

Broad Oak Farm - Design Evolution Report

Introduction

This document has been compiled in response to concerns raised by the Local Authority during the planning pre-app consultation phase regarding the quanta of units in the current proposals. The design team has always been aware that the Local Authority has aspirations for the site to deliver around 170 units. They have done their utmost throughout the extended design development period to maximise the number of units in the proposals, whilst giving due account to the constraints that apply to the site. In order to better explain the issues that have been encountered this stand alone document has been prepared as a supplement to the Planning Statement and the Design and Access Statement, in order to explain the evolution of the proposals, and to indicate how the site, technical and design constraints have impacted the proposed dwelling yield.

Constraints

There are three primary constraints that apply to the site – topography; the need to maintain a rural character on the Church Lane frontage; and drainage. Topographical constraints are immediately apparent on first inspection of the site, as the land falls steeply from Church Lane (typically at 1 in 3.5), with an overall fall of 35m from its highest to lowest point. This embankment is also underlain with shallow rock strata, making development difficult due to the additional costs involved with such excavations.

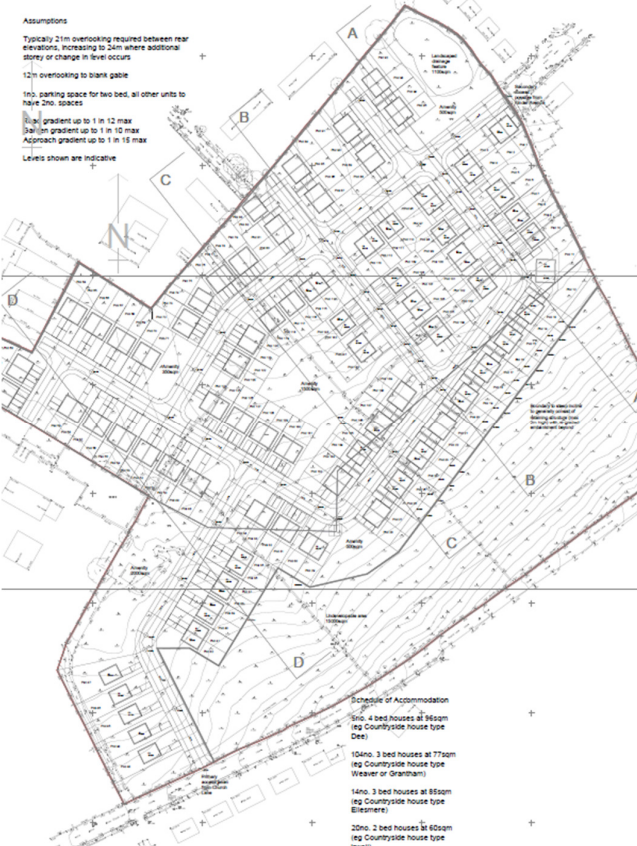
As well as setting a suggested overall level of development, the Local Authority have always maintained that the site should not be overdeveloped. In particular there has been a requirement that the land adjacent to Church Lane should maintain its current rural character. The fact that this area of the site also has the steepest gradient, means that it has always been relatively easy to meet this requirement. Nonetheless it should be noted that these two constraints are contradictory, and the latter is ill-defined. Therefore, the design team have been obliged to use their best judgement to strike a reasonable balance between the two.

Various design approaches were considered during the long gestation period of this project. For the most part these resulted in schemes which delivered about 150 units. However, discussions with Yorkshire Water and the Local Authority with regards to acceptable drainage strategies resulted in further constraints which reduced numbers to around 125 units. These consisted of a combination of a larger balancing pond and restricted below ground pipes. Further details of this are provided in section 6.3 of the FRA and section 8.5 of the DAS.

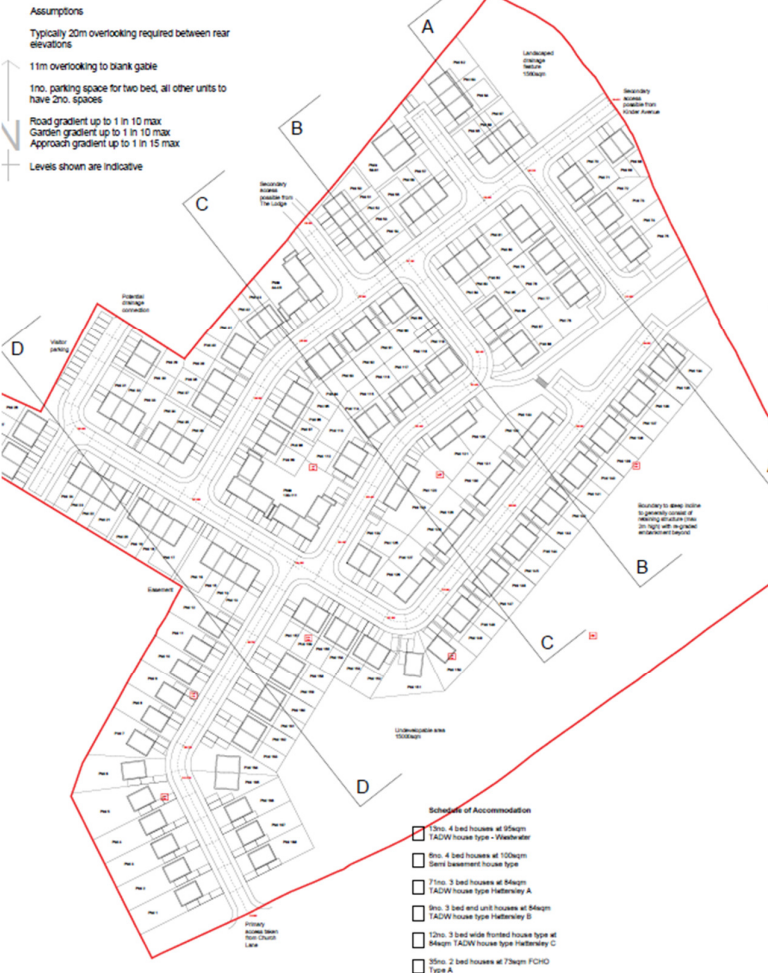
The need to achieve 170 units is also a design constraint of sorts, however we would argue that this amounts to an unreasonable constraint. It is understood that the initial capacity assessment of the site undertaken by the Local Authority arrived at a figure of 202 units based on site area alone. This was then reassessed at 170 units to reflect the topography of the site. However, we are not aware of any detailed analysis that was undertaken to confirm that this figure in itself was realistic. In particular no account was taken of drainage constraints, which have a significant impact on the site's capacity.

The pages that follow provide a detailed indication of the design evolution of the scheme. They demonstrate how development capacity has been limited by the constraints listed above.

Iteration 1

Layout	Assumptions Typically 21m overlooking required between rear elevations, increasing to 24m where additional storey or change in level occurs 12m overlooking to blank gable 1m² parking space for two bed, all other units to have 2m² spaces 1:100 gradient up to 1 in 12 max 1:200 gradient up to 1 in 10 max Approach gradient up to 1 in 16 max Levels shown are indicative  Schedule of Accommodation 1m² - 4 bed houses at 95sqm (eg. Countryside house type Des) 104m² - 3 bed houses at 77sqm (eg. Countryside house type Weaver or Brampton) 14m² - 3 bed houses at 85sqm (eg. Countryside house type Elmstone) 20m² - 2 bed houses at 60sqm (eg. Countryside house type Pearl)
Date	June 2019
Description of layout	Early layouts show the basic configuration of a road running between Kinder Avenue and Church Lane with a connecting road further up the hillside. From the outset the proposed route from Kinder Avenue to Church Lane is dictated by maximum highway gradients that can be adopted between the higher and lower parts of the site. Shorter cul-de-sacs lead off the main spine road with open space in between. At this stage the intention was to develop the site as a single connected development area. Note however that land on either side of the new road from Church Lane was shown undeveloped at this stage due to concerns about gradient. This was subsequently brought into the development area in order to try and keep numbers high. With the open embankment to Church Lane being smaller than in later schemes additional open space has been provided within the site
Unit yield	143 units
Technical constraints impacting developable area	Land adjacent to the road leading from Church Lane was left undeveloped due to steep and challenging gradients in these areas. A balancing pond is shown in the lowest part of the site, however it is considerably smaller than the one that has ultimately been required (1100sqm, compared to 5000sqm).
Developable area	4.0ha
Density	36 units per hectare

Iteration 2

Layout	Assumptions - Typically 20m overlooking required between rear elevations 11m overlooking to blank gable 1no. parking space for two bed, all other units to have 2no. spaces - Road gradient up to 1 in 10 max - Garden gradient up to 1 in 10 max - Approach gradient up to 1 in 15 max - Levels shown are indicative  Schedule of Accommodation 13no. 4 bed houses at 95sqm TADW house type - Warehouse 8no. 4 bed houses at 100sqm Semi basement house type 71no. 3 bed houses at 84sqm TADW house type Hatterley A 8no. 3 bed end unit houses at 84sqm TADW house type Hatterley B 12no. 3 bed wide fronted house type at 84sqm TADW house type Hatterley C 35no. 2 bed houses at 70sqm FCHD Type A 4no. 2 bed cottage flats at 84sqm (similar to FCHD standard) 18no. 1 bed cottage flats at 45sqm
Date	July 2019
Description of layout	in an attempt to increase density, the graded embankments between tiers have been replaced with housing. In this instance level changes are addressed by retaining walls in rear gardens. Issues with gradients and the cost of cutting into underlying rock have led to a top cul-de-sac rather than a through route. Amenity space within the site is minimised to compensate for the reduced overall development area. A through route is still proposed in the centre of the site in place of a cul-de-sac. The previously undeveloped land close to Church Lane is shown with houses. Note that the overall proposed development area still approaches Church Lane more closely than the current submitted proposals
Unit yield	168
Technical constraints impacting developable area	Balancing pond has now increased to 1500sqm following advice from the engineer Greater understanding of levels constraints on steepest part of the site
Developable area	4.5ha
Density	37 units per hectare

Iteration 3

Layout	The diagram is a site plan for a housing development. It includes a legend at the top left with six categories: 'Houses' (light green), 'Terraced' (dark green), 'Semi-detached' (light blue), 'Detached' (dark blue), 'Cottages' (light purple), and 'Bungalows' (dark purple). Each category lists the number of units and their total area. Below the legend, it states '169 UNITS' and '1:500 at A1'. The plan shows a cluster of buildings arranged around a central area, with a red line indicating the site boundary. A north arrow is located at the bottom left of the plan.
Date	February 2020
Description of layout	The project had been put on hold for some months while Yorkshire Housing were brought on board as a client. By the time design works resumed a more detailed analysis of gradients and the resulting required retaining structures had ruled out the possibility of providing extensive cu-de-sacs off the main through route. This also put paid to the proposed loop route in the middle of the site. However it can be seen that attempts are being made in this layout to maintain density by proposing a short new cul-de-sac off the length of road that leads from Church Lane
Unit yield	169 units
Technical constraints impacting developable area	At this stage the primary constraint is still the topography. An allowance has been made for a balancing pond however this is undersized compared to the one which will ultimately be required.
Developable area	4.55ha
Density	37 units per hectare

Iteration 4

Layout	 Total 164 units 1:500 at A1 29 two bed houses 8 two bed flats 96 three bed 31 four bed
Date	February 2020
Description of layout	Design work continued throughout February with a larger number of options being produced. Now that the scheme is seeming to be more viable more investigations are being made into the drainage requirements. In the above layout a potential drainage easement is shown leading down from the highest level down to the balancing pond (indicated by the green lines).
Unit yield	164 units
Technical constraints impacting developable area	A better understanding of the problems associated with the drainage solution is now beginning to impact on the layout. At this stage discussions have only been held with Yorkshire Water.
Developable area	4.5ha
Density	36 units per hectare

Iteration 5

Layout	 Total 158 units 1:500 at A1 12 two bed houses 20 two bed flats 90 three bed houses 36 four bed houses
Date	April 2020
Description of layout	By this time a much clearer picture has emerged of the drainage requirements for the site. The balancing pond at the lowest level has increased considerably in size - from 1100sqm in previous designs to 3600sqm in the above, as a result of discussions with Yorkshire Water (see further details following design iterations). To compensate the development area continues to push into the hillside adjacent to Church Lane and additional flats have been introduced to increase the overall unit numbers. Pre-application planning advice was sought for a scheme similar to the above in summer 2020
Unit yield	158 units
Technical constraints impacting developable area	At this stage (over a year into the design development stage), overall developable area and numbers of units have remained very similar. In other words, where constraints have been encountered (e.g. the much larger balancing pond) efforts have been made to counter them and to keep development numbers high.
Developable area	4.3ha
Density	37 units per hectare

Iteration 6

Layout	The site plan illustrates the proposed housing development. A legend at the top left defines various building types and their corresponding colors: Cottages (white), Apartments (light blue), Semi-detached (dark blue), Terraced (green), Detached (yellow), Bungalows (orange), and Houses (red). It also lists unit counts for each type. The main map shows these units arranged in rows and clusters across the site. Key features include a red boundary line, a north arrow, and labels for 'Childcare centre' and 'Primary school'. Section lines A-A, B-B, C-C, and D-D are indicated. Total 136 units 1:500 at A1 13 two bed houses 10 two bed flats 86 three bed houses 27 four bed houses
Date	October 2020
Description of layout	Further consultation with Yorkshire Water has increased the size of the balancing pond further – now up to 5000sqm. The size of the balancing pond is linked to the size of the development – the more houses provided, the larger the pond area required. However the size of the pond is limited by the access points from Kinder Avenue and The Lodge. As a result, the length of the uppermost cul-de-sac has had to be curtailed. Previous cost analyses confirmed that developing too far into the steeper part of the site increases development costs, which reduces viability. The impact on viability is further exacerbated by the lower values following the reduced number of units resultant from the drainage constraints. Short cul-de-sacs have also been introduced into the lower level of the site to address comments made in the pre-app response. However, this is also adding to costs due to the need for highway retaining walls.
Unit yield	136 units
Technical constraints impacting developable area	Drainage constraints imposed by Yorkshire Water have become increasingly critical. Detailed discussions have now also begun with the Local Authority Highways Department, and this will result in new constraints which limit development further.
Developable area	3.9ha
Density	35 units per hectare

Iteration 7

Layout	 Total 125 units 1:500 at A1 10 two bed houses 10 two bed flats 79 three bed houses 26 four bed houses
Date	November 2020
Description of layout	This layout forms the basis of the current planning application. By this point extensive negotiations have been held with the Local Authority Highways Department to ensure that the proposals will meet their drainage requirements. This has led to the loss of the short uppermost cul-de-sac. The lower level cul-de-sacs have also been removed. These had been introduced to address concerns regarding the impact on distant views from across the valley. However the cul-de-sac retaining structures have been considerably inflating costs, and as these are located in the lower part of the site they are not visible from distant vantage points.
Unit yield	125 units
Technical constraints impacting developable area	The need to limit the size of drainage pipework imposed by the Local Authority, coupled with the increasing size of the balancing pond to ensure compliance with all necessary requirements and guidelines, have led to the maximum area that can reasonably be developed given the site constraints. The commentary in the following section provides more details on these requirements and the impact on the proposals.
Developable area	3.5ha
Density	36 units per hectare

Other Layouts

At various points in the design process alternative layouts were also considered, specifically those which didn't involve a through route from Church Lane to Kinder Avenue. None of these options were brought forward as they all involved further reductions to unit numbers, and we were aware that maintaining development density was a priority for the Local Authority. The reason for the loss in units was that even if the road was not continued across the site, a significant drainage easement would still be required in order to drain the upper levels. Therefore these options were rejected as being less efficient.

Drainage Considerations

As has been indicated in this document, drainage has proved to be a critical constraint in the design development process. The proposed drainage strategy has been developed following extensive discussions with Yorkshire Water and Kirklees Highways department to ensure compliance with all necessary requirements and guidelines. Full details can be found on the design drawings submitted separately with this application and in section 6 of AJP's Flood Risk Assessment document. In brief it consists of a network of adoptable sewers located beneath the new highways. This is linked to a 5,000sqm balancing pond located at the lowest part of the site. A 4.5m landscaped easement is to be provided on the eastern boundary of the site to allow drainage from the upper cul-de-sac to connect to the balancing pond.

Section 6.3 of the Flood Risk Assessment details the measures that have been taken to balance drainage and development requirements across the site. It demonstrates the effect of initial consultations with Yorkshire Water, where it was agreed that flow rates could be increased from 3.5l/s to 5l/s. At that stage of the design process the proposals involved the development of 157 units on the site. The drainage solution consisted of a large balancing pond and 1,200mm diameter pipes.

The above sequence of design iterations demonstrates our growing understanding of the drainage requirements. The proposals have always incorporated a balancing pond, however this has gradually grown in size reaching a maximum of 5,000sqm by Iteration 6 (October 2020). It should be noted that the original assessment of the site capacity of 170 units, took no account of any drainage requirements on the site. As a minimum this aspiration would need to be reduced to around 150 units to take account of the fact that half a hectare of the most developable part of the site has had to be excluded from the development area. In addition, the density target takes no account of other supporting infrastructure, such as the overflow route, that needs to be included to accommodate Yorkshire Water's requirements.

At this point our proposals involved a scheme of 136 units. It is possible that if the site allowed more flexibility in the positioning/sizing of the balancing pond, then additional units could have been provided at this stage. However the balancing pond needs to be located at the lowest part of the site, and in this instance it is constrained by access from Kinder Avenue and The Lodge. We did consider abandoning the pedestrian access to the Lodge and extending the balancing pond beyond this to try and accommodate more units. However the nature of the site means that the pond gets narrower as it extends westward. This means that it also gets shallower, as the banks must have a maximum gradient of 1 in 4. As a result more and more low level developable land was being taken up by the pond, whilst in return the increased size was releasing less and less difficult to develop land elsewhere. Inevitably this would mean overall numbers actually reduce as the pond gets larger.

At this stage we had also started detailed discussions with Kirklees Highways Authority to ensure that they could adopt the proposed scheme. It was clear from this that any potential adjustments to the balancing pond would have little or no impact on numbers as additional constraints were being placed on the size of the pipes below the road. Local Authority requirements meant that the proposed 1,200mm diameter pipes had to be reduced to 900mm. This meant less attenuation was possible within the highway network itself, which in turn placed additional burdens onto the balancing pond.

These proposals were then put to Kirklees Highways Authority, but were rejected on the grounds that Local Authority would only adopt a maximum pipe size of 900mm. AJP then undertook a redesign of their proposals to deliver the scheme to adoptable standards and to meet flood risk requirements. The requirement for smaller pipes resulted in the requirement for a considerably larger balancing pond. However the size of this was in turn constrained by the existing access points on Kinder Avenue and The Lodge. The need to balance these various requirements has therefore led to the current proposed scheme of 125 units.

Conclusion

In arriving at the current proposals, proposed numbers of units have dropped from a maximum of 169 units to 125. This has been despite the best efforts of the design team to maintain a higher density of development. The reduction in numbers is solely a result of the topographical constraints of the site, and drainage restrictions placed on development by Yorkshire Water and Kirklees Highways department. In particular the timeline given demonstrates that housing numbers remained high until the additional drainage constraints imposed by the Local Authority came into play. It can also be seen that at all times our proposals have achieved or exceeded the 35 units per hectare required by the Local Plan. This includes the current scheme, which achieves 36 units per hectare.

Given all the above evidence, the imposition of a benchmark of 170 units on this site was always unreasonable. We have made extensive efforts to achieve as close to this number as we could possibly manage and the site could accommodate. However, the constraints imposed by Yorkshire Water and Kirklees Highways department, together with the need to maintain an appropriate form of development, mean that the current scheme of 125 units is as dense as could reasonably be achieved on the site.