JACKSON
CONSULTING ENGINEERS

Drainage Appraisal

Project:

Proposed Barn Conversion, Orchard Farm, Dowsdale Bank, Shepeau Stow, Spalding, Lincs

Client:

Mr Dickens c/o Swann Edwards Architecture

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Introduction

Jackson consulting engineers have been appointed by Mr Dickens c/o Swann Edwards Architecture, to report on the drainage solution to satisfy the foul and surface water drainage disposal for the proposed barn conversion, Dowsdale Bank, Shepeau Stow. The following document is to assist the planners, building control and internal drainage board in demonstrating that the development is acceptable in terms of surface water drainage strategy for the development.

Existing Site

Location

The site lies to the south east of Dowsdale Bank, Shepeau Stow, Lincolnshire – The approximate post code is PE12 0UB. An aerial location plan, with approximate site boundary (please note this is not the planning boundary) is shown in figure 1.



Figure 1 - Site Location

Site Description

The existing site is made up of agricultural buildings, which are no longer in use. The area for redevelopment consists of a mixture of clad buildings and concrete hardstanding. The total site boundary is 2432m^2, and of this, 2271m^2 consists of positively drained surfaces – the existing drainage arrangements and catchment plan can be found on JCE drawing: 0203-JCE-00-SI-DR-C-2000.

The total redevelopment consists of 4 new dwellings, but for phasing reasons, only the 2 southernmost plots are going to be developed. This report will explore the overall and phase 1 betterments, although the application to discharge the final 2 plots will be done at a later date.

Site Proposals

The site is being developed by demolishing the existing agricultural buildings and concrete hardstanding and erecting 4 detached dwellings – this phase will only consist of the two dwellings to the south.

Site Topography

Some levels from and external survey have been provided on JCE drawing: 0203-JCE-00-SI-DR-C-2000. The existing drainage runs have been added from records and visual inspections.

The site generally falls towards the north east of the planning boundary, where surface water is either collected through sealed rain water pipes, or channel drainage and gullies.

The north west of the site is bounded by Dowsdale bank, which is at a higher elevation than the site, with the main road being drained via. local land drainage. The north section of the site is bounded by hedges/trees. The south west boundary consists of existing agricultural buildings which are being retained. The southern boundary is a mixture of shallow open water course, fencing and hedges.

Existing Drainage

There is no below ground survey as the existing drainage is relatively simple. The owner of the site has owned the property for more than 20 years, and has described no surface flooding issues, other than where surface gullies have been blocked (the current agricultural use is to store bailed hay which can clog the gullies). The existing drainage arrangements were inspected by JCE and some photo descriptions are shown below (the existing drainage layout has been shown on JCE drawing: 0203-JCE-00-SI-DR-C-2000).

As shown on the above drawing, there is a historic watercourse, wholly within the landowners boundary which has been culverted, with a minimum pipe of 450mm dia. (only the head was inspected – which is only relevant for the scheme) and multiple brick built catchpits. This was historically undertaken by the previous land owner, and is at least 20 years old. The culvert and catcpits are well constructed and well maintained. The location and connection of the culvert is shown in the figure below, identified in red. The watercourse that it connects into is private, with water generally present throughout the year, and of substantial size.

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Figure 2 - Location of Culverted Watercourse

The private watercourse (wholly within the landowners site, then connects into the IDB running along Oxcroft Bank – South Holland IDB drain reference: DRN196P0702, shown in the figure below.

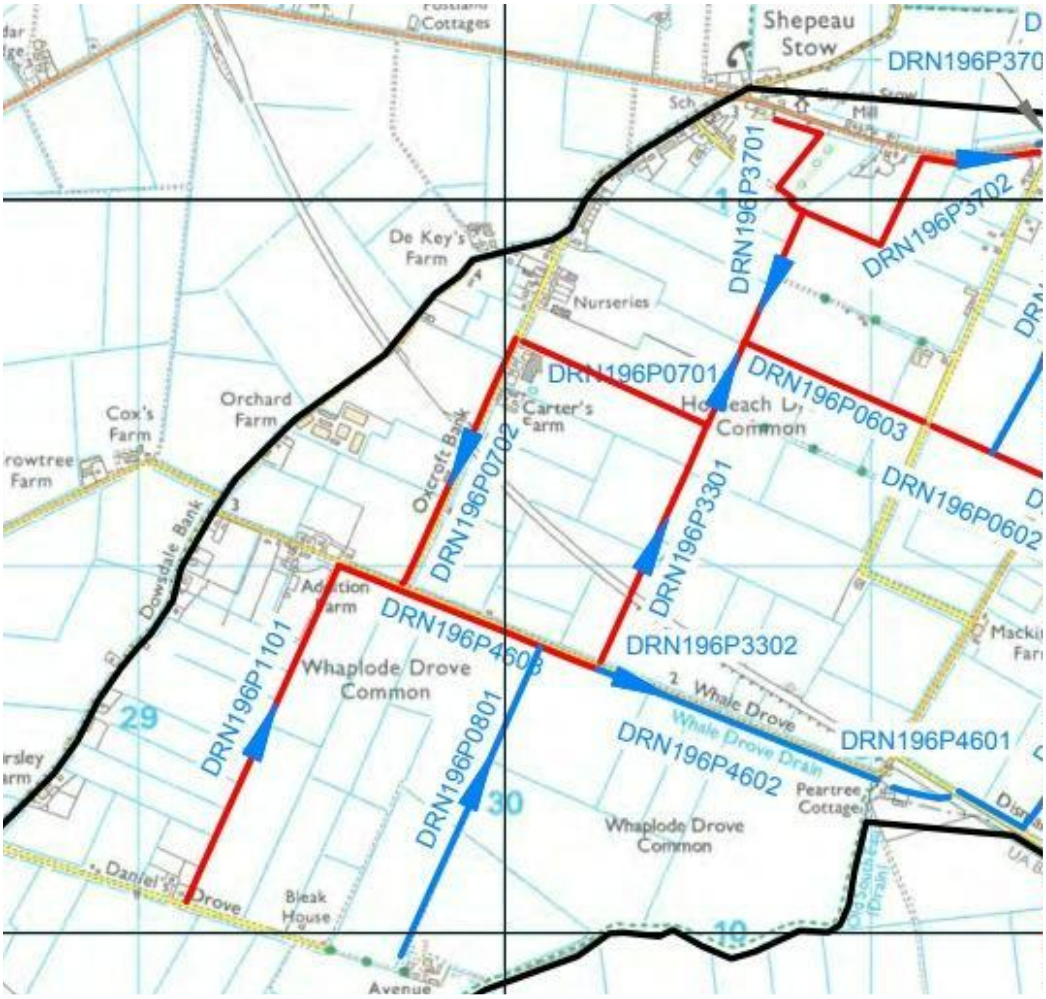


Figure 3 - Extract of IDB Map

Existing Drainage Photos & Descriptions

Second culvert, viewing towards the first culvert.



Close up of second culvert, showing general condition and large outgoing pipe. Some sediment is seen at the bottom of the pipe, but the cross-sectional area still remains at roughly 85%.



Existing concrete hardstanding, photo shows the direction of the surface falls.



Multiple photos showing the open watercourse to the south – heavily overgrown. This watercourse is relatively shallow.





Example of an existing building RWP, eventually connecting into the culverted watercourse.



Manhole cover, towards the head of the run.



The main surface water drainage for the yard, consisting of dished channels and gullies.



Infiltration Testing

The possibility of infiltration testing was discussed with the client. Although a trial pit was excavated to record ground conditions (generally described as loamy soils), and no water was encountered within 2m of the surface, it was noted by the landowner that the seasonal water table varies, and can raise to approximately 1m of existing ground levels, and that the trial pit (observed in July) would not represent a winter ground water level. As a result of this, and through comments received on the planning application from the IDB, it was agreed that the safest approach is to rule out the use of infiltration.

Drainage Proposals

As infiltration has been ruled out, it is proposed to maintain the current drainage connections, with the ultimate outfall into a watercourse. This is the preferred method of surface water disposal, directly behind infiltration.

Preliminary discussions have been held with the IDB regarding the proposals, and although it needs to be ratified via. a formal submission (the purpose of this document), it was tentatively agreed that as a significant betterment is being created with hardstanding's being reverted back to grassed/gravel areas in instances other than roof areas, then the scheme could potentially benefit from an unrestricted discharge, provided the appropriate development contribution is paid.

The existing total positively drainage impermeable area is 2271m^2, with the total post development impermeable area being 645m^2 – this is shown on JCE drawings 0203-JCE-00-SI-DR-C-2000 and 3010 respectively. This is a total reduction of approximately 71%, which is a significant betterment, with only approximately 29% of existing flows directly entering the watercourse post development. This reduces both the flood risk and the amount water entering the IDB system. This is the total betterment, once all 4 dwellings have been completed.

During the first phase of the development, the existing hardstanding to remain is 1409m^2, with approximately 860m^2 of hardstanding being removed. The proposed roof area of phase 1 is 347m^2, which is a betterment of roughly 60%, with only 40% of the existing flows/volume directly entering the system. Although this amount is not quite as good as the overall betterment, it still represents a significant improvement over the existing contributing impermeable areas.

Foul Proposals

As the site is in a remote location, and as no mains drainage is available, it is proposed to discharge each dwelling into a wastewater treatment plant and to discharge the treated effluent into the existing culvert, which enters the landowners open watercourse and eventually into the IDB drain.

The flows from these units will be low (even when 4 are finally constructed), and as the receiving watercourse has water present throughout the year (other than drought), this complies with the general binding rules, and is considered acceptable from an EA perspective.

The proposed drainage design can be found on JCE drawing: 0203-JCE-00-SI-DR-C-3000.

Conclusion

The above documentation demonstrates that best practice drainage design has been considered, and that the proposals are suitable for the present conditions, and that as the impermeable area is being vastly reduced, the flood risk of the area – post development has been reduced. Given the shallow nature of the connecting drainage and ditch network, the provision of additional attenuation will not be able feasible as there is insufficient cover available.

Foul water will be treated to a sufficient quality prior to ultimately discharging into the watercourse.

The proposals still need approval from the planners and IDB, and this document will assist in providing the supporting evidence.