



CLEVE HILL SOLAR PARK

ENVIRONMENTAL STATEMENT
VOLUME 4 - TECHNICAL APPENDIX 5.4
OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

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**ENVIRONMENTAL STATEMENT
TECHNICAL APPENDIX A5.4**

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
FOR CLEVE HILL SOLAR PARK

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EXECUTIVE SUMMARY

This Outline Construction Environmental Management Plan (CEMP) provides a code of construction practice for the construction phase of Cleve Hill Solar Park (the Development).
Table 1 summarises the areas of construction control covered by the Outline CEMP for ease of reference.

Table 1: Summary of Areas of Construction Control

| Area of Control | Reference |
|-----------------------------|---|
| Working Hours | <ul style="list-style-type: none">Section 1.1 |
| Lighting | <ul style="list-style-type: none">Section 1.2 |
| Noise | <ul style="list-style-type: none">Section 1.1Section 1.3 <p>The Outline Special Protection Area Construction Noise Management Plan (SPA CNMP), ES Technical Appendix A12.10 (DCO Document Reference 6.4.12.10) also addresses control of noise in relation to the Swale SPA</p> |
| Ecology and Ornithology | <p>All sections. Specifically:</p> <ul style="list-style-type: none">Section 1.4Appendix B – Breeding Bird Protection Plan <p>The Outline SPA CNMP, ES Technical Appendix A12.10 (DCO Document Reference 6.4.12.10) also addresses control of noise in relation to the Swale SPA</p> |
| Hydrology and Water Quality | <p>All sections. Specifically:</p> <ul style="list-style-type: none">Sections 2 to 8Appendix C – New Watercourse Crossing InventoryAppendix D – Existing Watercourse Crossing Inventory |
| Air Quality | <ul style="list-style-type: none">Section 4.4 |
| Waste | <ul style="list-style-type: none">Appendix A – Outline Site Waste Management Plan |

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|------------|---|
| 1 | INTRODUCTION |
| 1. | This Outline Construction Environmental Management Plan (CEMP) forms an appendix to the Environmental Statement (ES) for Cleve Hill Solar Park ("the Development"). The Outline CEMP presented in this document is intended to demonstrate measures that could be used across the Development site to adequately protect environmental resources. Detailed proposals for such measures will be documented prior to construction, and will provide the same or greater protection for the environment as those described in this document. The measures are proportionate to the risk and, where greater risk is highlighted at specific locations prior to construction, specific measures would be agreed for those locations. |
| 2. | The methods set out in this Outline CEMP are based on good practice, including measures agreed with the Environment Agency (EA) for several constructed solar farms and the following guidance: <ul style="list-style-type: none">• The Construction Industry Research and Information Association (CIRIA), 'Environmental Good Practice On Site (C741)' (2015)¹;• CIRIA, 'Control of Water Pollution from Construction Sites (C532)' (2001)²; and• The SuDS Manual (2015). |
| 3. | The Outline CEMP takes into account specific activities during the construction and operational phases of the Development, including: <ul style="list-style-type: none">• Access road / spine road;• Foundations required for the substation and other components; and• Hardstanding areas and buildings (including hardstandings, electrical compound and associated infrastructure). |
| 4. | Appropriate methodologies for the mitigation of water-related effects and other environmental effects are described in the following sections. |
| 5. | The Outline CEMP includes the following appendices: <ul style="list-style-type: none">• Appendix A – Site Waste Management Plan;• Appendix B – Breeding Bird Protection Plan;• Appendix C – New Watercourse Crossing Inventory; and• Appendix D – Upgraded Watercourse Crossing Inventory. |
| 1.1 | WORKING HOURS |
| 6. | Core working hours are proposed to be between 07.00 until 19.00, Monday to Friday and 07.00 until 13.00 on a Saturday (unless in exceptional circumstances where need arises to protect plant, personnel or the environment). In addition to this, a start-up and close down period for up to an hour before and after the core working hours is proposed. This does not include the operation of plant or machinery likely to cause a disturbance. |
| 7. | Application of the above working hours to manage construction noise and vibration will ensure that effects are minimised as far as reasonably practicable. |
| 1.2 | CONTROL OF LIGHTING |
| 8. | Depending on the time of year, some work lighting may be required to facilitate construction during the hours set out in section 1.2. |
| 9. | The vast majority of construction activities will be undertaken during daylight hours. In winter, the short daylight hours may require some temporary lighting to be deployed during construction however this will be avoided as far as practicable. |

¹ The Construction Industry Research and Information Association (CIRIA), (2015), Environmental Good Practice on Site Guide (C741), CIRIA: London

² CIRIA, (2001), Control of Water Pollution from Construction Sites (C532), CIRIA: London.

10. All construction lighting will be deployed in accordance with the following recommendations to reduce or remove impacts on human and ecological receptors:
 - The use of lighting will be minimised to that required for safe site operations;
 - Lighting will utilise directional fittings to minimise outward light spill and glare;
 - E.g., via the use of light hoods/cowls which direct light below the horizontal plane (preferably at an angle greater than 20° from horizontal); and
 - Lighting will be directed towards the middle of the site rather than towards the boundaries.

1.3 CONTROL OF NOISE

11. Measures to control noise to avoid adverse impacts on ecological receptors are set out in the outline Special Protection Area Construction Noise Management Plan (SPA CNMP), ES Technical Appendix A12.10 (DCO Document Reference 6.4.12.10).

1.4 ECOLOGICAL CLERK OF WORKS

12. An Ecological Clerk of Works (ECoW) will be appointed. The appointment shall be for the period from commencement of development to final commissioning of the Development or end of the construction period, whichever is the later. The scope of the work of the ECOW shall include:
 - (a) Monitoring compliance with the ecological mitigation works contained in the ES (including Technical Appendix A5.2, Landscape and Biodiversity Management Plan);
 - (b) Providing advice on adequate protection of nature conservation interests on the site;
 - (c) Monitoring the compliance with environmental management measures contained in the ES;
 - (d) Ensuring that good practice measures with regards to the protection of breeding birds are implemented;
 - (e) Providing contractor tool-box briefings about legally protected species and their habitats; and
 - (f) Ensuring any required protected species licences are in place and providing advice and monitoring compliance with the licence conditions.

2 THE MANAGEMENT OF SEDIMENT AND SURFACE WATERS

13. This section addresses the management of sediment and surface water run-off generated during the construction phase of the Development, through good practice construction techniques.
14. Major construction works (e.g., large-scale earthworks) will be minimised during heavy precipitation events.
15. Drainage from the Development site will include elements of Sustainable Drainage Systems (SuDS) design, where appropriate. SuDS replicate natural drainage patterns and have a number of benefits:
 - SuDS will attenuate run-off, thus reducing peak flow and any flooding issues that might arise downstream;
 - SuDS will treat run-off, which can reduce sediment and pollutant volumes in run-off before discharging back into natural drainage network; and
 - SuDS measures, such as lagoons or retention ponds, correctly implemented will produce suitable environments for wildlife.

2.1 LOCATION OF SILT TRAPS AND SILT MATTING

16. Silt traps may be utilised to trap and filter sediment-laden run-off from excavation works at the Development, including foundations for the compound and access roads.

17. Good practice will be followed prior to placement of silt traps adjacent to watercourses and land drains. Silt matting may be placed at the outfall of settlement lagoons to filter sediment during times of heavy rainfall.
18. The silt traps and silt matting will be monitored by the Ecological Clerk of Works (ECOW) and replaced when necessary.
19. Plates 1, 2 and 3 of this document display typical silt fencing, silt traps and silt matting.

Plate 1: Typical silt fencing



Plate 2: Typical silt traps

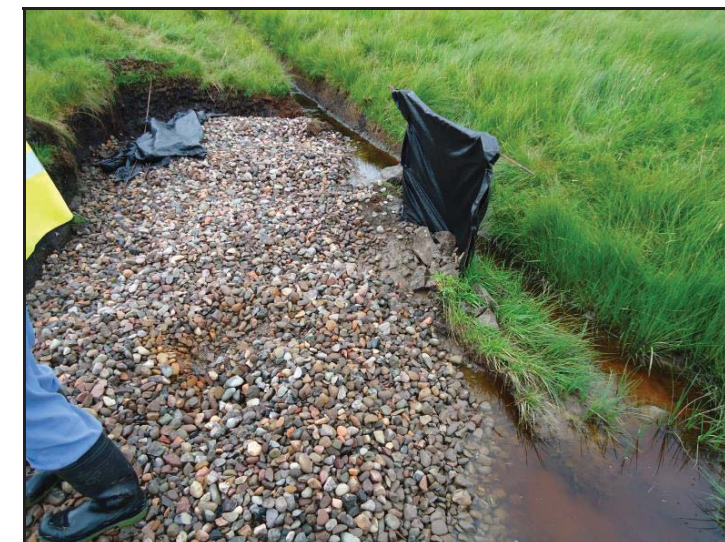


Plate 3: Typical silt mat to be placed at lagoon outfalls



2.2 LOCATION OF CHECK DAMS

- 20. Check dams will be installed within drainage ditches at regular intervals, where appropriate. Check dams will facilitate the settlement of suspended solids by slowing the flow of water within the drainage ditches. Appropriately sized stone pitching will be used within the dam in order to provide a rough surface for water within the drainage ditch to pass over.
- 21. Plate 4 of this document displays a typical check dam.

Plate 4: Typical check dams - to be installed in drainage ditches adjacent to the new spine road



2.3 LOCATION OF SETTLEMENT LAGOONS

- 22. Settlement lagoons will be implemented, where appropriate, at the electrical compound excavations. The location and management of settlement lagoons is important and will not be sited within habitat management areas.
- 23. All settlement lagoons will be actively managed to control water levels and ensure that any runoff is contained, especially during times of rainfall. If required to achieve the necessary quality of the final run-off, further measures may include the use of flocculent to further facilitate the settlement of suspended solids.
- 24. Plate 5 of this document displays a typical settlement lagoon and flocculent station.

Plate 5: Typical lagoon and flocculent station



2.4 OUTFLOW MONITORING FROM SETTLEMENT LAGOONS

- 25. Settlement lagoon outflow will be regularly inspected and discharge may be pumped, when required, for maintenance purposes. Any pumping activities will be supervised and authorised by the Contractor's Project Manager.
- 26. Treated water will be discharged onto vegetated surfaces and directed away from surface watercourses. Within all catchments, irrigation techniques, which may include the use of perforated discharge hoses, or similar, will be employed to rapidly distribute discharge across a vegetated area. This will be carried out in consultation with the ECoW.
- 27. 'Siltbusters' will be used to treat pumped/surplus water from lagoons during periods of heavy or persistent rainfall.
- 28. Silt mats may be used at the outfalls of settlement lagoons to further aid the settlement from earthworks drainage.
- 29. Plate 6 of this document displays typical pumping operations.

Plate 6: Typical 'Siltbuster' and settlement lagoon



2.5 PROVISION FOR STORM EVENTS

- 30. The Development site itself is not considered to be at risk from surface water or fluvial flooding. In extreme storm events, there would be elevated levels of run-off from the hardstanding elements of the Development relative to greenfield flow rates, which has the potential to contribute to down-stream, off-site, flood risk.
- 31. In the baseline scenario, the water table is not at the ground surface, and hence some infiltration would be expected. The Development proposals could raise the water table (e.g., through pumping / dewatering of excavations), and therefore infiltration would reduce. Notwithstanding this, measures are proposed here that would reduce run-off rates further.
- 32. Temporary storage volume for storm run-off from the foundations and hardstanding areas would be provided via settlement lagoons.
- 33. Along the access tracks, drainage channels on the down-slope would shed track run-off to adjacent rough ground approximately every 30 m, to attenuate flow and allow natural filtration to remove sediments.
- 34. Appropriate licensing and discharge consents will be sought before the construction phase of the Development.

2.6 FOUL DRAINAGE

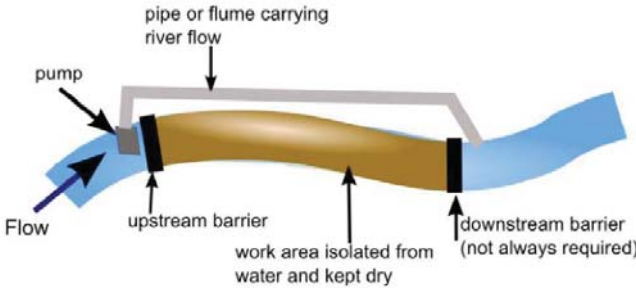
- 35. The substation building may house a toilet facility and hand basin for visiting maintenance staff during the operational phase. Should this facility be required, rainwater will be collected from the roof of the building via a gutter and inlet pipe to fill a rain water harvesting tank.
- 36. Effluent and waste from onsite construction personnel will be treated at a package sewage treatment plant or a septic tank and will be discharged into a drainage field, in accordance with PPG4. The system will be designed prior to the construction phase of the Development and shall be designed and approved by the EA prior to construction.
- 37. During the construction phase, 'Porta-loo' type facilities, or equivalent, will be used and emptied by a waste contractor, therefore minimising potential effects on drainage ditches and watercourses.

2.7 DRAINAGE DITCH DIVERSION

- 38. One drainage ditch, passing through the site of the electrical compound, will require diversion to ensure hydrological continuity.

- 39. The section of the drainage ditch will be isolated using barriers that span the full width of the watercourse. This keeps a stretch of the ditch dry and the water is transferred downstream of the works area by mechanical assistance (pumping), until the long-term diversion, via a new ditch to the east, is operational. The pump and associated pipework need not be located in the isolated area, as shown in Plate 7.

Plate 7: Typical over pumping arrangement³



- 40. It may be necessary to pump water from upstream of the barrier to downstream of the works area, i.e., maintain 'normal' flow in the watercourse either side of the isolated reach. Depending on the gradient of the watercourse, it may also be necessary to install a full width barrier downstream of the work area to prevent ingress of water, as shown in Plate 8.

Plate 8: Full isolation – over pumping/siphon



- 41. Pumps will be kept at least 10 m from the edge of the channel and on drip trays or within bunds that have a capacity 110 % of that of the fuel tank.

³ Engineering in the Water Environment Good Practice Guide Temporary Construction Methods. SEPA. 2009

3 THE MANAGEMENT AND MOVEMENT OF FRESH CONCRETE

42. Concrete will be batched onsite in the bunded compound and the following management measures are proposed.

3.1 ACCIDENTAL SPILLAGE WITHIN THE CONSTRUCTION COMPOUND

43. The construction compound will have a bunded area and this area will be underlain by an impermeable ground membrane layer. The bund will have a 110 % capacity to attenuate stored liquids. This will reduce the potential for accidental spillages to contaminate surface water or groundwater. An appropriately sized spill kit(s) will be provided and maintained on site. This will contain materials, such as absorbent granules and pads, absorbent booms and collection bags. These are designed to halt the spread of spillages and will deployed, as necessary, should a spillage occur elsewhere within the construction compound.

3.2 ACCIDENTAL SPILLAGE OUTSIDE CONSTRUCTION COMPOUND

44. Speed limits for vehicles transporting fresh concrete will be set at a maximum of 15 miles per hour (mph) and will be continually monitored. Maximum vehicle load capacities will not be exceeded. Although tracks will be maintained in good condition, vehicle loads and/or speeds will be reduced when a rougher surface is identified prior to track maintenance.
45. Spill kits will also be located at strategic points across the Development site where fresh concrete may be present, as displayed in Plate 9.

Plate 9: Spill Kits



46. Measures to manage fresh concrete during pouring operations are described in Section 3.4: *Concrete Pouring for Foundations*.

3.3 VEHICLE WASHING

47. There will be a wash-out facility within the construction compound consisting of a sump overlain with an impermeable geosynthetic membrane. The geosynthetic membrane will filter out the concrete fines leaving liquid water to pass through to the sump. The sump water will be pumped to a licenced carrier and taken off-site for approved disposal.
48. No washing of concrete-associated vehicles will be undertaken outside the wash-out facilities, and the area will be signposted, with all site contractors informed of the locations.
49. The frequency of concrete plant wash-out may also be reduced through the use of retarders.
50. Plate 10 displays a typical concrete wash-out facility.

Plate 10: Typical concrete wash-out facility



51. In the event that plant and wheel washing is required, dry wheel wash facilities, as shown in Plate 11, and road sweepers will be provided to prevent (as far as is practicable) mud and debris being carried from within the Development site onto the public road.
52. Signage will be put in place to direct all vehicles to use wheel wash facilities. The track section between the wash facility and the public road will be surfaced with tarmac or clean hardcore and the area surrounding the facilities will be kept clean and in good condition.
53. The wheel wash facility, which will work on a closed cycle, shall be operated throughout the construction period. Wheel wash facilities will be located within a designated area of hardstanding at least 50 m from the nearest watercourse or 20 m from the nearest surface drain. It is expected that these facilities shall be sited adjacent to the electrical compound.
54. Should debris be spread onto the site access or public road adjacent to the Development, then road sweepers will be quickly utilised to clean affected areas. Loose debris will also be periodically removed from on-site tracks. Also, all HGVs taking construction materials to and from the Development site will be sheeted to prevent the spillage or deposit of material on the highway.

Plate 11: Example of a dry ramp wheel wash facility



3.4 CONCRETE POURING FOR FOUNDATIONS

55. Methods to protect surface and groundwater from the batching and transportation of concrete are considered above.
56. To prevent pollution it is important that all concrete pours are planned and that specific procedures are adopted where there may be a risk of surface water or groundwater contamination, in accordance with CIRIA C532. These procedures will include:
- Ensuring that all excavations are sufficiently dewatered before concrete pours begin and that dewatering continues while the concrete cures. However, construction good practice will be followed to ensure that fresh concrete is isolated from the dewatering system; and
 - Ensuring that covers are available for freshly placed concrete to avoid the surface of the concrete washing away during heavy precipitation.
57. The excavated area will be back-filled with compacted layers of graded material from the original excavation, where this is suitable, and capped with soil. Locally, around the foundations, the finished surface will be capped with crushed aggregate to allow for safe personnel access. The management of run-off from these areas is described in Section 2: *The Management of Sediment and Surface Waters*.

3.5 CONCRETE BATCHING

58. Concrete will be batched on site and will be located at the construction compound. The plant will be located away from surface water drainage features and will be in a contained area with a separate drainage system. A settlement and recirculation system for water reuse will be implemented and the washing out of mixing plant will be carried out in a contained area.
59. Wash water and surface runoff from this area will be adequately treated to deal with suspended solids and high alkalinity before discharge. Lined settlement ponds will be used to prevent infiltration of alkaline runoff in the soils and watercourses. Consultations will be carried out with the ES to ensure all methods adopted are appropriate and regarding any licensing requirements for discharge consents.

4 HYDROCARBON CONTAMINATION

4.1 VEHICLE MAINTENANCE

60. During construction, machinery will be regularly maintained to ensure that there is minimal potential for fuel or oil leaks / spillages to occur. All maintenance will be conducted on suitable absorbent spill pads to minimise the potential for groundwater and surface water pollution. All machinery will be equipped with drip pans to contain minor fuel spillage or equipment leakages.

61. Appointed refuelling personnel will be trained in the correct methods of refuelling on site to ensure that pollution incidents are prevented and a quick response plan is implemented, should a spill occur, to minimise the impact of spills.
62. Fuel delivery vehicles servicing the site will only be allowed as far as the construction compound. The construction compound will include a bunded refuelling area, and operations will only be permitted where they comply with the Contractor's method statement/ requirements.
63. Fuel pipes on plant, outlets at fuel tanks, etc., will be regularly checked and maintained to ensure that no drips or leaks to ground occur. The following precautions will also be installed on fuel delivery pipes:
- Any flexible pipe, tap or valve must be fitted with a lock where it leaves the container and be locked when not in use;
 - Flexible delivery pipes must be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use;
 - The pump or valve must have a lock and be locked when not in use;
 - Warning notices including "No smoking" and "Close valves when not in use" shall also be displayed; and
 - Spill kits will be available within each plant/ vehicle on site and also located close to identified pollution sources or sensitive receptors (fuel storage areas, water course crossings, etc.).
64. Irrespective of the buffer distances to watercourses and location of refuelling points, interceptor drip trays or similar (open metal drip trays are not acceptable) will be available in accordance with standard good practice across the construction industry. Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays.
65. Plate 12 displays examples of drip pans and bunds.

Plate 12: examples of drip trays and bunds



4.2 CHEMICAL STORAGE

66. Potentially contaminating chemicals stored on site will be kept within a secure bunded area to prevent any accidental spills from affecting hydrological resources. The bunded area will be within the construction compound and will be underlain by an impermeable ground membrane layer to reduce the potential pathways for contaminants to enter watercourses and groundwater.
67. Oil storage areas will be covered in order to prevent rainwater collecting within the bunded area.
68. Further detail is presented in Section 3.1: Accidental Spillage within Construction Compounds.

69. The chemicals storage area would be kept secure to prevent theft of vandalism. A safe system for accessing the storage area would be implemented by the Construction Contractor.

4.3 MANAGEMENT OF DRAINAGE FROM SURPLUS MATERIALS

70. Careful consideration will be given to the location of topsoil and subsoil storage areas for all areas of the Development site during construction. Storage areas will be either in a flat dry area away from watercourses, or be protected by the addition of cut off drains above the storage areas to minimise the ingress of water.
71. Mineral soils will not be allowed to dry out and silt fences and mats will be employed to minimise sediment levels in run-off.
72. All stockpiled material will be stored at least 50 m from drainage ditches in order to reduce the potential from sediment to be transferred into the wider surface water system and will be regularly inspected to ensure that erosion of the material is not taking place.

4.4 DUST SUPPRESSION AND CONTROL

73. Water needed for dust suppression on the haul roads during periods of dry weather and the compound vehicle wash will be clean water. Clean water may be obtained from re-circulated clean or treated drainage waters.
74. Where required, water may be extracted from local watercourses or groundwater. In these instances, the Contractor will liaise with the EA beforehand to agree abstraction locations, rates and licencing requirements.
75. Good practice measures will be adopted during construction to control the generation and dispersion of dust such that significant impacts on neighbouring habitats will not occur. The hierarchy for mitigation will be prevention, suppression then containment.
76. The following mitigation measures will be implemented to control the movement of dust within the Development site:
- Excavation and earthworks areas will be stripped as required in order to minimise exposed areas;
 - During excavation works, drop heights from buckets will be minimised to control the fall of materials reducing dust escape;
 - Completed earthworks and other exposed areas will be covered with topsoil and re-vegetated as soon as it is practical in order to stabilise surfaces;
 - During stockpiling of loose materials, stockpiles shall exist for the shortest possible time;
 - Material stockpiles will be low mounds without steep sides or sharp changes in shape;
 - Material stockpiles will be located away from the site boundary, sensitive receptors, watercourses and surface drains;
 - Material stockpiles will be sited to account for the predominant wind direction and the location of sensitive receptors;
 - Water bowsers will be available on site and utilised for dust suppression during roadworks/ vehicle movements when and where required;
 - Daily visual inspections will be undertaken to assess need for use of water bowsers, with increased frequency when activities with high potential to generate dust are carried out during prolonged dry or windy conditions;
 - Shielding of dust-generating activities;
 - Use of enclosed chutes, conveyors and covered skips;
 - Covering vehicles carrying dry spoil and other wastes to prevent escape of materials;
 - Provision of wheel washing and wet suppression during loading of wagons/vehicles; and
 - Daily visual inspections will be undertaken to assess the condition of the junction of the site track with Seasalter Road and its approaches.

5 ACCESS TRACK / SPINE ROAD CONSTRUCTION AND USE

77. Prior to access track construction, site operatives will identify flush areas, depressions or zones which may concentrate water flow. These sections may be spanned with plastic pipes if required to ensure hydraulic conductivity under the road, and reduce water flow over the road surface during heavy precipitation. Site drainage design will be produced in advance of construction.
78. At spine road and access track crossings of watercourses where protected species are present, there will be a requirement to obtain a license from Natural England prior to the commencement of works to enable activities that would otherwise be illegal. The completion of works will need to strictly follow the conditions contained within a Class⁴ Licence or Science & Conservation⁵ License for Water Voles, and following a Reptile Mitigation Strategy (RMS) for reptiles. Further details of licensing requirements can be found within ES Chapter 8, Ecology.

5.1 MANAGEMENT OF SURFACE WATER

79. Access tracks will be designed to have adequate cross fall to avoid ponding of rainwater and surface run-off. Run-off from the access tracks will be directed into swales that will be designed to intercept, filtrate and convey the runoff.
80. Check dams will be installed within the swales in order to increase the attenuation of run-off.
81. Permanent swales and drainage ditches adjacent to access tracks will have outlets at specified intervals to reduce the volume of water collected in a single channel and, therefore, reduce the potential for erosion. Further measures could include the use of settlement ponds or possibly flocculent to further facilitate the settlement of suspended solids, if required.
82. The contractor would be responsible for the management of all surface water run-off, including the design and management of a drainage scheme compliant with SuDS principles. This may include settlement lagoons and retention ponds, incorporating natural or assisted attenuation.

5.2 LOOSE TRACK MATERIAL

83. Loose material from the use of the access track / spins road will be prevented from entering watercourses by utilising the following measures:
- Silt fences will be erected between areas at risk of erosion and drainage ditches;
 - Silt fences and swales will be inspected daily and cleaned out as required to ensure their continued effectiveness;
 - Silt matting if required will be checked daily and replaced as required;
 - Excess silt will be disposed of in designated areas at least 50 m away from any watercourses or drainage ditches;
 - Swales and drains will be checked after periods of heavy precipitation;
 - The inlets and outlets of settlement lagoons, retention basins and extended detention basins will be checked on a daily basis for blockages; and
 - The access tracks will be inspected on a daily basis for areas where water collects and ponds.
84. An example of a semi-permeable geotextile layer is shown in Plate 13.

⁴ Class Licence: Intentional disturbance of water voles and damage/destruction of water vole burrows by means of displacement (to facilitate development of activities). (WML-CL31 – Class Licence) Natural England.

⁵ Licence Application Form: Application for a licence to kill, take, disturb or possess wild animals for science, education or conservation (A29 – Science, Education or Conservation) Natural England.

Plate 13: semi-permeable geotextile layer



5.3 MATERIAL EXCAVATED DURING TRACK CONSTRUCTION

85. Material excavated during track construction will be either be stored adjacent to the track or within agreed spoil deposition areas and compacted in order to limit instability and erosion potential. Silt fences will be employed if required to minimise sediment levels in run-off. Material will be stored at least 50 m from watercourses and drainage ditches in order to reduce the potential from sediment to be transferred into the wider hydrological system.
86. Typical overburden stockpile measures are shown in Plate 14.

Plate 14: Typical overburden stockpile measures



5.4 WATERCOURSE / DRAINAGE DITCH CROSSINGS

87. The use of in-situ fresh concrete in the construction of watercourse crossings will be avoided by the use of pre-cast elements. Existing culverts may be upgraded and are anticipated to be replaced with suitable pre-cast culvert designs. Ready-made concrete 'box style' culverts will be used. Existing culverts requiring an upgrade will be replaced using ready-made culverts, outlined in Section 12 of this CEMP.
88. Culverts will be designed based on best practice in order to minimise effects of construction on the natural integrity and continuity of watercourses. The design will incorporate the following criteria:
 - Culverts will be well bedded to avoid settlement and protected by an adequate cover of road material;
 - The substrate and side/ head walls will be reinforced in order to prevent erosion;

- The culverts will be designed such that it does not cause a barrier to movement of fish or other aquatic fauna;
 - Culvert floors will have the same gradient (not exceeding a slope of 3 %) and level, and carry similar bed material and flow, as the original stream;
 - There shall be no hydraulic drop at the culvert inlet or outlet;
 - The width of the culvert will be greater than the active channel width of the watercourse;
 - Culverts will be used to conduct water under the solar park tracks; and
 - Any fences or screens fitted on the inlet or outlet of the culvert will be designed to allow at least 230 mm of space between the bars of the screen of fence, up to the high water level;
 - There is a preference to avoid construction in watercourses altogether through the use box culverts or bridges structures appropriately designed not to impede the flow of water and allow safe passage for wildlife, such as fish, water voles, otters etc. However, short and long term impact of designs should be considered, and there can be a case for using box culverts;
 - When installing culverts, care will be taken to ensure that the construction does not pose a permanent obstruction to migrating species of fish, or riparian mammals (i.e. the crossings will make provision for fish and wildlife migration);
 - Culverts should be sized so that they do not interfere with the bed of the stream post construction, (i.e. the crossings will leave the watercourse in as natural condition as possible or permit reestablishment of substrate post construction);
 - Single culverts will be used in preference to a series of smaller culverts that may be more likely to become blocked with flotsam and create erosion (i.e. the crossings will not constrict the channel);
 - Although no fish have been observed within the drains running through the site, if any fish are found during the construction of any culverts they will be removed from the immediate construction site to a place of safety if deemed necessary after consultation with the relevant fisheries interest;
 - To minimise impacts on breeding of any fish found, then any in-stream works in these areas will be conducted during months which have less impact on their breeding and development, where possible;
 - Ease and speed of construction are important to minimise disruption to the watercourse and surrounding habitat;
 - Culverts and headwalls should be designed for the life of the project;
 - Designs should be low maintenance and where possible self-cleansing; and
 - Structures should visually in keeping with the surroundings
89. Each watercourse crossing shall be designed on a case by case basis to be appropriate for the width of watercourse being crossed, and the prevailing ecological and hydrological situation (i.e., the sensitivity of the watercourse).
 90. A number of factors, both environmental and engineering will influence the selection of structure type and the design of the crossing.
 91. Where the diversion of a minor section of drainage ditch is considered necessary (in proximity to the compound) the Internal Drainage Board (IDB), the EA and the ECoW would be consulted.

5.4.1.1 Structural Design

92. The structural design of watercourse crossings will take into account
 - Design loading (taking into account different delivery vehicles);
 - Bearing capacity;
 - Potential for short and long term settlement;
 - Environmental conditions; and
 - Flood risk.

93. All structures will be designed in accordance with the Design Manual for Roads and Bridges (DMRB).

5.4.1.2 Culverts

94. Box culverts on watercourses where such structures are considered appropriate will likely be concrete. Inverts will be located below bed level reflecting ecological requirements.
95. A natural stone headwall will be provided upstream and downstream of culverts to protect the road embankment. Further protection will be provided to the banks using soft engineering techniques as much as possible.
96. Where there is risk of bed erosion upstream or downstream of culverts, natural stone rip-rap will be provided.

6 HANDLING OF MINERAL SOILS

6.1 GENERAL GOOD PRACTICE MEASURES

97. The excavation of foundations will generate excess material, the majority of which will typically be mineral soils.
98. At excavations, topsoil will be stripped separately to sub soils, where possible aiming to keep the top layer of turf intact. This material will be stored adjacent to the base working area and will be limited in height to 2 m to minimise the risk of overheating. Subsoil will then be stripped and stored, keeping this material separate from the topsoil in accordance with guidance by the EA.
99. In accordance with BS 3882 'Specification for Topsoil and Requirements for Use', any long term stockpiling of topsoil should not exceed 2.0 m in height with a maximum side slope of 1 in 2. In its dry non plastic state, topsoil can be stockpiled in a 'loose tipped' manner and tracked using a compactive method reducing water ingress. Wetter soils can be stored in windrows for drying and later stockpiled for re-use.

7 DISPOSAL OF WASTE MATERIALS

100. Waste such as timber, metal, general waste, etc., will be segregated on site, and disposed of, off site, in a licenced waste facility.

8 MONITORING PROGRAMME

101. A surface water and groundwater monitoring programme will be established prior to the construction phase of the Development. An indicative monitoring programme is set out below.

8.1 SURFACE WATER MONITORING

102. Surface water monitoring would be undertaken at locations on the principal watercourses downstream of the Development infrastructure and upstream of other non-natural influences, where possible.
103. Regular visual inspections of surface watercourses are proposed, especially during major excavation works, as these allow rapid identification of changes in levels of suspended solids that could indicate construction related effects are occurring upstream. Potential effects can then be investigated and remedial action taken to prevent further effects, if necessary.
104. To supplement the visual inspections, it is anticipated that there would be up to six surface water monitoring points for extractive sampling and analysis. Details will be agreed in advance of construction.
105. The following sampling frequency is proposed in order to establish baseline hydrochemical conditions of surface water constituents:
- once a month for six months prior to the construction phase.

106. The following sampling frequencies are proposed in order to monitor surface water conditions against baseline conditions:
- twice a month during earthworks and concrete works, e.g., access track construction, foundations; and
 - once a month, for six months after the construction phase.
107. Establishing baseline conditions for surface waters will enable any trends in levels of critical parameters to be assessed and deviations from the norm identified and rectified through water management measures. Monitoring will not take place within catchments or sub-catchments where no construction activity has occurred for a period of two weeks or more, during the on-going construction phase.

8.2 MONITORING REPORTING

108. The results of all laboratory analysis of water samples will be tabulated and recorded.

8.3 OPERATIONAL PHASE MONITORING

109. Sampling and testing will be carried out during the operational phase when any major maintenance or construction works are undertaken that may give rise to pollution of surface water.

8.4 MONITORING PROGRAMME SUMMARY

110. Any activity proving detrimental to water quality will be detected at the earliest opportunity during the construction and operational phases of the Development. This will allow action to be taken to prevent any further effect on water quality.

9 DECOMMISSIONING

111. The Outline Decommissioning and Restoration Plan (ES Technical Appendix A5.5) will be supported by a Decommissioning Environmental Management Plan (DEMP) to be agreed prior to the commencement of decommissioning.
112. A full drainage reinstatement plan would be developed as part of the DEMP in advance of decommissioning the Development. Decommissioning activities will be undertaken in accordance with good practice at the time, and agreed with the relevant consultees in advance of the works commencing.

10 CONCLUSIONS AND RECOMMENDATIONS

113. The purpose of this Outline CEMP is to detail appropriate water management measures to control surface water run-off, and drain infrastructure during the construction and operation of the Development. The measures detailed throughout this report would ensure that any effects on the surface and groundwater environment are minimised.
114. This document would be adapted to meet the additional requirements of the construction contractor and ECoW, when appointed, to ensure that all measures implemented are effective and site-specific.
115. The Outline CEMP is considered to be a live document, such that modifications can be made following additional information and advice from consultees.

11 APPENDIX A - OUTLINE SITE WASTE MANAGEMENT PLAN

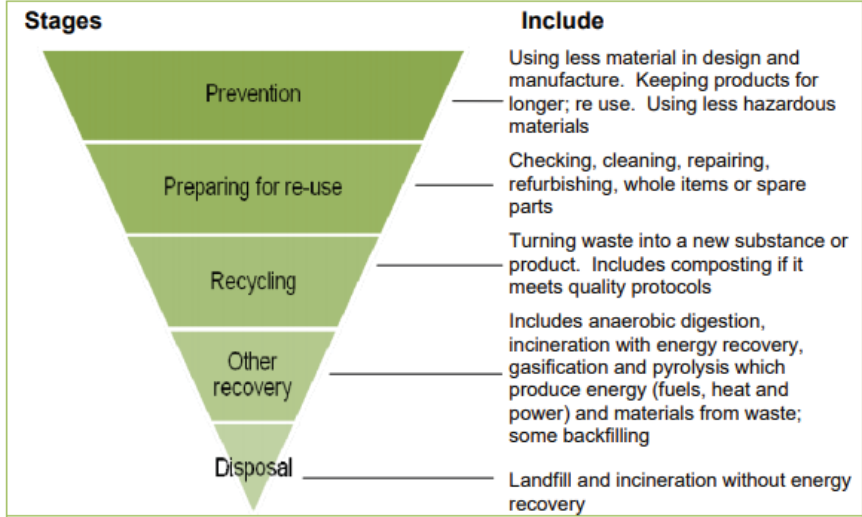
11.1 INTRODUCTION

116. This Outline Site Waste Management Plan (SWMP) has been prepared by Arcus Consultancy Services Ltd for Cleve Hill Solar Park ('the Development'). The aim of this document is to protect the environment through implementation of effective management plans which relate to the management of waste throughout the life cycle of the Development. The Principal Contractor will take ownership of the SWMP and will adhere to the principles presented within it.
117. The SWMP is a key tool which is used to plan, implement, monitor and review waste minimisation and management during the construction, operation and decommissioning phases of the Development. This SWMP builds on the outcomes of the Environmental Impact Assessment (EIA), taking account of good practice guidance to provide waste management methodologies.
118. This outline SWMP provides guidelines and details of the minimum requirements which the Contractor shall include in their detailed SWMP. The detailed SWMP will be put in place by the appointed Contractor prior to commencement of the construction phase and will be implemented in conjunction with the Construction Environmental Management Plan (CEMP) to ensure environmental effects on site are reduced.
119. It is anticipated that all excavated materials will be utilised on site as part of the permanent works and site restoration process resulting in no waste arising from these elements of the Development. As such this SWMP considers only the management of the waste arising from other imported construction materials.

11.1.1 The Waste Hierarchy

120. The 'Waste Hierarchy' provides an outline approach of how waste management should be assessed within the SWMP, see Plate 16. The Waste (England and Wales) Regulations 2011 place a duty on all persons who produce, keep or manage waste to apply the 'Waste Hierarchy' in order to minimise waste production at every stage of the development. The 'Waste Hierarchy' promotes selection of the Best Practicable Environmental Option (BPEO) and preferred option for management of waste.

Plate 16: Waste Hierarchy⁶



121. The core waste management principles of prevention, reuse, recycle, recover and disposal as defined in the 'Waste Hierarchy', are embedded within this SWMP.
- 11.1.1.1 Waste Prevention

122. Minimisation of waste generation is achieved through careful design and creating a 'waste aware' culture on site. All reasonable actions will be taken by the Contractor to avoid the production of and/or minimise the volume of waste produced as a result of the Development. This can be through reducing consumption, using resources efficiently, and designing for longevity.
- 11.1.1.2 Waste Separation for Reuse and Recycle

123. Where possible, the separation of waste will be carried out at the source in order to maximise opportunities for reuse and recycling. Segregation of waste will require training, monitoring and enforcement.
- 11.1.1.3 Waste Storage, Disposal and Transportation

124. All areas used for temporary storage of waste on site will comply with Defra and EA guidelines and will be clearly signed. Waste storage facilities will be provided at source using the best environmental options available. Any hazardous or special waste will be stored in separate, secure containers and clearly identified as such.

125. Disposal activities will also be carried out in accordance with the PPGs in order to ensure compliance with current waste legislation.

126. Waste transportation will take place at regular intervals to avoid the accrual of waste. Where possible, delivery vehicles will aim to remove waste materials on return trips.

127. Only registered waste carriers will be authorised to transport waste and a Waste Transfer Note (WTN) will be completed for each load of waste, which must contain a record of their waste carrier registration number. Copies of each WTN will be filed as an appendix to the SWMP and held for at least two years. The appropriate European Waste Catalogue (EWC) code will be noted on the WTN, in addition to how it is contained. All sites receiving waste must have an appropriate permit, licence or registration exemption, the details of which should also be recoded.

⁶ Defra (2011), Guidance on applying the Waste Hierarchy [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69403/pb13530-waste-hierarchy-guidance.pdf (accessed 31/10/2018)

128. If required, EA will be advised in advance of any hazardous waste movements and Waste Consignment Notes (WCNs) will be purchased in advance for this type of waste transportation. These consignment notes will be held for at least three years.

11.1.2 Policy Context and Legislation

129. The development and implementation of a SWMP in England is no longer a legal requirement as of 2013, however it is regarded as best practice⁷. However, policy and legislation do dictate the management of waste in England and therefore the following items have been considered when developing the SWMP:

- The Environmental Protection Act 1990;
- The Hazardous Waste (England and Wales) Regulations 2005;
- The Waste (England and Wales) Regulations 2011;
- The Waste Framework Directive; and
- The Waste Management Plan for England 2013.

130. Should any surplus waste remain which cannot be reused or recycled, then the Landfill Directive 1999 will apply.

11.1.3 Guidance

131. Several guidance documents were also used to develop the SWMP and include:

- Environment Agency, 2015, Manage Water on Land: Guidance for Land Managers;
- British Standards Institution, 2015, BS 5930:2015, Code of practice for ground investigations;
- Construction Industry Research and Information Association (CIRIA), 2015, Environmental Good Practice on Site (C741), 4th edition;
- Defra and Environmental Agency, 2016, Waste Duty of Care Code of Practice;
- Defra and Environmental Agency, 2016, Pollution Prevention for Businesses;
- Defra and Environmental Agency, 2016, Discharges to Surface water and groundwater: environmental permits;
- Defra and Environmental Agency, 2016, Oil Storage Regulations for Businesses;
- Institute of Environmental Management and Assessment (IEMA), 2008, Practitioner Vol. 11 Waste Management: a guide for businesses in the UK;
- Wrap, www.wrap.org.uk

11.1.4 Objectives

132. The above guidance on waste management will be used to ensure the following objectives are met through the SWMP:

- Legal obligations of the Development;
- Waste production is minimised;
- Waste is recognised as a resource;
- Project build costs are minimised;
- A framework for continuous improvement and best practice is implemented and maintained; and
- Adverse environmental impacts associated with the production and management of waste materials are minimised.

11.2 ANTICIPATED WASTE STREAMS

133. The list below provides an indication of the expected waste streams, however this list is not exhaustive and additional streams may be added as the works progress:

- Waste from welfare and domestic facilities;

⁷ IEMA (2008) Practitioner Series No. 11, Waste Management: A Guide for Business in the UK. Institute of Environmental Management and Assessment.

- Waste chemicals, fuels and oils;
- Packaging;
- Waste metals; and
- Waste water.

11.2.1 Waste from Welfare and Domestic Facilities

134. Temporary welfare facilities will be provided during the construction phase, with permanent welfare facilities provided in the site office, storage and welfare building. These facilities will include toilets, washing and drinking water. This would include a connection to the public mains water supply, and either a connection to the foul sewer or a cess tank that would be periodically emptied and taken off site by a licensed operator. All on site welfare facilities will be clearly signposted and maintained.

135. Where excess surface water occurs from the area of the buildings, this would be collected and treated in a Sustainable Urban Drainage System (SUDS), prior to discharge.

11.2.1.1 Toilet Facilities

136. Effluent and waste from onsite construction personnel will be treated at a package sewage treatment plant or a septic tank and discharged into a properly designed and sized drainage field, in accordance with PPG4, subject to obtaining the required consents.

137. The substation will house permanent welfare facilities, with waste water treated via a closed system (a temporary (long-term) package sewage treatment plant or septic tank) which will be fully consulted upon with the EA prior to construction.

138. Where a septic tank is used, this will be emptied on a regular basis and taken away by a registered waste disposal contractor.

11.2.1.2 Other Domestic Refuse

139. Collection facilities for refuse will be provided to segregate waste. These facilities will be clearly marked, positioned in appropriate locations and protected from the weather and animals.

11.2.2 Waste Chemicals, Fuels and Oils

140. All fuel and oil will be stored within an area of the construction compound and contained by a small bund constructed from material sourced on site and lined with an impermeable membrane in order to prevent any contamination of the surrounding soils, vegetation and water table, in accordance with Defra and Environmental Agency Oil Storage Regulations for Businesses 2016. Any contaminated run-off within the bund will be disposed of at an appropriate waste management facility.

141. Any used (contaminated) spill kits, absorbent granules, sheets or fibres must be disposed of in accordance with the COSHH regulations and in accordance with the spill management plan.

11.2.3 Packaging

142. Construction waste generated is expected to be restricted to general construction waste, such as off cuts of timber, wire, cleaning cloths, paper, etc. which will be sorted and either recycled or disposed of off-site to an appropriately licenced landfill by the Contractors.

143. Packaging will be separated at the source of generation on site, where practical. This approach uses the Waste Hierarchy by encouraging reuse and recycling of materials, such as plastic, wood and paper.

11.2.4 Waste Metals

144. It is likely that this will be produced from excess steel from the solar PV mounting structures or cuttings from underground cabling. These materials would be recycled.

11.3 WASTE WATER

11.3.1 Dewatering of Excavations

145. Where dewatering is required, water will be pumped into settlement lagoons for treatment and discharged onto vegetated surfaces. Details of such activities are included in the CEMP.

11.3.2 Cleaning Activities

146. A vehicle washing facility will be in the construction compound or other designated area. The sump water will either be pumped to a licenced carrier and disposed of offsite or discharged to vegetated surfaces if the water quality meets EA requirements, following consultation with the Ecological Clerk of Works (ECOW).

12 APPENDIX B – OUTLINE BREEDING BIRD PROTECTION PLAN

12.1 INTRODUCTION

147. This Outline Breeding Bird Protection Plan (BBPP) details all breeding bird protection and safeguarding measures in place and proposed during construction of the Development. This includes avoiding direct disturbing effects on the Swale Special Protection Area which is situated adjacent to the land where development will take place and could therefore be subject to direct disturbance effects during construction.
148. Breeding bird protection measures are referenced within ES Chapter 9: Ornithology. This Outline BBPP is appended to the Outline Construction and Environmental Management Plan (CEMP), Technical Appendix A5.4.

12.2 RELEVANT LEGISLATION

149. Breeding (nesting) birds are protected under the European Birds Directive (2009/147/EC), transposed into national law by the Wildlife and Countryside Act (WCA) 1981 (as amended). Part 1 of the WCA 1981, as amended, is of greatest relevance to the Development since it establishes protection for breeding birds where it prohibits the following actions:
- Intentional or reckless killing, injuring or taking of any wild bird;
 - Taking, damaging or destroying of the nest (whilst being built or in use) or eggs; or
 - Possession of wild birds (dead or alive) or their eggs.
150. Additional penalties apply for offences relating to birds listed on Schedule 1 of the WCA: it is an offence to intentionally or recklessly disturb a Schedule 1 bird while it is nest building or is in, on or near a nest with eggs or young; or to disturb the dependent young of such a bird.
151. The breeding bird season during which the majority of bird species nest, is 1 March to 31 August inclusive⁸.

12.3 POTENTIAL EFFECTS TO BREEDING BIRDS

152. When construction activities are undertaken during the breeding bird season, there are several ways nesting birds may be inadvertently affected.
153. Construction related accidental disturbance and damage to breeding birds and active nests has potential to constitute a legal offence, specifically including the following effects (not limited to):
- Direct damage to a nest or nest site;
 - Harm to parent birds, their eggs or unfledged young;
 - Disturbance to dependent young;
 - Disturbance during nest building activity;
 - Prevention of access to a nest site or dependant young; and
 - Abandonment of a nest site by parent birds at any stage between nest building and fledging.

12.4 PROTECTION AND SAFEGUARDING MEASURES

154. In order to safeguard breeding birds, the following measures will be adopted:
- The implementation of an Ecological Clerk of Works (ECOW);
 - Sensitive timing of construction activities;
 - Pre-construction nesting bird checks; and
 - Breeding bird dissuasion.

⁸ <https://www.gov.uk/guidance/wild-birds-surveys-and-mitigation-for-development-projects>

12.4.1 Appointment of an Ecological Clerk of Works

155. Compliance with the law will be achieved by the appointment of a suitably experienced ornithologist/ecologist as Ecological Clerk of Works (ECoW) to locate any active nests close to construction works shortly before these commence.
156. During the breeding bird season the ECoW will carry out regular walkover surveys to identify any potential breeding bird constraints.
157. Other ECoW responsibilities will include (but not be limited to) the following:
 - Planning (as far in advance as possible) for known ornithological issues, and responding to new ones, appropriately.
 - Advising on the location of avian conservation interests and the type of protection or mitigation required.
 - Supervising and monitoring the implementation and maintenance of protective or mitigation measures to ensure legal compliance and safeguard sensitive ornithological receptors.
 - Monitoring pollution prevention measures.
 - Liaising with, and reporting to the construction project management team, the principal contractor and workforce, and relevant stakeholders about ornithological issues.
 - Educating workforce (e.g. with 'Toolbox Talks') about ornithologically sensitive features, legal obligations, best practice, and procedures.
 - Ensuring that Method Statements and Plans are revised according to new information.

12.4.2 Sensitive Construction Scheduling

158. Where practicable, construction related activities in the areas of the Development site closest to The Swale SPA will be avoided during the breeding bird season. This will help to reduce the risk of breeding birds in the protected site being directly or indirectly affected by the construction phase of the Development (and vice versa – construction activities being affected by restrictions imposed by the ECoW).
159. This may not be fully achievable, and therefore additional safeguarding measures may be required, as outlined elsewhere in this BBPB.
160. An Outline SPA Construction Noise Management Plan (SPA CNMP), Technical Appendix A12.10 has been produced and will be updated prior to the commencement of construction. The SPA CNMP will be used by the ECoW to ensure noise levels do not give rise to disturbance effects in the SPA during the breeding season.

12.4.3 Nesting Bird Checks

161. No more than two weeks prior to the commencement of construction activities during the breeding bird season in any given location, the ECoW would be required to undertake pre-commencement checks for nesting birds in all areas which may be potentially affected by construction and which may support any wild breeding bird.
162. If nesting birds are recorded within or in close proximity to the working area, an appropriate exclusion zone (at least 50 m)⁹ will be enforced around the nest and no works will be permitted in this area until an ecologically-sensitive and legally-compliant solution is in place, or until it can be confirmed by the ECoW that the nest has been vacated.
163. Until this time, all construction staff will be informed of the constraint, and the area will be clearly cordoned off and demarcated to ensure no disturbance occurs.
164. Upon natural conclusion of the breeding attempt (once breeding has finished and all adults and young have vacated the nest), works may commence in the exclusion zone.

⁹ Bird tolerance levels vary from species to species, therefore the exclusion zone area allocated to a nest will be decided upon on a case-by-case basis by the ECoW following the identification of the nesting species.

12.4.3.1 Nesting Marsh Harrier


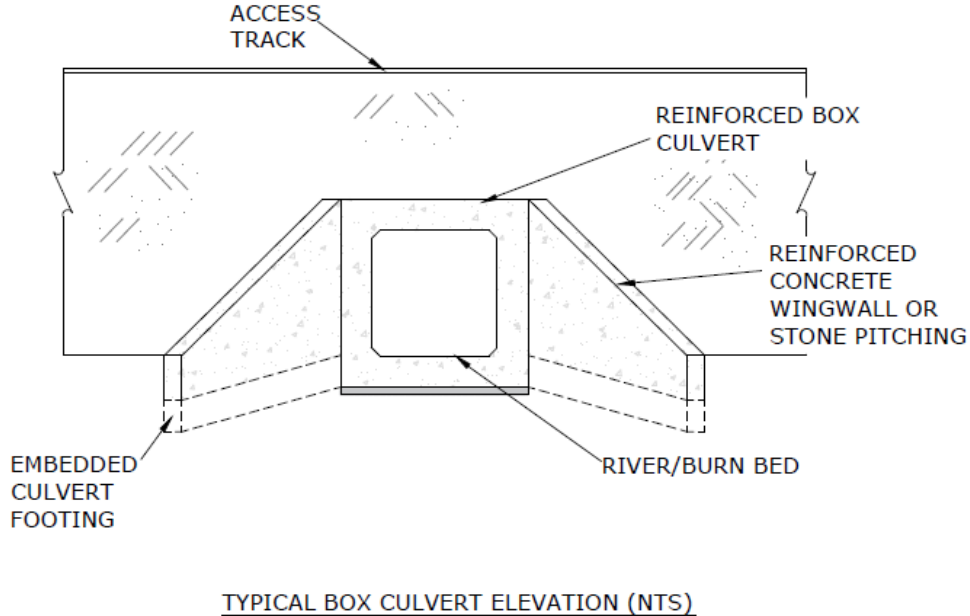
165. In the event that a nest site of marsh harrier is identified, a 500 m exclusion zone¹⁰ will be enforced immediately around the nest location and no works will be permitted in this area until an ecologically-sensitive and legally-compliant solution is in place, or until it can be confirmed by the ECoW that the nest has been vacated. The area will be clearly marked and site personnel will be informed of the sensitivity of the area. A disturbance risk assessment will be completed by the ECoW and the exclusion zone will be amended as appropriate, ensuring that any disturbing or damaging impact on nesting marsh harriers is avoided.
166. Upon natural conclusion of the breeding attempt (once breeding has finished and all adults and young have vacated the nest), works may re-commence in the exclusion zone.

12.4.4 Breeding bird dissuasion

167. In addition to the above measures, should it be necessary to schedule construction activities within the breeding season in certain areas, visual deterrent devices such as reflective bunting may be placed within a restricted area by the ECoW to dissuade birds from nesting within that locality.
168. In certain areas of the Development site, grassland will establish prior to construction activities taking place. In areas where grassland has become established prior to construction and provides suitable conditions for ground-nesting birds, the grassland sward will be managed (e.g. by mowing or grazing) to reduce its attractiveness to ground-nesting birds and minimise the risk of disturbance to nesting birds and prevent disruption to the construction schedule.
169. Areas of establishing grassland in the development area that are not scheduled for construction during the breeding season (e.g., areas excluded from construction during the breeding season as defined in the SPA CNMP) will not be managed to dissuade ground nesting birds; this is to maximise the nesting opportunities for ground-nesting birds in the undisturbed areas of the site during the construction phase.


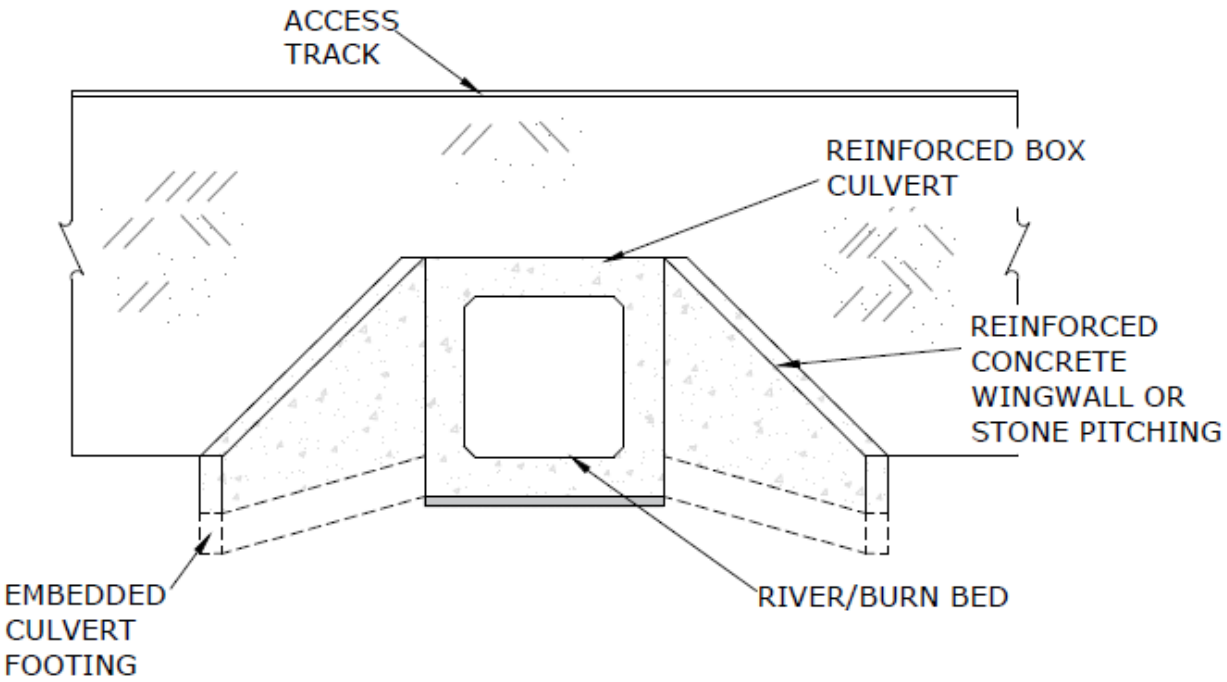
¹⁰ Ruddock, M. and Whitfield, D.P. (2007). *A Review of Disturbance Distances in Selected Bird Species*. Report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

13 APPENDIX C - NEW WATERCOURSE CROSSING INVENTORY



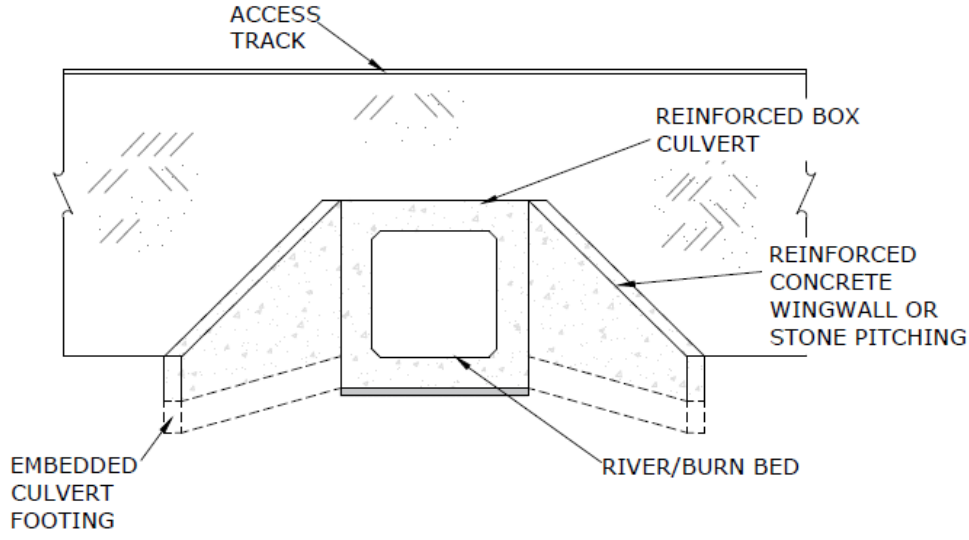
| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|---|--|---|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C3 | No | Box Culvert |
| <div><div>Crossing Location Upstream</div><div></div></div> | <div><div>Crossing Location Downstream</div><div>No photograph available</div></div> | <div><div>Type of Crossing</div><div></div></div> |





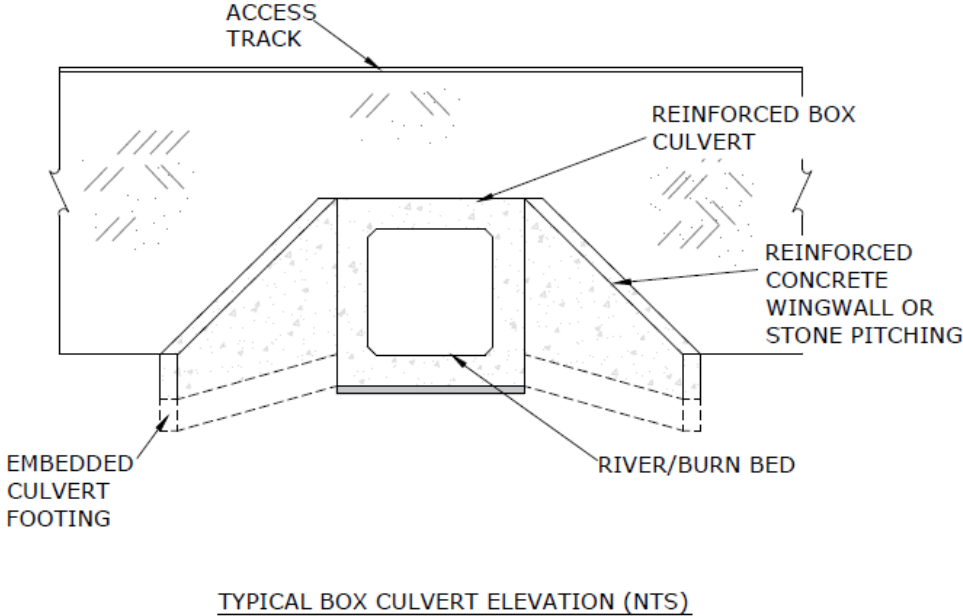
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| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|---|---|--|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C4 | No | Box Culvert |
| <div><div>Crossing Location Upstream</div><div></div><div>Photograph taken approximately 50 m north of crossing location. The existing crossing shown is not in the location of the proposed crossing.</div></div> | <div><div>Crossing Location Downstream</div><div>No photograph available</div></div> | <div><div>Type of Crossing</div><div><p>TYPICAL BOX CULVERT ELEVATION (NTS)</p><p>Map</p></div></div> |

| | | |
|--|--|--|
| | |   <p>Crossing Location</p> |
|--|--|--|

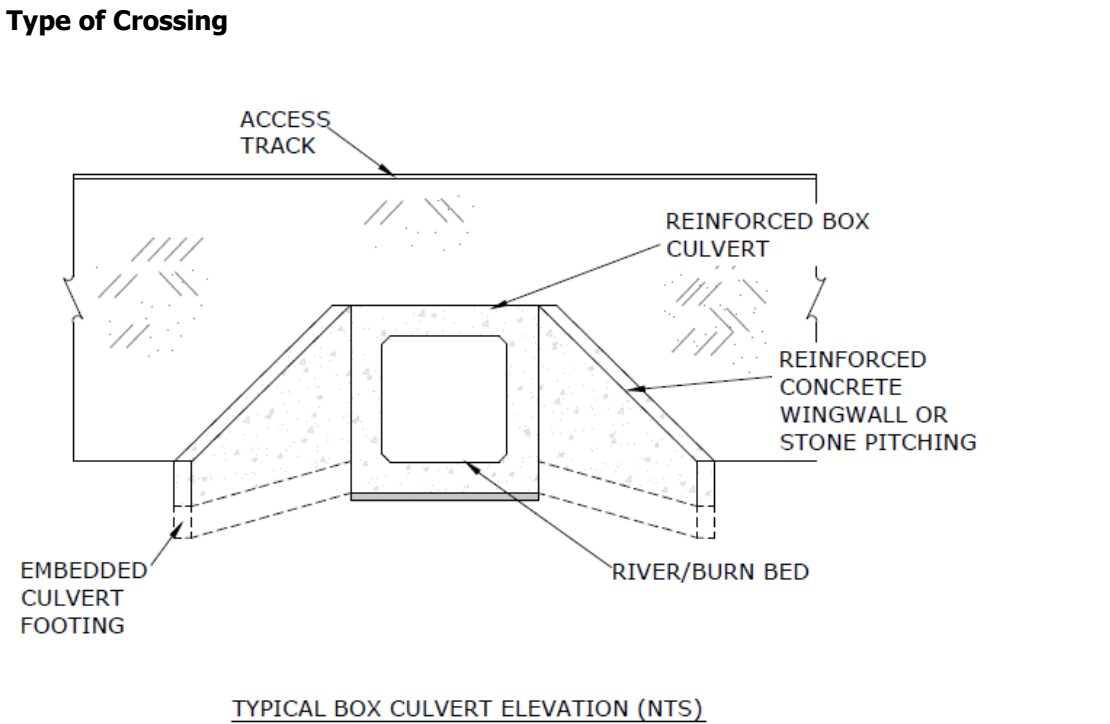
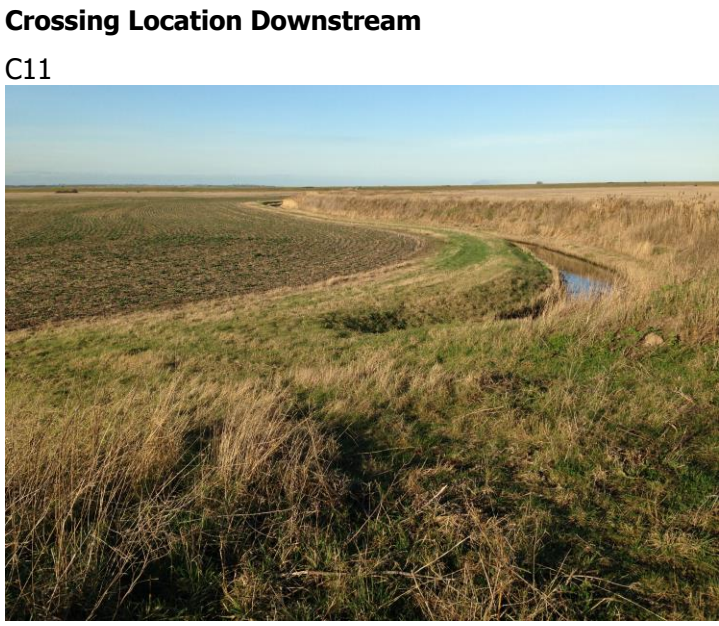
| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|---|--|---|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C9 | No | Box Culvert |
| <div>Crossing Location Upstream</div> <div></div> | <div>Crossing Location Downstream</div> <div></div> | <div>Type of Crossing</div> <div></div> <div>TYPICAL BOX CULVERT ELEVATION (NTS)</div> <div>Map</div> |

| | | |
|--|--|---|
| | |  <p>Crossing Location</p> |
|--|--|---|

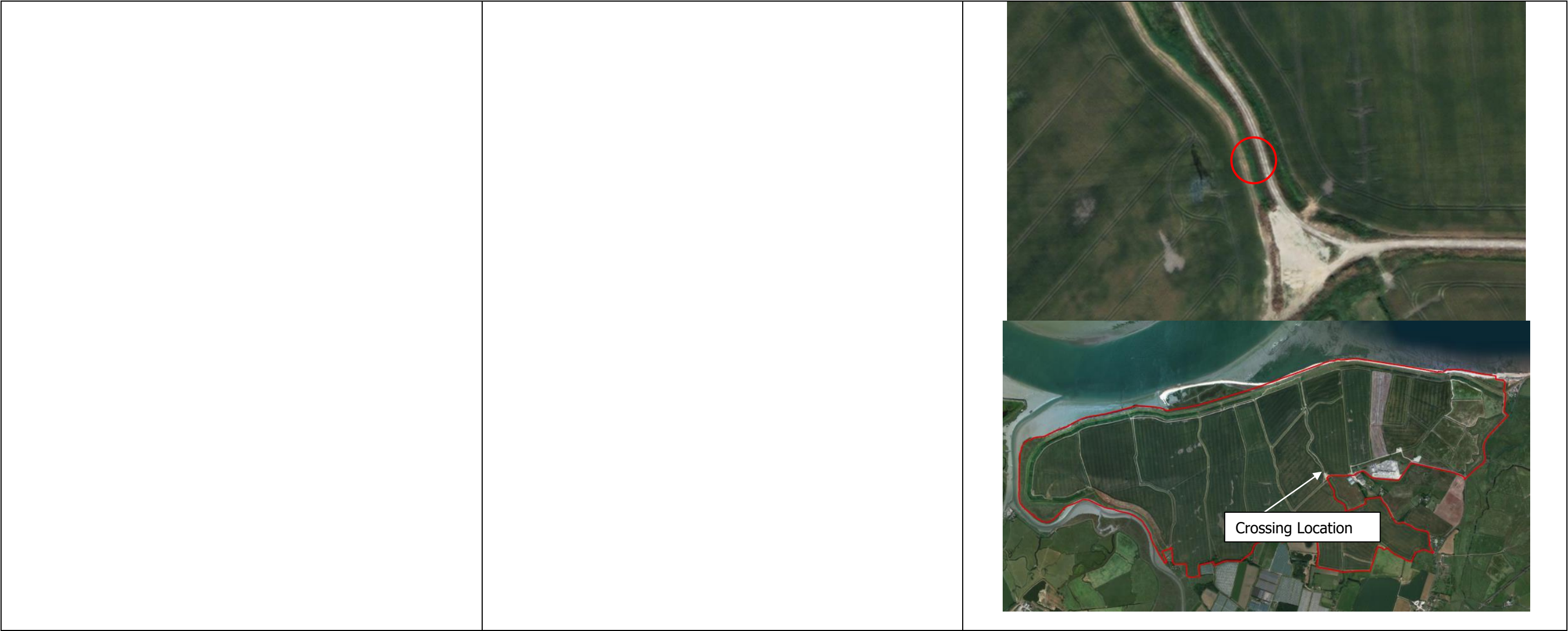
| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|--|--|---|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C10 | No | Box Culvert |
| <div><div>Crossing Location Upstream</div><div></div></div> | <div><div>Crossing Location Downstream</div><div></div></div> | <div><div>Type of Crossing</div><div></div><div>TYPICAL BOX CULVERT ELEVATION (NTS)</div><div>Map</div></div> |

| | | |
|--|--|---|
| | |  <p>Crossing Location</p> |
|--|--|---|


| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|---|---|--|
| Crossing of two unnamed land drains (the western one IDB, the eastern one not) Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C11 & C12 | No | Box Culvert |





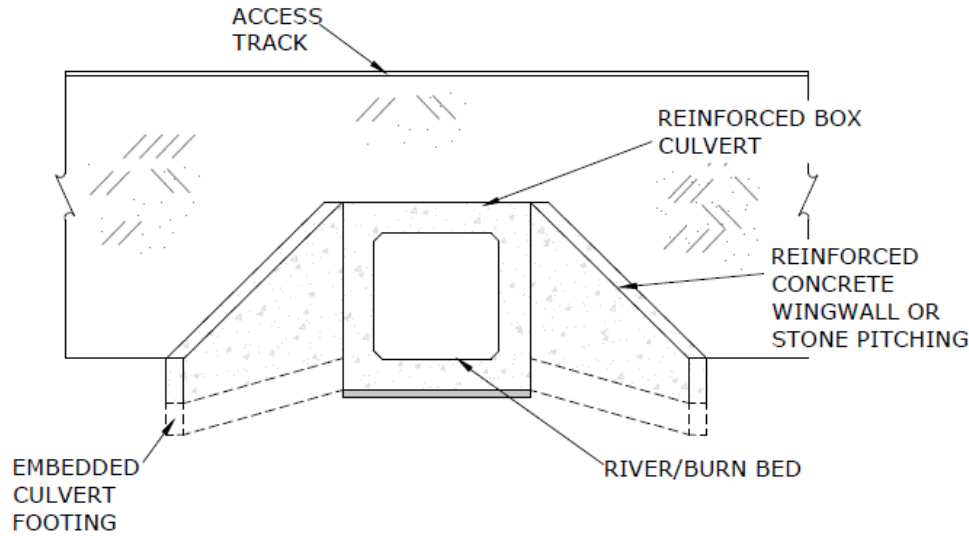

Map




| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type | |
|--|---|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C25 | No | Box Culvert | |
| Crossing Location Upstream No photo available | Crossing Location Downstream No photo available | | <div>Type of Crossing <p>TYPICAL BOX CULVERT ELEVATION (NTS)</p>Map </div> |

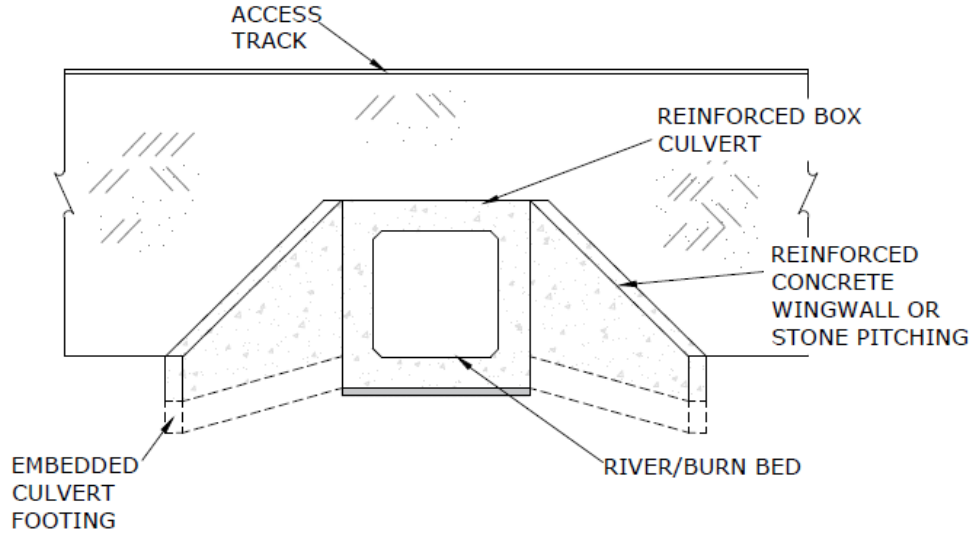
| | | |
|--|--|--|
| | |  An aerial photograph showing a rural landscape with a red boundary line. A white arrow points to a specific location on the boundary, labeled 'Crossing Location'. The landscape includes fields, a road, and a body of water in the background. |
|--|--|--|


| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|--|---|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C13 | No | Box Culvert |


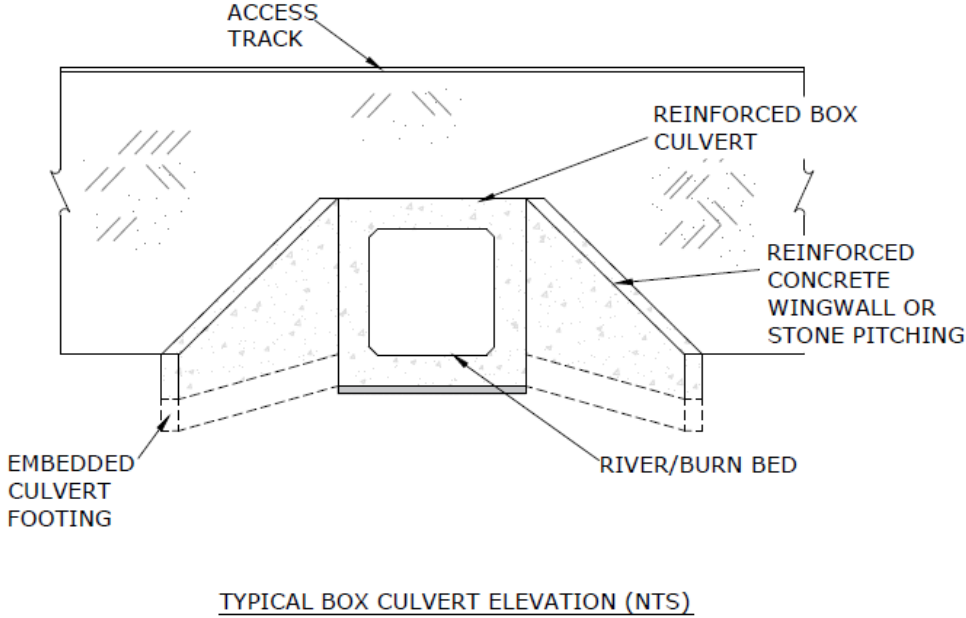

| Crossing Location Upstream | Crossing Location Downstream | Type of Crossing |
|--|---|--|
|  |  | <div><p>Type of Crossing</p><p><u>TYPICAL BOX CULVERT ELEVATION (NTS)</u></p><p>Map</p></div> |


| | | |
|--|--|--|
| | |  <p>Crossing Location</p> |
|--|--|--|


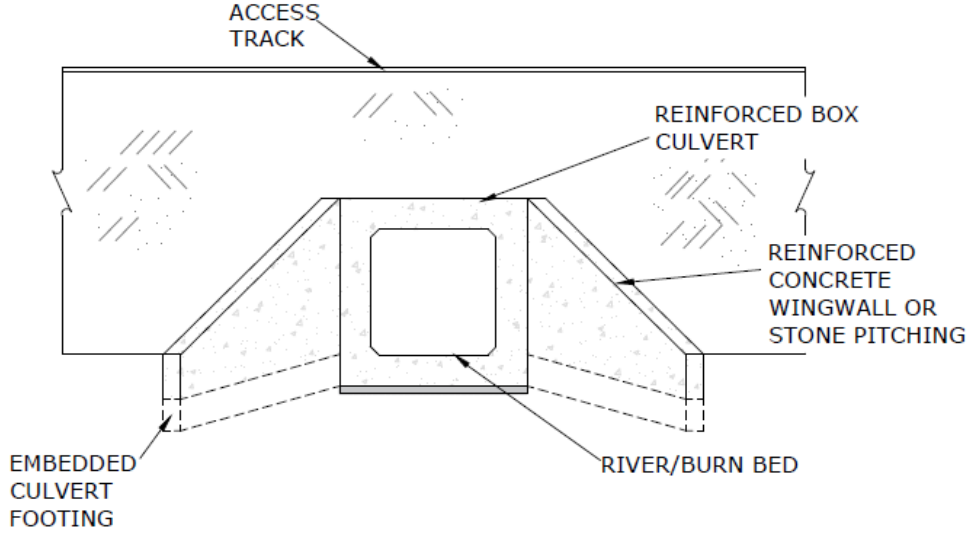
| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|--|---|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C14 | No | Box Culvert |



| Crossing Location Upstream | Crossing Location Downstream | Type of Crossing |
|---|--|--|
|  |  | <div><p>Type of Crossing</p><p><u>TYPICAL BOX CULVERT ELEVATION (NTS)</u></p><p>Map</p></div> |

| | | |
|--|--|---|
| | |  <p>An aerial photograph showing a landscape with a red boundary line. The boundary follows a winding path through green fields and a small body of water. A label 'Crossing Location' is placed on the boundary line. The photograph is part of a table with two empty cells to its left.</p> |
|--|--|---|


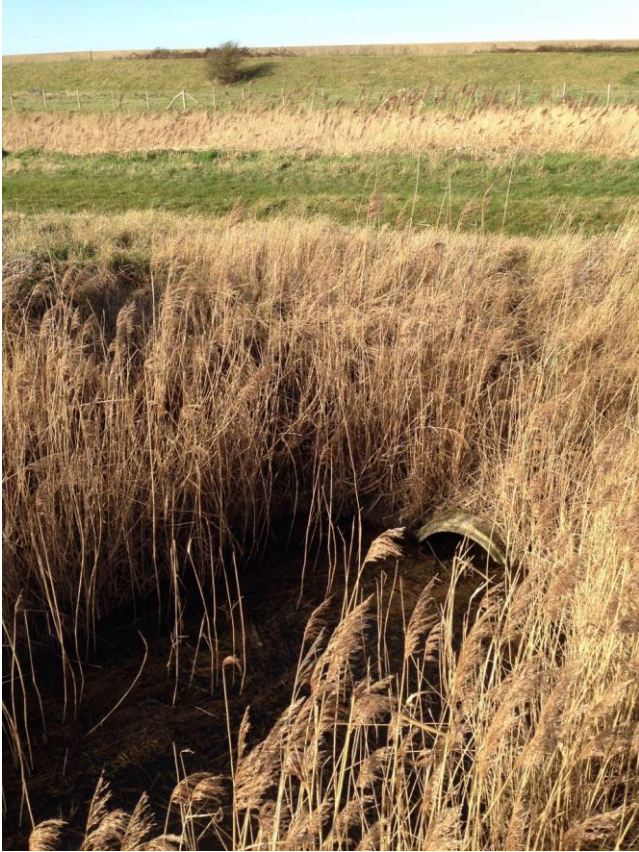

| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|--|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C16 | No | Box Culvert |
| <div><div>Crossing Location Upstream</div><div>No photograph available</div></div> | <div><div>Crossing Location Downstream</div><div></div></div> | <div><div>Type of Crossing</div><div></div><div><div>Map</div><div></div></div></div> |




| | | |
|--|--|---|
| | |  |
|--|--|---|



| Watercourse description | Is it an existing watercourse crossing? | New proposed watercourse crossing type |
|--|--|---|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C17 | No | Box Culvert |
| <div><div>Crossing Location Upstream</div><div></div></div> | <div><div>Crossing Location Downstream</div><div>No photograph available</div></div> | <div><div>Type of Crossing</div><div></div><div>TYPICAL BOX CULVERT ELEVATION (NTS)</div></div> |




| | | |
|--|--|---|
| | | <div>Map</div> <div></div> |
|--|--|---|




14 APPENDIX D - EXISTING WATERCOURSE CROSSINGS INVENTORY

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | |
|--|---|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt and stones Surrounding land use: Agriculture Reference: C1 | Yes – pipe culvert | Possible – Box culvert | |
| Crossing Location Upstream | Crossing Location Downstream | Map | |
|  |  |  | |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|---|---|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C2 | Yes – twin pipe culvert | Possible – Box culvert |
| Crossing Location Upstream | Crossing Location Downstream | Map |
|  |  |  |


| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|---|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C5 | Yes | Possible – single box culvert |
| <div>Crossing Location Upstream </div> | <div>Crossing Location Downstream No photo available</div> | <div>Map </div> |


| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|---|-------------------------------|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt and stones Surrounding land use: Agriculture Reference: C6 | Yes – pipe culvert with concrete headwall | Possible – single box culvert | | |
| Crossing Location Upstream  | | | Crossing Location Downstream  | |
| | | | Map  | |


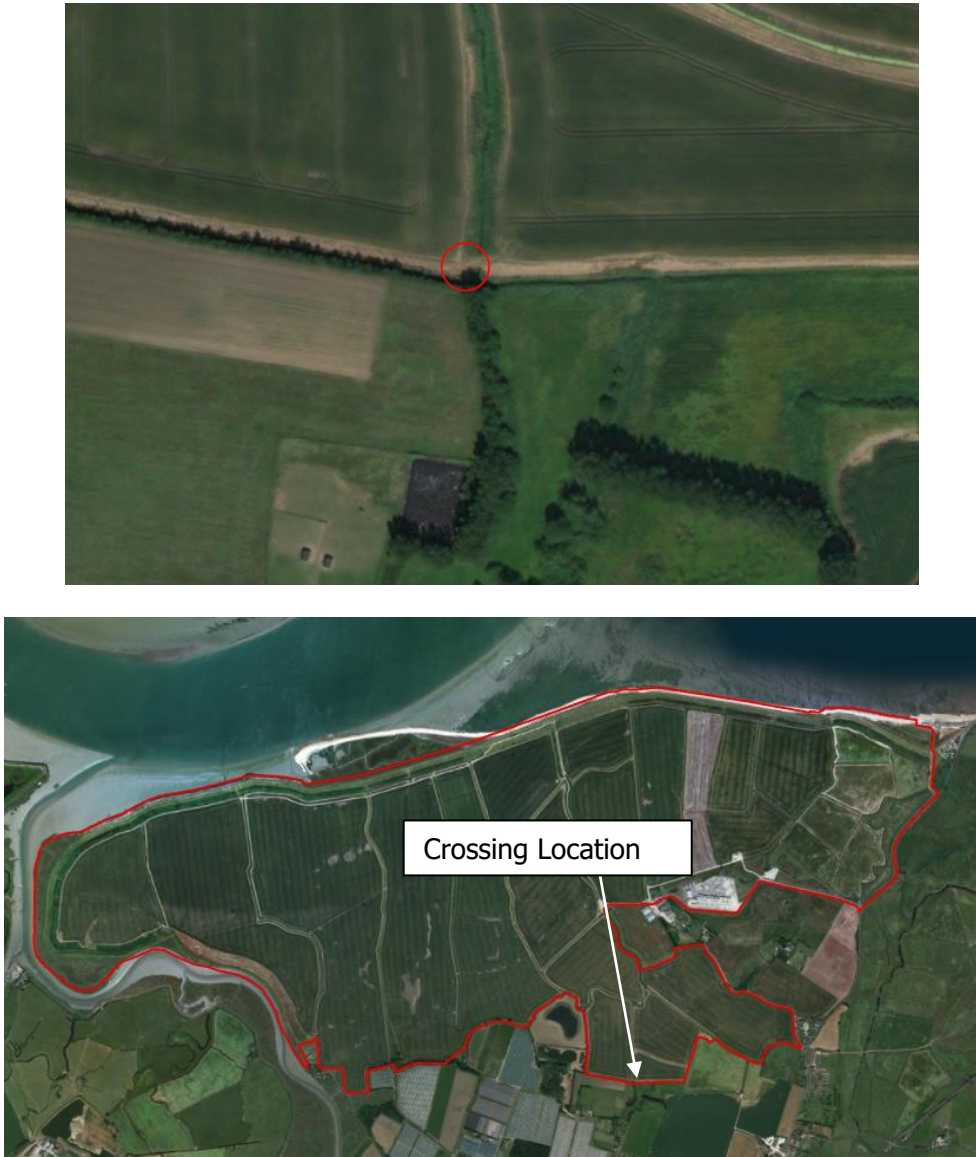
| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|---|--|--|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C7 | Yes – pipe culvert with concrete headwall | Possible – single box culvert |
| <div>Crossing Location Upstream</div> <div></div> | <div>Crossing Location Downstream</div> <div></div> | <div>Map</div> <div></div> |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|---|---|-------------------------------|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C8 | Yes – pipe culvert with concrete headwall | Possible – single box culvert |


| Crossing Location Upstream | Crossing Location Downstream | Map |
|--|---|--|
|  |  |  |



| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|---|--|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C24 | Yes – pipe culvert | Unlikely – wide crossing | | |
| Crossing Location Upstream No photograph available | | Crossing Location Downstream No photograph available | Map  | |





| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|---|--|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C26 | Yes – pipe culvert | Unlikely – wide crossing | | |
| Crossing Location Upstream  | | Crossing Location Downstream  | | Map  |



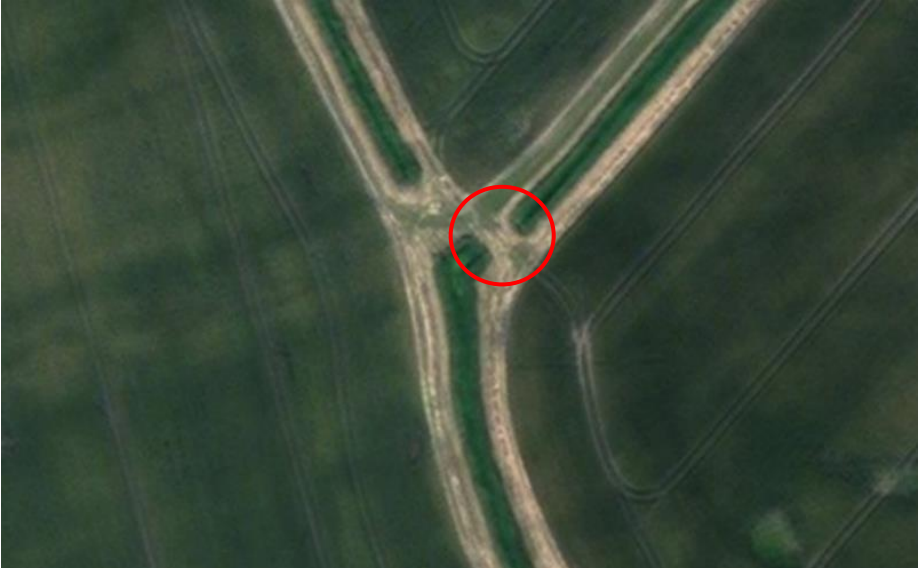

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|---|---|--|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C19 | Yes – pipe culvert | Possible – single box culvert | | |
| Crossing Location Upstream | | Crossing Location Downstream | Map | |
|  | |  |  | |



| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|--|---|-------------------------------|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C15 | Yes | Possible – single box culvert |

| Crossing Location Upstream | Crossing Location Downstream | Map |
|--|---|--|
|  |  |  |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|---|--|---|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C20 | Yes | Possible – single box culvert | | |
| Crossing Location Upstream No photograph available | | Crossing Location Downstream No photograph available | Map   | |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? | | |
|--|--|------------------------|---|--|
| Crossing of non IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C21 | Yes | Possible – box culvert | | |
| Crossing Location Upstream | Crossing Location Downstream | | Map | |
|  |  | |   | |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|--|--|---|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C22 | Yes | Possible – single box culvert |
| Crossing Location Upstream | Crossing Location Downstream | Map |
|  |  |   |

| Watercourse description | Is it an existing watercourse crossing? | Upgrade required? |
|--|--|--|
| Crossing of IDB drain Flow: Slow Level: Low Gradient: Low Watercourse bed substrate: Silt Surrounding land use: Agriculture Reference: C23 | Yes | Possible – single box culvert |
| <div>Crossing Location Upstream </div> | <div>Crossing Location Downstream No photo available</div> | <div>Map </div> |