Technical note

ATKINS

Project:	The Triangle, Kingswinford	**To:**	Barberry Summer Hill Ltd.
Subject:	Preliminary Site Appraisal	**From:**	Atkins
Date:	4 Sep 2015	**cc:**	

Introduction

This Technical Note presents the findings from a Preliminary Site Appraisal relating to land referred to as The Triangle, Kingswinford, hereafter referred to as "the Site", and indicated in Figure 1 below. The intention of this document is to inform the further promotion of the Site as a Preferred Option in the Dudley Borough Development Strategy.

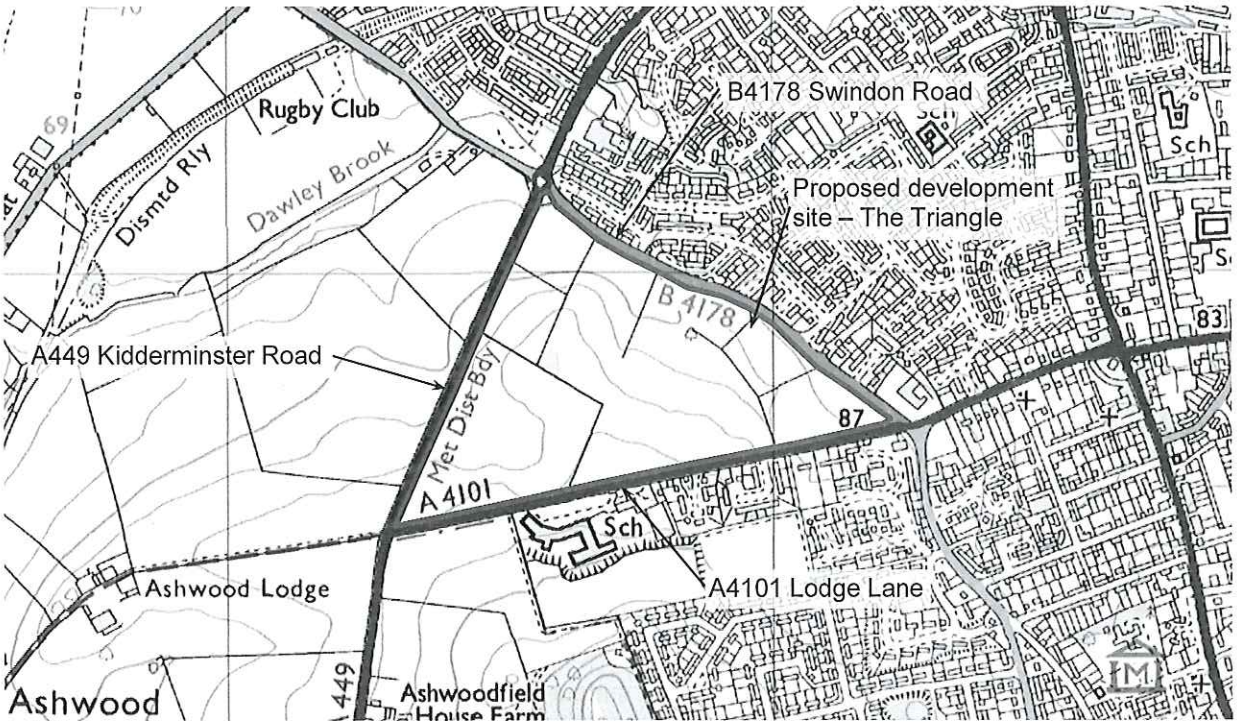


Figure 1. Site location plan (not to scale)

This appraisal has reviewed a number of areas that have the potential to influence the future development of the Site and, as a consequence, will require further consideration and investigation as the plans for the Site progress. The areas considered are:

- Access
- Topography
- Flooding
- Drainage
- Ground conditions
- Ecology
- Noise

This appraisal is based on a site visit undertaken on 27 August 2015 and publically available data sources. At this stage, no consultations with authorities such as the Environment Agency, Dudley Borough Council or Severn Trent Water have been undertaken.

Access

With the exception of the school on the A4101, there are no land-uses or developments adjacent to the Site that have the potential to affect access onto it. The position of the school dictates that any accesses off the A4101 Lodge Lane will need to be positioned towards the junction with the B4178 Swindon Road.

The location of accesses off the A449 Kidderminster Road or the B4178 will be dictated primarily by visibility. The A449 is almost completely straight adjacent to the Site; however, the vertical alignment does not follow a continuous grade between the junctions with the B4178 and A4101 as local topography might suggest. There is a saddle point at the approximate midpoint between the two junctions. Site observations showed that this obstructs the sight line along the road for drivers in both directions with the consequence that any site access would need to be positioned either further to the north or south. The A449 is a busy road with a 40mph speed limit; as a minimum, a ghost right turn priority junction is expected. The B4178 is a quieter road with a 30mph speed limit but is more variable in terms of its vertical and horizontal alignment with the consequence that access locations may be more restricted.

The following conclusions can be drawn from the above information:

- Highway access onto the Site can be achieved from any of the surrounding roads and there is expected to be potential for more than one point of access.
- The influence of the school on the location of any accesses off the A4101 will require further investigation.
- Access from the A449 and B4178 is primarily dictated by visibility. There are sections of both roads where visibility is likely to be sufficient for new access points to be formed.

Topography

The site has an area of approximately 26ha. The ground surface generally falls from south to north with the lowest area with a level of approximately 71m AOD located in the northern corner of the Site adjacent to the junction between the A449 Kidderminster Road and the B4178 Swindon Road. The topography of the Site primarily comprises two distinct valleys separated by a ridgeline extended north from the approximate midpoint on the southern boundary. The highest point on the Site, with a level of approximately 92m AOD is located at the point where the ridge meets the southern boundary adjacent to the A4101 Lodge Lane. The ridge extends to the approximate midpoint of the Site with a level of approximately 90m AOD. The two valleys both fall towards the northern corner of the Site. One valley runs parallel to the A449 while the second is located broadly parallel with the B4178. Figure 2 illustrates the site topography.

The falls across the Site are such that drainage, both surface and foul water, is expected to be wholly gravity-driven with minimal need to install pipework at depth. Further details are given in the Drainage section below.

Gradients on the site vary between approximately 1 in 10 and 1 in 100. The steepest gradients are found around the ridge with the valley bottoms and top of the ridge being flatter. The gradients will influence any future development layout in terms of highways and the creation of development plateaus. This may result in a lower density development potentially comprising a number of discreet development areas due to the need to provide landscaped areas to accommodate level differences. The highway layout will be dictated by the need to select alignments that have acceptable gradients.

The following conclusions can be drawn from the above information:

- The Site topography is beneficial in terms of drainage solutions for any future development.
- The surface gradients may necessitate the inclusion of landscape areas to accommodate changes in level between development plateaus. This results in a lower density development. The landscape areas could become important ecological features in terms of habitat creation to offset any loss of habitat elsewhere as a result of the development.
- Highway alignments will be influenced by the topography of the Site and will affect where development plateaus can be located.

Figure 2. Site topography

Ground Conditions

The soils on the Site, according to Soilscape (England), are described as freely draining, slightly acid, sand soils. According to the British Geological Survey, the superficial deposits underlying the Site comprise Sand and Gravel. These are shown to cover the majority of the site with the exception of areas along the western boundary and the most northerly corner. The bedrock beneath the site is Sandstone.

Old Ordnance Survey maps show that the Site has been agricultural land since, and probably before, the late 19th century. There is no evidence of potentially contaminating land uses either within or adjacent to the Site. A risk remains of some localised, agricultural-related contamination from machinery and other farming chemicals used in the recent past.

The Environment Agency website shows that the Site is located within groundwater *Source Protection Zone 3 (Total Catchment)*. This is defined as the recharge area for any underlying aquifer hence any run-off resulting from rainfall over this area has the potential to enter groundwater and possibly water supply. The superficial deposits beneath the site are classified as a *Secondary A* aquifer (permeable layers capable of supporting local water supplies) while the bedrock is classified as a *Principal* aquifer (layers providing a high level of water storage capable of supporting strategic water supplies). These aquifers are identified as being at high risk of pollution due to the high permeability of the overlying geology.

The following conclusions can be drawn from the above information:

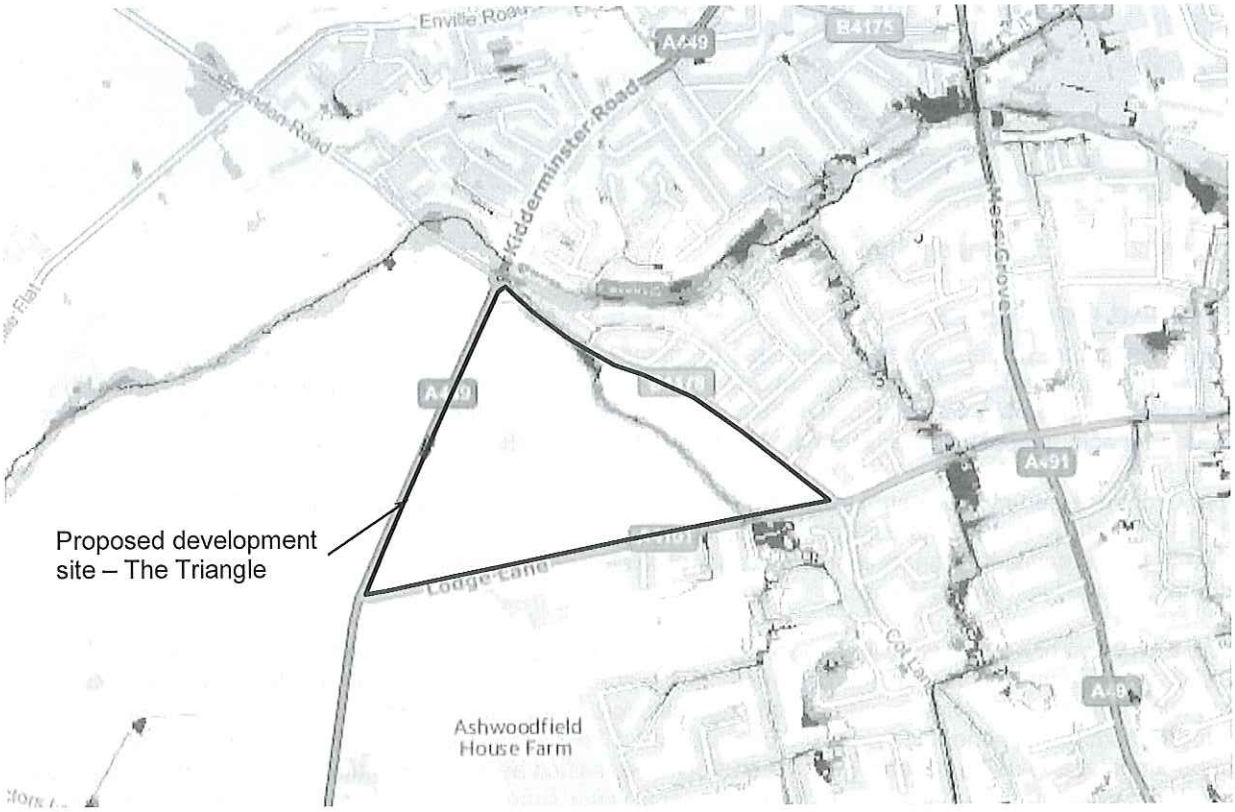
- The soils and underlying geology are potentially permeable hence it may be possible to use infiltration (e.g. soakaways) to dispose of surface water run-off from any proposed development, increasing the scope for using a wider range of sustainable drainage (SuDS) techniques. The infiltration capacity of the ground should be confirmed by permeability testing in accordance with BRE Digest 365 *Soakaway Design*.
- The risk of ground contamination is potentially low; however, this is subject to confirmation following more detailed, intrusive site investigations.

- The location of the Site within a Source Protection Zone, in conjunction with the potentially high permeability of the soils and geology, is such that consideration may need to be given to measures to ensure good water quality prior to infiltration occurring to meet the requirements of the Environment Agency. For a residential development, SuDS features are expected to be capable of achieving the required water quality standards.

Flooding

The Environment Agency Flood Map shows that the Site is located wholly within Flood Zone 1 (low risk; >1 in 1,000-year). The nearest watercourse is the Dawley Brook, designated a Main River and a tributary of the Smestow Brook, which runs to the north of the Site through the residential area to the north of the B4178 Swindon Road before crossing beneath the A449 Kidderminster Road in a culvert just north of the roundabout with the B4178. The Flood Map shows that the B4178 to the east of the roundabout lies within Flood Zone 2 (medium risk; 1 in 100-year to 1 in 1,000-year) but this does not encroach into the Site. There are no other watercourses in the vicinity of the Site.

The Surface Water Flood Map from the Environment Agency website, shown in Figure 3 below, shows that there is an overland flow path running through the Site from the residential area to the south of the A4101 Lodge Lane to the B4178 Swindon Road. This flow route follows, and to some degree is constrained by, the natural topography. The depth of flooding along this flow path is unknown. The topography of the remainder of the Site is such that it is possible that further overland flow paths could be present; however, these may be limited due to the potentially high permeability of the ground.



Source: Environment Agency

Figure 3. Surface water Flood Map

Particular consideration will be required to ensure that any proposed development on the Site does not exacerbate surface water flooding elsewhere beyond its boundary either by diverting an existing or creating a new flow path.

Little or no information is readily available relating to other flooding sources with the potential to affect the Site such as sewers and groundwater. The topography of the Site, together with the permeability of ground, is such that groundwater emergence in some isolated areas may be possible, although this is subject to

confirmation. The Black Country Strategic Flood Risk Assessment suggests that sewer flooding is an issue in some areas; however, the locations are not disclosed.

The following conclusions can be drawn from the above information:

- The Site is at low risk of fluvial (river) flooding; however, the floodplain extents in the vicinity of the northern corner of the Site should be confirmed with data that can be obtained from the Environment Agency.
- Surface water flooding, originating from both beyond and within the Site, has the potential to affect any proposed development. Allowance for all overland flow paths must be made within any future development masterplan for the Site. Further analysis is required to determine the location of all the existing flow paths that may be present and the space that each could occupy so these can be appropriately managed.
- As groundwater emergence could occur on the site, the likelihood of this should be assessed through appropriate monitoring during any ground investigation works that are undertaken. The most vulnerable areas are likely to be at the bottom of existing valley lines through the Site. It is expected that any emerging groundwater could be managed by the proposed surface water drainage system that would be constructed to serve a future development.

Drainage

The existing surface water drainage regime is expected to be a combination of overland flow towards the northern corner of the Site and the Dawley Brook and infiltration. Based on local topography, the Dawley Brook is the only natural outfall for any surface water run-off from the Site; there is no evidence of other positive drainage systems serving the Site. Preliminary calculations suggest that the annual average run-off flow rate for the Site towards the Dawley Brook is 47.4l/s (1.8l/s/ha). This low flow rate is due to the high permeability of the ground.

It is anticipated that the maximum permitted surface water discharge rate from the Site into the Dawley Brook will be limited to the existing annual average run-off flow rate. There is an expectation that SuDS will be distributed throughout any proposed development to provide flow control, water treatment and amenity functions. The potentially high permeability of the ground means that these features can also provide infiltration pathways and the necessary water treatment to meet any quality requirements imposed by the Environment Agency for the protection of groundwater.

At this time, no sewer records have been obtained from Severn Trent Water. Due to the nature of the area surrounding the Site and its location on the urban edge, public sewers are anticipated to be present within or alongside the A4101 and the B4178. It is unclear whether any sewers are present within the A449 Kidderminster Road. During the site visit, a pumping station (assumed to be foul water), was identified immediately adjacent to the junction between the A4101 Lodge Lane and B4178 Swindon Road. Based on local topography it is assumed that this serves existing development to the south and east. It is considered unlikely, due to topography, that any proposed development on the Site will discharge flows into the network draining to this pumping station.

The topography of the Site is such that a wholly gravity-driven foul water system should be possible within any proposed development. The location of a suitable foul water outfall cannot be established at this stage hence it cannot be determined whether a gravity or pumped outfall will be required.

Foul water flows from the area surrounding the Site are treated at either Lower Gornal or Wombourne wastewater treatment works. According to the Black Country Water Cycle Study both works have sufficient headroom to accommodate additional flows from new development; however, the availability of capacity in the local sewerage network to convey flows to the works is unknown.

The following conclusions can be drawn from the above information:

- There will be a single surface water outfall from the proposed development into the Dawley Brook. Ground conditions are such that infiltration may also be a viable means of surface water disposal; permeability testing is required to confirm this.
- The proposed development layout will include space for SuDS features. It is likely that these would be located in any corridors retained for the management of overland flows. The SuDS will be needed to

provide treatment to run-off prior to it infiltrating in order to meet the requirements of the Environment Agency.
- Discussions with Severn Trent Water will establish the availability of capacity in the local foul water sewerage network to accommodate any proposed development, and identify where any off-site improvement works may be required.
- Capacity is believed to exist at the local waste water treatment works. This will require confirmation from Severn Trent Water.

Ecology

The Site currently supports arable habitat, which may include notable arable plant species. There are mature hedges bounding the Site, and extending within it, which may be 'important' ecologically or archaeologically. The mature trees within the site may have Tree Preservation Orders. Other notable habitats could be identified during a walk over survey.

Notable habitats, such as the trees and hedges should be retained, with buffer zones of planting established around them to maintain the ecosystem services they provide: such as air quality enhancement, noise attenuation, flood risk reduction, health and recreation benefits, amenity and visual value. Rather than lose any hedge habitat within site, hedges that overlap with development proposals could be translocated within the site to create instant mature habitat.

Species associated with the Site are likely to include:

- Nesting birds within the fields, trees and hedges; there are records on the Magic website of corn bunting, curlew, grey partridge and tree sparrow within 2 km of the Site. Nesting bird species that use the Site may be notable.
- Bats are likely to forage within the Site, commute along the hedges and may roost within the mature trees.
- Badgers may forage within the Site, and have their outlier or breeding setts along the hedges.
- Notable invertebrates, reptiles or other notable species may use the site. There is a low probability of dormice, amphibians, riparian mammals and white clawed crayfish being present within the site given the apparent lack of suitable habitat.

There are no designated sites of nature conservation value within 1 km of the site. However there are several designated sites within 2 km of the site, the South Staffordshire Railway Walk Local Nature Reserve, Ketley Claypit SSSI and Checkhill Bogs SSSI. These sites may need to be taken into account in any development proposals.

The following conclusions can be drawn from the above information:

- The Site has a number of ecological features and characteristics that any future development should endeavour to retain. Retention of these is likely to provide a range of benefits both ecologically and for the development itself.
- A walk over survey is required to identify any species that use the site, and the requirement for more detailed species surveys to inform a planning application. As a minimum nesting birds and bats are highly likely to require surveys and mitigation for the loss of habitats that support them, and possible disturbance to the habitats such as intrusive lighting schemes.

Noise

The Site is wholly surrounded by roads of which the A449 Kidderminster Road and A4101 Lodge Lane are busy with minimal separation between the carriageway and the site boundary. Further assessment is required to establish the requirement for and, if necessary, the scale of any mitigation measures. The impact of any proposed development on noise levels at local sensitive receptors is expected to be low.

Should noise mitigation measures be required within the Site, the introduction of a buffer zone along the affected boundaries is anticipated to be sufficient. The width of this zone is subject to confirmation.

The following conclusions can be drawn from the above information:

- There is the potential for some parts of the Site to be affected by noise from adjacent roads; however, it is expected that this can be mitigated.
- Suitable mitigation measures are likely to include a buffer zone along the boundary. In addition to noise benefits, this would also provide opportunities for screening any new development and habitat creation.

Conclusions

Based on the appraisal results presented above, it is concluded that development of the Site is technically deliverable. The following issues will require further consideration to inform the scale and layout of any future development:

- The impact of topography on the developable area available on the site.
- Permeability of the ground and hence whether infiltration is a viable mean of surface water disposal so surface water storage land take requirements can be established.
- Location of the foul water outfall, whether a pumping station is required, and the extents of any off-site sewerage reinforcement.
- The presence of any utilities within or adjacent to the Site.