

Tritax Symmetry (Hinckley) Limited

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

The Hinckley National Rail Freight Interchange Development Consent Order

Project reference TR050007

Environmental Statement Volume 2: Appendices

Appendix 12.2: Biodiversity Impact Assessment Calculations

Document reference: 6.2.12.2CB

Revision: ~~08~~7

~~27~~9 February 2024

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Regulation 14

This document forms a part of the Environmental Statement for the Hinckley National Rail Freight Interchange project.

Tritax Symmetry (Hinckley) Limited (TSH) has applied to the Secretary of State for Transport for a Development Consent Order (DCO) for the Hinckley National Rail Freight Interchange (HNRFI).

To help inform the determination of the DCO application, TSH has undertaken an environmental impact assessment (EIA) of its proposals. EIA is a process that aims to improve the environmental design of a development proposal, and to provide the decision maker with sufficient information about the environmental effects of the project to make a decision.

The findings of an EIA are described in a written report known as an Environmental Statement (ES). An ES provides environmental information about the scheme, including a description of the development, its predicted environmental effects and the measures proposed to ameliorate any adverse effects.

Further details about the proposed Hinckley National Rail Freight Interchange are available on the project website:

<http://www.hinckleynrfi.co.uk/>

The DCO application and documents relating to the examination of the proposed development can be viewed on the Planning Inspectorate's National Infrastructure Planning website:

<https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/hinckley-national-rail-freight-interchange/>

Appendix 12.2 ◆ Biodiversity Impact Assessment Calculations

INTRODUCTION

- 1.1. This report presents the Biodiversity Impact Assessment (BIA) Calculations (Annex 1) of the Proposed Development at Hinckley National Rail Freight Interchange (HNRFI).
- 1.2. The BIA has been undertaken using the Department for Environment, Food and Rural Affairs (DEFRA) Biodiversity Metric 3.1 (Version date: 21 April 2022)¹, by an ecologist with experience of using such calculators.
- 1.3. The BIA has been produced to objectively assess the net effects of the Proposed Development on biodiversity in line with local and national planning policy and in accordance with BS8683 (Process for designing and implementing biodiversity net gain – Specification).
- 1.4. The assessment was undertaken based on the existing habitat information derived from the Extended Phase 1 survey carried out by EDP in July 2021 as shown on Figure 12.3: Extended Phase 1 Survey (document reference 6.3.12.3), a Modular River Physical (MoRPh) field assessment undertaken in January 2023 and proposed habitats detailed on Figure 11.20: Illustrative Landscape Strategy (document reference 6.3.11.20). Plans for post-development habitats are shown in **Annex 2** to this report.
- 1.5. Geographic Information System (GIS) software has been used to accurately calculate areas of habitat to be retained, enhanced and recreated. The Biodiversity Metric 3.1 condition assessment calculator reference sheets have been used to inform the conditions used for existing habitats alongside professional judgement.

ASSUMPTIONS AND LIMITATIONS

- 1.6. It is worth noting that these calculations are based on the Illustrative Landscape Strategy (ES Figure 11.20, document reference 6.3.11.20) (i.e. the ‘calculation area’) to demonstrate the outline development proposals impact upon biodiversity. This may be subject to variation at the detailed design stage.
- 1.7. Various assumptions have been made for the purposes of the calculations as detailed below. Where appropriate, these have been added to the impact calculation table in the notes column.
- 1.8. Recommendations for ecological enhancements to habitat management and additional planting have been made as part of the River Condition Assessment. It may be possible to

¹ <http://publications.naturalengland.org.uk/publication/6049804846366720>

enhance the condition further by incorporating physical alterations to the channel bed and banks. Any structural changes must be advised by a hydrologist and additional flood risk assessments must be considered should the function of the watercourse be altered in any way.

Strategic Significance

- 1.9. The use of strategic significance within the Metric is reliant on published documentation by the Local Planning Authority and assigns a local significance based on its location and habitat type. Leicester do not currently have a published Local Nature Recovery Strategy (LNRS), therefore we are reliant on documents such as Local Plans, Biodiversity Action Plans, Green Infrastructure Strategies, etc., to determine the best interpretation of strategic significance at baseline and post-development.
- 1.10. The following habitats have been entered as 'Formally identified in local strategy' in the baseline and post-development tabs of the Metric as they have habitat action plans in place within the Leicester, Leicestershire and Rutland Biodiversity Action Plan (BAP) 2016-2026:
- Lowland mixed deciduous woodland along the south-eastern boundary and two small strips along the western boundary, which are associated with Burbage Wood and Aston Firs Site of Special Scientific Interest (SSSI);
 - Wet woodland created within the site and off-site areas is a habitat identified within the BAP;
 - Neutral grassland includes areas of marshy grassland in the north of the site and embankment grassland adjacent to the M69. Whilst these are not areas of unimproved grassland, there are opportunities for the change of management to improve these areas;
 - Modified grassland existing at baseline is of poor condition with localised areas of increased diversity. Whilst this is not a habitat identified within the BAP there are opportunities identified to enhance this through the development; and
 - Hedgerows, whether existing as species rich, with potential to enhance to species rich, or created as species rich, all hedgerows have been input into the Metric as formally identified within the BAP.
- 1.11. Additionally, those habitats not identified in the BAP, such as neutral grassland creation not of significant species diversity, mixed scrub planting, pond creation and woodland creation where it does not meet the criteria to be lowland mixed deciduous woodland, have been input as 'Location ecologically desirable but not in local strategy'.
- 1.12. ~~have been entered as 'Formally identified in local strategy' as mentioned in the Leicester, Leicestershire and Rutland Biodiversity Action Plan 2016-2026. Additionally, hedgerows have also been included as 'Formally identified in local strategy' at the request of the council.~~

Existing Habitats

- 1.13. Habitat data was collected during the Extended Phase 1 survey, however, the site was not formally assessed against Biodiversity Metric 3.1 condition assessment criteria. Those habitats retained within the Metric are shown on the Plan within Annex 2.
- 1.14. Improved grassland has been precautionarily entered as 'modified grassland' of 'fairly poor' condition owing to the lack of species diversity, uniformed sward height and intensive grazing from cattle and/or sheep. It is likely that the essential criteria 1 (which is required to achieve moderate or good condition) is failed across the majority of this habitat type. The precautionary assessment is intended to be a worst case should there be a lapse or change in management prior to detailed assessment of the site. The majority of this habitat will be lost, however, a small area within will be enhanced with wildflower grassland mix and/or shade tolerant meadow grassland mix. This has been entered into the calculator as 'other neutral grassland' of 'moderate' condition.
- 1.15. Poor semi-improved grassland has been entered as 'modified grassland' of 'moderate' condition owing to limited species diversity. There were pockets of grassland which supported more diversity within their sward. It is likely that the essential criteria 1 (which is required to achieve moderate or good condition) is failed across the majority of the site dependent on where pockets of increased diversity have been noted. The precautionary assessment is intended to be a worst case should there be a lapse or change in management prior to detailed assessment of the site. Small areas to the north and south will be enhanced with wildflower grassland mix and have been entered into the calculator as 'other neutral grassland' of 'moderate' condition.
- 1.16. The marsh/marshy grassland in the northeast of the calculation area has been entered as 'other neutral grassland' of 'moderate condition' as it does not qualify under the UK habitats classification as one of the marshy grassland communities but would be undervalued to include as modified grassland. It has been inputted as 'moderate' condition owing to its species composition and absence of management. It is likely to achieve essential criteria 1 to be classified as moderate condition but not achieve essential criteria 6 to be classified as good condition.
- 1.17. Broadleaved semi-natural woodland has been entered as 'lowland mixed deciduous woodland' of 'moderate' condition, owing to the limited ground flora and lack of management. This habitat is to be retained in its entirety.
- 1.18. There are several ponds within the calculation area, which have collectively been entered as 'poor' condition as they are mostly shaded and overgrown with poor water quality.
- 1.19. Defunct species-poor hedgerows and intact species-poor hedgerows are entered as 'native hedgerow' of 'poor' and 'moderate' condition respectively. Defunct and intact species-poor hedgerows with trees are entered as 'native hedgerow with trees' of 'poor' and 'moderate' condition respectively. Defunct and Intact species-rich hedgerows are entered as 'native species-rich hedgerow' of 'poor' and 'moderate' condition respectively and intact species-rich hedgerows with trees is entered as 'native species-rich hedgerow with trees' of 'moderate' condition. Hedgerows throughout the calculation area are of

varying quality, with the majority intensively managed.

- 1.20. A large proportion of linear hedgerow habitat is to be lost due to the Proposed Development; however, areas of intact hedgerows are to be retained, and the retained defunct hedgerows will be enhanced to 'native species-rich hedgerows with trees' of 'moderate' condition through management and gap planting to increase structural and species diversity, including the establishment of trees; and gap planting with native tree and hedgerow species.
- 1.21. The existing stream corridor has been entered as 'Other Rivers and Streams' of 'Moderate' and 'Fairly Good' condition. A large proportion of the stream will be re-routed to facilitate the Proposed Development and areas of the stream will be culverted at certain points to pass beneath new road. There are also several wet and dry ditches, which have been input as 'Ditches' of 'Poor' condition throughout the Site, of which approximately half will be lost. Those ditches that are being retained will be enhanced.
- 1.22. An area of approximately 11ha to the north of the calculation area has been identified for possible offsite mitigation of the biodiversity loss. This area is under negotiation and has not been formally adopted and therefore is presented within the BIA calculator to demonstrate the possible provision within the local area in close proximity to the Site. This area consists mainly of arable land (entered as 'Cereal Crops'), dense continuous scrub (entered as 'Mixed Scrub' of 'Moderate' condition) and tall ruderal (entered as 'Ruderal/Ephemeral' of 'Good' condition).
- 1.23. The offsite mitigation area is bordered by a stream. Given the stream itself does not fall within the offsite mitigation area, it will not be directly enhanced as part of the proposals. However, the associated riparian and river corridor habitats which do fall within the offsite mitigation area will be subject to improvement, thereby contributing to enhancement of stream habitat.

Habitat Created

- 1.24. All created habitats are shown on the plan within Annex 2.
- 1.25. Although the majority of the arable land, entered as 'cereal crops', will be lost, with the exception of the retained habitats to the east of the northern road, large areas of wildflower meadow ('other neutral grassland' of 'fairly good' condition), shade tolerant meadow ('other neutral grassland' of 'fairly good' condition), scrub planting ('mixed scrub' of 'fairly moderate' condition) wet woodland planting ('wet woodland' of 'moderate' condition and woodland planting ('other woodland; broadleaved' of 'moderate' condition), will be created within the proposed on-site open space and ecology mitigation areas.
- 1.26. The wet attenuation features will be designed for wildlife and to hold permanent water, in addition to serving drainage needs. These have been assumed to contain 50% of permanent water ('ponds (non-priority)') and 50% wetland wildflower grassland planting ('Sustainable Urban Drainage Feature' with 'moderate' condition targeted), with areas of marginal/aquatic planting being entered as 'reedbeds' of 'moderate' condition.

- 1.27. The calculation assumes the addition of a total of 740 urban trees of which 574 small and 166 medium sized are planted across the Proposed Development. Tree planting according to the Biodiversity Metric 3.1 User Guide (paragraph 7.11) states that size classes for newly planted trees should be classified by projected size at 30 years from planting. Medium sized trees will be sourced and planted as heavy standards of fast-growing species or as semi-mature trees. The condition of the tree stock is likely to vary according to location, therefore 'moderate' condition has been entered as a precautionary approach.
- 1.28. A total of 7.48km of 'native species-rich hedgerow' of 'good' condition will be planted in areas adjacent to buildings and 8.96km of 'native species-rich hedgerows with trees' of 'good' condition will be planted throughout the calculation area.
- 1.29. The re-routing of the stream will account for 3.23km (including 0.98km of culvert under new roads) being reinstated along the south and east of the Proposed Development, allowing for a naturalistic profile and the establishment of vegetation which is currently absent.
- 1.30. The condition of the proposed rerouted stream has been entered as 'Moderate' condition precautionarily, given that it ties in with the existing upstream watercourse, and therefore a number of physical attributes relating to the channel bed/margin could be assumed to naturalise and achieve a similar condition as the existing section to be lost. Culverts have been entered as 'Poor' condition. **Annex 3** shows how the condition of the existing river was calculated and the anticipated features which could contribute to the target condition of the reinstated stream section.
- 1.31. Assumptions have been made precautionarily at this stage and will be reviewed later when additional hydrological information is available in a more detailed application. It may be possible to enhance the condition further by incorporating physical alterations to the channel bed and banks, however this must be advised by a hydrologist.
- 1.32. A mosaic of different habitats will be created within the proposed offsite mitigation area. This area would have reduced public access to the area, along with suitable management, to allow habitats created in this area to achieve 'Good' condition. These habitats will include a large area of wildflower meadow ('other neutral grassland'), wet grassland ('other neutral grassland'), woodland ('other woodland; broadleaved'), wet woodland ('wet woodland'), scrub ('mixed scrub') and wildlife ponds ('ponds (non-priority habitat)'). Those areas being created/enhanced, that are within 10m of the stream running along the boundary of the offsite mitigation area, have contributed to the river assessment calculations.
- 1.33. If the possible area of offsite mitigation land identified was secured, the designated footpaths would be planted with double hedgerows, and thorn scrub, which will serve as a deterrent for public access into the offsite fields and will encourage 'Good' condition habitats to be achieved in these areas. Boundary hedgerows within the offsite land fall mostly outside of the redline boundary identified and have not been included in the calculations. Those boundary hedgerows which do form part of the redline boundary have been measured although they are assumed to be of 'Good' condition and retained in their entirety as they will not be impacted by the enhancement works undertaken in the area.

1.34. The BIA calculations do not account for other protected species enhancement measures, for example, the provision of bird and bat boxes and reptile hibernacula, see Figure 12.24 (document reference 6.3.12.24).

RESULTS

1.35. Based on the BIA calculations, as provided in Annex 1 of this report, the illustrative proposals for onsite habitat achieves a net loss of habitat and river biodiversity units, and a net gain in hedgerow biodiversity units:

- Habitat Biodiversity Impact Score = - ~~32.51~~30.65 biodiversity units (~~6.18~~5.44% net biodiversity loss);
- Hedgerow Biodiversity Impact Score = + 54.610 linear units (36.~~68~~70% net linear gain); and
- River Biodiversity Impact Score = - 16.56 river units (48.19% net river loss).

1.36. With the potential area of offsite compensation, the Proposed Development's biodiversity impact habitat area score has been calculated to achieve an overall net gain of habitat biodiversity units:

- Habitat Biodiversity Impact Score = + ~~28.92~~30.82 biodiversity units (5.~~50~~47% net biodiversity gain);
- Hedgerow Biodiversity Impact Score = + ~~60.51~~61.41 linear units (41.27~~0.66~~% net linear gain); and
- River Biodiversity Impact Score = -15.65 river units (45.56% net river loss).

1.37. Although this does not meet current planning policy requirements and the Environment Act (November 2021) requirements for developments to deliver a 10% net gain in biodiversity, the additional ~~23.67~~25.53 habitat units and 19.09 river units will be achieved through an offsetting scheme, such as the Environment Bank, in order to achieve 10% net gain. Discussions with the Environment Bank have been undertaken and will be progressed.

1.38. If the offsite land cannot be secured or an alternative area of suitable offsite mitigation cannot be found then it is envisaged that the Proposed Development would commit to the 10% biodiversity net gain, with any short fall picked up through an offsetting scheme, such as the Environment Bank.

1.39. While the Environment Act 2021 has come into force as of 12 February 2024~~now been passed, the minimum 10% biodiversity net gain biodiversity net gain has not yet come into force~~is not yet mandatory for Nationally Significant Infrastructure Projects until November 2025 when a period of transition has passed.~~and there will be a period of transition until it does.~~

- 1.40. The current calculations are illustrative and give an indication of how the proposals will achieve a 10% net gain. The final biodiversity position will be subject to the detailed design stage and supported by a detailed version of the Defra Metric. At that time, further opportunities will potentially be identified to increase the level of biodiversity gain. The biodiversity net gain strategy will include management of habitats over a 30-year period, in line with standard biodiversity net gain guidance.~~The final biodiversity position will be subject to the detailed design stage and opportunities can potentially be identified to increase the level of biodiversity gain.~~

Annex 1 ◆ Biodiversity Impact Assessment Calculations

Annex 2 ◆ Post-development BIA Plan (edp3267_d178a 18 December 2023 FAI/MNe)



HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

Date: 18-12-2023
 Paper size: A3
 Scale: 1:11,000



Key:

- Order Limits
- Cereal crops (2.78ha)
- Developed land (138.59ha)
- Woodland (16.81ha)
- Scrub (8.51ha)
- Wildflower grassland (29.76ha)
- Amenity grassland (19.03ha)
- Ponds and SuDS (2.60ha)
- Reedbeds (1.01ha)
- Habitat Enhancement
- Habitat Retention
- Enhanced Hedgerow (0.67km)
- Retained Hedgerow (3.34km)
- Removed Hedgerow (13.51km)
- Created Hedgerow (16.43km)
- Retained Watercourse (1.79km)
- Removed Watercourse (2.19km)
- Created Watercourse (1.34km)



Post-development BIA Plan

APFP Regulation: 5(2)(a)

Document Ref:

Drawing Number: edp3267_d178a

Drawing Status: FINAL

Revision: A

Drawn by: FAI

Approved by: MNe

Bank Face							
Bank face riparian vegetation structure	C1	<u>2</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>
Bank face tree feature richness	C2	<u>2</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>
Bank face natural bank profile extent	C3	<u>3</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>3</u>
Bank face natural bank profile richness	C4	<u>4</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>4</u>
Bank face natural bank material richness	C5	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Bank face bare sediment extent	C6	<u>4</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>4</u>	<u>3</u>
Bank face artificial bank profile extent	C7	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Bank face reinforcement extent	C8	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Bank face reinforcement material severity	C9	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Bank face NNIPS cover	C10	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Channel Margin							
Channel margin aquatic vegetation extent	D1	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>
Channel margin aquatic morphotype richness	D2	<u>2</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>3</u>
Channel margin physical feature extent	D3	<u>2</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>
Channel margin physical feature richness	D4	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>
Channel margin artificial features	D5	<u>-1</u>	<u>0</u>	<u>-1</u>	<u>-1</u>	<u>0</u>	<u>-1</u>

Channel Bed							
<u>Channel aquatic morphotype richness</u>	<u>E1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>3</u>
<u>Channel bed tree features richness</u>	<u>E2</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>
<u>Channel bed hydraulic features richness</u>	<u>E3</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>
<u>Channel bed natural features extent</u>	<u>E4</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed natural features richness</u>	<u>E5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed material richness</u>	<u>E6</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>
<u>Channel bed siltation</u>	<u>E7</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed reinforcement extent</u>	<u>E8</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed reinforcement severity</u>	<u>E9</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed artificial features severity</u>	<u>E10</u>	<u>-3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed NNIPS extent</u>	<u>E11</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Channel bed filamentous algae extent</u>	<u>E12</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Table 1.2: Post-development Realignment Potential

Indices		Assessed Habitats/Features	Existing Average	Potential Realignment Target	Potential Routes to Achieve Realignment Target
Bank Top					
Bank top vegetation structure	B1	Mosses/Lichens, Short/Creeping herbs and grasses, Tall herbs and grasss, scrub/shrubs, saplings/trees.	2	3	Create a mixture of standard and grouped tree planting along the bank top, shrubby understorey planting, tall grass and herbs and short mown grass up to 10m from the bank
Bank top tree feature richness	B2	Fallen trees, leaning trees, j-shaped trees, tree/shrub branches trailing into the river channel, large wood	1	2	Plant trees with naturally trailing branches Plant trees with a tendency to drop branches
Bank top water-related features	B3	Pond: disconnected, Pond: connected, side channel, Wetland: short non-woody vegetation (mosses/sedges), Wetland: tall non-woody vegetation (reeds/rushes), Wetland: shrubs and trees (e.g. alder/willow carr)	0	1	Creation of alder carr or non-woody wetland vegetation
Bank top NNIPS cover	B4	Non-native invasive species	0	0	
Bank top managed ground cover	B5	Built area, landfill, storage, pedestrianised, arable/agriculture/allotments, permanently vegetated agriculture (pasture, intensive orchard), permanently vegetated recreation (playing fields, gardens, parks), plantation woodland, open water (canal, reservoir)	-2	-1	If pedestrianised footpaths, bridges etc. are going to be located within 10m of the bank edge then this will impact the score, this looks to be proposed only on one bank in a couple of places so likely to achieve -1.
Bank Face					
Bank face riparian vegetation structure	C1	Mosses/Lichens, Short/Creeping herbs and grasses, Tall herbs and grasss, scrub/shrubs, saplings/trees.	2	2	Individual tree or patches of large shrub planting on shallow gradient banks as well as a mixture of tall and short grass management should be achievable

Indices		Assessed Habitats/Features	Existing Average	Potential Realignment Target	Potential Routes to Achieve Realignment Target
Bank face tree feature richness	C2	Fallen trees, leaning trees, j-shaped trees, tree/shrub branches trailing into the river channel, large wood, discreet organic accumulations, exposed tree roots	2	3	Plant trees with naturally trailing branches Plant trees with a tendency to drop branches Plant trees with tendency to drop leaves that will sink and accumulate rather than float and be washed away Plant trees which will tolerate exposed roots on the bank face
Bank face natural bank profile extent	C3	Vertical, vertical with overhang, vertical with undercut, vertical with toe, steep (>45 degrees), gentle (>45 degrees), Composite	3	3	Create a mixture of sections with vertical bank faces, gentle and steep slopes
Bank face natural bank profile richness	C4	Vertical, vertical with overhang, vertical with undercut, vertical with toe, steep (>45 degrees), gentle (>45 degrees), Composite	3	3	
Bank face natural bank material richness	C5	Bedrock, Boulder, Cobble, Gravel, Earth, Sand, Silt, Clay, Peat, Organic	1	1	Unlikely able to influence as dependent on existing geology
Bank face bare sediment extent	C6	Bedrock, Boulder, Cobble, Gravel, Earth, Sand, Silt, Clay, Peat, Organic	4	1	Unlikely able to influence as dependent on existing geology
Bank face artificial bank profile extent	C7	Reshaped, Artificial two-stage, Embanked, Set-back embankment, poached bank	0	-1	Poached bank would be worn away from regular access by humans and dogs. Have assumed some poaching will be present
Bank face reinforcement extent	C8	Extent of reinforcement in the top, bottom, whole and horizontal extents of each bank	0	-1	Assumed that some reinforcements will be required for pipes/outfalls into the channel
Bank face reinforcement material severity	C9	Concrete, brick, stone, piling, rip rap, gabions, planted reeds etc. - lots of options with different weightings	0	-1	Concrete is the worst possible material for use in reinforcements but precautionarily assumed this will be present
Bank face NNIPS cover	C10	Non-native invasive species	0	0	
Channel Margin					

Indices		Assessed Habitats/Features	Existing Average	Potential Realignment Target	Potential Routes to Achieve Realignment Target
Channel margin aquatic vegetation extent	D1	Liverworts/mosses/lichens, emergent broad-leaved, emergent linear-leaved, amphibious	2	3	Aim for a mixture of emergent broad-leaved, emergent linear-leaved and amphibious plants in an even mixture across both channel margins
Channel margin aquatic morphotype richness	D2	Liverworts/mosses/lichens, emergent broad-leaved, emergent linear-leaved, amphibious	2	3	Need to ensure channel margins are designed to allow an area for vegetation to establish
Channel margin physical feature extent	D3	Unvegetated side bar, vegetated side bar, berm, bench, stable cliff, eroding cliff, toe, marginal backwater, tributary junction	2	1	Aim to achieve creation of a mixture of unvegetated and vegetated side bars?
Channel margin physical feature richness	D4	Unvegetated side bar, vegetated side bar, berm, bench, stable cliff, eroding cliff, toe, marginal backwater, tributary junction	2	2	Eroding cliffs are unlikely to be seen positively so some sections of stable cliff would be preferable instead. Marginal backwaters could be possible
Channel margin artificial features	D5	pipes/outfalls, deflector and jetty	-1	-1	Assumed up to 4 outfalls would be present along each 50m surveyed section, if this is focussed on one area it may be possible to reduce negative impacts elsewhere
Channel Bed					
Channel aquatic morphotype richness	E1	Liverworts/mosses/lichens, emergent broad-leaved, emergent linear-leaved, floating leaved (rooted), free floating, submerged broad-leaved, submerged linear-leaved, submerged fine-leaved	2	2	Aim for a mixture of floating, emergent and submerged plants with a mixture of broad-leaved and linear leaved species Need to ensure flow rates are appropriate to allow establishment of vegetation
Channel bed tree features richness	E2	vegetation shading channel, submerged tree roots, large wood, discrete accumulation of organic material, large wood dam, fallen tree	3	1	It should be possible to achieve vegetation shading channel but may be more difficult to guarantee submerged tree roots and discrete accumulations of organic material within the channel bed. If choosing trees that have a tendency to drop braches then large wood may also be achievable

Indices		Assessed Habitats/Features	Existing Average	Potential Realignment Target	Potential Routes to Achieve Realignment Target
Channel bed hydraulic features richness	E3	Free fall, chute, broken standing waves, unbroken standing waves, upwelling, rippled, smooth, no perceptible flow	1	2	Free fall and chute flows are unlikely to be achieved in a gravel/sand river. Potential to add in areas of larger cobbles/boulders to achieve these hydraulic features? Rippled, smooth and no-perceptible flow are most likely to be achieved. Channel bed profile and materials will need to be considered to achieve unbroken and broken standing waves
Channel bed natural features extent	E4	exposed bedrock, exposed unvegetated boulders, exposed vegetated boulders, unvegetated mid channel bars, vegetated mid-channel bars, islands, cascades, pools, riffles, steps, waterfalls	1	2	Create a run of riffles and pools so that each one appears more than once in a single stretch (e.g. back to back - riffle, pool, riffle, pool). This would potentially require a coarser gravel river bed in places to create the riffles and profiling of the channel bed to achieve the shallower and deeper areas required
Channel bed natural features richness	E5	exposed bedrock, exposed unvegetated boulders, exposed vegetated boulders, unvegetated mid channel bars, vegetated mid-channel bars, islands, cascades, pools, riffles, steps, waterfalls	1	1	Assuming we can only produce pools and riffles this would score 1, with the channel width being ~2m it would be implausible to create mid-channel bars or islands and given the sand/gravel river type with a shallow gradient, achieving cascades, waterfalls and steps would also be implausible
Channel bed material richness	E6	peat, organic, clay, silt, sand, gravel-pebble, coble, boulder, bedrock	3	3	Dependent on what materials will be brought in from upstream by natural flow. Likely to be similar to existing.
Channel bed siltation	E7	patchy silt or continuous overlying silt layers	0	0	The existing stream does not have any silt issues so this should hopefully be maintained, assuming that no silt deposition comes from outfalls/pipes or run-off
Channel bed reinforcement extent	E8	Extent of channel bed reinforcement	0	0	
Channel bed reinforcement severity	E9	concrete, brick, stone, piling, gabions, rubble, washed out etc.	0	0	

Indices		Assessed Habitats/Features	Existing Average	Potential Realignment Target	Potential Routes to Achieve Realignment Target
Channel bed artificial features severity	E10	large trash, bridge shadow, major weir, intermediate weir, minor weir, bridge pier in river bed, culvert	-1	-4	Have precautionarily assumed culverts to be present in places This would be ideal to avoid as it would impact the riparian zone encroachment multiplier in the Metric but would not increase the condition assessment into the next category up.
Channel bed NNIPS extent	E11	Non-native invasive species	0	0	
Channel bed filamentous algae extent	E12	extent of filamentous algae	0	0	

Table 1.3: River Type Assessment and Condition Criteria Ranges

River Type K	Good	Fairly Good	Moderate
Score (likely maximum 2.4)	>1.9	1.9 - >1.2	1.2 - > 0.2
Average of Target Negative Indicators	-0.69	Average of Target Positive Indicators	2.05
Total Target River Condition Score	1.36	Fairly Good	