructed that branches off the Cheadle branch to the north and south of the Site, and circles around the eastern site boundary but remains 150m away at it’s closest point.
	1957	Quarrying has begun in the centre of the southern half of the Site. SLR understands from site interviews that quarrying first took place in 1952.
	1966 (only partial map coverage to west of Site)	Site is unchanged. A works is located on the site of the Brickworks.
	1974-76	The quarry has expanded to cover the majority of the centre of the Site. The small pond/lagoon on the southern edge of the Site is also present. The pumping station is present 400m to the southwest. Cheadle branch of the railway has been dismantled. The quarry to the northwest is disused.
	1992	The quarry has expanded to cover the majority of the Site; however, little detail of the quarry is shown on the mapped extents would appear to be larger than those which would be inferred from SLR’s site walkover. What appears to be the weighbridge is shown close to the site entrance.
	2002	Quarry appears to still be active. A conveyer and two structures (probably the plant shed and diesel tanks) are shown at the centre of the site along with a second pond. A pond is shown at the centre of the Site. The

		mineral railway is shown as disused. The works to the northwest have been replaced by depots.
	2010	Quarry is disused and has been cleared of structures. The ponds/lagoons are shown in their present day positions. There are n*o* significant changes to the Site's surroundings within 500m
Geography	Gradient	The deepest point of the quarry is approximately 40m lower than the highest point of the Site. The Site generally runs along the ridge of a hill and regional topography falls to the north and south.
	Elevation	Approximately 200 to 240m AOD
	Surface Water	There are three man-made surface water bodies on site. These are unlined and were used as settlement lagoons for water used during the quarrying process. SLR understands that these were periodically topped up using water taken directly from the River Tean, which flows south 200m east of the Site. Water level in the centre pond is believed to lie at around 205m above ordnance datum (AOD), 185m AOD in the western pond and 175m AOD in the southern pond. Records for boreholes drilled in the vicinity of the Site (available through the BGS website) indicate groundwater is likely to be at approximately 175mAOD, if this is the case, the western and southern ponds may be in direct hydraulic connection with groundwater. The central pond is likely to be an expression of perched water above the regional levels. However, anecdotal evidence from the former Site employees suggests a deep borehole was sunk in the 1950s, close to the southern pond, to a depth of at least 60m but was found to be dry. It is therefore possible that the faults which cross the Site are influencing the water table beneath the Site and that all three ponds are actually perched above the water table.
	Grid Ref.	399668, 341467
Geology and Hydrogeology	Geology	Sand and gravel and glacial till deposits overlying the Freehay Member and Hawksmoor Formation of the Sherwood Sandstone Group as shown on BGS geological Mapping Sheet No. 124. Geological faults cross the Site running east-west close to the southern boundary and north-south through the centre of the quarried area. The second of these two faults was observed outcropping at surface by SLR during the site walkover.
	Aquifer status	Principal (Major).
	Abstractions	The western most tip of the Site lies within Zone 2 (Outer Catchment) of a groundwater source protection zone. This is believed to be associated with a potable water abstraction located at the pumping station, 400m southwest of the Site. The remainder of the Site lies within Zone 3 (Total Catchment). A second potable water abstraction is located 500m southeast of the Site.

Other e.g. previous site assessments and investigations. Permits, licences, consents, etc for adjacent sites	Site lies within a nitrate vulnerable zone No other pertinent permits or licenses registered within 250m of the Site.

3.0 PRELIMINARY CONCEPTUAL MODEL

As part of the evaluation of the Site and in accordance with current best practice, the Site has been considered in terms of a Conceptual Site Model using the principles of a risk assessment comprising the potential ***Source – Pathway – Receptor*** model of potential pollutant linkages.

Table 2 below lists the potential sources, pathways and receptors identified at this site within the context of possible pollutant linkages, i.e. a situation where the source(s), pathway(s) and receptor(s) are all present at a site and therefore a real (as opposed to a perceived) risk of potential impact exists.

SLR understands that the Site is proposed to be redeveloped as an outdoor recreation facility and, therefore, the assessment presented below is made in the context of the existing site condition in relation to the proposed development.

Table 2
Risk Assessment

Sources	There are small-scale historic and small-scale future theoretical sources of contamination at the Site. SLR understands the historic sources of contamination comprise relatively small-scale fuel storage, refuelling and the localised small-scale maintenance of mobile plant resulting in the storage of clean and waste lubricating oils. These fuels and oils, if released to ground are of relatively low solubility with respect to water and thus if any were released are most likely to be absorbed in near-surface soils and porosity of underlying permeable strata. SLR understands from interviews with former site employees that no significant leaks, spills or other potentially contaminative incidents occurred at the Site. Thus the potential for residual sources of hydrocarbons to remain from historic operations is considered to be low. The future use of the Site as an outdoor recreational facility would generate foul sewage. It is understood that the foul sewage generated will be treated using a Biorock treatment system or similar located onsite. Treated water would be discharged to a soakaway; use of a drainage treatment system would minimise the discharge of dissolved phase effluent to groundwater.		
Receptors	**Receptor**	**Location**	**Sensitivity**
	Onsite Human Health	Communal buildings, a club house, toilet blocks and an amphitheatre are proposed to be built on the quarry floor, in the area immediately north of the former oil tanks and oil store shed. Site soil and vegetation surfacing and hardstanding will cover former fuel and oil storage areas. A manger's residence and further communal buildings are proposed for areas that were not actively quarried and away from small-scale historic sources.	Low to Medium
	Offsite Human Health	The Site is surrounded by scattered farm properties. Only Grotto Farm (northwest) and Coneygreaves Farm (southwest) are within 250m of the actively quarried area of the Site.	Very Low
	Buildings	The buildings will be wooden lodge type structures either raised on stilts above ground level or built on concrete slabs.	Low

	Ecological		Approximately 50% of the Site is covered in woodland of which approximately half is designated as ancient woodland. The wooded areas are at a higher elevation and some distance from former historic sources.	Low to Medium
	Property: Flora & Fauna		Site is surrounded by mixed use farmland.	Medium
	Groundwater		Site lies above a principal aquifer. The western most tip of the Site lies within Zone 2 of a source protection zone, the remainder of the Site is within Zone 3. There are 2 potable groundwater abstractions within 500m of the Site.	High
	Surface waters		There are three man-made surface water bodies on site, which are potentially hydraulically connected to groundwater. No other water bodies within 250m of the actively quarried areas of the Site.	High
Pathways	**Pathway**		**Description**	**Risk**
	Dermal contact, ingestion or inhalation	On-site	Site will be predominantly covered with soft landscaping and ancient woodland. Areas of car parking are proposed to be surfaced using gravel available in existing onsite stockpiles. There should be little reason for ground to be disturbed by anyone other than site workers, nonetheless the pathway theoretically exists.	Medium
		Off-Site	There is the theoretical potential for impacts to migrate off-site via groundwater, but this is likely to occur at depths of greater than 2m therefore off-site shallow soils will not be impacted.	Negligible
	Underground services	On-Site	Potential for underground services (water supply and pipe formerly used for topping up settlement ponds) to act as preferential pathway for the migration of impacts. Likely moderate to high permeability of underlying geology limits the likelihood of this.	Low
	Vapour / gas migration	On-Site	Theoretical potential for the migration of soil vapours and gases via shallow soils. No petrol or other volatile organic compounds believed to have been stored or used on Site.	Negligible
		Off-Site	Theoretical potential for contaminants to migrate off-site via groundwater and volatilise off-site. No petrol of other volatile organic compounds believed to have been stored or used on Site.	Negligible
	Ground to Controlled Waters	G/Water	Principal aquifer beneath site. Depth to groundwater likely to vary across the Site but the groundwater is likely to be at least 20 to 25m (possibly >60m) below the quarry floor occupied by the former plant/fuel storage areas and the proposed drainage treatment systems. Thus there is a substantial unsaturated zone between surface or near surface sources and the groundwater receptor.	Medium to High

		Surface	Three surface water ponds on site. The pathways to these receptors would be via direct drainage pipelines formerly used to connect areas of the quarry, but direct connection from source areas is unlikely now and in the future.	Medium
Pollutant Linkages	Onsite Human Health	Possibly present, but unlikely: Only small quantities of fuel and lubricating oils have been stored and used at the Site and no leaks or spills are understood to have occurred. No visual evidence of impact in source areas observed during site walkover. Works to place soils over the quarry floor as part of the development will break the potential contact risk for future site users. Any residual risks to site workers can be managed by appropriate use of PPE.		
	Offsite Human Health	Not present: Absence of significant sources or likely pathway mitigates risk		
	Property: Flora & Fauna	Possibly present, but unlikely: Areas of ancient woodland are generally higher than the quarry floor and due to the depths to groundwater there will be no direct contact. No evidence of die back among plants located near to localised potential sources of contaminants.		
	Buildings	Possibly present but very unlikely: Volatile compounds are highly unlikely to be present in the ground..		
	Groundwater	Possibly present but unlikely: via leaching from soils and surface run-off to ponds in hydraulic continuity with groundwater. No evidence of historical leaks or spills at the Site. In the event that small fugitive leaks or spills did occur, the low solubility of the hydrocarbon in groundwater combined with relative low mobility through porous strata as a separate phase and the depth to groundwater beneath the plant/fuel storage area mitigates risk to a degree that indicates impact of controlled waters is unlikely. Future foul drainage treatment systems will improve quality of effluent discharge and this combined with depth to groundwater should provide a substantial zone for attenuation of residual nitrate contamination.		
	Surface Water	Possibly present but unlikely: via surface run-off to ponds or migration of impacted groundwater. Significant historical contamination of the Site unlikely to have occurred, and depth to groundwater beneath plant/fuel storage area mitigates risk further. No evidence of contamination observed during site walkover (surface sheens etc) ponds populated by fish suggesting water quality is good. Future foul drainage treatment systems will improve quality of effluent discharge and this, combined with depth to groundwater, provides a substantial zone for attenuation of residual nitrate contamination.		
Overall Risk Assessment		**Human Health LOW RISK** **Controlled Waters LOW RISK**		

3.1 Overall Risk Summary

Following interviews with former site employees, whose knowledge of the Site covered nearly all its operational history, SLR was able to establish detailed information relating to the Site's history. From these interviews it is understood that chemical storage at the Site was limited to three diesel tanks (approximately 13,500 litres each) and a waste oil tank. SLR understands that management systems at the Site were robust and that all tanks were bunded and waste oil was collected regularly for off-site disposal. A concrete block bund, which formerly contained a tank, was observed by SLR during the site walkover; the bund appeared to be in good condition and was free of gross staining or oily residues. The

interviewed employees were unaware of any significant pollution incidents, such as oil leaks or spills, occurring during the Site's operation as a quarry. No evidence of contamination (such as sheens on surface water ditches, ponds and puddles, areas of stained soil, vegetation die-back) was observed during SLR's site walkover.

Therefore, although sources of hydrocarbon impact were present on-site historically, there is no evidence of leaks or spills from these facilities. Whilst it is not possible to categorically discount the possibility that fugitive releases of hydrocarbons from these sources occurred, it is considered highly unlikely due to the small quantities involved, the relative low solubility/mobility of these heavier hydrocarbons (that prefer to sorb to soil particles) and the depth of the unsaturated zone beneath the quarry floor, that a complete pollutant linkage to groundwater exists.

Similarly, in the event that there is residual near-surface hydrocarbon impacts the potential for these to pose human health risks via direct contact is very low. Future visitors to the site will be protected from direct contact via landscaped surfaces associated with the development; there will be no need for soils in the area of the former plant/fuel storage areas to be disturbed, particularly by site visitors. Actual risks posed by these possible pollutant linkages are considered to be low and acceptable.

4.0 PRELIMINARY RISK ASSESSMENT

4.1 Criteria for Deciding if there are Potentially Unacceptable Risks

In the context of Part IIA inspection a preliminary risk assessment must focus on whether the land meets the definition of Contaminated Land as laid out the Environmental Protection Act 1990 (EPA 1990) and its statutory guidance. Within Part IIA of the EPA 1990, Contaminated Land is defined as:

"any land which appears to the local authority in whose area it is situated to be in such condition by reason of substances in, on or under the land, that:

significant harm is being caused or there is a significant possibility of significant harm being caused; or

pollution of Controlled Waters is being, or is likely to be, caused".

When assessing significance of the identified pollutant linkages against the definition of contaminated land one must also consider the information needed to complete the assessment to the required level of confidence. In this case, the types of uncertainties that affect the evaluation of significance include, but are not limited to:

- Insufficient knowledge about contaminant location & distribution; and
- Insufficient characterisation of ground conditions (in this case none) to allow an assessment of the Site averaging area to be statistically valid.

4.2 Potentially Unacceptable Risks

Having considered the above criteria including the uncertainties and gaps in the conceptual model, it is considered that the Preliminary Risk Assessment (using desk study information only) provides a reasonable level of confidence that the nature and scope of the proposed development is unlikely to be impacted by residual hydrocarbons arising from small scale fuel storage and mobile plant operations at the former quarry. In summary, although the Site operated for 50 years as a potentially contaminative site (i.e. a sand and gravel quarry), there is good historical and anecdotal evidence to suggest that the scale of contaminant sources at the Site were small and well managed and there is no evidence that leaks or spills, with the potential to pose risks of significant contamination, are likely to have actually occurred. In addition, the proposed development itself is of low risk with respect to sensitive receptors.

On the basis of this assessment there appear to be no unacceptable risks posed by the development of this site and a dedicated intrusive investigation is considered unlikely to be necessary at this time.

.

5.0 SUMMARY AND RECOMMENDATIONS

SLR was instructed by Argoncroft Ltd, to undertake a review of their former quarry site located off Coneygreaves Lane, Draycott Cross, Nr Cheadle, Staffordshire. The purpose of the report was to consider environmental issues associated with the Site, in particular the likelihood of the presence of contaminated land and its potential impact on humans and the environment, and ultimately on the proposed redevelopment of the Site as an outdoor recreational facility.

Based on our current understanding of the proposals for the Site and on the available information, it is considered that whilst diesel and lube oil contaminants have been stored and used on a small-scale historically in the quarry there is no evidence to infer that these have lead to sources of ground contamination at the Site and in turn it is considered highly unlikely that there are any complete pollutant linkages at the Site.

On the basis of this assessment there are no recommendations for further investigation of historical contamination sources at the Site.

6.0 CLOSURE AND LIMITATIONS

The information reported herein is based on the interpretation of data collected during the study, pertaining specifically to the identification of potential contamination which may have arisen from current and previous activities within and around the site and potential future impacts which may be generated by these former activities.

The evaluation and conclusions do not preclude the existence of contamination, which could not reasonably have been revealed by the desk study. Hence, this report should be used for information purposes only and should not be construed as a comprehensive characterisation of all site conditions.

It should be noted that where budget costs are provided within this report, a detailed survey would be required to accurately confirm this cost. It should also be noted that the cost associated with the introduction and application of new legislation, not in existence at the time of this report, could escalate substantially.

This report is for the exclusive use of Argoncroft Ltd and their exclusive agents; no warranties or guarantees are expressed or should be inferred by any third parties. Any such party relies upon the report at their risk.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.