Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 1

Chapter 17: Assessment of Cumulative Effects and Inter-relationships

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17.1 Introduction

17.1.1 Cumulative effects result from multiple actions on receptors or resources occurring in combination over time. This chapter analyses two types of cumulative effect.

17.1.2 The first type is the assessment of effects on receptors or receptor groups, such as local residents, users of local rights of way or services, which may be affected by different environmental effects generated by the Scheme simultaneously or concurrently. This is sometimes referred to as the 'inter-relationships' between different environmental effects. This assessment includes consideration of particular locations where several effects, for example noise, air quality and visual change, may all occur.

17.1.3 The second type is the assessment of effects of the Scheme together with other proposed (but not yet built) developments, where there is the potential for impacts to overlap spatially or temporally.

17.2 Legislation and Policy Context

Relevant Legislation

17.2.1 The EIA Directive requires the EIA to consider cumulative effects and inter-relationships.

17.2.2 Cumulative effects result from multiple actions on receptors and resources and over time and are generally additive or interactive (synergistic) in nature. Cumulative impacts can also be considered as:

'…impacts resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.' (European Commission 1999)

Planning Policy Context

17.2.3 The adopted Newport Local Development Plan (LDP) (Newport City Council, 2015) makes reference to the importance of cumulative effects in relation to renewable energy developments, particularly wind turbines. Other references to cumulative effects relate to a requirement for development near existing residential areas to not adversely affect '*local residential amenity, either in its own right or cumulatively with other uses'.*

17.2.4 The adopted Monmouthshire County Council Local Development Plan (Monmouthshire County Council, 2014) highlights the importance of ensuring that the cumulative effects of development in Monmouthshire and adjoining areas do not result in harm to internationally designated nature conservation sites. The Local Development Plan also states that development in neighbourhood centres, new retail and renewable energy schemes will be permitted provided that the development, either individually or cumulatively with other recently proposed development, does not undermine vitality, attractiveness or viability.

17.2.5 The Cardiff Local Development Plan (Cardiff Council, 2016) refers to cumulative impacts on amenity, quality and character of the countryside and landscape as a result of residential conversions, retail, small scale developments in the green belt and the countryside.

17.2.6 There are no specific local policies relating to cumulative effects in relation to new highway development.

17.3 Assessment Methodology

Relevant Guidance

17.3.1 A range of guidance is available on cumulative effects assessment but at present there is no single, agreed industry standard method.

17.3.2 Relevant guidance taken into account in this assessment is as follows.

- HA205/08 Principles of Environmental Assessment – Assessment and Management of Environmental Effects (Highways Agency *et al*., 2008).
- Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2015).
- Advice Note Nine: Rochdale Envelope (Planning Inspectorate, 2012).

17.3.3 Although not specifically designed for highway schemes, the Planning Inspectorate guidance note provides more recent guidance on good practice for the assessment of cumulative effects for major infrastructure schemes.

DMRB Guidance

17.3.4 The Design Manual for Roads and Bridges (DMRB) guidance set out in HA 205/08 (Highways Agency *et al*., 2008) states that there are two types of cumulative effects to be considered in environmental assessment. As set out in Section 17.1 above, these are (i) cumulative effects from a single scheme (referred to as 'inter-relationships' in this chapter) and (ii) cumulative effects from different schemes.

Type (i) Cumulative Effects from a Single Scheme (Inter-relationships)

17.3.5 The DMRB states that type (i) effects are those that arise from the combined action of a number of different environmental topic-specific impacts from a single scheme upon a single receptor/resource. The guidance states that, when considered in isolation, the environmental effects upon any single receptor/resources may not be significant. However, when all effects from a single scheme are considered together, the resulting cumulative effect may be significant.

17.3.6 The guidance sets out factors to be considered in the assessment of such effects.

- Which receptor/resources are affected?
- How will the activity or activities affect the condition of the receptor/resource?
- What are the probabilities of such effects occurring?

- What ability does the receptor/resource have to absorb further effects before changes become irreversible?

17.3.7 The DMRB guidance states that it is important that there is good co-ordination and sharing of results between topic areas to ensure a comprehensive identification and understanding of the interaction between effects.

Type (ii) Cumulative Effects from Different Schemes

17.3.8 Type (ii) effects may arise from multiple actions of a number of different reasonably foreseeable proposed developments, occurring with the scheme being assessed, on a single receptor/resource. This can include multiple effects of the same or similar type from a number of proposed developments upon the same receptor/resource.

17.3.9 The DMRB guidance defines 'reasonably foreseeable' to mean other proposed developments that are committed. It states that these should include (but not necessarily be limited to) trunk road and motorway schemes which have been confirmed (gone through the statutory process) and development projects with valid planning permissions as granted by the local planning authority, and for which formal EIA is a requirement or for which a non-statutory environmental impact assessment has been undertaken.

The Planning Inspectorate Guidance

Type (i) Cumulative Effects from a Single Scheme (Inter-relationships)

17.3.10 With respect to inter-relationships, the Planning Inspectorate's Advice Note Nine (Planning Inspectorate, 2012) states that:

'The ES should not be a series of separate unrelated topic reports. The interrelationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how interrelationships have been assessed in order to address the environmental impacts of the proposal as a whole. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant but could become significant when their inter-relationship is assessed. It will be for the developer to demonstrate that the likely significant impacts of the project have been properly assessed.'

17.3.11 For clarity, in this chapter these effects are called type (i) cumulative effects in accordance with DMRB guidance.

Type (ii) Cumulative Effects from Different Schemes

17.3.12 Planning Inspectorate Advice Note 17 (Planning Inspectorate, 2015) provides a clear and systematic approach to cumulative effects assessment. The guidance only covers type (ii) cumulative effects.

17.3.13 This guidance identifies a wider range of other proposed developments to be taken into account in cumulative effects assessment (CEA), as set out below.

- Under construction.

- Permitted applications not yet implemented.
- Submitted applications not yet determined.
- Planning applications where a scoping report has been submitted.
- Projects on the planning register where a scoping report has been submitted.
- Sites identified in the relevant Local Development Plans (and emerging Local Development Plans – with appropriate weight being given as they move closer to adoption).
- Other plans and programmes (as appropriate) which set the framework for future development consent/approval, where such development is reasonably likely to come forward

17.3.14 In light of the brevity of the DMRB guidance and the relevance of this more recent advice note to a major infrastructure scheme, this is considered to be the most applicable and up to date guidance and has been generally followed for this assessment.

Study Area

17.3.15 The study area for the cumulative and in combination effects assessment has been based on the zones of influence of the environmental effects of the Scheme. These are presented in Tables 17.8 – 17.10.

17.3.16 The information within this chapter is based on the baseline data and assessments provided in Chapters 7 to 16 of this ES.

Consultation

17.3.17 Consultation regarding cumulative effects has centred on agreeing a list of other proposed developments for inclusion in the cumulative effects assessment. DMRB guidance states that in each case, other schemes to be considered in the assessment of cumulative effects should be determined in consultation with the local planning authority and other statutory bodies. A summary of the consultation with stakeholders undertaken for the cumulative effects assessment is provided in the table below.

Table 17.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issue Raised	How/Where Addressed
18 September 2015	Natural Resources Wales responded to scoping, stating that '*We support the proposals with respect to consideration of cumulative effects and inter-relationships within the EIA. Consideration of inter-relationships will be particularly key across the Gwent Levels where issues around Ecology, Cultural Heritage, Landscape and Visual Effects, Road Drainage and the Water Environment, Geology and Soils (particularly in the context of contaminated land) and Materials all overlap. As part of this, the cumulative impacts of this proposal with other developments should be considered, as should the possible in-combination impacts with other proposals that are yet to start/ be completed*.'	An assessment of the inter-related effects on the Gwent Levels and the cumulative effects on this receptor from the Scheme and other unbuilt developments is set out in this chapter.

Date	Consultee and Issue Raised	How/Where Addressed
13 October 2015	Newport City Council responded to scoping stating that there were '*No comments at this stage'* regarding cumulative effects and inter-relationships.	N/A
1 October 2015	Cadw responded to scoping with no comments regarding cumulative effects or inter-relationships.	N/A

Adopted Approach to the Assessment of Type (i) Cumulative Effects from a Single Scheme (inter-relationships)

17.3.18 The approach to assessing type (i) effects or inter-relationships has followed a four staged process, as summarised in Table 17.2 below.

Table 17.2: Approach to Assessment of Inter-related Effects

Stage	Description
1	Scoping exercise of receptor/resource types not affected by in combination effects or where these receptor/resource types are assessed wholly in a single Environmental Impact Assessment (EIA) topic area.
2	Review of the likely receptor(s) /resource(s) affected by more than one impact through analysis of the assessment of effects sections undertaken for individual Environmental Impact Assessment (EIA) topic areas.
3	Identification of potential in combination effects on these receptor groups through review of the topic specific assessments in the Environmental Statement chapters.
4	Assessment undertaken on how individual effects may combine to create inter-related effects on each receptor group for: • 'project lifetime effects', i.e., during construction, operational and decommissioning phases; and • 'receptor-led effects', i.e., multiple simultaneous effects on a single receptor/resource.

Adopted Approach to the Assessment of Type (ii) Cumulative Effects from Different Schemes

17.3.19 The approach taken within this assessment for the assessment of type (ii) effects follows the guidance published by the Planning Inspectorate (2015) and centres on screening other proposed developments within the zone of influence of the Scheme using a four stage approach using matrices to clearly present the process and findings. The activities followed within each stage are set out below.

Stage One: Establish the Zone of Influence and Identify Long List of 'Other Developments'

- Identify a long list of 'other development'.
- Undertake a desk study to establish the zone of influence of the Scheme and present in a table and on mapping.
- Set out the other development in a matrix (see Appendices 17.2 and 17.3) detailing the key information.
- Assign tiers 1, 2 or 3 for the level of certainty (see Table 17.3).

- Consult with the relevant planning authorities and statutory consultees regarding the list of 'other development'.

Table 17.3: Tiers for 'Other Development' for inclusion in CEA

Tier	Description	
Tier 1	Under construction (however, where projects are expected to be completed before construction of the Scheme and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline).	Decreasing level of detail likely to be available
	Permitted application(s) but not yet implemented.	
	Submitted applications but not yet determined.	
Tier 2	Planning applications where a scoping report has been submitted.	
Tier 3	Projects on the planning register where a scoping report has not been submitted.	
	Sites identified in the relevant Local Development Plans (and emerging Local Development Plans – with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposal will be limited.	
	Other plans and programmes (as appropriate) which set the framework for future development consent/approval, where such development is reasonably likely to come forward.	

Stage Two: Identify Shortlist of 'Other Development' for CEA

- Develop a shortlist of 'other development' for CEA by applying inclusion/exclusion criteria to the Stage One list of 'other development'.
- Consider inclusion/exclusion threshold criteria based on the potential for significant cumulative effects by virtue of overlaps in temporal scope, the scale and nature of the 'other development' or other factors.
- Update the matrix to detail reasons for inclusion/exclusion.
- Consult with the relevant local authorities and statutory consultees.

Stage Three: Information Gathering

- Gather information regarding the shortlisted 'other development' to inform the CEA and document in a second matrix (see Table 17.11).

Stage Four: Assessment

- Review each of the 'other development' in turn to assess whether cumulative effects may arise and document this in the second matrix (see Table 17.11).
- Identify mitigation measures in relation to adverse cumulative effects and document the means of delivering the mitigation.
- Consider the apportionment of effect between the Scheme and the 'other development' e.g. the contribution to the effect demonstrably related to one development or is there an equal contribution from either development. However, the Scheme is a larger scale than all the other developments and therefore, the focus for this chapter has been to describe the mitigation that would be put in place for the Scheme itself.

- The applicant may wish to consult with the applicants/developers of 'other development' to identify means to jointly address the mitigation of significant adverse cumulative effects and the means to ensure delivery.

Assessment Criteria and Assignment of Significance

17.3.20 The assessment does not aim to assign significance levels. Instead the assessment is to be used to identify where there is the potential for cumulative effects. A statement is made as to whether the cumulative effect would be worse or better than the effects predicted for the Scheme alone, whether the cumulative effects have the potential to be more significant than the effects of the Scheme alone and, if so, whether this would be adverse or beneficial.

Limitations of the Assessment

17.3.21 The key difficulties in any cumulative effects assessment relate to the level of detail available in relation to other proposed developments and the reliance that would need to be made on environmental assessment carried out by others. Additionally, due to the scale and linear nature of the Scheme, many other developments are considered, more than 100 in total. For those applications at earlier stages of development or those for which EIA has not been undertaken, professional judgement and knowledge of the wider study area are employed to consider the receptors or resources that may be affected by the Scheme and the other development in question.

17.3.22 The above considerations, together with the lack of a definitive and agreed process for the assessment of cumulative effects, leads to difficulty in assigning a level of significance to cumulative effects.

17.3.23 Nevertheless, the aim of the assessment is to present the findings of the EIA as a whole for stakeholders and to identify cumulative effects on particular receptors or groups of receptors. This is beneficial to understanding the environmental effects of the Scheme as a whole both alone and together with other proposed developments.

17.3.24 In addition, due to the linear nature of the Scheme, a large amount of data were collected during the assessment. Difficulties in presenting the amount of data regarding receptors and clear mapping were overcome by simplifying and grouping receptors and zones of influence and by scaling the mapping effectively.

17.4 Assessment of Type (i) Cumulative Effects from the Scheme on Single Receptors or Resources

17.4.1 This assessment considers receptors or receptor groups, such as local residents, users of local rights of way or services that may be affected by different environmental effects generated from the Scheme simultaneously or concurrently. This may include, for example, particular locations where noise, air quality and visual change may all occur at the same time. To differentiate this assessment from the cumulative effects assessment with other proposed developments, these are referred to as 'inter-relationships' or 'inter-related effects'. All of these effects would be derived from the Scheme.

Scoping of Receptors/Resources

17.4.2 This chapter presents those cumulative effects not explicitly addressed elsewhere in the Environmental Statement. The majority of the EIA topic assessments consider the effects of the Scheme on receptors or receptor groups and, as such, many of the inter-related impacts on those receptors are considered within the topic chapters. For instance, effects on ecological receptors arising from any combination of land take, noise/visual disturbance, air quality impacts, water quality impacts and potential traffic collision are considered within the ecology chapter. As such, the potential for inter-relationships is inherent within the topic assessments and these effects are not repeated in this chapter. The topics where this applies are shown in Table 17.4 below.

Table 17.4: Environmental Statement Topics Excluded from Further Inter-related Effects Assessment

Topic receptor / resource	Rationale for exclusion from further in combination assessment
Cultural Heritage	The assessment of effects on historic assets is provided in Chapter 8: Cultural Heritage. This assessment considers all potential impacts on the relevant receptors, namely buried archaeology and historic assets. This topic relies heavily on co-ordination with other topics to understand the variety of impacts on ecological receptors i.e. inter-relationships.
Landscape Resources	The landscape assessment presented in Chapter 9: Landscape, includes the consideration of all potential impacts on landscape character and landscape quality. Therefore, no additional inter-related effects are considered likely to occur beyond those identified in the specific assessment in Chapter 9: Landscape and Visual Impacts.
Ecology	The assessment of in combination effects (many impacts on one receptor/resource e.g. disturbance from noise, emissions, land take) is central to the assessment of potential impacts on ecological receptors and the integrity of designated sites and, as such, has already been assessed within Chapter 10: Ecology and Nature Conservation. No additional effects are therefore, considered likely to occur beyond those identified in the assessment in Chapter 10. This topic relies heavily on co-ordination with other topics to understand the variety of impacts on ecological receptors i.e. inter-relationships.
Geology and Soils	All the potential impacts on geological receptors and soils have been assessed within Chapter 11: Geology and Soils
Materials	All the potential impacts on materials and waste have been assessed in Chapter 12: Materials.
Private Assets	All the potential impacts on private assets (farm holdings) area assessed within Chapter 15: Community and Private Assets.
Road Drainage and Water	All the potential impacts on road drainage and water are assessed in Chapter 16: Road Drainage and the Water Environment.

Identification of Receptors/Resources

17.4.3 The potential for inter-related effects is limited to the zones of influence presented in this chapter for cumulative effects of the Scheme with other developments (Tables 17.11 and 17.12). The receptors identified as likely to experience inter-related effects are people living in or using the area near the Scheme, for example users of Public Rights of Way (PRoW). There is the potential for air quality, noise and visual impacts to combine and affect these people. Based on

the zones of influence, a core study area for the assessment of these effects of 350 metres from construction activities has been adopted.

17.4.4 Operational traffic noise and vehicle emissions effects both have wider zones of influence because the Scheme is predicted to result in changes traffic volumes not only on the proposed new section of motorway and the area affected by Complementary Measures but also on the wider highway network. For these topics, the receptors affected by the predicted changes to traffic flows as a result on the Scheme are those within 200 metres of the roads shown on Figure 17.3 for air quality changes (vehicle emissions) and 1 km or the noise contour plots for traffic noise.

17.4.5 Receptors to visual change (including users of Public Rights of Way, users of local facilities, visitors and local residents) would experience effects beyond the boundaries of the zones of influence for other topics. Beyond 350 metres, air quality effects on people would not be felt (the zone of influence is 350 metres for construction dust and 200 metres for traffic emissions during operation). Therefore the visual change effect would not be experienced in combination with an air quality change beyond 350 metres. Construction noise would be experienced up to 300 metres from machinery and vibration within 30 metres. Operational noise effects extend beyond the air quality zone of influence and are not a uniform distance from the proposed new section of motorway. For this reason the noise contour plots are used to demonstrate the zone of influence for noise, rather than a buffer distance.

17.4.6 Existing Public Rights of Way and those diverted or created as part of the Scheme are shown on Figure 17.3 and 17.4. The zone of influence for inter-related effects on users of Public Rights of Way is shown on Figure 17.3 and 17.4 and is not a uniform distance from the order limits due to the noise zone of influence varying along the length of the proposed new section of motorway.

17.4.7 In terms of transport effects, receptors comprise people living in an area, using facilities in an area and using transport networks in an area i.e. a much wider area. For this reason, the inter-related effects study area for transport effects and for noise, vibration and air quality effects related to changes in traffic is wider.

17.4.8 Traffic and visual assessments both consider a wider study area than the core study area for inter-related effects. Visual effects on occupiers of vehicles are assessed in the landscape and visual assessment. Road user receptors are considered in the assessment within the residential receptor group but it is accepted that these receptors could be located outside the core zone of influence.

17.4.9 It is assumed that the users of the properties within the zones of influence for air quality, noise and visual effects would use the local transport network and are therefore also receptors in terms of effects on ‘all travellers’. Dwellings and groups of dwellings are shown on Figure 17.3 and 17.4.

17.4.10 Public Rights of Way are shown on Figure 17.3 and 17.4 and the users of those within the core zone of influence could experience in combination effects in terms of noise, air quality and visual change.

17.4.11 To conclude, there are broadly two receptor groups. These are as follows.

- Closest long term receptors - people living at dwellings within 350 metres of construction activities and within 1 kilometre of the Scheme / or the limits of the noise effects shown on the noise contour plots.
- Closest intermittent receptors - people using Public Rights of Way (and other linear routes) within 350 metres of construction activities and within 1 kilometre of the Scheme / or the limits of the noise effects shown on the noise contour plots.

Identification of Potential Effects

17.4.12 For each receptor group Table 17.5 lists the potential effects on these receptors.

Table 17.5: Potential Effects for Each Receptor Group

Receptor Group	Potential Impacts
Closest long-term receptors - people living at dwellings within 350 m of construction activities and within 1 km of the Scheme / or the limits of the noise effects shown on the noise contour plots.	• Potential impacts from dust soiling surfaces, particularly window sills, cars and laundry • change to the level of traffic emissions (adverse or beneficial);changes to the noise environment and vibration (adverse or beneficial); and • changes to views.
Closest intermittent receptors - people using PRoWs (and other linear routes) within 350 m of construction activities and within 1 kilometre of the Scheme / or the limits of the noise effects shown on the noise contour plots.	• Changes to the PRoW network and other linear routes; • change to the level of traffic emissions (adverse or beneficial); • changes to the noise environment (adverse or beneficial);; and • changes to views.

17.4.13 Tables 17.6 and 17.7 list the inter-related effects that are predicted to arise during construction and operation of the Scheme. The tables present the Scheme lifetime inter-related effects and the text beneath each table describes the simultaneous inter-related effects. The effects are adverse and beneficial.

Table 17.6: Potential Type (i) Cumulative (Inter-related) Effects for People Living Near the Scheme

Receptor	Closest long-term receptors - people living at dwellings within 350 m of construction activities and within 1 km of the alignment of the Scheme				
Phase	Construction phase		Operation and maintenance phase		Project Lifetime Cumulative Effects
Impact type	Source of impact	Significance of individual effect with mitigation	Source of impact	Significance of individual effect with mitigation	
Dust soiling surfaces, particularly window sills, cars and laundry.	Dust generating construction activities such as excavating and moving earth.	A temporary, short/medium term effect which would be a negligible effect and not significant.	Not applicable.	Not applicable.	Through the project lifetime the receptors living closest to the existing M4 would experience limited construction related effects (construction noise, dust) followed by a reduction in traffic noise and traffic related emissions once traffic starts using the new section of motorway and limited change in views. Through the project lifetime the people living closest to the new section of motorway may experience noise and dust during construction alongside changes in views (both day and night). This would be followed by increased traffic noise and traffic related emissions once traffic starts using the new section of motorway as well as changes in views (both day and night).
Air quality	Exhaust emission impacts from construction traffic on human health.	A temporary, short/medium term effect which would not be significant.	Traffic emission impacts on human health.	Major beneficial effects (improvements in human health) for the receptors along the existing M4 corridor. The modelling results indicate that there is not a risk of environmental standards for NO_2 or PM_{10} being breached in the Scheme opening year (2022) or future year (2037). Although some locations across the study area result in an increase in pollutant concentrations, these are locations predicted to be below air quality objectives and have no risk of exceedance. There are no large increases in pollutant concentrations (>4 µg/m^3) as a result of the Scheme. The maximum increase in annual mean NO_2 concentrations is 1.5 µg/m^3, which is classified as a minor adverse impact according to the criteria and not significant.	

Receptor	Closest long-term receptors - people living at dwellings within 350 m of construction activities and within 1 km of the alignment of the Scheme				
Phase	Construction phase		Operation and maintenance phase		Project Lifetime Cumulative Effects
Impact type	Source of impact	Significance of individual effect with mitigation	Source of impact	Significance of individual effect with mitigation	
Noise change (adverse)	Noise generating construction activities such as excavation activities, piling, working machinery, construction traffic, etc.	A temporary, short/medium term effect, which would be: a significant 'moderate or large' adverse effect for 92 residential noise sensitive receptors; a significant moderate adverse effect for 121 residential noise sensitive receptors; and a slight (not significant) adverse effect for 140 residential noise sensitive receptors.	Noise from traffic on the new section of motorway.	A significant moderate or large adverse effect for 499 receptors in the short / medium term (2022) and a long term (2022-2037) permanent moderate or large effect for 30 receptors. A significant moderate adverse effect on 618 receptors short / medium term and 496 receptors long term. A slight effect (not significant) on 1,088 receptors short / medium term and 628 receptors long term. A neutral or slight effect (not significant) on 1,654 receptors short / medium term and 4,343 receptors long term. Of the three nurseries and schools within the noise study area for the new section of motorway all would experience an adverse noise effect, and two (Duffryn High and Lisweey High) are predicted to experience a significant adverse noise effect.	This assumes that the same people (receptors) would remain in the same properties from the start of the Scheme construction through to operation.
Noise change (beneficial)	Not applicable.	Not applicable.	Change in noise levels due to the reduction in traffic using the existing M4 or complementary measures.	A significant moderate or large beneficial effect for 1395 receptors short / medium term and zero receptors long term. A significant moderate beneficial effect for 2,706 receptors short / medium term and	

Receptor	Closest long-term receptors - people living at dwellings within 350 m of construction activities and within 1 km of the alignment of the Scheme				
Phase	Construction phase		Operation and maintenance phase		Project Lifetime Cumulative Effects
Impact type	Source of impact	Significance of individual effect with mitigation	Source of impact	Significance of individual effect with mitigation	
				774 receptors long term. A minor beneficial (not significant) effect for 8,955 receptors short / medium term and 1,393 receptors long term. A neutral or slight effect (not significant) for 3,137 receptors short / medium term and 11,911 receptors long term. For 610 receptors there would be no change short / medium term and no change for 1,079 receptors long term. Of the nine nurseries and schools within the noise study area for complementary measures all would experience a benefit in noise terms and three (St Julians High, St Julians Primary and Glasllwch School) are predicted to experience a significant beneficial noise reduction.	
Vibration	Vibration generating construction activities such as blasting or piling.	A temporary, short/medium term adverse effect which would be neutral or slight and would not be significant.	Vibration generated from traffic moving on the new section of motorway.	A neutral effect (not significant) and scoped out of the noise and vibration assessment as a result.	
Changes to views	Visibility of the construction activities.	A temporary, short/medium term neutral to very large adverse effect, which would be significant.	Visibility of the new section of motorway.	Slight beneficial to very large adverse (significant) effect at year one and neutral to very large adverse (significant) effect at year 15.	

Table 17.7: Potential Type (i) Cumulative Effects for People Using Public Rights of Way

Receptor	Closest intermittent receptors - people using PRoWs (and other linear routes) affected by the Scheme or within 350 m of construction activities and within 1 km of the Scheme				
Phase	Construction phase		Operation and maintenance phase		Project Lifetime Cumulative Effects
Impact type	Source of impact	Significance of individual effect with mitigation	Source of impact	Significance of individual effect with mitigation	
Changes to the Public Rights of Way network	Temporary stopping up and diversions: temporary stopping up affecting route for Wales Coast Path and Newport Coast Path. Temporary effects on ability to access local routes: temporary stopping up of a section of National Cycle Route 4 resulting in effects on route integrity.	Slight adverse medium temporary effect (not significant).	The introduction of new section of motorway close to existing routes. Permanent diversion and new cycle routes created.	A significant moderate adverse for users of the Wales Coast Path, slight adverse for users of the Newport Coast Path and slight beneficial for users of local routes. Slight beneficial effects for users of cycle routes. All effects are long term and permanent.	Project lifetime cumulative effects could only be experienced by regular users of the routes affected by the Scheme and the combination of types of impacts and levels of effects would be highly variable depending on the route itself.
Changes to the Public Highways, overbridges and underbridges, public transport. Driver stress.	Stopping up and diversion, resulting in temporary change in length of route. Temporary loss of access across existing structures impacting local journeys.	Significant moderate adverse effects on public highways. Significant moderate adverse effects for strategic routes and a slight adverse effect (not significant) on local routes for overbridges and underbridges. Slight adverse effect (not significant) on public transport. All are	Creation of new section of motorway and change in amenity of existing routes. Change in traffic flows and journey experience. No effect on public transport during operation.	Neutral effect on the users of overbridge and underbridge crossings. No significant effect on public transport. Slight beneficial effect on driver stress (not significant). Significant moderate beneficial effects on public highways.	

Receptor	Closest intermittent receptors - people using PRoWs (and other linear routes) affected by the Scheme or within 350 m of construction activities and within 1 km of the Scheme				
Phase	Construction phase		Operation and maintenance phase		Project Lifetime Cumulative Effects
Impact type	Source of impact	Significance of individual effect with mitigation	Source of impact	Significance of individual effect with mitigation	
		temporary medium term effects.			
Noise change (adverse)	Noise generating construction activities such as excavation activities, piling, working machinery, construction traffic, etc.	A temporary, short/medium term effect is expected for users of public rights of way in the vicinity of construction activities.	Noise from traffic on the new section of motorway.	There would be marked changes to the amenity of the existing footpaths/ bridleways, cycle and other routes that currently run through the more rural and quieter areas to the south and west of Newport. During the operation of the new section of motorway, a section of National Cycle Route 4 would run alongside the new motorway and the Cardiff to Newport Cycleway would cross over it. Other non-motorised users would also have a different experience to that presently enjoyed.	
Noise change (beneficial)	Not applicable.	Not applicable.	Change in noise levels due to the reduction in traffic using the existing M4 or complementary measures.	Users of public rights of way in the vicinity of the existing motorway may notice a reduction in traffic noise as traffic moves onto the new section of motorway but this would not be significant.	
Changes to views	Visibility of construction activities.	Short / medium term slight to very large significant adverse effects.	Visibility of the new section of motorway.	Moderate beneficial to very large significant adverse effects at year one (2022) and slight beneficial to very large adverse significant adverse effects at year 15 (2037).	

Summary of Type (i) Cumulative (Inter-related) Effects from the Scheme on People Living Locally

17.4.14 People living locally to the Scheme may be affected adversely or beneficially. The new section of motorway would enable traffic related effects to move from a highly populated residential area to a less populated area. Those people living near the existing motorway would see beneficial changes in relation to noise levels and air quality but a limited visual change. The cumulative beneficial effects have the potential to be more significant than the individual effects of the Scheme.

17.4.15 Despite the lower density of dwellings near the new section of motorway, there are new receptors that would experience an increase in noise as a result of the new section of motorway. Although air quality changes would not breach environmental standards, there would be a change in air quality near the new section of motorway. Changes in views from dwellings nearby would also result from the introduction of the new section of motorway and would also be a new effect for these receptors. The cumulative adverse effects have the potential to be more significant than the individual effects of the Scheme and would be new significant effects for those living near the new section of motorway.

Summary of Type (i) Cumulative (Inter-related) Effects from the Scheme on People Using Public Rights of Way

17.4.16 Users of Public Rights of Way and other routes near the Scheme during construction may be simultaneously affected by the dust and noise generated during construction activities as well as the visual effects (change in views). Users could also experience a temporary diversion or closure of a route (shown on Figure 17.3 and 17.4). Such effects would only combine where users of Public Rights of Way are in close proximity to the Scheme's construction activities. The receptors are transient through the landscape along the paths or routes and would not experience a long term effect unless out of choice. Nevertheless, the cumulative adverse effects have the potential to be more significant than the individual effects of the Scheme.

17.4.17 During operation, users of Public Rights of Way and other routes may be simultaneously affected by changes in the amount of traffic noise and air quality from the new section of motorway as well as the visual effects (change in views). Users could also experience a permanent diversion or closure of a route (shown on Figure 17.3 and 17.4). Such effects would only combine where users of Public Rights of Way are in close proximity to the Scheme. The receptors are transient through the landscape along the paths or routes and would not experience a long term effect unless out of choice. Effects are more likely to be felt intermittently. Nevertheless, the cumulative adverse effects have the potential to be more significant than the individual effects of the Scheme.

Mitigation and Monitoring

17.4.18 Environmental effects from the construction of the Scheme would be mitigated and monitored through the CEMP. A Pre-CEMP is provided at Appendix 3.2 of this ES.

17.4.19 Operational environmental effects from the Scheme would be mitigated and monitored as set out in this ES, including the commitments register set out at Appendix 18.1.

17.5 Assessment of Type (ii) Cumulative Effects from the Scheme and Other Proposed Development

17.5.1 'Other developments' have been identified and are shown on Figure 17.1 and 17.2. These are listed in Tables 17.11 and 17.12. The zones shown on the figures indicate the zones of influence for effects on environmental receptor(s) or resource(s). The mapping only shows the proposed new section of motorway because it is this part of the Scheme where the potential for significant adverse effects is expected. These zones have been identified in each topic chapter of the ES and are presented separately for land take, construction and operation phase effects in the tables below.

Zones of Influence for Land Take

17.5.2 Many effects would be expected to occur simultaneously and sequentially as a result of the land take required for the Scheme. Those effects that have a zone of influence limited to the land take itself and that are not expected to have an effect that radiates out from the limits of the land take are shown in Table 17.8 below. As all these effects are confined to the area of land take, their ability to combine and cause a cumulative effect with effects from other developments relates to the receptor or resource being affected by the footprint of the Scheme and the other development. For example, a development which would result in the loss of the same habitat type or specific designated land type combined with the Scheme's contribution to this effect would be a cumulative land take effect.

Table 17.8: Zones of Influence for Land Take Effects

Topic	Potential impact	Receptor/ resource	Zone of Influence (see Figure 17.1 and 17.2)
Cultural Heritage	Loss and direct physical change	Buried archaeology, designated heritage assets	Land take
Ecology and Nature Conservation	Loss of habitats, loss of ecologically designated land.	Habitats, ecologically designated sites	Land take
Geology and Soils	Geological exposure, loss of seedbank	Solid geology, superficial geology, geological designations and the seedbank	Land take
Materials	Sterilisation of mineral resources	Mineral resources	Land take
Community and Private Assets	Loss of land and properties	Users of land, users of community facilities, landowners	Land take

Zones of Influence during Construction

17.5.3 The zones of influence for construction effects are relevant to any other development where there is the potential for both the other development and the Scheme to be under construction at the same time. This could lead to cumulative effects arising as a result of construction activities (see Table 17.9).

Zones of Influence during Operation

17.5.4 The zones of influence for the operational stage focus on those effects that may radiate out from the proposed new section of motorway during operation (see Table 17.10).

17.5.5 The noise and air quality assessments presented in the ES use data from the Traffic Forecasting Report to predict future traffic flows in the opening year of 2022 and also in 2037 (design year). As such, the cumulative noise and air quality effects from traffic generated from new housing and employment uses allocated in the Newport, Monmouthshire and Cardiff Local Development Plans have been considered within these assessments, alongside standard growth factors. The planning departments at each of these local authorities were consulted regarding the proposed developments. The methodology for the traffic forecasting is set out in Section 4.4 of the Traffic Forecasting Report.

17.5.6 As such, the operational cumulative noise and air quality effects as a result of traffic have already been assessed in the noise and air quality chapters of the ES and are not repeated in the cumulative effects assessment.

Table 17.9: Zones of Influence during Construction

Topic	Potential impact	Receptor/ resource	Zone of Influence
Air Quality	Dust	Humans and ecological designations	350 m
Cultural Heritage	Indirect non-physical (visual and aural) change	Heritage assets and the Gwent Levels Landscape of Outstanding Historic Interest, visitors to heritage assets	200 m
Cultural Heritage	Change in setting of heritage assets	Setting of designated heritage assets, visitors to heritage assets	Based on the Zone of Theoretical Visibility
Landscape and Visual	Visual change	Humans	5 km from the centreline and 15 km centred on the height of the two bridge piers
Landscape and Visual	Change to character of the landscape	Designated and non-designated landscapes	Based on the Zone of Theoretical Visibility
Ecology and Nature Conservation	Disturbance, severance, fragmentation, wildlife casualties, barrier effects, lighting, air pollution.	Protected species, habitats, ecologically designated sites	Up to 500 m for traffic spray, disturbance from noise, visual, lighting. Receptor specific for severance, fragmentation and barrier impacts.
Geology and Soils	Instability	Solid geology, superficial geology, topsoil and subsoil	Land take. Maintaining stability is an inherent part of highway design. Implementation of the design as approved would mitigate potential effects.
Geology and Soils	Creation of pathways for contamination migration	Aquifers and surface waters	Land take. Impacts would be designed out or managed by the mitigation measures implemented through the CEMP, remediation strategy and earthworks specification.
Geology and Soils	Potential explosion from buried unidentified unexploded ordnance.	Construction workers and adjacent land users	Land take. Risk would be managed through the implementation of appropriate working methods and protocols.
Geology and Soils	Exposure to contamination through dermal contact, ingestion and inhalation of contaminated soil/soil derived dust. Exposure to waste/Made Ground with potentially elevated levels of soil contamination and asbestos. Inhalation of ground gases with elevated	Construction workers and adjacent land users	Land take. Human health would be managed by implementation of appropriate working methods and protocols. Work would be undertaken as described in the remediation strategy and CEMP.

Topic	Potential impact	Receptor/ resource	Zone of Influence
	concentrations.		
Materials	Waste generation from construction	Waste disposal facilities	Land take. Offsite disposal of contaminated and uncontaminated soils to landfill would be limited through the implementation of the Materials Management Plan and the Site Waste Management Plan. Where practical, all site won materials would be reused or treated and reused in order to minimise disposal.
Noise and Vibration	Noise from machinery	Humans	300 m
Noise and Vibration	Vibration from construction activities such as piling	Humans and structures	30 m
All Travellers	Diversions, stopping up, provision of new routes, temporary loss of use, change to operation of public transport services, change in attractiveness or length of journey, change in amenity, community severance.	Users of public highways, public transport, existing and proposed PROW connecting settlements between junctions 23A and 29 (Castleton, Newport, Magor and smaller settlements to the south).	Existing and proposed PRoW connecting settlements between junctions 23A and 29 (Castleton, Newport, Magor and smaller settlements to the south) - see Figure 14.2 and 14.3.
Community and Private Assets	Construction traffic/noise affecting amenity, temporary loss of land.	Local communities - Figure 15.1, 15.4, 15.6.	As for the noise/traffic/visual/air quality ZOIs on the settlements between Junctions 23A and 29 (Castleton, Newport, Magor and smaller settlements to the south), with account taken of the nearest available community facility where these are not available within these settlements.
Community and Private Assets	Change in the amenity of property along construction corridors/access routes due to construction traffic/noise, temporary loss of land.	Private assets	All properties and land, including agricultural land, which have the potential to be affected by demolition of property or loss of land (land take) or to experience changes to the amenity of properties or land as a result of the Scheme.
Road Drainage and the Water Environment	Generation of silt laden runoff during construction, abstraction and discharge of low quality groundwater into surface water during dewatering, generation of contaminated leachate during surcharge periods / through infiltration through embankment	Surface water	The principal premise is that surface water and groundwater pollution is managed for this Scheme to prevent deterioration of water status under the Water Framework Directive. This is achieved through risk assessment, use of remedial criteria and via baseline and aftercare monitoring. Importantly, it has been agreed with Natural Resources Wales that the Scheme would seek to deliver no statistically significant long-term adverse impact

Topic	Potential impact	Receptor/ resource	Zone of Influence
	fill, contaminated waters from known areas of contamination, sediment generated during culverting, creation of pathways for contamination, accidental spillage.		to the water quality within the Gwent Levels. The baseline water quality will be established prior to construction and take account of non-construction related variation in water quality measured at distant monitoring locations. As such the potential for a cumulative impact on surface water quality has been screened out.
Road Drainage and the Water Environment	Disturbance of contamination, reduction in groundwater levels and flows, generation of potentially contaminated leachate, disturbance of contamination, change to supply, quality, reliability of groundwater dependant features, creation of pathways for contamination, accidental spillage.	Groundwater	The principal premise is that surface water and groundwater pollution is managed for this Scheme to prevent deterioration of water status under the Water Framework Directive. This is achieved through risk assessment, use of remedial criteria and via baseline and aftercare monitoring. Importantly, it has been agreed with Natural Resources Wales that the Scheme would seek to deliver no statistically significant long-term adverse impact to the water quality within the Gwent Levels. The baseline water quality will be established prior to construction and take account of non-construction related variation in water quality measured at distant monitoring locations. As such the potential for a cumulative impact on groundwater water quality has been screened out.
Road Drainage and the Water Environment	Changes to flood risk	Structures, assets, land and people in the flood risk area.	Flood risk is modelled and assessed for this project at a scale and predicative uncertainty that would render the cumulative effects of all but the largest projects indiscernible. Flood risk assessment and management of all development is undertaken with the philosophy of not increasing flood risk parameters of the land take and third party land. This also implies cumulative risks from flooding are not possible insofar as all development cannot be permitted if it renders other projects responsible for mitigating any associated adverse effects (detriment) of flooding. As such the potential for a cumulative flooding impact has been screened out.

Table 17.10: Zones of Influence during Operation

Topic	Potential impact	Receptor/ resource	Zone of Influence
Air Quality	Change in the level of vehicle emissions	Humans	200 m from traffic
Air Quality and Ecology	Change in the level of vehicle emissions	Ecological designated sites sensitive to vehicle emissions	200 m from traffic
Cultural Heritage	Indirect non-physical (visual and aural) change, change to the setting of heritage assets.	Heritage assets, visitors to heritage assets	Based on Zone of Theoretical Visibility
Landscape and Visual	Visual change	Humans	Based on Zone of Theoretical Visibility
Ecology and Nature Conservation	Disturbance, severance, fragmentation, wildlife casualties, disruption to hydrology, polluted run-off into watercourses, barrier effects, lighting, air pollution, traffic spray (de-icing salt).	Protected species, habitats, ecologically designated sites	Wildlife casualties within the highway, up to 500 m for traffic spray, disturbance from noise, visual, lighting. Receptor specific for severance, fragmentation and barrier impacts.
Geology and Soils	Pollution of soils due to traffic spray/airborne pollutants.	Topsoil and subsoil	New section of motorway footprint. Committed mitigation would avoid topsoil and subsoil being effected beyond the footprint. The mitigation measures would be implemented via the approved drainage design and landscape planting to verges and secured through the Order.
Geology and Soils	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts on end users/maintenance workers. Ground gas migration and inhalation of gases by end users/maintenance workers.	End users / maintenance workers	Land take. Routine maintenance is expected during operation. Working procedures and safe systems of work would be implemented in accordance with existing requirements for highway management to mitigate exposure.
Noise and Vibration	Traffic noise change	Residents	1km either side of the motorway edge and/or extent of the contour plots in the figures for Chapter 13.
Noise and Vibration	Traffic noise change	Non-residential noise sensitive receptors (school, places of worship, care homes, etc)	1km either side of the motorway edge and / or extent of the contour plots in the figures for Chapter 13.
Noise and Vibration	Vibration	Residents and structures.	1km either side of the motorway edge.
All Travellers	Diversions, provision of new routes; loss of use; change to operation of	Users of public highways, public transport, existing and proposed	Local public highways, local public transport. Existing and proposed PRoW connecting settlements between junctions

Topic	Potential impact	Receptor/ resource	Zone of Influence
	public transport services; change in attractiveness or length of journey; change in amenity, community severance.	PRoW connecting settlements between junctions 23A and 29 (Castleton, Newport, Magor and smaller settlements to the south).	23A and 29 (Castleton, Newport, Magor and smaller settlements to the south).
Community and Private Assets	Change in traffic flows on routes which serve the local community; change in amenity of land used by the community due to predicted changes in operational traffic flows.	Communities	The settlements between Junctions 23A and 29 (Castleton, Newport, Magor and smaller settlements to the south), with account taken of the nearest available community facility where these are not available within these settlements.
Community and Private Assets	Change in the amenity of properties along the alignment of the new section of motorway.	Private assets	All properties and land, including agricultural land, which have the potential to be affected by demolition of property or loss of land (land take) or to experience changes to the amenity of properties or land as a result of the Scheme.
Road Drainage and the Water Environment	Run-off polluting surface water bodies, reens, tidal waters; generation of contaminated leachate by infiltration through embankments; generation of contaminated groundwater followed by lateral movement to surface waters.	Surface water	The main impact is from traffic use. The assessment has used predicted traffic flows from the traffic forecasting report which included all likely future development to account for cumulative traffic generation.
Road Drainage and the Water Environment	Generation of contaminated leachate through infiltration through embankment; generation of contaminated groundwater; change to supply, quality, reliability of groundwater dependant features.	Groundwater	The main impact is from traffic use. The assessment has used predicted traffic flows from the traffic forecasting report which included all likely future development to account for cumulative traffic generation.
Road Drainage and the Water Environment	Changes to flood risk	All resources/receptors sensitive to flooding within the flood risk area of the Scheme	Flood risk is modelled and assessed for this project at a scale and predicative uncertainty that would render the cumulative effects of all but the largest projects indiscernible. Flood risk assessment and management of all development is undertaken with the philosophy of not increasing flood risk parameters of the land take and third party land. This also implies cumulative risks from flooding are not possible insofar as all development cannot be permitted if it renders other projects responsible for mitigating any associated adverse effects (detriment) of flooding. As such the potential for a cumulative flooding impact has been screened out.

17.5.7 The assessment of cumulative effects is set out in the tables below. Appendices 17.2 and 17.3 show all the other developments identified in the area for assessment and provide a justification on their inclusion or exclusion to the assessment stage. All the other developments are shown on Figure 17.1 and 17.2. The cumulative effects assessment of those developments progressed to the assessment stage are presented in the tables below for planning applications and allocated sites.

Table 17.11: Cumulative Effects Assessment Matrix for Planning Applications shown on Figure 17.1

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
1	3	NCC 15/0456	5MW Solar farm	Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI and a cluster of residential receptors during construction. Potential for shared effects on PRoW (ref 390/15 and 390/18), which is being temporarily stopped up during construction of the Scheme, and a section of PRoW (ref: 390/15), which would be diverted permanently by the Scheme. Potential for shared long term temporary land take effects on the best and most versatile agricultural land and shared effects on the same farm holding. Potential increase in adverse visual effects on receptors in the area to the south east of Castleton Junction due to an increase in detracting urban intrusions. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs. Potential for shared effects on landscape character due to urbanisation and change in land use within Landscape Character Area (LCA) LCA1 and LCA2. No shared effects on the same cultural heritage receptor/resource or sensitive ecological receptors as the Scheme that could not be avoided or reduced by standard mitigation.	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects at residential dwellings and SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme provides mitigation land for land take effects on the SSSI. A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland between and underneath the arrays.
2	2	NCC 15/0323	Solar farm and grid yard	Likely significant effects on the designated historic landscape would be expected, which would also be significantly affected by the Scheme. Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI during construction. Appropriate mitigation would minimise cumulative effects. Potential for shared land take effects on agricultural	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects on the SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme provides mitigation land for land take effects on

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				land, but no anticipated loss of best and most versatile agricultural land. Shared effects on the same farm holdings as the Scheme. No shared effects on all travellers receptors/resources. No shared effects on private assets receptors/resources. Potential increase in adverse visual effects on receptors in the area to the south of the Llanwern Steel Works due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors and users of roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA7.	the SSSI. A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland between and underneath the arrays.
3	2	NCC 14/0700	7.5 MW Solar Farm	No shared effects on the same cultural heritage receptor/resource as the Scheme. Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI and several residential receptors during construction. Potential for shared impacts on the Wales Coast Path and Newport Coast Path. Potential for shared land take effects on agricultural land, but no anticipated loss of best and most versatile agricultural land. Shared effects on the same farm holdings as the Scheme. Potential increase in adverse visual effects on receptors in the area to the south east of Duffryn due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors and users of PRoWs and roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA1.	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects on the SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme provides mitigation land for land take effects on the SSSI. A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland between and underneath the arrays.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
5	3	NCC 14/0337	Installation of a ground mounted PV (Solar Electricity) Plant (4.85MW), including the erection of transformers and other ancillary equipment, tracks, drainage, fencing, CCTV, landscaping and all associated building and engineering operations, for use for a period of up to 25 years affecting Public Rights of Ways.	Potential for land take effects on protected species, particularly dormice populations associated with the M4 corridor, combined with significant adverse effects on the same receptors from the Scheme. Potential for shared long term temporary land take effects on the best and most versatile agricultural land. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA1. No shared effects on visual, cultural heritage, all travellers or community receptors/resources.	The Scheme's ecological mitigation includes the translocation of dormice from land take areas and the creation of suitable habitat.
6	3	NCC 15/0606	Single turbine (2.3 MW)	Potential for significant cultural heritage effects on the transporter bridge from both the turbine and the Scheme. Potential increase in adverse visual effects on receptors across a wide area around the Alexandra Docks due to an increase in urban clutter as a result of tall detracting vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. No shared landscape character effects as the type of development proposed is in-keeping with the character of LCA3. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
6a	1	NCC 15/0839	Installation of single wind turbine (2.3MW)	As for 6 above.	

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
7	1	NCC 12/0649	Erection of one wind turbine height to tip 125 meters, and new substation	As for 6 above.	
8	1	NCC 11/1287	Erection of single wind turbine and associated works	Potential for significant effects on the Grade I listed Nash Church from both the turbine and the Scheme. Potential increase in adverse visual effects on receptors across a wide area around the western end of the Caldicot Levels due to an increase in urban clutter as a result of tall detracting vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Limited potential for shared landscape character effects as the development is unlikely to change the overall character of LCA7 being at the edge of the Power Station and near an existing turbine. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
9	3	NCC 11/1058	A single wind turbine	Potential for significant effects on the designated historic landscape from both the turbine and the Scheme. Potential increase in adverse visual effects on receptors across the area around the eastern end of the Caldicot Levels due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA7. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private	The Scheme's landscape planting may minimise cumulative visual effects from some views.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				assets or all travellers receptor/resource as the Scheme.	
10	2	NCC 12/1021	A single wind turbine (73.25 m high, 99.7 m to tip)	Potential for significant effects on the designated historic landscape from both the turbine and the Scheme. Potential increase in adverse visual effects on receptors across the eastern end of the Caldicot Levels due to an increase in urban clutter as a result of tall detracting vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA7. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
11	2	NCC 11/1224	Two wind turbines and associated access tracks, hardstanding area and switch room	Potential for significant effects on the designated historic landscape from both the turbines and the Scheme. Potential increase in adverse visual effects on receptors across the area around the eastern end of the Caldicot Levels due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA7. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the community, private assets or all travellers receptors/resources as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
12	1	NCC 12/1001	Erection of one wind turbine (1.5 MW) with a maximum height to tip of 100m, together	Potential for significant effects on the designated historic landscape from both the turbine and the Scheme. Potential increase in adverse visual effects on receptors across north east section of the Caldicot Levels due to	The Scheme's landscape planting may minimise cumulative visual effects from some views.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			with ancillary development including electrical substation kiosk and electrical transforming kiosk, underground cabling, onsite access tracks, access to the public highway, crane hardstandings, temporary construction compound and site signage.	an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA7. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the community, private assets or all travellers receptors/resources as the Scheme.	
13	2	NCC 11/0863	Three wind turbines	Potential for significant effects on the designated historic landscape from both the turbines and the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI during construction. Potential increase in adverse visual effects on receptors around Greenmoor Arch due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA7. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects on the SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
14	2	NCC 11/0860	Wind farm development (Option A ten turbines, Option	Potential for significant effects on the designated historic landscape from both the turbines and the Scheme. Potential increase in adverse visual effects on receptors	The Scheme's landscape planting may minimise cumulative visual effects from some views.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			B six turbines)	across the central and northern sections of the Caldicot Levels due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Effects most likely to be judged as adverse for receptors across the more rural surrounding areas. Potential for shared landscape character effects on LCA7 due to the introduction of vertical elements and urbanising form on this part of LCA7, which is naturalistic and tranquil. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	
15	2	NCC 11/0529	Up to three wind turbines (126.5 m high) affecting PRoW 404/3	As for 14 above.	
15a	3	NCC 12/0465	A single wind turbine	As for 14 above.	
16	2	NCC 11/0864	Three wind turbines	Potential for significant effects on the designated historic landscape from both the turbines and the Scheme. Potential increase in adverse visual effects on receptors across a wide area around the western end of the Caldicot Levels due to an increase in urban clutter as a result of numerous tall detracting vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWS and roads. No shared landscape character effects as the type of development proposed is in-keeping with the character of LCA3. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving	The Scheme's landscape planting may minimise cumulative visual effects from some views.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	
18	1	NCC 10/0805	Erection of two wind turbines	Shared effects on the same farm holding as the Scheme. Potential increase in adverse visual effects on receptors to the north of Castleton Junction due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWS and roads. Potential for landscape character effects on LCA1 due to the introduction of vertical elements. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same cultural heritage, community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
21	3	NCC 11/0871	Solar farm	Potential for significant effects on the designated historic landscape from both the solar farm and the Scheme. Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI during construction. Appropriate mitigation will minimise cumulative effects. Potential for shared land take effects on agricultural land, but no anticipated loss of best and most versatile agricultural land. Shared effects on the same farm holdings as the Scheme. No shared effects on all travellers receptors/resources. No shared effects on private assets receptors/resources. Potential increase in adverse visual effects on receptors in the area to the south of the Llanwern Steel Works due to an increase in detracting urban intrusions. Potential	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects on the SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme provides mitigation land for land take effects on the SSSI. A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland between and underneath the arrays.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				increased adverse effect on residential receptors and users of roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA7.	
22	3	NCC 11/0869	Solar farm	Potential for significant effects on the designated historic landscape from both the solar farm and the Scheme. Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. Potential for shared land take effects on agricultural land, but no anticipated loss of best and most versatile agricultural land. No shared effects on community or all travellers receptors/resources. Potential increase in adverse visual effects on receptors to the north west of Redwick due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA7.	Appropriate mitigation would minimise cumulative noise effects. Should both the Scheme and the development be constructed at the same time, there is the potential for dust effects on the SSSI. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme provides mitigation land for land take effects on the SSSI. A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland between and underneath the arrays.
23	3	MCC DC/2015/00573	Installation of ground mounted photovoltaic solar arrays to provide circa 5 MW generation capacity together with power inverter systems; transporter stations; internal access track; landscaping; cable trench, security measures, fencing, access gates, and associated	Potential for shared long term temporary land take effects on the best and most versatile agricultural land. Shared effects on the same farm holding as the Scheme. Should construction phases overlap there would be potential effects on all travellers. Potential increase in adverse visual effects on receptors to the west and north west of Junction 23a of the M4 due to an increase in detracting urban intrusions. Potential increased adverse effect on non-residential receptors and users of PRoWs and roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA5.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			infrastructure.	No significant effects on cultural heritage receptor/resource expected. No shared receptor for construction dust or noise. No shared effects on the same cultural heritage, ecological or community receptor/resource as the Scheme.	
24	1	MCC DC/2012/00931	Two wind turbines of up to 100m tip-height; An electrical substation kiosk at the base of each turbine; An electricity transformer kiosk at the base of each turbine; Crane hard-standing areas; On-site access track; Access to the public highway; Underground cabling; temporary construction compound; and site signage	Potential for significant effects on the designated historic landscape from both the turbines and the Scheme. Potential increase in adverse visual effects on receptors across a wide area around Junction 23 of the M4 due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PROWS and roads. Potential for shared landscape character effects due to an intensification of urbanisation and more vertical elements within LCA8. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	This site is within the SSSI mitigation area for the Scheme. Both can co-exist.
25	3	CCC 14/00851/DCO	Installation of a ground mounted photovoltaic (solar electricity) plant, including the erection of transformers and other ancillary equipment, tracks, drainage, fencing, CCTV, landscaping and all associated building and engineering operations, for use for	No shared effects on the same cultural heritage receptor/resource as the Scheme. Likely significant effects on the non-designated historic landscape are expected from the proposed solar project. However, the Scheme would not have a significant effect on the non-designated historic landscape. Potential for land take effects on protected species, particularly dormice populations associated with the M4 corridor, combined with significant adverse effects on the same receptors from the Scheme. Potential for shared long term temporary land take effects on the best and most versatile agricultural land. No shared effects on community or all travellers receptors/resources.	The Scheme provides mitigation includes the translocation of dormice from land take areas and the creation of suitable habitat. The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			a period of up to 25 years (19,400 no. 250kw solar panels)	Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA1. No shared visual receptors.	
27	1	NCC 06/0471	Integrated mix of residential, employment, service and leisure facilities.	Potential for land take effects on open mosaic habitats on previously developed land used by reptiles and terrestrial invertebrates (including the Shrill Carder Bee) combined with the Scheme's significant adverse effect on this habitat type. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for more visual change for receptors across the elevated, steeply sloping districts of north east Newport due to an increase in urban development. Potential impacts on residential and non-residential receptors and users of roads. Additional impacts are not likely to change significance of visual effects. Located within LCA6 the development would contribute to a broader change of character from industrial to residential/commercial, which is a different and therefore not shared with the Scheme's landscape character impacts in LCA6. No significant effects on cultural heritage receptor/resource expected. No shared effects on the same cultural heritage receptor/resource as the Scheme. No shared receptors for noise impacts. No shared effects on community, private assets or all travellers receptors/resources.	The Scheme's mitigation provides for restoration of temporary land for construction to 'suitable' habitat. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
31	1	NCC 10/0626	Residential development of 36 dwellings together	No shared effects on the same receptor as the Scheme apart from the potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk	The Scheme's otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			with riverside path and associated works affecting PRoW 411/1	SAC designation) combined with a significant effect from the Scheme.	
34	1	NCC 11/1000	Construction of 28 apartments and associated works	As for 31 above.	As for 31 above.
35	1	CCC 13/00578/DCO	New Community comprising up to 1020 new homes, village centre (comprising retail, employment, and community uses), play areas and allotments; two form entry primary school, riverside park including extension and improvements to Rhymney Trail. All associated landscaping, land re-profiling, access (vehicular, cycle and pedestrian) and highway works	No shared effects on the same receptor/resource as the Scheme apart from the potential for land take effects on protected species, particularly dormice populations, associated with the M4 corridor, combined with significant adverse effects on the same receptors from the Scheme. Also, potential for shared permanent land take effects on the best and most versatile agricultural land.	The Scheme provides mitigation includes the translocation of dormice from land take areas and the creation of suitable habitat. The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land. .
36	1	NCC 12/0491	Great Western Main Line overhead line electrification (between London and Oxford, Newbury, Bristol, Cardiff and Swansea) involving the installation of overhead line	Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on the SSSI and two residential receptors during construction. Potential increase in adverse visual effects on receptors in the vicinity of the South Wales to London Mainline railway due to an increase in detracting urban intrusions. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and	Appropriate mitigation will minimise cumulative noise effects. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			electrification conductor wires supported on gantries spaced between 50m and 70m apart. A number of existing structures such as bridges and tunnels would be altered or replaced to provide sufficient clearance for the wires.	roads. The electrification would affect several LCAs which would also be affected by the Scheme. Within LCA2 and LCA5 there would be increased prominence of transport infrastructure and the number of vertical elements. There would be limited potential for additive landscape effects within LCA3, LCA4 and LCA6. LCA8, 9 and 10 would be affected by an incremental change in character in the context of the railway line as a boundary feature. No shared effects on the same ecological, cultural heritage, community, private assets or all travellers receptor/resource as the Scheme.	
37	3	National Infrastructure Planning Project 'Tidal Lagoon Newport'	Newport Tidal lagoon electricity generating station with a potential generating capacity of 1800MW up to a possible 2800 MW. A seawall attached to the foreshore, at its western extent approximately 1km to the mouth of the River Usk, and at its eastern extent to the foreshore in the area of Baldwin Sands. The furthest offshore extent is up to 8km from the foreshore towards the centre of the Severn Estuary.	Potential effects on wintering birds and assemblages using the intertidal and subtidal areas affected by the tidal lagoon and foraging on land within the land take of the Scheme. Potential for shared impacts on the Wales Coast Path. Potential increase in adverse visual effects on receptors in the vicinity of the Severn Estuary and on receptors across the elevated areas to the north of the Gwent Levels due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors, users of PRoWs and boats sailing on the estuary. Shared landscape character receptor (LCA11). The Scheme's landscape character effects relate to the setting of LCA11 whereas the Tidal Lagoon's effects would physically change the character of LCA11. No shared effects on the same cultural heritage, community or private assets receptor/resource as the Scheme.	The Scheme's ecological mitigation aims to create suitable habitat.
38	3	National Infrastructure	Cardiff Tidal lagoon electricity generating	Potential effects on wintering birds and assemblages using the intertidal and subtidal areas affected by the	The Scheme's ecological mitigation aims to create suitable habitat.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
		Planning Project 'Tidal Lagoon Cardiff'	station with a potential generating capacity of 1800MW up to a possible 2800 MW. A seawall attached to the foreshore, at its western extent approximately 2 km from the entrance to Cardiff Bay, and at its eastern extent approximately 2km from the mouth of the River Usk. The furthest offshore extent is approximately 8km from the foreshore to the centre of the Severn Estuary.	tidal lagoon and foraging on land within the land take of the Scheme. Potential for shared impacts on the Wales Coast Path. Potential for shared land take effects on agricultural land, but no anticipated loss of best and most versatile agricultural land. Potential increase in adverse visual effects on receptors in the vicinity of the Severn Estuary and on receptors across the elevated areas to the north of the Gwent Levels due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors, users of PRoWs and boats sailing on the estuary. Shared landscape character receptor (LCA11). The Scheme's landscape character effects relate to the setting of LCA11 whereas the Tidal Lagoon's effects would physically change the character of LCA11. No shared effects on the same community or cultural heritage receptor/resource as the Scheme.	
39	3	NCC 15/0424	Proposed photovoltaic farm and associated works	Potential for shared long term temporary land take effects on the best and most versatile agricultural land. Potential increase in adverse visual effects on receptors in the vicinity of Wilcrick Hill and on receptors across the elevated areas to the north of the M4 motorway due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors, users of PRoWs and roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA5. No shared effects on the same ecological, cultural heritage, community, all travellers or cultural heritage receptor/resource as the Scheme.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
40	3	NCC 15/0788	Wind turbine, 30m hub height.	No shared effects on the same receptor/resource as the Scheme apart from the potential for landscape and visual cumulative effects. There is the potential for an increase in adverse visual effects on receptors across the Wentlooge Levels and in the surrounding villages and across the high ground to the north of the Levels due to an increase in detracting urban intrusions, including tall vertical elements. Potential increased adverse effect on residential and non-residential receptors and users of PRoWs and roads. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme.Potential for landscape character effects on LCA2 due to the introduction of vertical elements.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
41	1	NCC 15/0725	Erection of 0.9MW wind turbine of 66 metres in height (to blade tip) and ancillary equipment and infrastructure(affecting public right of way 388/20 Bishton and 388/18 Bishton) Resubmission of 14/0713	Potential increase in adverse visual effects on receptors in the vicinity of Wilcrick Hill and on receptors across the elevated areas to the north of the M4 motorway due to an increase in detracting urban intrusions including large vertical elements. Potential increased adverse effect on residential receptors, users of PRoWs and roads. Shared landscape character receptor (LCA5) would be affected by an incremental change due to the introduction of a vertical element. Potential significant effects on the Registered Parks and Gardens to the north of the turbine and Grade II listed church to the south. However, no significant effects on these receptors are expected from the Scheme. Potential for injury or mortality to birds and bats from moving turbine blades and from collision with moving traffic on the Scheme. No shared effects on the same community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's landscape planting may minimise cumulative visual effects from some views.
44	3	NCC 14/0419	Solar farm	Likely significant effects on the designated historic landscape would be expected, which would also be significantly affected by the Scheme.	A solar development has the potential for the retention of ditches, reens and the creation of species rich grassland

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The scheme provides mitigation land for these effects. Potential for dust impacts on the same receptors as the Scheme during construction. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at residential dwellings and SSSI. Potential for noise impacts on SSSI and residential receptors during construction. Potential for shared land take effects on agricultural land, but no anticipated loss of best and most versatile agricultural land. Shared effects on the same farm holdings as the Scheme. Potential increase in adverse visual effects on receptors in the area to the south of the Llanwern Steel Works due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors and users of PRoWs and roads. Potential for shared long term temporary (reversible) effects on landscape character due to new noticeable features, urbanising elements, loss or change to field pattern and a change in land use within LCA7. No shared effects on all travellers or private assets receptors/resources.	between and underneath the arrays. Appropriate mitigation will minimise cumulative noise effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
45	3	NCC 15/1111	Solar farm (4MW)	Potential for dust impacts on the same receptors as the Scheme during construction. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at residential dwellings and SAC. Potential for more visual change for receptors in the vicinity of the Usk River to the east of this proposed development due to an increase in highly perceptible urban elements. Potential effect on users of PRoWs and non-residential receptors. Additional impacts are not likely to change significance of visual effects.	The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
				No shared landscape character effects as the type of development proposed is in-keeping with the character of LCA3. No shared effects on the same noise, community, private assets, all travellers, cultural heritage or ecological receptor/resource as the Scheme.	
48	3	NCC 15/1189	182 no. houses and associated glazing and infrastructure on housing phase 2a of the Glan Llyn Regeneration Site	Potential for land take effects on open mosaic habitats on previously developed land used by reptiles and terrestrial invertebrates (including the Shrill Carder Bee) combined with the Scheme's significant adverse effect on this habitat type. Potential for more visual change for receptors across the elevated, steeply sloping districts of north east Newport due to an increase in urban development. Potential impacts on residential and non-residential receptors and users of roads. Additional impacts are not likely to change significance of visual effects. Located within LCA6 the development would contribute to a broader change of character from industrial to residential/commercial, which is a different to the Scheme's landscape character impacts in LCA6. No shared effects on the same cultural heritage, community, private assets or all travellers receptor/resource as the Scheme.	The Scheme's ecological mitigation provides for restoration of temporary land for construction to suitable habitat.
52	1	NCC 15/0078	Crindau Pill Flood Alleviation Scheme, Evans Street, Newport. Proposed new raised flood defences comprising reinforced concrete walls, embankments and ground raising 0.2m – 1.5 m above existing ground levels	As for 31 and 34, no shared effects on the same receptor as the Scheme apart from the potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme.	As for 31 and 34, the Scheme's otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.

ID	Tier	Application reference	Brief description	Assessment of cumulative effect with Scheme	Proposed mitigation
			and associated works along the west bank of the River Usk and the lower end of Crindau.		

Table 17.12: Cumulative Effects Assessment Matrix for Allocated Sites shown on Figure 17.2

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
EM1(i)	3	EM1(i)	38.5 ha employment land for B1, B2, and B8 uses	Potential for land take effects on open mosaic habitats on previously developed land used by reptiles and terrestrial invertebrates (including the Shrill Carder Bee) combined with the Scheme's significant adverse effect on this habitat type. Potential for noise impacts on the one residential receptor and SSSI receptors during construction. No shared effects on community, private assets or all travellers receptors/ resources. Potential for dust impacts on the same receptors as the Scheme during construction. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at residential dwellings and SSSI. Potential increase in adverse visual effects for receptors across the Imperial Park area and areas of the Wentlooge Levels to the south due to an increase in urban elements. Potential impacts on residential and non-residential receptors and users of PRoWs and roads. Located within LCA1 the development would result in the potential for further adverse change as a result of increased urban form of notable scale.	The Scheme's mitigation provides for restoration of temporary land for construction to suitable habitat. Appropriate mitigation would minimise cumulative noise effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
EM1(ii)	3	EM1(ii)	27 ha employment land for B1, B2, and B8 uses	Significant effects on the setting of Tatton Farm are expected from this employment use. Significant adverse effects are also predicted on Tatton Farm from the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on the one residential and SSSI receptors during construction. Potential shared land take effects on agricultural land, but no anticipated loss of the best and most versatile agricultural land. Shared effects on the same land holding as the Scheme. Potential increase in adverse visual effects for receptors around Pye Corner and surrounds due to an increase in urban elements. Potential impacts on residential and non-residential receptors and users of PRoWs and roads. Should both the Scheme and development be constructed at the	Appropriate mitigation would minimise cumulative noise effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				same time, there is the potential for dust effects at residential dwellings and SSSI. Located within LCA7 the development would result in a further adverse change as a result of the increase in urban form within the area and loss of the levels field pattern and associated vegetation within the LCA.	
EM1(iv)	33	EM1(iv)	43 ha employment land for B1, B2, B8 and leisure use	The site is the Solutia SINC. The Scheme would have severance and land take effects on the same SINC. The Scheme and EM1(iv) would result in the complete loss of the SINC. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on several residential receptors and SSSI receptors during construction. Potential shared land take effects on agricultural land, but no anticipated loss of the best and most versatile agricultural land. Shared effects on the same land holding as the Scheme. Potential increase in adverse visual effects for receptors along Nash Road and Pye Corner and surrounds due to an increase in urban elements. Potential impacts on residential and non-residential receptors and users of PRoWs and roads. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at residential dwellings. Located within LCA7 the development would result in an further adverse change as a result of the increase in urban form within the area and loss of the levels field pattern and associated vegetation within the LCA.	Appropriate mitigation would minimise cumulative noise effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
EM1(v)	3	EM1(v)	16 ha employment land for B8 distribution uses	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The scheme provides mitigation land for these effects. Potential for dust impacts on the same receptors as the Scheme during construction. No shared noise effects. Potential shared land take effects on agricultural land, but no anticipated loss of the best and most versatile agricultural land. Potential increase in adverse visual effects for receptors in the vicinity of Wilcrick Hill and across the elevated areas to the north of the M4	The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				motorway due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors, users of PRoWs and roads. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at SSSI. Located within LCA6 the development would result in different impacts to those identified for this LCA contributing to a broader change of character from industrial to residential/commercial.	
H1(15)	3	H1(15)	130 housing units	Potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme. No shared effects on community, private assets or all travellers receptors/ resources. Visible for some receptors across the elevated, steeply sloping districts of north east Newport affected by the Scheme but this proposed development is unlikely to be noticeable within the expansive views available. No shared landscape receptor.	Scheme otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.
H1(16)	3	H1(16)	160 housing units	Potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme. No shared effects on community, private assets or all travellers receptors/ resources. Visible for some receptors across the elevated, steeply sloping districts of north east Newport affected by the Scheme but this proposed development is unlikely to be noticeable within the expansive views available. Located within LCA3 the development would not result in an increase to the potential effects on this LCA because the type of development proposed is in-keeping with the character of the LCA.	Scheme otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.
H1(34)	3	H1(34)	38 housing units	Potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme. No shared effects on community, private assets or all travellers receptors/ resources. Visible for some receptors across the elevated, steeply sloping districts of north east Newport affected by the Scheme but this	Scheme otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				proposed development is unlikely to be noticeable within the expansive views available. No shared landscape receptor.	
H1(40)	3	H1(40)	154 housing units	Potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme. No shared effects on community, private assets or all travellers receptors/ resources. Visible for some receptors across the elevated, steeply sloping districts of north east Newport affected by the Scheme but this proposed development is unlikely to be noticeable within the expansive views available. No shared landscape receptor.	Scheme otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.
H1(42)	3	H1(42)	63 housing units	Potential loss of terrestrial habitat used by otters (a protected species and part of the River Usk SAC designation) combined with a significant effect from the Scheme. No shared effects on community, private assets or all travellers receptors/ resources.Visible for some receptors across the elevated, steeply sloping districts of north east Newport affected by the Scheme but this proposed development is unlikely to be noticeable within the expansive views available. No shared landscape receptor.	Scheme otter mitigation aims to avoid creation of barriers, reduce lighting and create suitable habitat.
SP11	3	SP11	The eastern expansion area consists of the former Llanwern Steelworks regeneration site known as Glan Llyn h1(47) and em1(vii), and housing sites at Llanwern village h1(3), Hartridge	No shared receptors for construction dust or noise effects. No shared effects on community, private assets or all travellers receptors/ resources. Potential for more visual change for receptors across the elevated, steeply sloping districts of north east Newport due to an increase in urban development. Potential impacts on residential and non-residential receptors and users of roads. Additional impacts are not likely to change significance of visual effects. Located within LCA6 the development would result in different impacts to those identified for this LCA contributing to a broader change of character from industrial to residential/commercial.	Appropriate noise mitigation would minimise cumulative effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
			High School h1(19) and Jigsaw Site h1(55). This eastern expansion area is identified as a residential led mixed use, sustainable urban expansion area which will provide a range and choice of housing, employment land and community uses.		
SAE1a	3	SAE1a	Area 4.0 ha identified for new industrial and business development (classes B1, B2 and B8)	Potential for land take effects on protected species combined with significant adverse effects on the same receptors from the Scheme. No shared receptor for noise impacts. No shared effects on community, private assets or all travellers receptors/ resources. Potential for shared visual effects on views from Wilcrick Hill (residential and PRoW receptors) and elevated land north of the existing M4 and also the potential for views from Magor. Located within LCA9 the development would potentially contribute to a further loss of green field land within the LCA and an increase in urban form.	The Scheme's mitigation provides for restoration of temporary land for construction to suitable habitat. The Scheme's planting would, in time, screen many of these views.
SAE1b	3	SAE1b	Area 19.6 ha identified for new	Potential for land take effects on protected species combined with significant adverse effects on the same receptors from the Scheme. Potential for dust impacts on the same receptors as the Scheme	The Scheme's planting would, in time, screen many of these views. The Scheme proposes

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
			industrial and business development (classes B1, B2 and B8)	during construction. Potential for noise impacts on SSSI receptors during construction. Appropriate mitigation would minimise cumulative effects. Potential for shared land take effects on the best and most versatile agricultural land. No shared community or all travellers receptors /resources. Potential for shared visual effects on views from Wilcrick Hill (residential and PRoW receptors) and elevated land north of the existing M4 and also the potential for views from Magor. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at the SSSI. Located within LCA9 the development would potentially contribute to a further loss of green field land within the LCA and an increase in urban form.	strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development. The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
SAE1c	3	SAE1c	Area 13.3 ha identified for new industrial and business development (classes B1, B2 and B8)	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on SSSI receptors during construction. Potential for shared land take effects on agricultural land but no anticipated loss of the best and most versatile. Shared effects on the same farm holding. Potential increase in adverse visual effects for receptors in the vicinity of Wilcrick Hill and across the elevated areas to the north of the M4 motorway due to an increase in detracting urban intrusions. Potential increased adverse effect on residential receptors, users of PRoWS and roads. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at the SSSI. Located within LCA7 the development would result in a further adverse change as a result of the increase in urban form within the area and loss of the levels field pattern and associated vegetation within the LCA.	The Scheme provides mitigation land for SSSI land take effects. Appropriate noise mitigation would minimise cumulative effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
SAE2o	3	SAE2o	Protected for industrial and business development	Potential for land take effects on protected species combined with significant adverse effects on the same receptors from the Scheme. No shared receptors for construction dust or noise effects. No shared effects on community, private assets or all travellers	The Scheme's mitigation provides for restoration of temporary land for construction to suitable habitat.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
			(classes B1, B2 and B8)	receptors/ resources. Potential for shared visual effects on views from Wilcrick Hill (residential and PRoW receptors) and elevated land north of the existing M4 and also the potential for views from Magor. Located within LCA9 the development would not result in an increase to the potential effects on this LCA because the type of development proposed is in-keeping with the character of the LCA.	The Scheme's planting would, in time, screen many of these views.
SAE2w	3	SAE2w	Protected for industrial and business development (classes B1, B2 and B8)	Potential for land take effects on protected species combined with significant adverse effects on the same receptors from the Scheme. No shared receptors for construction dust and noise effects. No shared effects on community, private assets or all travellers receptors/ resources. Potential for shared visual effects on views from Wilcrick Hill (residential and PRoW receptors) and elevated land north of the existing M4 and also the potential for views from Magor. Located within LCA9 the development would not result in an increase to the potential effects on this LCA because the type of development proposed is in-keeping with the character of the LCA.	The Scheme's mitigation provides for restoration of temporary land for construction to suitable habitat. The Scheme's planting would, in time, screen many of these views.
SAH5	3	SAH5	11 ha, 270 dwellings, 2 ha serviced land for industrial and business. Noted that the new section of motorway (referred to as M4 Relief Road) must not be prejudiced by this development	The Breezy Bank to Rockfield Farm SINC is within this allocation. Potential for dust impacts on the same receptors as the Scheme during construction. Potential for noise impacts on multiple residential receptors during construction. No shared effects on community, private assets or all travellers receptors/ resources. Potential for shared visual effects from elevated areas to the north of the existing M4 (residential, PRoW and roads). There is the potential for views of the Scheme from the northern edge of Magor to be obscured by this development. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at the SSSI. Located within LCA5 the development would potentially contribute to a further loss of green field land within the LCA and an increase in urban form.	Appropriate noise mitigation would minimise cumulative effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development.
SAH6	3	SAH6	7.81 ha allocated	Potential for dust impacts on the same receptors as the Scheme during construction.	Appropriate noise mitigation would minimise cumulative

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
			residential development, approx. 225 new dwellings.	Potential for noise impacts on multiple residential receptors during construction. No shared effects on community, private assets or all travellers receptors/ resources. Potential for shared visual effects from elevated areas to the north of the existing M4 (residential, PRoW and roads). There is the potential for views of the Scheme from the northern edge of Magor to be obscured by this development. Should both the Scheme and development be constructed at the same time, there is the potential for dust effects at the SSSI. Located within LCA5 the development would potentially contribute to a further loss of green field land within the LCA and an increase in urban form.	effects. The Scheme proposes strict controls on construction dust and it is anticipated that appropriate controls would also be applied for the other development
10	3	10	3.12 Motorway related employment (B1,B8) service and/or tourism uses, garden related retail uses, agricultural related commercial development	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
14	3	14	1.09 ha Residential (35 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
15	3	15	0.97 ha Residential	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community	The Scheme's Soil Handling Methodology (Pre-CEMP) would

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
			(10 dwellings)	receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	limit effects on the best and most versatile agricultural land.
29	3	29	5 ha Residential (64 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
30	3	30	7.89 ha Residential (40-50 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
38	3	38	4 ha Residential (100-150 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
43	3	43	9.72 ha Residential	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
44	3	44	1.1 ha Residential (9-13 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				Limited potential for shared views of the Scheme and this development.	
48	3	48	4.5 ha Residential (70 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
53	3	53	10.4 ha District Centre Shopping Centre	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
59	3	59	13 ha Commercial/residential	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
72	3	72	81 ha Mix of residential, retail, employment, waterside park and community use (1200 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
80	3	80	5.05 ha Residential (130 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				Limited potential for shared views of the Scheme and this development.	
91	3	91	9.65 ha Mix of residential and employment (337 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
98	3	98	6.61 ha Residential (150 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
105	3	105	6.96 ha : Residential (20 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
109	3	109	0.87 ha Residential (12 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.
1	3	1	28 ha Residential, Business/Industry	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The Scheme provides mitigation land for these effects. Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land. The Scheme provides mitigation land for SSSI land take effects. The

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
				receptors/resources. Potential for views of the Scheme and this development by all visual receptor types across the western edge of the Wentlooge Levels.	Scheme's landscape planting may minimise cumulative visual effects from some views.
2	3	2	3.9 ha Residential or Business/Industry	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The Scheme provides mitigation land for these effects. Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Potential for views of the Scheme and this development by all visual receptor types across the western edge of the Wentlooge Levels. Located within LCA2 the development would result in a further adverse change as a result of the increase in urban form within the area and loss of the Levels field pattern and associated vegetation within the LCA.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land. The Scheme provides mitigation land for SSSI land take effects. The Scheme's landscape planting may minimise cumulative visual effects from some views.
24	3	24	9.5 ha Commercial/light industrial B1, B2 & B8 uses; alternatively residential (350 dwellings)	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The Scheme provides mitigation land for these effects. Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Potential for views of the Scheme and this development by all visual receptor types across the western edge of the Wentlooge Levels. Potential for views of the Scheme from residential receptors on the eastern edge of St Mellons to be obscured by this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land. The Scheme provides mitigation land for SSSI land take effects. The Scheme's landscape planting may minimise cumulative visual effects from some views.
49	3	49	3.32 ha Housing/general retail/employment or mixed use (132 dwellings)	Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Limited potential for shared views of the Scheme and this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land.

ID	Tier	Site Reference	Brief Description	Assessment of cumulative effect with Scheme	Proposed mitigation
106	3	106	71 ha Rail station, park & ride, hotel, retail, business, landscaping	Potential for land take effects on the SSSI combined with significant adverse effects on the SSSI from the Scheme. The Scheme provides mitigation land for these effects. Potential for shared permanent land take effects on the best and most versatile agricultural land. No shared effects on community receptors/resources. No shared effects on all travellers receptors/resources. Potential for views of the Scheme and this development by all visual receptor types across the western edge of the Wentlooge Levels. Potential for views of the Scheme from residential receptors on the eastern edge of St Mellons to be obscured by this development.	The Scheme's Soil Handling Methodology (Pre-CEMP) would limit effects on the best and most versatile agricultural land. The Scheme provides mitigation land for SSSI land take effects. The Scheme's landscape planting may minimise cumulative visual effects from some views.

Summary of Cumulative Effects from the Scheme and Other Proposed Developments

17.5.8 There are a number of types of cumulative effects likely to occur during the lifetime of the Scheme. These include cumulative effects due to loss of land in respect of the Gwent Levels Sites of Special Scientific Interest, best and most versatile agricultural land and various farm holdings; and the loss of terrestrial habitat for otters, dormice and other protected species. The majority of potential cumulative impacts would arise as a result of proposed housing or solar farm developments in the vicinity of the Scheme.

17.5.9 In terms of landscape effects, other proposed development would add further urbanisation to certain landscape character areas (LCAs) and, in other areas, would be in keeping with landscape character (for example, further built development in an already urbanised area) and would not result in a significant cumulative effect on landscape. Similarly for views, the introduction of more development and vertical elements (such as wind turbines) in some areas would not present a noticeable cumulative visual effect, while in other locations, where development represents a more noticeable change from the baseline, there may be an increase in adverse visual effects on residential receptors, users of Public Rights of Way and road users.

17.5.10 Cumulative effects between the Scheme and other planned or proposed developments may occur in respect of the historic landscape of the Gwent Levels and the setting of several cultural heritage assets.

17.5.11 Some of the closest residential properties to the Scheme, together with several Public Rights of Way (including the Wales Coast Path and the Newport Coast Path) would experience cumulative effects both during construction and the operation of the Scheme, particularly in respect of visual impact, noise and potentially air quality. This would occur with other programmed developments set out in the Local Development Plans of Newport City Council and Monmouthshire County Council as well as with private developments including solar farms.

17.5.12 Wintering birds may experience a cumulative effect between the loss of suitable foraging areas within or close to the Scheme and intertidal and subtidal areas that could be impacted upon by the proposed Cardiff and Newport Tidal Lagoon developments. Bird and bat populations may also be affected by injury or mortality from both collision with vehicles on the Scheme and collision with the moving blades of wind turbines.

Mitigation and Monitoring

17.5.13 Construction environmental effects from the Scheme would be mitigated and monitored through the CEMP. A Pre-CEMP is provided at Appendix 3.2 of this ES.

17.5.14 Operational environmental effects from the Scheme would be mitigated and monitored as set out in this ES, including the commitments register set out at Appendix 18.1.