

Head of Planning
Arun District Council

20 August 2021

Angmering Flood Alleviation Scheme Phase 1: Request for Screening Opinion

References:

- A. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
- B. European Commission (2001) Guidance on EIA Scoping.
- C. Flood Risk Assessment for Angmering Flood Alleviation Scheme dated 15 October 21.

Introduction

1. A screening opinion is sought from Arun District Council for the above scheme, the scope of which falls within Schedule II of Reference A in the category 10(i): Dams and other installations designed to hold water or store it on a long-term basis...
2. Based upon available evidence, it is the view of West Sussex Lead Local Flood Authority (LLFA) that the limited extent of both the proposed weir and the upstream effect of the scheme are such that it would not have a significant negative impact upon the environment and, therefore, does not require an EIA. The basis for this conclusion is set out below.

Description of the Flood Alleviation Scheme (FAS) Phase 1

3. The scheme comprises a weir with approximate dimensions 11m in length by 2m in height to be located immediately upstream of the culverted section of the Black Ditch (culvert due to be constructed in Autumn 2021) under the access road to The Land South of Water Lane development, Water Lane, Angmering. The weir will have two openings in it, each of 1.3m width and height to carry the normal flow from the Black Ditch; for normal use only one of these openings is likely to be in use at any time. Some modification will be made to the banks of the culvert in terms of erosion protection and a means

of access will need to be provided for inspection / maintenance. Figure 1 shows the plan and elevation of the proposed weir.

4. The weir has a crest height of 11.3m above ordnance datum (AoD) and is designed to attenuate floodwater for a range of return period events. The attenuation volume takes place mainly between the proposed weir location and the upstream Water Lane crossing of the Black ditch. This attenuation volume is estimated as 2,000 for the 1% Annual Exceedance Probability (AEP) event + 40% climate change allowance.

The Effects of the FAS Phase 1

5. The effects of the FAS Phase 1 are considered in terms of construction impacts and operational impacts.

Construction Impacts

6. The weir is a very minor structure and, discounting the erosion protection to the proposed culvert will have a footprint of approximately 32m² including the apron at the upstream base. In order to construct the weir, there is a possibility that, there would need to be a temporary diversion of the Black Ditch. However, subject to a smooth passage through planning application, the intention will be for the weir to be constructed immediately upon completion of the road access culvert when the Diversion for the Black Ditch is in place, allowing works to proceed on the back of existing construction works for Land South of Water Lane. In relation to the wider scale of development associated with the Land South of Water Lane development, the proposed construction impacts associated with the FAS Phase 1 are considered de minimis.

Operational Impacts

7. E.U. guidance on scoping recommends consideration of the following factors in terms of assessing potential impact:

Impacts on people, human health, fauna and flora, soils, land use, material assets, water quality and hydrology, air quality, climate, noise and vibration, the landscape and visual environment, historic and cultural heritage resources, and the interactions between them (Reference B).

The main impact of the scheme is upon the hydrology of the Black Ditch. Consideration of operational impacts will start by characterising the changes to hydrology. Impacts that follow from this, principally those on people, fauna and flora, land use and the visual environment are considered in the light of the hydrological changes. As will become evident, following the description of the scheme below, operational impacts upon human health, soils, material assets, water quality, air quality, climate, noise and vibration and historic and cultural heritage resources are considered to be insignificant and are not commented on further.

8. This Phase 1 element of the FAS forms an element of a wider Angmering FAS that was the subject of a Flood Risk Assessment (FRA) (Reference C)

accompanying the planning Application: Approval of reserved matters (appearance, layout, scale and landscaping) following outline consent A/99/17/OUT, for a culverted embankment. Included in the FRA was hydraulic modelling of Scenario 2, i.e. road access with new culvert plus weir structure just upstream (only partial implementation of the FAS) which equates to what is now being referred to as the FAS Phase 1. The Scoping Request should therefore be read in conjunction with Reference C (previously submitted). Some of the updated content of Reference C is included here for ease of reference.

9. The predominant effect of the weir is to create a backwater effect in terms of storm water attenuation upstream. Normal flows pass through one of the two 1.3m wide openings in the weir wall but once storm flows increase beyond an approximate rate of $1.8\text{m}^3/\text{sec}$, water will be held up behind the weir. The backwater effect extends as far upstream as the reach between Ecclesden Farm Track and the intersection with the north west flowing drain from Miles Copse (Figure 1).

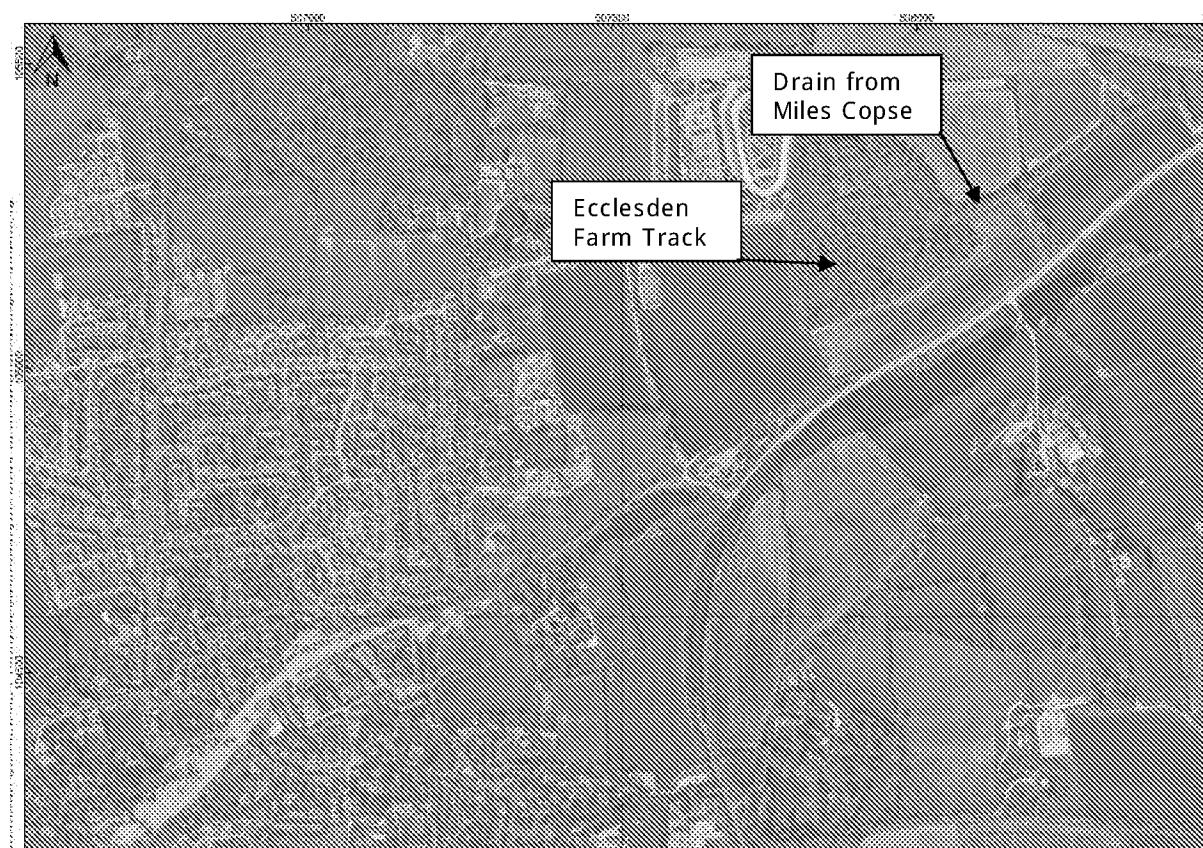


Figure 1: Depth difference plot: baseline - un-throttled culverted embankment 1% AEP + 45% cc event compared with FAS Phase 1 for same conditions.

10. The scale of change is greatest immediately upstream of the Lands South of Water Lane access road culvert, where the extreme event effectively results in an increase in flood depth over the baseline of 0.4m (refer to Table 1). These are updated results based on more refined modelling however it is important to note that the constriction will be optimised and peak water levels

could increase locally up to 0.6m. However, with the full FAS scheme on completion of Phase 2, the increases in peak water levels will be confined between the upstream Water Lane crossing of the Black Ditch and the proposed weir location, and between the Ecclesden Farm access and the drain from Miles Copse as shown in Figure 2.

Table 1 Depth differences: baseline - un-throttled culverted embankment 1% AEP + 45% cc event compared with FAS Phase 1 for same conditions.

Location No	20	20	50	50	100	100	100C	100CC
1 Junction Water Lane and Church Road	0.51	0.52 (0.01)	0.58	0.58 (0.0)	0.62	0.61 (0.01)	0.71	0.71 (0.00)
2 Localised low spot in Water Lane	Null	Null	0.18	0.16 (0.02)	0.25	0.22 (0.03)	0.37	0.34 (0.03)
3 Upstream of Avenals Farm Access	0.81	0.81 (0.00)	0.85	0.84 (0.01)	0.87	0.87 (0.00)	0.93	0.93 (0.00)
4 Upstream of Proposed BDW Site Access	1.44	1.6 (0.16)	1.48	1.65 (0.17)	1.51	1.87 (0.36)	1.58	1.98 (0.4)
5 Upstream of Water Lane Culvert	0.63	0.61 (0.02)	0.74	0.71 (0.03)	0.83	0.80 (0.03)	1.04	1.03 (0.01)
6 Upstream of A280 culvert	0.65	0.79 (0.14)	0.77	0.9 (0.13)	0.86	1.00 (0.14)	1.07	1.2 (0.13)
7 Upstream of Ecclesden Farm	1.62	1.62 (0.0)	1.67	1.68 (0.01)	1.70	1.71 (0.01)	1.76	1.77 (0.01)

Note: Changes in water depth are shown in parentheses; red for reduction in depth and black for increase.

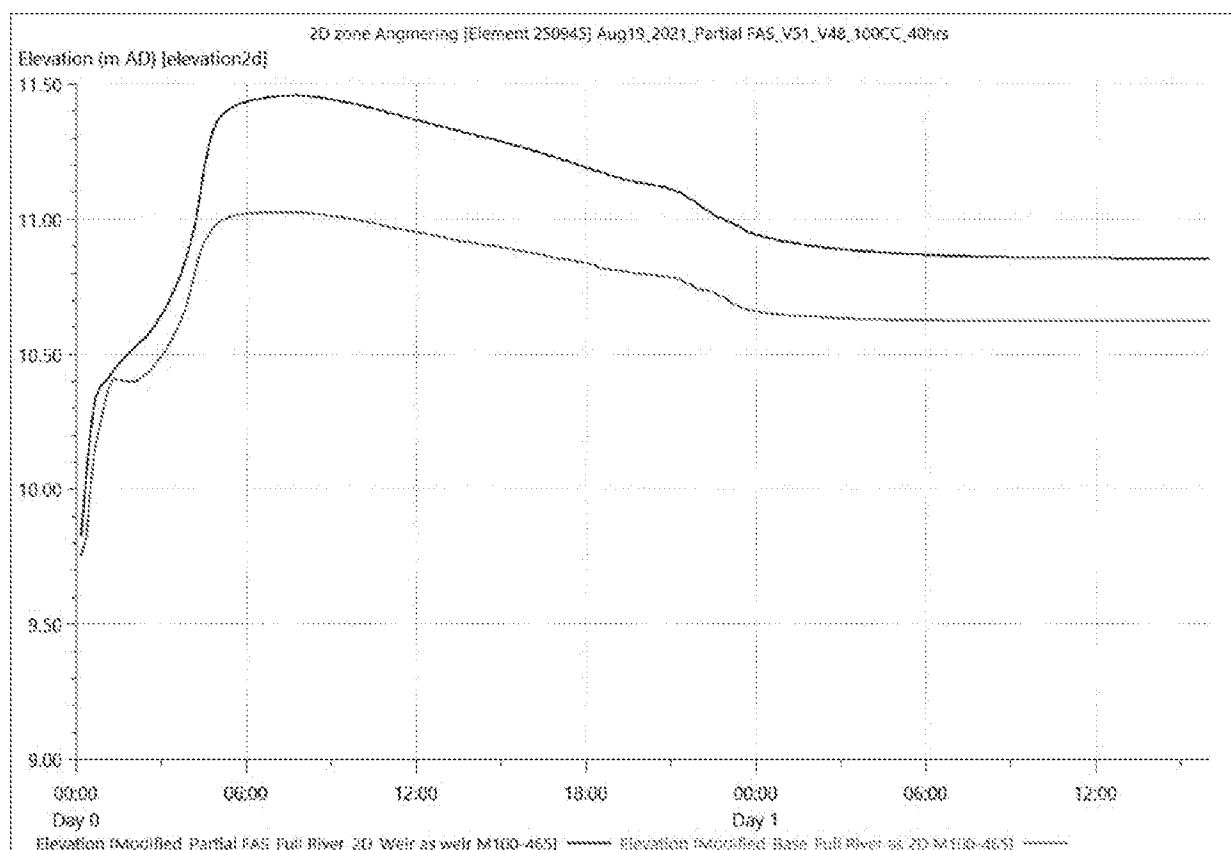
Figure 2



Figure 1: Depth difference plot: baseline - unthrottled culverted embankment 1% AEP + 45% cc event compared with full FAS for same conditions.

12. The residence time for these elevated flood depths is indicated by the graph shown in Figure 3. This shows the residence time for elevated flood depths over and above the peak depth for the baseline to be less than 24 hours.

Figure 3 Flood levels immediately upstream of the Road Access to Land South of Water Lane for a 1% AEP event plus 45% cc FAS Phase 1



Impacts on People

13. The negative impacts upon people are considered to be negligible. There are no existing nor planned public rights of way affected by the Angmering FAS. The land has traditionally been used for rough grazing outside the winter months as it forms part of the flood plain for the Black Ditch. Since the land will be owned and maintained by the Land South of Water Lane development, there is no perceived loss of amenity. In terms of the indirect effects of the Phase 1 scheme, there is only marginal increase in flood levels upstream of the A280 culvert not exceeding ~0.13m and this will have negligible impact upon the adjacent arable land over and above baseline conditions for the design storm event.
14. The positive effects of the scheme are quite limited for this initial phase of the Flood Alleviation scheme but it represents a key component of a wider flood alleviation scheme that will yield benefits in terms of reduced flood risk for Angmering, particularly for higher frequency storm events that regularly flood the town every year. Exceedance in the capacity of the Water Lane culvert is

one primary source of flooding in Angmering but coincidence of this with run-off from the urban catchments is also a contributory factor. Thus, while Phase 1 of the Angmering FAS will yield some benefit, more significant storms e.g. 5% AEP or 2% AEP will exceed the capacity of weir and will contribute to storm run-off in the centre of Angmering to cause flooding. A further phase 2 will attenuate water upstream of Ecclesden Farm track to allow an overall attenuation in the catchment to significantly reduce flooding in the village.

Impacts upon Fauna and Flora

14. Baseline data on the fauna and flora has been compiled from the following documents:
 - ¿ Angmering Flood Alleviation Scheme Preliminary Ecological Appraisal dated 9 November 2018 (Appendix 1);
 - ¿ Ecological Walk Over Survey (Rev A) of Land at Water Lane March 2020 (Appendix 2);
 - ¿ Water Vole and Otter Survey of Land at Water Lane, August 2020 (Appendix 3);
 - ¿ Reptile Survey of Land at Water Lane, May 2020 (Appendix 4);
 - ¿ Badger Survey of Land at Water Lane, Feb 2020;
 - ¿ Sussex Biodiversity Record Centre (2021) Ecological data search for land at Ecclesden Farm, Angmering (Appendix 5)
 - ¿ Landscape and Ecological Management and Maintenance Plan, November 2020 (Appendix 6).
15. In addition, the LLFA has sought guidance from both Natural England and from the Environment Agency regarding the potential effects of the scheme on flora and fauna. Copies of the responses can be found at Appendix 7.
16. Appendix 1 is based upon an extended Phase 1 Habitat survey was carried out by Mott MacDonald during August 2018. The purpose of this survey was to assess the ecological importance of the site and determine the requirement for targeted Phase 2 surveys. Appraisal of effects upon ecology is based around a zone of influence (paragraph 1.5 of Appendix A). The current guidance on ecological assessments recommends that all ecological features within a Zone of Influence (ZoI) for a project are investigated (IEEM, 2016). The potential ZoI includes:
 - a) Areas directly within the land take for the proposed development and access;
 - b) Areas that will be temporarily affected during construction;
 - c) Areas likely to be impacted by hydrological disruption; and,
 - d) Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

Given the very small footprint (32m²) and scale of the construction works for the weir, of the above, a), c) and d) are considered to be minimal in relation to the scale of development for the Land South of Water Lane site of which the proposed weir is a small sub-component.

Direct effects of the proposed works on flora and fauna

17. Appendices 2,3, 4 and the Badger survey have all considered the presence, or potential presence, of any protected or notable species or habitats on, or adjacent to, the site. A summary of the ecological surveys is provided in the Landscape and Ecological Management and Maintenance Plan (Appendix 6) and is included below:

- ¿ The main habitats within the site boundary are of relatively low value to biodiversity the exception being some scrub and of the boundary hedgerows which while species poor provide a connective habitat for different species.
- ¿ Dormice were identified within the site but there is unlikely to be a population due to the lack of suitable habitat and separation from the woodland due to Water Lane and the A280 roads.
- ¿ No evidence of badgers was found within the site.
- ¿ Hedgerows within the site are used by a number of common bird species for nesting and / or feeding.
- ¿ The site is used by a number of relatively common bat species for feeding and commuting.
- ¿ No reptiles were identified during the surveys.
- ¿ No evidence of Great Crested Newts was found on site.

Significantly, while water voles are not referred to in the above summary, Appendix 3, found no water vole present within 50m of the boundary to Land South of Water Lane, although Appendix 1 reported that a water vole latrine and feeding station were recorded in waterbody 1 (30m north east) during the eDNA water sampling. This does fall within the area likely to be impacted by hydrological disruption and will be discussed further below.

18. A key objective of the plan is to maintain and enhance biodiversity that includes the requirement to fulfil all legal requirements in relation to the protection and management of ecological features and the protection and management of target species including bats and reptiles. The plan (Appendix 6) was reviewed by the Chichester District Council Environment Officer on 7 Dec 20 on behalf of Arun District Council who found the information within it to be suitable and sufficient for the site.
19. On the basis of the information outlined above, in relation to any direct impacts associated with the construction of the weir, it is considered that, providing these works take place within the physical and temporal boundaries of the Land South of Water Lane Landscape and Ecological Management and Maintenance Plan and are compliant with the requirements of this plan, then the works will not have a significant effect upon the environment.

Flora and fauna likely to be impacted by hydrological disruption;

20. The hydrological effects of the proposed Phase 1 Flood Alleviation Scheme have been outlined in paragraphs 9 to 12 above. These effects are most prominent in the area immediately upstream of the weir where peak water levels will increase above the baseline for the extreme 1% AEP (+ 40% climate change allowance) by as much as 0.6m). This area is already subject to wide fluctuations in water depth owing to constriction of the Black ditch downstream at Avenals Farm access. As a consequence, extensive

inundation of the floodplain already occurs during periodic winter storms (Plate 1). These changes in peak water depths over and above natural storm levels are brief in duration amounting to hours not days.



Plate 1: Evidence of extensive winter flooding occurring at Land South of Water Lane.

21. Information on the ecological baseline that includes the extent of hydrological disruption beyond the Land South of Water Lane development is available from Appendices 1 and 5. Appendix 1 maps most of the Black ditch flood plain north of the A280 culvert as species poor semi-improved grassland or scrub that is confined to the embankment of the A280. There is a small band of ruderals on either bank of the ditch immediately south west of the Ecclesden Farm access. The Highways attenuation basin immediately north of the intersection between Water Lane and the A280 is mapped as dense / continuous scrub.
22. Appendix 1 reports on a water vole survey undertaken by Mott MacDonald of Black Ditch during August 2018. During the survey no individuals or evidence of activity (latrines, feeding station and or borrows) was identified. However suitable habitat on site was identified to support these species of which the eastern section of Black Ditch that runs adjacent to the A280 from Patching

Pond through to Avenals Farm where it goes under culvert through Angmering at Water Lane is relevant. Most of the habitat here is of high quality for water voles. With marginal vegetation in most areas. Some areas were very overgrown and fenced off with limited access, whilst others had narrow marginal vegetation due to grazing pressure. However, a diversity of feeding and shelter opportunities were observed for the species.

23. Water levels that fluctuate widely and frequently are a potential threat to water voles as water can flood the burrow systems and may drown Water Voles. During flood conditions, refuge areas (high banks and backwater pools) are essential. In the absence of any known water vole nests along the reach of the Black Ditch affected, a significant impact upon this species is not envisaged. In terms of the potential impact (should water voles choose to nest there in the future) the scale and speed of fluctuation in water level is a critical consideration. It can be seen from Table 1 that, in the area identified as suitable habitat upstream of the A280 culvert (line 6) changes of the order of 0.1 to 0.14m maximum above background levels. These maximum increases (representing between 22% and 12% baseline depths for more significant storm events) are likely to be reached as the storm progresses and the catchment fills over several hours. It is understood that flooded burrows for water voles are not an uncommon nor unnatural occurrence and the species can adapt to such changes.
24. For the Mott MacDonald ecological review that was based upon a significantly larger area of interest than the Phase 1 FAS, Sussex Biodiversity Records Centre SBRC (2018) returned no records for great crested newts (GCN) *Triturus cristatus* within the 2km of the proposed extent to the Scheme (Appendix 1 paragraph 4.3.5). A similar enquiry for the narrowed area of search for the Angmering FAS in 2018 also yielded no records. There are no in-line ponds affected by the scheme so no significant impact is envisaged.
25. In summary, review of available evidence suggests that there is no significant negative impact from the Angmering FAS on priority habitats or species. This conclusion is borne out by the response from Natural England who concluded: it doesn't look like the proposed area is closely connected/impacting upon any designated sites or priority habitats/species (of principle importance under the NERC Act) (Appendix 7).

Land Use and Visual Impact

26. The implications of the FAS on agricultural land use were considered in Section 7.14 of Reference A and have been further discussed directly with the landowner for Ecclesden Farm. A key reason for phasing the project is to allow further iterative design work with the landowner for Ecclesden Farm to optimise flood storage that is not in conflict with his utility of the land. This process will continue for follow on work for the wider scheme. Initial estimates suggest that of the arable land that falls within the red line boundary of the whole FAS, when the full scheme is implemented, there should be the scope to marginally reduce the impact upon arable land,
27. Given the relatively marginal increases in flood depth / extent of water attenuation over and above peak baseline depths / extents associated with

the Phase 1 scheme, negligible visual impact will result from the hydrological changes to the scheme. The only structural change is the construction of the Weir immediately upstream of the culvert. Given that the 2m x 11m wall has as its backdrop the significantly larger structure of the culvert and wing walls no significant impact is envisaged.

Summary

28. The LLFA requests a screening opinion from Arun District Council on the impact of the Angmering FAS upon the environment. The LLFA's own review of evidence, much of which has been reviewed and collated as appendices to this letter, suggests that there will be no significant adverse impact upon the environment, a conclusion that is supported by the regulators and other stakeholders that the LLFA has consulted.

Ray Drabble
For Lead Local Flood Authority

References:

- A. Flood Risk Assessment for Angmering Flood Alleviation Scheme: V 1.0 dated October 2020.

Appendices:

1. Angmering Flood Alleviation Scheme Preliminary Ecological Appraisal dated 9 November 2018.
2. Ecological Walk Over Survey (Rev A) of Land at Water Lane March 2020.
3. Water Vole and Otter Survey of Land at Water Lane, August 2020.
4. Reptile Survey of Land at Water Lane, May 2020.
5. Sussex Biodiversity Record Centre (2021) Ecological data search for land at Ecclesden Farm, Angmering.
6. Landscape and Ecological Management and Maintenance Plan, November 2020.
7. Correspondence with Statutory Regulators.

Copies to:

Hazel Stanworth	Natural England
Ele Pilla	Environment Agency
Jessica Sparkes	Barratt David Wilson Homes