
Appendix 13.1
Heritage Impact
Assessment



N2 SLANE BYPASS AND PUBLIC REALM ENHANCEMENT SCHEME

EIA REPORT APPENDIX 13.1

ASSESSMENT OF PREDICTED IMPACTS ON THE OUTSTANDING UNIVERSAL VALUE OF BRÚ NA BÓINNE WORLD HERITAGE PROPERTY

for RPS on behalf of Meath County Council

09/08/2023

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August 2023

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AUTHOR	Dr Stephen Carter



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SUMMARY

This report presents the results of a heritage impact assessment (HIA) of the predicted impact of the proposed N2 Slane Bypass and Public Realm Enhancement Scheme on the Outstanding Universal Value (OUV) of Brú na Bóinne World Heritage Property.

No part of the Proposed Scheme is located within the World Heritage Property or its buffer zone. The proposed bypass, at its closest where it crosses the N51, would be at least 0.9km outside the buffer zone and 2.0km outside the World Heritage Property. However, the Proposed Scheme would lie within the wider setting of the World Heritage Property. Construction of the Proposed Scheme would change the setting and this could affect the OUV of the World Heritage Property.

The report therefore has three main objectives:

- *To analyse how the setting of the World Heritage Property around Slane currently supports OUV, and how changes resulting from construction of the Proposed Scheme could affect OUV;*
- *To explain how the design of the Proposed Scheme has evolved in order to avoid or minimise potential adverse impacts on OUV; and finally*
- *To assess how the scheme, as now proposed, would affect OUV.*

*An Introduction to the report (**Section 1**) and Statement of Competence (**Section 2**) are followed by a description of the methods used in the assessment (**Section 3**).*

*Analysis of the contribution made by setting to OUV in **Section 4** of the report leads to a Statement of Significance in **Section 5** that describes three ways in which the wider setting around Slane supports the OUV of the World Heritage Property:*

- *Attributes of both the built and natural environment near Slane have functional associations with the monumental landscape of the World Heritage Property and with individual monuments within the property. Appreciation of these associations supports the OUV of the property.*
- *Viewpoints near Slane provide opportunities to experience the monumental landscape of the World Heritage Property and the landscape setting of individual monuments within the property. These opportunities enhance our appreciation of the landscape setting and therefore support the OUV of the property.*
- *The land around Slane features in the background to some important views of the World Heritage Property from within the nominated property and the buffer zone. In these views, it is part of the modern rural agricultural landscape that forms an appropriate green setting for the Neolithic monuments within the nominated property. Experience of the monuments in this rural setting supports the OUV of the property.*

These three aspects of setting provide the framework for assessment of how the predicted changes in the wider setting caused by the Proposed Scheme would impact on OUV.

*The key aim of the HIA has been to avoid or minimise any adverse impacts on OUV, consistent with the delivery of the public benefits of the project and recognising the need to resolve potential conflicts of interest with other environmental disciplines. This mitigation, as reported in **Section 6** of the report, has been achieved in two main stages:*

- *Option selection: comparison of the likely impact of the available route options on OUV, leading to a choice of preferred route for the bypass that takes sufficient account of any implications for the World Heritage Property; and*
- *Design and Environmental Evaluation: advice to the project design team based on an understanding of OUV, leading to a detailed design proposal that incorporates all opportunities to minimise adverse impacts on OUV from the preferred route of the bypass.*

The route option selection process led to the selection of a preferred route for the bypass to the east of Slane, between Slane and the World Heritage Property. This was not the preferred choice from the perspective of protection of OUV as all eastern route options were predicted to cause adverse impacts of some magnitude and moderate significance. Most western and on-line options were predicted to have no impact on OUV but other considerations led to the rejection of these route options.

From the perspective of the World Heritage Property, the choice of preferred route represented a compromise, but one that already delivered considerable mitigation embedded in the design at this stage. It was the best of the eastern route options from the perspective of predicted impacts on the OUV of the World Heritage Property. This is because it offered more embedded design mitigation at the two most sensitive locations affected by the various eastern route options, minimising visibility of the proposed road in:

- the view looking west from Knowth; and
- the view of the World Heritage Property from the Hill of Slane.

Accepting that the selected route option could have an adverse impact on OUV without further mitigation, the subsequent design and environmental evaluation stage of the project provided an opportunity to reduce these potentially adverse impacts. The primary aim of mitigation measures at this detailed design stage was to reduce the visibility or visual prominence of the proposed bypass, and vehicles using it, in views from Knowth and the Hill of Slane. This was achieved through refinements to the design of the bypass as follows:

- Selection of a design and materials for the Boyne Bridge that minimise its visual prominence in views from Knowth;
- Addition of a planted bund that creates additional screening of vehicles immediately to the south of the bridge structure when viewed from Knowth;
- Planting of hedgerows and trees beside the mainline cutting south of the Boyne Bridge to integrate the cutting into the existing landscape of enclosed fields and to screen the upper parts of high-sided vehicles in views from Knowth; and
- Planting of a woodland strip along the west side of the mainline between the N51 Roundabout and the north roundabout to screen the bypass and vehicles moving along it when viewed from the Hill of Slane.

The net effect of these additional mitigation measures, after growth of screening vegetation, would significantly reduce the visibility of the proposed bypass in key views from Knowth and the Hill of Slane. This, in turn, would reduce the magnitude of impact on OUV of the World Heritage Property below that identified in the option selection assessment. The predicted impact of the proposed scheme, following these embedded mitigation measures, is assessed in **Section 7** of the report.

Construction-phase impacts: The construction of the scheme is predicted to last for 36 months. During this time period, the construction works will be visible within the wider setting of the World Heritage Property, including visibility from important viewpoints that support OUV.

Any changes in the visual or noise environment due to these works would be of short-duration and entirely reversed at the end of construction works. As a result of their temporary nature, it is concluded that they would not have any long-term or permanent effect on the setting of the World Heritage Property and therefore no impact on OUV.

Operational impacts: The assessment of predicted operational impacts has considered each of the three aspects of OUV that are supported by elements of the wider setting of the World Heritage Property around Slane.

It is concluded that the only aspect of OUV that would be adversely affected by the operation of the proposed bypass would be the functional relationship between the World Heritage Property and its wider setting; specifically the role of the River Boyne in the development of the monumental landscape of Brú na Bóinne.

It is concluded that partial visibility of the proposed Boyne Bridge in the view looking west from Knowth (PV59), combined with visibility of the bridge from the Fennor Cross Roads (V1) and audible traffic noise at the west end of Viewpoint V3 on the towpath, would have a very limited impact on our ability to experience the close physical links between the western end of Brú na Bóinne and the River Boyne and therefore very little impact on our appreciation of the role that the river may have played in the evolution of this remarkable monumental landscape. This is considered to be a permanent adverse impact of negligible magnitude and minor significance on OUV.

Cumulative impacts: *The potential for cumulative impacts on the OUV of the World Heritage Property has been assessed using two different approaches to the topic:*

- *the combined impact of the Proposed Scheme together with other approved projects, not yet constructed; and*
- *the combined impact of the Proposed Scheme together with other projects, approved and constructed since the inscription of the World Heritage Property in 1993.*

In the first case, it is concluded that there would be no cumulative impact on OUV as a result of the construction and operation of the Proposed Scheme in combination with any other approved development project that is not yet constructed.

In the second case, it is concluded that the combined impact of post-1993 development with the Proposed Scheme would result in a cumulative impact of some magnitude. This cumulative impact is judged to be an adverse impact of moderate significance. However, it should be noted that the cumulative adverse impact of post-1993 developments on OUV, excluding the Proposed Scheme, is already of some magnitude. Addition of the Proposed Scheme would lead to only a negligible incremental addition to the cumulative impact on OUV.

Overall conclusion: *The assessment has concluded that operation of the Proposed Scheme (with all relevant mitigation measures embedded in the scheme design) would result in a negligible negative impact on the OUV of the World Heritage Property. This conclusion applies to an assessment of the impact of the Proposed Scheme alone and to its contribution to cumulative impact on OUV since inscription in 1993.*

In terms of the UNESCO 2022 guidance, avoidance and mitigation measures implemented during the design of the Proposed Scheme have reduced any negative impacts on OUV to an acceptable level. The impact is therefore judged to be acceptable in a World Heritage context.

1. INTRODUCTION

- 1.1. This report presents the results of a heritage impact assessment ('HIA') of the predicted impact of the proposed *N2 Slane Bypass and Public Realm Enhancement Scheme* ('Proposed Scheme') on the Outstanding Universal Value ('OUV') of Brú na Bóinne World Heritage Property ('World Heritage Property').
- 1.2. The current N2 road runs from south to north through Slane, where it crosses the River Boyne. The World Heritage Property is located further down the Boyne, east of Slane, at least 2.7km from the current N2 at Fennor. The boundary of the buffer zone that surrounds the World Heritage Property is at least 1.4km from the current N2 (**Figure 1**).
- 1.3. The proposed new road would bypass Slane on its east side and therefore would be closer to the World Heritage Property than the existing road. However, it must be stressed that no part of the Proposed Scheme would lie within the World Heritage Property or its buffer zone. The bypass, at its closest where it crosses the N51, would be at least 0.9km outside the buffer zone and 2.0km outside the World Heritage Property. The proposed bridge over the River Boyne would be 1.1km outside the buffer zone and 2.4km outside the World Heritage Property.
- 1.4. As a result, the Proposed Scheme would lie within the wider setting of the World Heritage Property. Construction of the Proposed Scheme would change the setting, and this could affect the OUV of the World Heritage Property. Change in the setting would not automatically affect OUV; this would depend on the nature of the change and the ways in which this part of the setting supports OUV.
- 1.5. Therefore, this report has three main objectives:
 - To analyse how the setting of the World Heritage Property around Slane currently supports OUV, and how changes resulting from construction of the Proposed Scheme could affect OUV;
 - To explain how the design of the Proposed Scheme has evolved in order to avoid or minimise potential adverse impacts on OUV; and finally
 - To assess how the scheme, as now proposed, would affect OUV.
- 1.6. This freestanding HIA for the World Heritage Property forms part of a wider study of the impact of the Proposed Scheme on the cultural heritage around Slane by Courtney Deery Heritage Consultancy ('CDHC'). The present report forms an appendix to Chapter 13 Archaeology and Cultural Heritage of the EIA Report, prepared by CDHC, and findings regarding impacts on OUV of the World Heritage Property contribute to the overall assessment in that chapter.

2. STATEMENT OF COMPETENCE

- 2.1. This report has been prepared by Dr Stephen Carter and was commissioned by RPS on behalf of Meath County Council. Dr Carter has formed part of the Slane Bypass project team since appointment in October 2017. He is a Senior Heritage Consultant with Headland Archaeology (UK) Ltd where he has worked since 1996. He is a Member of the Chartered Institute for Archaeologists and a Fellow of the Society of Antiquaries of Scotland. Headland Archaeology is a Registered Organisation with the Chartered Institute for Archaeologists.
- 2.2. Dr Carter has over 30 years professional cultural heritage experience and, for the past 15 years, has specialised in cultural heritage impact assessment with particular experience of the setting of heritage assets in rural landscapes. He recently served on the Advisory Panel that published *Principles of Cultural Heritage Impact Assessment the UK* in 2021 on behalf of Chartered Institute for Archaeologists, Institute of Historic Buildings Conservation and the Institute of Environmental Management and Assessment.
- 2.3. He has previously worked on the setting of Brú na Bóinne in connection with a wind farm application in 2015; this project also required assessment of the setting of the Hill of Tara and Kells (both sites on Ireland's Tentative List¹ for World Heritage Properties at that time). He is currently contributing to a project to design the proposed Boyne Greenway, between Navan and Oldbridge, running past Brú na Bóinne. He also advised Sligo County Council in 2021/22 on the proposed N17 Knock to Collooney road upgrade, which passes through 'The Passage Tomb Landscape of County Sligo', a site recently added to Ireland's Tentative List.
- 2.4. Other experience of World Heritage Properties, all in the UK, includes development projects affecting the setting of the 'Heart of Neolithic Orkney', 'Frontiers of the Roman Empire', 'Derwent Valley Mills' and 'Pontcysyllte Aqueduct and Canal' World Heritage Properties.
- 2.5. Whilst Dr Carter is the author of the present report, the HIA that it describes has benefitted from input by other members of the project team and external expert consultees.
- 2.6. Within the project team, information and advice on the World Heritage Property and wider archaeological issues raised by the Proposed Scheme has been provided by Clare Crowley and Siobhan Deery (CDHC), Niall Roycroft (Meath County Council) and Mary Deevy (Transport Infrastructure Ireland).
- 2.7. Information and advice on predicted changes in the noise environment have been provided by John Mahon (acoustics consultant with RPS). Information and advice on predicted visual impacts and landscape mitigation measures has been provided by Stuart Anderson (landscape consultant with RPS) who also prepared the visualisations used to assess predicted visual change in key views relating to the World Heritage Property. Viewsheds for the proposed Boyne Bridge were prepared by Steve Davis (UCD).
- 2.8. External advice on the World Heritage Property has come from a variety of consultees (as described in Chapter 6 of the EIA Report) but the following three have been of particular assistance in the provision of relevant information and advice:
 - Conor Brady (Dundalk Institute of Technology)
 - International Council on Monuments and Sites (ICOMOS) Ireland
 - National Monuments Service and Built Heritage & Architectural Advisory Unit of the Department of Housing, Local Government and Heritage (previously Department of Culture, Heritage and the Gaeltacht)

¹ 'Royal Sites of Ireland' which included the Tara Complex and 'Early Medieval Monastic Sites' which included Kells. Of these two, only 'Royal Sites of Ireland' remains on the current 2022 Tentative List.

3. METHODS

GENERAL APPROACH TO IMPACT ASSESSMENT

- 3.1. This assessment adopts the general approach to impact assessment recommended by UNESCO in its *Guidance and Toolkit for Impact Assessments in a World Heritage Context (2022)*. More specifically, it has followed the guidance provided in Chapter 5: *Assessing Impact on World Heritage as part of a Wider Environmental and Social Impact Assessment*.
- 3.2. The programme of work reported on below commenced in 2017 and therefore the majority of it was undertaken before publication of the UNESCO 2022 guidance. As a result, it followed the earlier good practice guidance published by ICOMOS in 2011: *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*. As noted in the Foreword to the UNESCO 2022 guidance, the 2022 document incorporates and replaces the ICOMOS 2011 guidance.
- 3.3. Comparison of the two guidance documents does not reveal any change in advice regarding the basic principles of impact assessment in the context of world heritage, with a continuing focus on understanding the OUV of a World Heritage Property and the predicted impact of a proposal on that OUV. The 2022 document is wider ranging as it offers guidance relevant to both cultural and natural heritage; it is also a longer and more-detailed document.
- 3.4. Following comparison, it was concluded that the assessment carried out herein remains in accordance with the up-dated guidance and this guidance does not undermine the relevance or reliability of the assessment work carried out before 2022. All earlier assessment work has therefore been retained without material revision in this final report although some of the vocabulary used in the earlier reports has been updated to conform with that used in the 2022 guidance.
- 3.5. In order to demonstrate how the 2022 guidance has been adopted, the text on 'impact assessment methods' (below) is presented using the main steps of the assessment process now recommended in the 2022 guidance (UNESCO 2022, Figure 5.1, page 24).

PROGRAMME OF WORK

- 3.6. This report contains the findings of a programme of work extending over five years from October 2017 that has contributed to Phases 2 and 3 of the project. The aim of this programme has been to ensure that the project to design a bypass for Slane is fully informed about the World Heritage Property and the potential for development to adversely affect its OUV. Early engagement by the project team with this matter has allowed the evolving project design to take account of the World Heritage Property and therefore to avoid or minimise any adverse impacts on its OUV. Opportunities for enhancement of the World Heritage Property have also been examined as part of the project.
- 3.7. Option Selection (Phase 2 of the TII Project Management Guidelines, TII 2016) involved two main tasks:
 - Analysis of OUV and its relationship to the wider setting of the World Heritage Property, leading to a detailed understanding of how the landscape potentially affected by the bypass supports OUV; followed by
 - Appraisal of route options for the bypass, leading to conclusions regarding likely impacts on OUV and recommendations to the project team for the selection of a preferred route option that would avoid or minimise adverse impacts on OUV.
- 3.8. Both tasks benefited from consultation with relevant stakeholders, including meetings to discuss the project with the International Council on Monuments and Sites (ICOMOS) (Ireland) and the National Monuments Service, Department of Housing, Local Government and Heritage (previously Department of Culture, Heritage and the Gaeltacht).

- 3.9. The results of the option selection work are presented in two reports². The first, dated February 2019, considers the predicted impacts of nine route options for the N2 bypass to the west and east of Slane along with 'Do-Nothing' and 'Do-Minimum' scenarios. The second report, dated July 2019, is a supplement to the first report. It considers the predicted impacts of six route options for a N51 bypass to the north of Slane in combination with what was then the emerging preferred option for the N2 bypass (Route E/G).
- 3.10. Design and Environmental Evaluation (Phase 3 of the TII Project Management Guidelines, TII 2016) also involved two main tasks:
- Advice to the project team regarding the detailed design of the Proposed Scheme, including landscape mitigation, in order to minimise adverse impacts on OUV; and
 - Assessment of the predicted impact of the finalised project design on OUV to inform the environmental impact assessment reporting for the Proposed Scheme.
- 3.11. ICOMOS (Ireland), the National Monuments Service and other stakeholders were again consulted during this work. The results of the final assessment are presented in this report.

IMPACT ASSESSMENT METHODS

- 3.12. The programme of work described in the preceding section has been undertaken using methods that follow the approach to impact assessment for World Heritage now promoted by UNESCO in its *Guidance and Toolkit for Impact Assessments in a World Heritage Context* (2022).
- 3.13. The impact assessment process recommended in Chapter 4 of the guidance involves 11 steps with two additional activities taking place throughout the assessment. These are summarised in Table 4.1 of the guidance document as follows:

Activities throughout assessment

- A. Participation
- B. Proactive problem solving

Steps of impact assessment

1. Screening
2. Scoping
3. Baseline
4. Proposed action and alternatives
5. Identifying and predicted impacts
6. Evaluating impacts
7. Mitigation and enhancement
8. Reporting
9. Reviewing the report
10. Decision-making
11. Follow-up

- 3.14. Steps 3-8 and the two continuing activities are the responsibility of the project's impact assessment team (UNESCO 2022, Figure 5.1); methods employed for each of these activities are described below.

² Both reports are titled *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site*.

A. PARTICIPATION

- 3.15. Participation, as defined in the UNESCO guidance, is referred to as 'consultation' in the present project. Consultation is an essential part the decision making associated with EIA. This includes not only the statutory consultation associated with the application but also, at pre-planning stage, the early involvement of the public and other stakeholders to ensure that the views of stakeholders are taken into consideration throughout the preparation of the EIA Report.
- 3.16. Stakeholder consultation has been a feature of the project development for the Proposed Scheme. Details of the consultation carried out by the project team and the responses from consultees are set out in Chapter 6 of the EIA Report. Consultation commenced in Q3 of 2017 as part of the process of defining the study area and potential constraints and have continued throughout the development of the Proposed Scheme.
- 3.17. Stakeholders consulted as part of this process with particular interest in the World Heritage Property include:
- Local residents and landowners
 - International Council on Monuments and Sites (ICOMOS) Ireland
 - National Monuments Service and Built Heritage & Architectural Advisory Unit of the Department of Housing, Local Government and Heritage (previously Department of Culture, Heritage and the Gaeltacht)
 - Royal Irish Academy
 - University College Dublin
 - Dundalk Institute of Technology
 - Meath Archaeological and Historical Society

B. PROACTIVE PROBLEM SOLVING

- 3.18. Guidance (UNESCO 2022, s.6.3) notes that impact assessment provides an opportunity to think creatively about the Proposed Scheme and potentially contribute to sustainable development. This problem-solving approach can be taken throughout the assessment and includes identifying broader alternatives for the Proposed Scheme as well as more specific mitigation measures.
- 3.19. This approach has been incorporated into the present project through the early engagement of a consultant with relevant World Heritage experience as part of the project team. This ensures that the need to protect OUV remains at the forefront of considerations during development of the Proposed Scheme and that all opportunities are taken to minimise any predicted adverse impacts.
- 3.20. As noted above ('Programme of Work') this approach has been applied both in the 'Option Selection' and 'Design and Environmental Evaluation' phases of the project. The results of this approach, in terms of avoidance or reduction in adverse impacts on OUV, are described in Section 6 of this report.

3. BASELINE

- 3.21. The need to analyse and understand the current baseline is addressed in this report through an analysis of the OUV of the World Heritage Property, focussing on the ways in which the wider setting around Slane supports OUV. This is dealt with in Sections 4 and 5 of the report.
- 3.22. Section 4 contains a summary of existing publications that are relevant to an analysis of the setting of the World Heritage Property. This provides the evidence base for Section 5, which contains a Statement of Significance, explaining how that part of the wider setting around Slane supports the OUV of the World Heritage Property.

4. PROPOSED ACTION AND ALTERNATIVES

- 3.23. A detailed description of the Proposed Scheme is provided in Chapter 4 of the EIA Report. Chapter 3 of the EIA Report describes how alternatives to the Proposed Scheme were considered as part of the project.
- 3.24. Alternative proposals were considered in Phase 2 of the project (Option Selection). Detailed analysis and assessment of the impact of alternative proposals on OUV were undertaken and are reported on in two reports titled *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site* (dated February and July 2019).
- 3.25. The conclusions reached in these two reports regarding the World Heritage Property in isolation fed into the *N2 Slane Bypass Option Selection Report* (May 2020), which brought together findings from all relevant disciplines to reach an integrated conclusion on the preferred route option for the bypass.
- 3.26. All three reports should be read to gain a full understanding of the analysis and decision-making process that led ultimately to a preferred route option.

5/6. IDENTIFYING, PREDICTING AND EVALUATING IMPACTS

- 3.27. The Proposed Scheme would be located in the wider setting of the World Heritage Property and would lead to permanent change in that setting. The identification of impacts on OUV requires the assessment of whether and how predicted changes in the setting would affect the ways in which that setting supports OUV (as identified in the baseline study).
- 3.28. Analysis of the changes that would occur in the wider setting of the World Heritage Property is based on field work in order to understand how the Proposed Scheme would be experienced on the ground. This has been informed by predicted visibility mapping and the production of photomontages that illustrate the predicted appearance of the bypass from selected viewpoints relevant to the experience and appreciation of the World Heritage Property.
- 3.29. An assessment of the predicted impact of the Proposed Scheme is presented in Section 7 of this report and includes separate consideration of construction and operation phase impacts. It also assesses the potential for cumulative impacts that would result from the Proposed Scheme in combination with other approved projects and with other projects constructed since inscription of the World Heritage Property in 1993.
- 3.30. The predicted impact of the Proposed Scheme on OUV is assessed using the various categories of impact significance recommended in the UNESCO guidelines (2022, page 84):
- *Neutral: Research into the potential impact reveals that no change would occur to the attribute.*
 - *Minor: Research into the potential impact shows that the change would be negligible.*
 - *Moderate: Research into the potential impact shows that there would be some change to the attribute.*
 - *Major: Research into the potential impact shows that there would be large change to the attribute.*
- 3.31. 'Change' to an attribute is understood to mean the magnitude of change (positive or negative) in OUV. 'Attribute' is understood to include elements of the World Heritage Property itself that convey OUV as well as elements of the buffer zone or wider setting that support OUV.

7. MITIGATION AND ENHANCEMENT

- 3.32. Steps taken to mitigate any predicted adverse impacts and, where possible, enhance OUV are described in Section 6 of this report. Mitigation of adverse effects has been achieved in two phases of the project:
- *Option selection: comparison of the nature and magnitude of impact of the available route options on OUV, leading to an informed choice of preferred route for the bypass; and*
 - *Design and Environmental Evaluation: advice to the project design team (including interaction with the landscape and visual specialist) based on an understanding of OUV, leading to a detailed*

design proposal that incorporates all opportunities to minimise adverse impacts on OUV from the preferred route of the bypass.

- 3.33. In both phases, the proposed mitigation measures have been embedded in the design of the project. As a result, it is logical to present an account of the embedded mitigation in Section 6 of this report, before the results of the impact assessment at Section 7.

8. REPORTING

- 3.34. Information relevant to consideration of the World Heritage Property may be found in four main reports, all of which have already been referred to in this description of assessment methods.
- *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site* (February 2019). Predicted impacts on OUV of nine route options for the N2 Slane Bypass to the west and east of Slane along with 'Do-Nothing' and 'Do-Minimum' scenarios.
 - *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site* (July 2019). Predicted impacts on OUV of six route options for a N51 bypass to the north of Slane in combination with the emerging preferred option for the N2 Slane Bypass.
 - *N2 Slane Bypass Option Selection Report* (May 2020). Multidisciplinary synthesis of findings (including assessment of the World Heritage Property) to reach an integrated conclusion on the preferred route option for the N2 Slane Bypass.
 - *N2 Slane Bypass Assessment of Predicted Impacts on the Outstanding Universal Value of Brú Na Bóinne World Heritage Property* (the present report). Predicted impact of the Proposed Scheme on OUV of the World Heritage Property, forming Appendix 13.1 to Chapter 13 of the EIA Report for the project.

4. THE WIDER SETTING OF THE WORLD HERITAGE PROPERTY

DEFINITION OF TERMS

- 4.1. The area of land around Slane that may be affected by the proposed bypass lies within the wider setting of the World Heritage Property but outside the limits of the nominated property and its designated buffer zone. The relationship between the nominated property (i.e. the World Heritage Property itself), its buffer zone and wider setting, and their collective role in the protection of OUV, may be understood by reference to the current UNESCO *Operational Guidelines for the Implementation of the World Heritage Convention* (2021).
- 4.2. For the nominated property:
"Boundaries should be drawn to incorporate all the attributes that convey the Outstanding Universal Value and to ensure the integrity and/or authenticity of the property." (paragraph 99)
"For properties nominated under criteria (i) - (vi) [including Brú na Bóinne], boundaries should be drawn to include all those areas and attributes which are a direct tangible expression of the Outstanding Universal Value of the property, as well as those areas which, in the light of future research possibilities, offer potential to contribute to and enhance such understanding." (paragraph 100)
- 4.3. The nominated property may be surrounded by a buffer zone:
"This should include the immediate setting of the nominated property, important views and other areas or attributes that are functionally important as a support to the property and its protection" (paragraph 104)
- 4.4. UNESCO also recognises a 'wider setting' beyond the buffer zone:
"The wider setting, may relate to the property's topography, natural and built environment, and other elements such as infrastructure, land use patterns, spatial organization, and visual relationships. It may also include related social and cultural practices, economic processes and other intangible dimensions of heritage such as perceptions and associations. Management of the wider setting is related to its role in supporting the Outstanding Universal Value." (paragraph 112)
- 4.5. It is clear from these quotations that the OUV of a World Heritage Property is primarily embodied and expressed in attributes within the nominated property itself. The buffer zone protects the OUV, containing views and other attributes that are functionally important to supporting the OUV. The wider setting of a World Heritage Property is important only in so far as it provides additional support for the OUV of the property. Therefore, for proposed developments in the wider setting of a World Heritage Property (such as the proposed Slane Bypass), the starting point for any assessment is an understanding of OUV and how it is supported by the wider setting.
- 4.6. Further guidance on 'setting' is provided by ICOMOS in the Xi'an Declaration³. The range of considerations that fall within the term is usefully defined at Paragraph 1 of the Declaration:
"The setting of a heritage structure, site or area is defined as the immediate and extended environment that is part of, or contributes to, its significance and distinctive character.
Beyond the physical and visual aspects, the setting includes interaction with the natural environment; past or present social or spiritual practices, customs, traditional knowledge, use or activities and other forms of intangible cultural heritage aspects that created and form the space as well as the current and dynamic cultural, social and economic context."

³ <https://www.icomos.org/charters/xian-declaration.pdf>

DOCUMENTARY SOURCES

- 4.7. There is no existing document that explicitly defines the wider setting of the Brú na Bóinne World Heritage Property and the various ways in which it supports OUV. However, the following documents contain information relevant to our understanding of the OUV of the Brú na Bóinne World Heritage Property and the role played by its wider setting in supporting OUV.
- 4.8. The documents fall into two main groups: firstly there are published accounts of academic research and, secondly, policy or management documents issued by planning and heritage bodies. Collectively, they provide the basis for our understanding of the ways in which the wider setting of the World Heritage Property supports OUV. They are summarised below in chronological order.
- 4.9. This evidence base is the starting point for the drafting of a Statement of Significance for the area around Slane, defining how this part of the wider setting to the World Heritage Property supports its OUV. This is presented in Section 5 (below).

NEWGRANGE AND THE BEND OF THE BOYNE, GERALDINE STOUT (2002)

- 4.10. The widely recognised importance of Brú na Bóinne has generated a long list of publications through the 19th and 20th centuries, both academic and non-specialist in content. A comprehensive review of that literature is not required here as the information and scholarship it contains are generally noted in the research and management documents that are summarised below. However, one book may be noted as it provides a comprehensive overview of the evolution of the prehistoric and historic landscape of this area. This is Geraldine Stout's 2002 publication which, although now 20 years old, remains a useful and authoritative account. More-recent academic research, not available to Stout but relevant to the topic, is discussed under the next sub-heading.
- 4.11. Stout's book does not seek to explicitly describe the setting of the World Heritage Property but its geographical scope is sufficient to take in the area around Slane and so it deals with relevant information. The key point to note from Stout's account is the emergence of Slane as an important place in the Early Medieval Period, in contrast to its apparent lack of importance in the prehistoric landscape.
- 4.12. Interpretation of the Early Medieval period is not clear-cut and depends on the analysis and integration of surviving contemporary written sources with a growing body of archaeological evidence. What emerges from this analysis is the importance of the area for the Early Medieval Kingdom of Brega and the locally based Aed Slaine dynasty. Secular power appears to have been focussed on a royal centre at Knowth with a contemporary ecclesiastical centre at Slane.
- 4.13. An Early Medieval presence at Knowth is confirmed by archaeological excavation but there is very little physical evidence in Slane. St Erc's grave on the Hill of Slane marks the traditional resting place of this 5/6th century bishop but the other religious buildings on the hill are of a later medieval date. However, there seems little doubt that Slane and Knowth were closely linked from at least the 5th century AD.

RESEARCH REPORTS PUBLISHED AFTER 2002

- 4.14. The World Heritage Property and its surroundings continue to be a focus for academic research and, as a consequence, our understanding of the place continues to develop. The following reports, all published since Stout's major synthesis of the evidence in 2002, are considered to be relevant to our understanding of the setting of the World Heritage Property.
- Brady, C, Barton, K and Seaver, M (2013) 'Recent geophysical investigations and LiDAR analysis at the Hill of Slane, Co. Meath'. *Riocht na Midhe* 24, 134-155.
 - Byrne, F J, Jenkins, W, Kenny, G and Swift, C (2008). *Excavations at Knowth 4, Historical Knowth and its Hinterland*, Dublin: Royal Irish Academy.
 - Condit, T & Keegan, M (2018) *Aerial investigation and mapping of the Newgrange landscape, Brú na Bóinne, Co. Meath*. Department of Culture, Heritage and the Gaeltacht.

- Cooney, G (2015). 'Icons of Antiquity: Remaking Megalithic Monuments in Ireland'. In Diaz-Guardamino, Garcia Sanjuan, L and Wheatley, D (eds) *The Lives of Prehistoric Monuments*, 55-76. Oxford: Oxford University Press.
 - Davis et al (2010) *Boyne Valley Landscapes Project Phase III Final Report*.
 - Eogan, G (2012). *Excavations at Knowth 5, The Archaeology of Knowth in the First and Second Millennia AD*. Dublin: Royal Irish Academy.
 - Eogan, G and Cleary, K (2017). *Excavations at Knowth 6, The Passage Tomb Archaeology of the Great Mound at Knowth*. Dublin: Royal Irish Academy.
 - Manning, C (2008). 'A pre-Romanesque Church at Slane', *Peritia* 20, 346-52.
 - McCormick, F and Murray, E (2007). *Excavations at Knowth Vol 3: Knowth and the Zooarchaeology of Early Christian Ireland*. Dublin: Royal Irish Academy.
 - Prendergast, F (2019) 'The Dark Sky Character of Archaeological Landscapes: Cultural Meaning and Conservation Strategies'. In Henty, L and Brown, D (eds) *Visualising Skyscapes, Material Forms of Cultural Engagement with the Heavens*. London: Routledge.
 - Prendergast, F and Ray, T (2017). 'Alignment of the Western and Eastern Passage Tombs.' In *Excavations at Knowth 6: The Passage Tomb Archaeology of the Great Mound at Knowth* (Appendix 2), edited by Eogan, G and Cleary K, 263–276. Dublin: Royal Irish Academy.
- 4.15. This list includes the three most recent volumes in the 'Excavations at Knowth' series. These latest volumes include an analysis of the importance of Slane in the first millennium AD and its relationship to Knowth, focussing on historical sources in Volume 4 and the archaeological evidence from Knowth in Volumes 3 and 5. The continuing but changing use of passage graves, illustrated by the early medieval re-use of Knowth is also explored in the 2015 paper by Cooney.
- 4.16. Also within the World Heritage Property, Condit and Keegan (2018) report the results of recent aerial reconnaissance and the discovery of multiple major Neolithic ritual sites. These cropmark sites add greatly to our understanding of the nature of the ritual landscape of Brú na Bóinne. It is important to note that all of these newly discovered sites lie within the existing boundary of the World Heritage Property. The aerial reconnaissance also included the area between Slane and the World Heritage Property and no new comparable monuments were revealed here. The findings therefore reinforce our existing understanding of the extent of the ritual landscape within the bend of the Boyne.
- 4.17. The Hill of Slane is the subject of two papers. Manning (2008) proposed that there is 11th century fabric in the north wall of St Patricks Church, previously considered to be a later medieval building. This supports the identification, largely from historical sources, of the Hill of Slane as the location for an important early Christian centre. Brady et al (2013) report on inconclusive geophysical investigations around the motte on the Hill of Slane, testing the hypothesis that it could be a modified passage grave.
- 4.18. The work by Prendergast (2019) on dark skies highlights the importance of the night sky to our understanding of the major passage grave landscapes, including Brú na Bóinne, and the negative impact of light pollution. This study draws attention to the relevance of archaeoastronomy to Brú na Bóinne, beyond the well-known midwinter sunrise at Newgrange. The potential significance of the east-west orientation of the tomb passages in Knowth are discussed by Prendergast and Ray (2017) in an appendix to Volume 6 of the Knowth publication. They conclude that there is no precise relationship with the spring and autumn equinox but cannot exclude a more general appreciation of the phenomenon by the building of the passage graves. This is relevant to an appreciation of views west from Knowth, up the valley of the River Boyne.
- 4.19. Finally, the report by Davis et al (2010) presents the results of Phase 3 of a diverse programme of research into the Boyne Valley landscape with the overall ambition of producing 'an integrated, comprehensive landscape archaeological model of the evolution of the Boyne catchment.' One aspect of the research programme is relevant to the present study; this is Objective 4 which was 'To undertake viewshed analysis for monuments in the World Heritage Property and assess the importance of monument intervisibility'.

- 4.20. The results of the viewshed analysis, presented in the report as a series of maps showing theoretical visibility from different locations, seeks to answer various questions regarding the visibility and intervisibility of the main monuments of the World Heritage Property. This provides useful data regarding the way in which the monuments can be experienced both within the World Heritage Property and over much greater distances, including intervisibility with the Hill of Tara and the passage grave cemetery at Loughcrew.

BRÚ NA BÓINNE WORLD HERITAGE SITE RESEARCH FRAMEWORK, THE HERITAGE COUNCIL (2009)

- 4.21. This major project, led by the Heritage Council, sought to bring together the current knowledge and understanding of the World Heritage Property to better protect and manage this resource.
- 4.22. As reported in the introduction to the report (section 1.1), Phase 1 of the project produced a state-of-knowledge summary of the archaeology of the Brú na Bóinne World Heritage Property (the *Resource Assessment*). Phase 2 involved seeking a series of critical position papers from a range of specialists to determine the gaps in research carried out to date and to identify a series of key questions for investigation (the *Research Agenda*). Phase 3 of the Research Framework focused on formulating a *Research Strategy*, i.e. a list of research priorities that would tackle the issues identified in Phase 2.
- 4.23. For the purposes of the present study, Objective 15 of the Research Strategy is a key reference point (page 98). Objective 15 is: *“Develop a setting and landscape use strategy for the protection and management of the WHS.”* Quoting from the explanatory text that follows:

“The current boundaries of the WHS were set out in the Boyne Archaeological Park report (O’Neill 1989). The core area is defined in part by the location of three main passage tombs and the prominent bend in the River Boyne, while the northern and southern buffer zones were established in large part to protect views into and out of the core area, particularly along the ridgeline from which the midwinter sun rises. The report also included a chapter on views and prospects within the WHS (Fig. 4.8). This work should be revisited and built upon to provide a robust setting and landscape use strategy to aid future planning and management within the WHS. This should be informed by an examination of definitions in existing policy documents, legislation and planning inquiry case studies from Ireland and abroad. A 2008 report commissioned by Historic Scotland to provide an objective description of the setting of the Heart of Neolithic Orkney World Heritage Site could be a useful comparative document.”

- 4.24. This objective is reinforced in Section 5 of the Research Framework (page 108) where the 18 objectives of Research Strategy are reduced to six recommendations. These include the following:

“The critical setting elements of the Brú na Bóinne WHS are currently under researched and vulnerable in the face of ongoing development pressure. Aspects of this were addressed in the 1989 O’Neill report on the Boyne Valley Archaeological Park, which formed the basis for the existing WHS. The rationale and decision making process behind the O’Neill report needs to be re-stated and a robust setting and landscape use strategy put in place to ensure that the living landscape of the WHS can be managed in a mutually beneficial way.”

- 4.25. To summarise the position in 2009, the Research Framework considered that the setting of the World Heritage Property was an important but under-researched topic. In this respect, the Research Framework focussed on what we do not understand about the setting. In the final recommendations, it expressed the hope that the proposals for action on this and other matters would *“feed into the forthcoming review of the Brú na Bóinne Management Plan”*. The revised management plan was issued in 2017 and is discussed below.

BRÚ NA BÓINNE WORLD HERITAGE SITE RETROSPECTIVE STATEMENT OF OUTSTANDING UNIVERSAL VALUE, UNESCO (2013)

- 4.26. The Statement of Outstanding Universal Value (SOUV) is a key document for all World Heritage Properties as it is the formal statement of values embodied in the property that justify its international designation. The text for Brú na Bóinne was drafted in 2011 and approved by UNESCO in 2013. The original UNESCO

documentation, endorsing the SOUV is reproduced at Appendix 9 of the current Brú na Bóinne World Heritage Property Management Plan. Appendix 9 contains the full text of the SOUV (Management Plan, page 119) but this text is also reproduced in Appendix 1 to the present report for ease of reference.

- 4.27. Referring to the SOUV, Brú na Bóinne is identified as a Neolithic funerary landscape of great ritual significance that continued to attract later monuments up to the medieval period. The property has met three of the six criteria for the inscription of cultural World Heritage Properties. This reflects the presence of the largest and most important expression of prehistoric megalithic plastic art in Europe (Criterion i), the concentration of social, economic and funerary monuments with long continuity from prehistory to the late medieval period (Criterion iii) and the finest passage graves in Europe (Criterion iv).
- 4.28. The SOUV refers to the buffer zone and the definition of its outer boundary in relation to important views but the role that the wider setting plays in supporting the OUV is not addressed. However, the statement of integrity includes the following text:

"Since inscription in 1993, views out of the property have been impacted by the M1 bridge crossing the River Boyne to the east of the property; the addition of a third chimney and other structures to the cement factory on the skyline to the east south-east near Duleek; the addition of an incinerator stack to the skyline at Carranstown and a housing development. The ambiance of the ritual centre is vulnerable to such disturbances which could potentially threaten the integrity of the property".

- 4.29. This suggests that the changes in the wider setting of the World Heritage Property can and do affect the character of the nominated property, with potential for negative impacts on OUV.

BRÚ NA BÓINNE WORLD HERITAGE SITE MANAGEMENT PLAN, JANUARY 2017, DEPARTMENT OF ARTS, HERITAGE, REGIONAL, RURAL AND GAELTACHT AFFAIRS

- 4.30. The significance of the Brú na Bóinne World Heritage Property is dealt with in Chapter 3 of the current Management Plan. A general Statement of Significance at the start of the chapter reads as follows:

"The scale of passage tomb construction within Brú na Bóinne, the important concentration of megalithic art (Fig.20), as well as the range of sites and the long and continuous duration of activity, were cited as reasons for the site's inscription as a WHS. Significantly, the OUV of Brú na Bóinne is linked not only with the Neolithic monuments, but includes all monuments in the WHS, which testify to the longevity of settlement."(section 3.1 page 27)

- 4.31. The chapter then goes on in section 3.5 (page 29) to describe in greater detail the various attributes of the World Heritage Property that contribute to the Statement of Significance and hence to OUV. This text provides the most detailed published statement of how the attributes of the World Heritage Property express the OUV of the property, expanding on the rather terse synthesis provided in the SOUV. It is therefore a key source for the analysis of the wider setting of the World Heritage Property and the ways in which it supports OUV. Section 3.5 is quoted here in full for ease of reference:

"The general approach to assessing the significance of Brú na Bóinne is adapted from the principles set out by James Semple Kerr (2013). It relies on an understanding of the physical attributes, uses, relationships and associations of the place up to and including the present day which make a place of value to us and our society.

As attested by its inscription on the UNESCO World Heritage List, the complex at Brú na Bóinne is of exceptional significance for the following reasons:

- The presence and scale of a series of megalithic tombs dating from the Neolithic period within the Bend of the Boyne, the important concentration of megalithic art and the landscape setting of this within the Bend of the Boyne. The importance of this complex is in the context of the wider European megalithic phenomenon (Fig. 23).*
- The views from most locations within Brú na Bóinne, in particular at the key monuments, are broad ones that take in many other key cultural and natural features, e.g. the River Boyne and the surrounding hills, which enable the visitor to share a sense of awe. This sense of awe undoubtedly played a role in establishing order among the ancient societies that lived in these landscapes.*

- *Brú na Bóinne provides an outstanding example of a monumental landscape associated with the adaptation of agriculture.*
- *The Neolithic passage tomb was constructed so that the rays of the rising sun would shine into the inner sanctum of the tomb at the winter solstice, demonstrating a high level of human knowledge, ingenuity and creativity.*
- *The longevity of settlement in this location is of particular significance. From early prehistory, through to the early medieval and medieval periods, and including more recent times, the landscape of the WHS contains a large concentration of settlement and ritual sites and vernacular heritage. These remains contain considerable information about life, ritual, economy, environment and settlement, and more discoveries will be made through future research and investigation (Fig. 24).*
- *The site of the Battle of the Boyne (1690) has relevance and meaning beyond the boundaries of the Irish State and was a battlefield of European significance during the wars of grand alliance against the French Sun King. In the 20th century during World War II, the River Boyne was equipped with a series of military structures (pillboxes and other structures) to enable it to operate as a defensive line of the Irish Free State. These structures still exist within the buffer zone and the WHS.*
- *The navigable River Boyne is a prime example of 18th century river navigation. Its construction commenced in 1748 and it consists of a series of bypass canals, locks, bridges and other associated structures such as mill complexes and quarries with their attendant workers' dwellings. The presence of these underlines the role of the river as a primary route of international trade and influence for millennia since the earliest settlements took place along its banks."*

- 4.32. The Management Plan does not attempt to describe how the wider setting of the World Heritage Property supports OUV, but it does state that *"The important landscape setting of the monuments is also a key issue that needs to be acknowledged and valued"* (page 31). One way in which the landscape setting is acknowledged and valued is through the Protected Views in the Meath County Development Plan ('Meath CDP', see below) and the Management Plan identifies 18 of these views that include the World Heritage Property. These are listed in Appendix 8 of the Management Plan (page 111).

MEATH COUNTY DEVELOPMENT PLAN 2021-2027

- 4.33. The Meath CDP 2021-2027 was adopted in September 2021, replacing the preceding Meath CDP 2013-2019, which was current during most of the preparation of this HIA.
- 4.34. The Meath CDP 2021-2027 deals with the World Heritage Property briefly in Sections 8.6.1 to 8.6.3 and primarily relies on the *Brú na Bóinne World Heritage Site Management Plan, January 2017* to provide more detailed information. The management plan is reproduced as Appendix 8 of the Meath CDP 2021-2027 and has already been discussed in the present report (see above).
- 4.35. Council policies relating to the World Heritage Property are set out in Section 8.6.3 (HER POL 6-11) but none of these have any direct relationship with our understanding of setting.
- 4.36. Section 8.6.3 also sets out the Council's objectives in relation to the World Heritage Property (HER OBJ 7-12). None of these are relevant to our understanding of setting with the exception of Objective HER OBJ 11 which is:

"To protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development."

This objective clearly recognises the potential for development in the wider setting to change views and, as a result, affect OUV.

- 4.37. The principal contribution that the Meath CDP makes to our understanding of setting is in the designation of Protected Views (Meath CDP 2021-7, Section 8.18). The views are listed in Appendix 10 of the CDP and their locations are shown in Map 8.6 of the CDP. Quoting from Section 8.18:

"The landscape of the County has many vantage points which offer attractive views from hilltops and upland areas, along river valleys and the coast. Many of these views are associated with heritage and

tourism sites and provide vantage points over high quality landscapes. These scenic views are of an amenity and tourism value and contribute to our quality of life."

- 4.38. 19 of the Protected Views listed in Appendix 10 have been explicitly designated, at least in part, for the contribution that they make to our experience and appreciation of the World Heritage Property. These are shown in a detailed plan (Map 8.6.1 of the CDP) where it is clear that there are an additional five Protected Views that contribute to our experience of the World Heritage Property but not described as such in Appendix 10 (PV 29, 30, 31, 62, 74).
- 4.39. Three different relationships can be described between the World Heritage Property and its wider setting in the Protected Views:
- Views out from monuments within the World Heritage Property that extend into the wider setting (PV59 Knowth, 87a-d Newgrange, 88 Dowth);
 - Views of the World Heritage Property from locations within the property or buffer zone that extend into the wider setting (PV31, 58, 62, 63, 64, 74, 89a-c, 90, 91, 92, 93a-c); and
 - Views from the wider setting towards the World Heritage Property (PV29, 30, 34).
- 4.40. It may be noted that 21 of these Protected Views provide views out into the wider setting, which therefore appears in the background beyond the World Heritage Property. Only three Protected Views are located within the wider setting:
- PV29 in the car park at the Hill of Slane, where it provides an extensive view eastward across the World Heritage Property;
 - PV30 higher on the Hill of Slane, with a panoramic view that includes the World Heritage Property; and
 - PV34 at Cullen Hill on the local road between McGruder's Cross Roads and Rossnaree, where it provides an open view looking north-east to Knowth and Newgrange.

5. THE WIDER SETTING OF THE WORLD HERITAGE PROPERTY AROUND SLANE

INTRODUCTION

- 5.1. It is clear from the preceding section that, currently, there is no published document that provides a comprehensive analysis of the ways in which the OUV of the World Heritage Property is supported by its wider setting.
- 5.2. The scope of the present HIA does not require a detailed understanding of how the setting in its entirety relates to OUV but, for the purposes of assessment, it is necessary to define the ways in which that part of the wider setting around Slane supports OUV. This is set out below in a Statement of Significance.
- 5.3. The area of land covered by the statement reflects the routes taken by the various options for the N2 Slane Bypass considered in the Option Selection appraisal. It extends east to west from the western edge of the World Heritage Property buffer zone (between Monknewtown, Crewbane and Rossnaree) to Carrickdexter on the N51 west of Slane. North to south it takes in the land between Knockmooney in the north and McGruder's Cross Roads in the south, both on the N2 (see **Figure 2**).
- 5.4. The statement of significance is based on information in the available documents that address the OUV of the Brú na Bóinne World Heritage Property, its buffer zone and wider setting (summarised in Section 4). This existing information has been supplemented by the results of project field work covering the land around Slane, which explored the relationship between the World Heritage Property and its wider setting.
- 5.5. The locations of places mentioned in the statement are shown on a plan (**Figure 2**), including the location of relevant viewpoints. All viewpoints relevant to the statement are listed in Table 1 with a summary of the ways in which they support OUV. This list includes Protected Views from the Meath CDP 2021-2027 which are labelled 'PV' with their associated number from the list at Appendix 10 of the CDP. Other relevant viewpoints, not previously identified but noted as part of the present study, are labelled 'V' and numbered sequentially from 1 to 5.
- 5.6. For the avoidance of confusion, it should be noted that the location of PV34 in the current Meath CDP (2021-2027) has been moved from that shown in the preceding plan (2013-19). The new location for PV34 on Cullen Hill coincides with viewpoint V1, identified during the Option Selection work. Therefore, the labelling of PV34 and V1 has been reversed for the present report from that used in reporting on Option Selection.

Table 1: Viewpoints that illustrate how the wider setting of the World Heritage Property around Slane supports OUV.

Viewpoint	Support for OUV of World Heritage Property
Protected views (Meath CDP)	
PV29 (Car Park, Hill of Slane)	The car park at the Hill of Slane provides an elevated open view looking east over the entire World Heritage Property and its setting. This view allows appreciation of: <ul style="list-style-type: none"> • Historical associations between Slane and Knowth in the Early Medieval period • The landscape of Brú na Bóinne, including the setting of Knowth and Newgrange • The landscape setting of Brú na Bóinne
PV30 (Hill of Slane)	The open summit of the Hill of Slane provides an elevated open view looking east over the entire World Heritage Property and its setting. This view allows appreciation of: <ul style="list-style-type: none"> • Historical associations between Slane and Knowth in the Early Medieval period • The landscape of Brú na Bóinne, including the setting of Knowth and Newgrange • The landscape setting of Brú na Bóinne
PV32 (Carrickdexter Cross)	Carrickdexter Cross provides an open view looking east down the valley of the Boyne to Slane and the western edge of the World Heritage Property. This view allows a limited appreciation of: <ul style="list-style-type: none"> • The historical relationship of Brú na Bóinne with the River Boyne

Viewpoint	Support for OUV of World Heritage Property
PV34 (Cullen Hill)	The minor road from McGruder's Cross Roads to Rossnaree provides an elevated view, looking north-east, of the west end of the World Heritage Property, including the mounds at Knowth and Newgrange. This view allows an appreciation of: <ul style="list-style-type: none"> The landscape of Brú na Bóinne, including the setting of Knowth and Newgrange
PV59 (Knowth)	The top of the main mound at Knowth provides an open elevated viewpoint with views west up the valley of the Boyne and northwest towards the Hill of Slane. These views allow an appreciation of: <ul style="list-style-type: none"> Historical associations between Slane and Knowth in the Early Medieval period The historical relationship of Brú na Bóinne and Knowth with the River Boyne The landscape setting of Brú na Bóinne
PV63 (Red Mountain) representative of PV62, PV63, PV64 and PV92	Various Protected Views on the hills to the south of the World Heritage Property (PV62, 63, 64 and 92) provide open views looking northwest over large parts of Brú na Bóinne and its setting. These views allow an appreciation of: <ul style="list-style-type: none"> The landscape of Brú na Bóinne, including the setting of Knowth and Newgrange The landscape setting of Brú na Bóinne
PV87b (Newgrange)	The west side of the mound at Newgrange provides a view looking west towards Cullen, Fennor and Slane, including the mound at Knowth. This view allows an appreciation of: <ul style="list-style-type: none"> The landscape setting of Brú na Bóinne including the setting of Knowth
PV88 (Dowth)	The top of the mound at Dowth provides an open view looking west towards Newgrange and beyond to the wider setting of the World Heritage Property. This view allows an appreciation of: <ul style="list-style-type: none"> The landscape of Brú na Bóinne, including the setting of Newgrange The landscape setting of Brú na Bóinne
Other viewpoints	
V1 (N2 south of Fennor)	Travelling north on the N2 between McGruder's Cross Roads and Fennor there are sequential but intermittent views looking east to the mound at Knowth. These views allow a limited appreciation of: <ul style="list-style-type: none"> The landscape setting of Knowth
V2 (Mooretown)	In the vicinity of Mooretown there are views looking southeast towards the western part of the World Heritage Property including the mound at Knowth. They allow an appreciation of: <ul style="list-style-type: none"> The landscape of Brú na Bóinne, including the setting of Knowth
V3 (Boyne Navigation Towpath)	Walking east along the Boyne Navigation Towpath from a point 2.2km west of Knowth (outside the buffer zone), there are sequential views down the River Boyne towards the western edge of the World Heritage Property and mound at Knowth. These views allow an appreciation of: <ul style="list-style-type: none"> The historical relationship of Brú na Bóinne and Knowth with the River Boyne
V4 (Rossnaree Road)	Gaps in the hedgerow on the north side of the Rossnaree Road, 2km west of Knowth provide views towards the west end of the World Heritage Property and the mound at Knowth (effectively a western extension of the views provided by PV93 within the buffer zone). These views allow a limited appreciation of: <ul style="list-style-type: none"> Historical relationship of Brú na Bóinne and Knowth with the River Boyne
V5 (Fennor Lane)	Travelling east along Fennor Lane, there are sequential but intermittent views (dependant on the height of hedgerows) looking east towards the World Heritage Property. These allow a limited appreciation of: <ul style="list-style-type: none"> The landscape setting of Brú na Bóinne

STATEMENT OF SIGNIFICANCE

5.7. The wider setting of the Brú na Bóinne World Heritage Property near Slane supports the OUV of the property in the following ways:

1. Attributes of both the built and natural environment near Slane have functional associations with the monumental landscape of the World Heritage Property and with individual monuments within the property. Appreciation of these associations supports the OUV of the property.

- Knowth and Slane are both associated with the Early Medieval Kingdom of Brega. Knowth is believed to be a royal centre based on excavation evidence and contemporary documentary references. Documentary references also confirm that Slane was an important ecclesiastical*

centre, although at least the majority of visible medieval structures on the Hill of Slane are considerably later in date. Views of the Hill of Slane from Knowth (PV59) and views of Knowth from the Hill of Slane (PV29 and 30) inform our understanding of the close links between these two sites in the Early Medieval period and support this aspect of the OUV of the World Heritage Property. Links between Brú na Bóinne and the Hill of Slane in prehistory are much more tenuous and currently rely on the speculative identification of the motte on the summit as a modified passage grave.

- Appreciation of the River Boyne as a significant routeway in prehistory is an important part of our understanding of the development of the monumental landscape of Brú na Bóinne. The relationship between river and monuments can be experienced from various locations. Knowth directly overlooks the river and there is an open view to the west up the valley from the top of the mound (PV59). There is a sequence of reciprocal views of Knowth from beside the river on the Boyne Navigation towpath as far west as V3. Carrickdexter Cross (PV32), 6km to the west of Knowth, provides a much longer-range view down the valley of the Boyne past Slane to both Knowth and Newgrange.

2. Viewpoints near Slane provide opportunities to experience the monumental landscape of the World Heritage Property and the landscape setting of individual monuments within the property. These opportunities enhance our appreciation of the landscape setting and therefore support the OUV of the property.

- The landscape setting of Knowth, overlooking the River Boyne can be appreciated from the towpath of the Boyne Navigation (V3) and, to a limited degree, from the adjacent Rossnaree Road (V4). The view of Knowth, looking south-east from Mooretown (V2) provides a different perspective across open farmland.
- Views from Cullen Hill (PV34) take in the west end of the World Heritage Property and the relationship between Knowth and Newgrange. Sequential views travelling east along Fennor Lane (V5) and north-bound on the N2 towards Fennor (V1) provide a more-limited experience of these parts of the World Heritage Property.
- Elevated viewpoints on the Hill of Slane (PV29 and 30) provide panoramic views looking to the south-east over the entire landscape of the World Heritage Property.

3. The land around Slane features in the background to some important views of the World Heritage Property from within the nominated property and the buffer zone. In these views, it is part of the modern rural agricultural landscape that forms an appropriate green setting for the Neolithic monuments within the nominated property. Experience of the monuments in this rural setting supports the OUV of the property.

- Within the World Heritage Property, the higher ground of the Hill of Slane and Cullen Hill appears in the background of views looking west from Newgrange (PV87b) and Dowth (PV88).
- Within the buffer zone, a cluster of locations at Corballis and Redmountain (PV62, 63, 64 and 92) provide panoramic views to the north-west over the World Heritage Property with the land around Slane appearing directly behind Newgrange and Knowth.

- 5.8. This Statement of Significance has identified the various ways in which the land around Slane supports the OUV of the World Heritage Property. However, in order to assess the predicted impact of the proposed bypass, it is also necessary to understand the degree to which these various factors support OUV.
- 5.9. The OUV of the World Heritage Property resides primarily in the physical attributes of the inscribed property itself. As already noted in Section 3, the UNESCO (2021) guidelines state that:
“Boundaries should be drawn to incorporate all the attributes that convey the Outstanding Universal Value and to ensure the integrity and/or authenticity of the property.” (paragraph 99)
- 5.10. Beyond the boundaries of the property, there is a buffer zone which is designed to provide an added layer of protection to the OUV of the property. Referring again to the UNESCO guidelines:

“This should include the immediate setting of the nominated property, important views and other areas or attributes that are functionally important as a support to the property and its protection” (paragraph 104)

- 5.11. It follows from these quotations that the OUV of the World Heritage Property will be preserved under most circumstances if inappropriate development is excluded from the property and its buffer zone. This conclusion may be reasonably applied in the case of Brú na Bóinne.
- 5.12. UNESCO also recognises that there is not necessarily a sudden cut-off at the outer edge of the buffer zone, beyond which the setting of the World Heritage Property has no role at all in the support of OUV. This is clearly the case in the wider setting around Slane where it remains possible to experience the World Heritage Property and there are some functional relationships with attributes of the property (as summarised in Items 1 and 2 of the Statement of Significance).
- 5.13. The degree to which these visual and functional relationships support OUV is much less than that recognised in the buffer zone. In the case of views towards and from the World Heritage Property this is primarily a matter of increasing distance in the wider setting which progressively reduces the quality of the experience. The distant view from Carrickdexter Cross, 6km west of Knowth, illustrates this point (PV32).
- 5.14. The functional relationships between the World Heritage Property and its wider setting are also weaker than those within the buffer zone. For example, a relationship between Slane and Knowth in the Early Medieval period has been identified (above) but this is not relevant to an appreciation of the prehistoric attributes that are the principal expression of OUV at Brú na Bóinne. These prehistoric attributes are not clearly expressed in functional relationships between the World Heritage Property and the land around Slane with the exception of relationship to the Boyne (encapsulated in views PV59 and V3). The Early Medieval use of Knowth is of greater relevance as one expression of the continuity of use of this monument (relevant to Inscription Criterion iii), but this expression of OUV is separate from any potential connections between Knowth and Slane in the Early Medieval Period.
- 5.15. The general conclusion is that the wider setting around Slane has a rather limited role in the protection of OUV and therefore might be considered not very sensitive to development or other types of landscape change. This is probably true for small-scale development where increasing distance from the World Heritage Property is likely to render any change unimportant to a consideration of OUV. However, it may not be the case for large-scale and tall developments where issues of visual prominence may arise even at long distances from the World Heritage Property.
- 5.16. These large-scale or tall developments have the potential to appear as prominent features in the background of valued views within the World Heritage Property or the buffer zone (Item 3 in the Statement of Significance). In these situations, the fact that the development site is at a relatively distant location in the wider setting is immaterial as it will be viewed as part of the valued landscape of the World Heritage Property. As a result, the potential for impacts on OUV is greater.
- 5.17. It is therefore necessary, in the context of the present assessment, to bear in mind these two contrasting conclusions:
- the limited role that the wider setting in the vicinity of Slane plays in supporting OUV, but
 - the general sensitivity of the World Heritage Property to visually prominent new features in that wider setting.

6. MITIGATION OF POTENTIAL ADVERSE IMPACTS ON OUV

INTRODUCTION

6.1. This HIA for the World Heritage Property has been prepared in the knowledge that the previous application by Meath County Council for a bypass at Slane ended in a decision by An Bord Pleanála in 2012 to refuse the application. Two reasons were given for this decision of which one related to the potential for impacts on the OUV of the World Heritage Property:

"Having regard to the importance and sensitivity of the location of the proposed bypass, and the high level of protection afforded to Brú na Bóinne and its landscape setting... [the proposed bypass] ... would be acceptable only where it has been demonstrated that no appropriate alternative is available." (An Bord Pleanála, decision dated 5 March 2012, Reason 1)

6.2. Whilst any new application will be judged on its merits, it is clear from this earlier decision that the current application must be able to demonstrate that either there are no adverse impacts on the OUV of the World Heritage Property, or, if there are any such adverse impacts on the OUV of the World Heritage Property, that they are unavoidable and have been minimised, whilst still delivering the public benefits of the Proposed Scheme.

6.3. Matters relating to justification of the need for the bypass, including consideration of alternative methods for the delivery of the benefits of the project are addressed in Chapter 3 of the EIA Report ('Consideration of Alternatives'). The EIA also includes a full consideration of other environmental, social and economic factors to arrive at a Proposed Scheme that responds proportionately to all identified constraints and opportunities.

6.4. Whilst impact on OUV is only one consideration out of many that must influence the design of the Proposed Scheme, it is clear that protection of OUV is a matter that must be given considerable weight.

6.5. The key aim of the HIA has been to avoid or minimise any adverse impacts on OUV, consistent with the delivery of the public benefits of the project and recognising the need to resolve potential conflicts of interest with other environmental disciplines.

6.6. This aim has been achieved in two main stages:

- Option selection: comparison of the likely impact of the available route options on OUV, leading to a choice of preferred route for the bypass by Meath County Council that takes sufficient account of any implications for the World Heritage Property; and
- Design and Environmental Evaluation: advice to the project design team based on an understanding of OUV, leading to a detailed design proposal that incorporates all opportunities to minimise adverse impacts on OUV from the preferred route of the bypass.

OPTION SELECTION MITIGATION

6.7. The work undertaken during option selection for the project to assess the potential impact of various route options on the OUV of the World Heritage Property is presented in two reports⁴. The first, dated February 2019, considers the predicted impacts of nine route options for the N2 bypass to the west and east of Slane along with 'Do-Nothing' and 'Do-Minimum' scenarios. The second report, dated July 2019, is a supplement to the first report. It considers the predicted impacts of six route options for a N51 bypass to the north of Slane in combination with what was then the emerging preferred option for the N2 bypass (Route E/G). The second report also contains an assessment of predicted cumulative impacts on OUV.

⁴ Both reports are titled *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site*.

- 6.8. The conclusions reached in these reports regarding predicted impacts on the World Heritage Property in isolation fed into the Option Selection Report⁵, which brought together findings from all relevant disciplines to reach an integrated conclusion on the preferred route option for the bypass.
- 6.9. All three reports should be read to gain a full understanding of the analysis and decision-making process that led ultimately to a preferred route option. What follows here is a summary that aims to highlight the main considerations relevant to the World Heritage Property that influenced the outcome of the route selection process.

CONCLUSIONS REGARDING THE WORLD HERITAGE PROPERTY IN ISOLATION

- 6.10. The predicted impacts of the various route options on the OUV of the World Heritage Property were assessed by testing the Statement of Significance (Section 5, above) against the changes that would occur in the wider setting as a result of each route option.
- 6.11. The assessments were focussed on predicted visual change in the wider setting of the World Heritage Property as this was the most likely source of material impact on OUV. Change in the noise environment was also considered but only found to be relevant at the point where Route Options F, G and H crossed the River Boyne (as reported below).
- 6.12. Understanding of the appearance of each of the off-line route options was based on a basic engineering design that included any sections where the carriageway would run in a cutting or on an embankment. No account was taken of the potential for mitigation measures, including landscaping or minor route adjustments, which could be incorporated if any off-line option was taken forward as the preferred route.
- 6.13. Modelling of the bridge required to cross the River Boyne was limited to a predicted height for the bridge deck, derived from the engineering design for each off-line route option. It was assumed that there would be no significant structural elements above deck height and no account was taken of any other aspect of bridge design at this stage.
- 6.14. The assessments of the route options can be discussed in three groups:
- The on-line options
 - The western options
 - The eastern options

ON-LINE ROUTE OPTIONS

- 6.15. Route Option A (Traffic Management Alternative) and the 'Do Nothing' and 'Do Minimum' scenarios all involved retaining the existing route of the N2. It was concluded that the relatively minor changes proposed along the existing route and any displacement of HGV traffic would not lead to material changes in the setting of the World Heritage Property and would therefore have no impact on OUV.

WESTERN ROUTE OPTIONS

- 6.16. The three western route options (Option B, C and D) passed to the west of Slane and were therefore most distant from the World Heritage Property. For much of their routes they lay outside the setting i.e. the area in which the World Heritage Property can be experienced. In all three cases the proposed route, including the bridge across the Boyne, would have affected the long-range view towards the World Heritage Property from Carrickdexter Cross. However, this distant view of Knowth and Newgrange makes very little contribution to OUV and was considered to be balanced by the equally limited enhancement that would result from the reduction of traffic at the much closer viewpoint on the existing N2 south of Fennor. It was concluded that there would be no net impact on OUV for Routes B and C.
- 6.17. Additional considerations affected Route D because its southern end on the hill above Fennor would be widely visible in views from the World Heritage Property and cuts through an identified viewpoint for the

⁵ N2 Slane Bypass Option Selection Report. RPS for MCC, May 2020

World Heritage Property on Fennor Lane (V5). However, the view from Fennor Lane could be retained and the degree of change in views from the World Heritage Property would be very low. It was concluded that there would be an impact of negligible magnitude on OUV due to Route D. This would be an impact of minor significance.

EASTERN ROUTE OPTIONS

- 6.18. The five eastern route options (Option E, E/G, F, G and H) all occupied the same relatively narrow corridor of land to the east of Slane. All would be visible to varying degrees from the World Heritage Property and would appear in the foreground of some views towards the World Heritage Property. In many cases the degree of change in relevant views would be very low and impact on OUV would be no more than negligible magnitude. However, for all five options, there would be viewpoints where change in the setting would have a greater effect and it was concluded that there would be an impact of some magnitude for all of the eastern options; these were considered to be impacts of moderate significance.
- 6.19. Most of the relevant changes in the setting would be in valued views to and from Knowth along the valley of the Boyne. Options F, G and H would introduce a bridge into the view from Knowth, fully visible crossing the river, albeit on a sunken vertical alignment that would minimise the height of any bridge structure. Additionally, in the case of Options G and H, this bridge would pass over the Boyne Navigation towpath at the point where views towards Knowth first become possible, affecting appreciation of the view through increased traffic noise. The bridge for Options E and E/G would be more distant from Knowth, beyond the point where the river is visible. The proposed bridge would be largely concealed behind the landform, but still potentially visible at its southern end.
- 6.20. One other predicted change was considered to result in more than a negligible impact on OUV. This was the appearance of Route E in the foreground of the view from the Hill of Slane towards Knowth. The route would run to the east of Norris Hill in a substantial cutting which would form a prominent and distracting new feature in this view towards the World Heritage Property.

PREFERRED ROUTE OPTION FOR THE WORLD HERITAGE PROPERTY

- 6.21. It is clear from the preceding text, summarising the assessments, that the on-line and western route options would be preferable from the perspective of protecting the OUV of the World Heritage Property. With the exception of Option D, none of these options would have any effect on OUV.
- 6.22. The five eastern route options were all predicted to result in adverse impacts on OUV of some magnitude and moderate significance. However they could be assigned an order of preference based on qualitative judgements within this group. E and E/G were to be preferred over F, G and H because of the more distant and largely concealed location for the bridge over the Boyne. E/G was then preferred over E because of the less-prominent route to the east of the Hill of Slane. Option E/G was therefore judged the preferred choice of the five eastern options.

OVERALL CONCLUSIONS REGARDING OPTION SELECTION MITIGATION

- 6.23. The balance of interest, when all relevant disciplines were considered together, led to the selection of Option E/G as the preferred route option for the proposed bypass. This was not one of the western or on-line route options, which were preferred from the perspective of avoiding impacts on the OUV of the World Heritage Property.
- 6.24. This decision is fully explained and justified in the Option Selection Report with a summary of that selection process also provided in section 3.3 of Chapter 3 in this EIA Report (Consideration of Alternatives).
- 6.25. From the perspective of the World Heritage Property, the selection of Option E/G represented a compromise, but one that still delivers considerable avoidance of adverse impacts embedded in the design. As noted above, E/G was the best of the eastern route options from the perspective of predicted impacts on the OUV of the World Heritage Property. This was because it offered more embedded

avoidance of adverse impacts by design at the two most sensitive locations affected by the various eastern route options, minimising visibility of the proposed road in:

- the view looking west from Knowth; and
- the view of the World Heritage Property from the Hill of Slane.

DESIGN AND ENVIRONMENTAL EVALUATION MITIGATION

- 6.26. Assessment of the preferred route option E/G during option selection predicted that it would lead to an adverse impact on OUV of some magnitude and moderate significance. As noted above, this primarily reflected visibility of elements of this route option in views from Knowth and from the Hill of Slane.
- 6.27. Therefore in the design and environmental evaluation stage, attention was focussed on the potential to reduce the visibility or visual prominence of the proposed bypass and vehicles using it in these two areas.

MITIGATION OF IMPACT ON OUV IN VIEWS FROM KNOWTH

- 6.28. Modelling of the proposed road in the viewshed from the top of the mound at Knowth indicates that it would be partially visible in two areas: the mainline south of the river leading up to and including part of the Boyne Bridge, and the north roundabout (**Figure 5**).
- 6.29. The larger area of partial visibility would be on the mainline south of the river leading up to the River Boyne. Elements visible would comprise parts of the upper east-facing side of the road cutting to the south of the River Boyne and the south end of the Boyne Bridge, including the southern abutment and part of the southernmost bridge span over the canal. The southern bridge pier on the north side of the canal would not be visible.
- 6.30. Moving vehicles would be visible on the south end of the bridge where the road emerges from its cutting and the upper parts of high-sided vehicles might be visible in the cutting to the south of the bridge. All vehicles would be seen moving perpendicular to the line of sight from Knowth, minimising the visibility of vehicle lights at night and other periods of low light conditions. No fixed lighting is proposed for this section of the Proposed Scheme.
- 6.31. Visibility of the proposed bypass in this area has potential to affect OUV by changing the character of the landscape in the view looking west from Knowth up the River Boyne. Mitigation measures focussed on two aspects of the detailed design in this area:
- Design of the Boyne Bridge; and
 - Landscape mitigation along the cutting south of the river
- 6.32. The greater part of the proposed bridge would not be visible from Knowth due to screening by intervening landform and existing woodland. However, the southern abutment and part of the southernmost bridge span would be seen. The following measures were incorporated in the final design in order to minimise the visibility of the bridge:
- Adoption of a sunken vertical alignment in order to minimise the height of the bridge whilst maintaining adequate clearance over the Boyne Navigation;
 - Selection of a construction technique with a shallow profile bridge span, to minimise the mass of the structure when viewed from Knowth (see EIA Report Chapter 4, Section 4.4.9.7 for more details);
 - Selection of weathering steel for the main bridge girders that naturally weathers to a muted dark brown colour, helping to make the span visually recessive (see EIA Report Chapter 4, Section 4.4.9.7 for more details);
 - Formation of an acoustic bund on east side of southern abutment. This was primarily required for noise attenuation at an adjacent residential property but it also serves to screen vehicles on

the road as they emerge from under the Rossnaree Road overbridge. Planting on the bund enhances the level of screening and aids integration of the bund into the landscape.

- 6.33. Following adoption of these various mitigation measures, it is calculated that bridge visibility from Knowth would be limited to the southern abutment and c.25m of the southernmost bridge span i.e. c.10% of the total bridge length of 258m.
- 6.34. For the cutting south of the river, landscape mitigation plans include the planting of a hedge with occasional trees along the upper edge of both sides of the cutting. This will allow the cutting to be experienced from Knowth as a field boundary and therefore apparently part of the existing landscape of enclosed fields. The planting will also screen the upper parts of high-sided vehicles, potentially visible in the cutting.
- 6.35. The smaller area of predicted visibility would be at the north roundabout where the bypass joins the existing N2. Visibility of the proposed bypass in this area has potential to affect OUV by creating a visual distraction in the view looking north-west from Knowth towards the Hill of Slane.
- 6.36. Despite the model predicting visibility in this area, any visual change is insufficient to be detected by a person standing at Knowth. It is assumed that vehicles would be visible on the proposed roundabout but, given that this is on the line of the existing N2 and existing traffic is not seen without careful observation, it is concluded that there would be no material visual change in this part of the view from Knowth. Therefore no further measures were recommended in this area for the purposes of reducing impact on OUV.
- 6.37. The effect of all of these proposed mitigation measures is illustrated in a set of photomontage views from Knowth (PV59, VPT 01, **Figure A12.1a-d**). These illustrate the appearance of the road in Year 1 after construction, with the bridge and associated earthworks in place but no growth of screening vegetation, and in Year 10 with predicted growth of vegetation added to the image. The Year 10 image also shows the predicted colour of the bridge span after 10 years of weathering.

FURTHER MITIGATION OF IMPACT ON OUV IN VIEWS FROM THE HILL OF SLANE

- 6.38. Modelling of the proposed road in viewsheds from the Hill of Slane (**Figures 13.1c and 13.1d**) indicates that it would be partially visible in two areas: the mainline between the N51 Roundabout and the north roundabout, and the mainline south of the River Boyne.
- 6.39. The larger area of partial visibility would be the mainline between the N51 Roundabout and the north roundabout. Elements visible would comprise the cutting past Norris Hill, the carriageway north of Norris Hill and the north roundabout. Moving vehicles would also be visible. This section of the proposed bypass would be visible from both of the Protected Viewpoints on the hill (PV29 and PV30).
- 6.40. Visibility of the proposed bypass in this area has potential to affect OUV by creating visual distraction in the view from the Hill of Slane towards Knowth and the wider World Heritage Property. Mitigation measures have focussed on reducing visibility of the proposed bypass and vehicles using it in this view.
- 6.41. It is proposed to create a continuous narrow strip of woodland along the west side of the mainline from the N51 Roundabout northwards, including the north roundabout. It is predicted that after 10 years of growth this will be sufficient to screen the cutting and carriageway from view; the woodland should also screen vehicles from view, although the upper parts of high-sided vehicles may remain visible for a longer time.
- 6.42. The smaller area of partial visibility would be on the mainline south of the River Boyne where the road cutting would be seen, including parts of the carriageway with vehicles moving along it. This section of the proposed bypass would only be visible from the higher of the two Protected Viewpoints on the hill (PV30, **Figure 4**).
- 6.43. The mainline to the south of the River Boyne would be seen directly behind a visually prominent housing estate on the eastern edge of Slane. The view looking south from the Hill of Slane is peripheral to the experience of the World Heritage Property, which lies to the east of this viewpoint. It was concluded that the predicted visual change would not affect the appreciation of the World Heritage Property from the

Hill of Slane and OUV would be unaffected. Therefore no additional design mitigation was proposed for the mainline south of the River Boyne.

6.44. The effect of these proposed mitigation measures is illustrated in sets of photomontage views from the two protected viewpoints on the Hill of Slane:

- PV29 Hill of Slane car park (VPT 18, **Figure A12.18a-f**); and
- PV30 Hill of Slane graveyard (VPT 17, Figure A12.17.1a-d; **Figure A12.17.2a-d**).

These illustrate the appearance of the road in Year 1 after construction, with no growth of screening vegetation, and in Year 10 with predicted growth of vegetation added to the image.

OVERALL CONCLUSIONS REGARDING MITIGATION APPLIED AT DESIGN AND ENVIRONMENTAL EVALUATION STAGE

6.45. The primary aim of mitigation measures was to reduce the visibility or visual prominence of the proposed bypass, and vehicles using it, in views from Knowth and the Hill of Slane.

6.46. This was achieved through refinements to the design of the bypass as follows:

- Selection of a design and materials for the Boyne Bridge that minimise its visual prominence in views from Knowth;
- Addition of a planted bund that creates additional screening of vehicles immediately to the south of the bridge structure when viewed from Knowth;
- Planting of hedgerows and trees beside the mainline cutting south of the Boyne Bridge to integrate the cutting into the existing landscape of enclosed fields and to screen the upper parts of high-sided vehicles in views from Knowth; and
- Planting of a woodland strip along the west side of the mainline between the N51 Roundabout and the north roundabout to screen the bypass and vehicles moving along it when viewed from the Hill of Slane.

6.47. The net effect of these mitigation measures, after growth of screening vegetation (illustrated at Year 10 in photomontages), is to significantly reduce the visibility of the proposed bypass in key views from Knowth and the Hill of Slane. This, in turn, reduces the level of impact on OUV of the World Heritage Property below that identified in the option selection assessment of Route Option EG.

OPPORTUNITIES FOR ENHANCEMENT OF OUV

6.48. Good practice guidance emphasises the need not only to avoid or minimise adverse impacts but also to identify opportunities to enhance OUV as part of the impact assessment process (UNESCO, 2022, s.6.10.2).

6.49. In the present assessment, mitigation measures have been dominated by the avoidance or reduction of adverse impacts and opportunities to incorporate enhancement measures have proved very limited. In so far as any potential for enhancement has been identified, attention has been focussed on potential for improvement of access to, and appreciation of the World Heritage Property from Slane.

6.50. The proposed removal of traffic from the existing N2 as it crosses Slane Bridge and passes through the village will create the opportunity for Slane to become a much more attractive destination for visitors with a strong focus on heritage. This potential would be enhanced by the proposed public realm measures that form part of the Proposed Scheme.

6.51. These enhancements in Slane village do not, of themselves, offer any direct enhancement for the World Heritage Property. However, they would provide the necessary starting point for future opportunities to enhance access to the World Heritage Property from the west, along the River Boyne.

6.52. Proposals for a Boyne Greenway Oldbridge to Navan (currently only in the early stages of design) envisage the creation of a continuous walking and cycling route along the Boyne from Navan to Drogheda (Drogheda to Oldbridge is already complete). At Slane, this route is likely to adopt the existing towpath

of the Boyne Navigation and would create public access along the right bank of the river, connecting Slane Bridge with the Brú na Bóinne Visitor Centre. This route would also create new and informative public views into the World Heritage Property, enhancing public appreciation of the key prehistoric monuments, such as Knowth and Newgrange, in their landscape setting.

- 6.53. It should be noted that the design of the new Boyne Bridge for the Slane bypass avoids any disruption to the Boyne Navigation and its towpath. There will also be a direct pedestrian link from the footpath beside the bypass carriageway down on to the towpath.
- 6.54. It must be emphasised that delivery of the enhancement to OUV offered by the Boyne Greenway proposals lies outside the scope of the Proposed Scheme. However the public realm enhancements that the Proposed Scheme would deliver in Slane, will greatly improve visitor access to the River Boyne and Boyne Navigation at Slane Bridge with additional access to the Boyne Navigation from the new Boyne bridge. These measures would facilitate any future local access to the long-distance route envisaged in the Boyne Greenway project, enhancing access and appreciation of the World Heritage Property.

7. PREDICTED IMPACT OF THE PROPOSED SCHEME

DESCRIPTION OF THE SCHEME

- 7.1. The predicted impact of the Proposed Scheme on the OUV of the World Heritage Property has been assessed by testing the Statement of Significance (Section 5, above) against the changes that would occur in the wider setting as a result of the construction and operation of the proposed bypass.
- 7.2. A detailed description of the Proposed Scheme is provided in Chapter 4 of the EIA Report, but an overview of the scheme is given here for ease of reference (quoting from s.4.2 of Chapter 4):

"The bypass commences on the existing N2 at a location 1.6 km south of the existing Boyne crossing, 0.4 km north of McGruder's Cross and completes at a tie-in to the existing N2 at a location 0.6 km north of the existing 50km speed limit gateway to Slane village.

An overview of the scheme is shown on EIA Report Chapter 4, Figure 4.2 comprising:

- 3.5km of mainline N2 bypass dual carriageway;
- 1.4 km of realigned N51 National Road;
- Reconfiguration of The Square junction in Slane, including removal of traffic light control;
- Public Realm improvement and traffic management measures in Slane village;
- 2.7 km of accommodation works and maintenance tracks;
- 3 at-grade roundabouts at N2 South, N51 and N2 North;
- 1 major bridge crossing of River Boyne
- 1 new road overbridge to allow the proposed N2 to pass under Rossnaree Road;
- 2 farm accommodation overbridges;
- 2 No. culverts on the Mooretown Stream;
- Provision of combined footway/cycleway facilities, including a pedestrian/cyclist link to the existing Boyne Canal towpath;
- Drainage system, including attenuated outfalls; and
- Landscaping and environmental mitigation measures.

The proposed N2 bypass route corridor runs to the east of Slane Village and is circa 3.5km in length. The proposed route diverts from the existing N2, in a north-easterly direction, from a location approximately 400m north of McGruder's crossroads in the townland of Johnstown. It continues in a north-north easterly direction, through Fennor and Crewbane townlands in a 6m to 7m deep cutting. The route passes under the existing Rossnaree Road, crossing the River Boyne approximately 630m east of the existing Slane Bridge. After crossing the river, the route runs in a north-easterly direction in a typically 6m deep cutting until it reaches the N51. It crosses the N51, approximately 1,100m east of the N2/N51 junction in the centre of Slane Village. The route then proceeds northwards, passing east of Ledwidge Cottage, through the townlands of Cashel and Mooretown, before turning north-west to tie in with the existing N2, approximately 415m north of the entrance to the Grassland Agro plant. The section from the N51 to the northern tie-in to the N2 is a combination of cut and fill.

At grade roundabouts are proposed at each tie in with the existing N2 and at the interface with the N51. The scheme includes for a realignment of the N51 between the proposed bypass and the edge of the village. The purpose of the realignment is to provide consistency of cross-section, easing of existing bends, extension of the existing footway and to provide public lighting."

- 7.3. It is important to note that the Proposed Scheme comprises both the new road, bypassing Slane on its east side, and works to enhance the public realm in Slane village.

- 7.4. Having considered the various works proposed as part of the scheme, it is concluded that only the bypass itself has potential to affect OUV of the World Heritage Property and, in the assessments that follow, the focus is entirely on the bypass and the works required to link it into the existing road network.
- 7.5. Proposed improvements to the public realm in Slane are an important consideration in the assessment of impacts on the built heritage and this matter is dealt with comprehensively in Chapter 13 of the EIA. However, none of the issues raised in relation to the historic character of Slane village can be related to the World Heritage Property where OUV resides in prehistoric and medieval landscape attributes.

SCOPE AND STRUCTURE OF THE IMPACT ASSESSMENT

- 7.6. This assessment of predicted impacts on the OUV of the World Heritage Property considers the potential for impacts under the following headings:
- *Construction-phase impacts* (impacts on OUV resulting from any groundworks and other temporary construction-related activities in the setting of the World Heritage Property)
 - *Operational impacts* (impacts on OUV resulting from the presence and operation of the Proposed Scheme in the setting of the World Heritage Property)
 - *Cumulative impacts* (impacts on OUV resulting from the combined effect of the Proposed Scheme and other developments within the World Heritage Property, its buffer zone and wider setting)
- 7.7. The assessment addresses both direct and indirect impacts of the bypass on the OUV of the World Heritage Property:
- *Direct impacts* relate to the impact of predicted changes in the wider setting of the World Heritage Property that would be a direct result of the construction and operation of the bypass. Change in the setting in this case is primarily a matter of visual change i.e. the ways in which the bypass would be seen in the landscape, including vehicle movement, lighting and therefore night-time visibility. However, the potential for change in noise levels as a result of traffic using the bypass and adjoining roads has also been considered.
 - *Indirect impacts* relate to the impact of any future changes that are not specified as part of the scheme (as described in outline above) but may be predicted to occur in the future as a consequence of the existence of the bypass. This could include future changes in land-use adjacent to the bypass.
- 7.8. Regarding indirect impacts, no changes are predicted to occur in the setting of the World Heritage Property as a consequence of the existence of the Proposed Scheme that might be predicted to result in impact on OUV. As a result, indirect impacts are not considered further in this assessment.
- 7.9. Avoidance and reduction of adverse impacts has been achieved through measures that were embedded in the design of the project, in both option selection and design and environmental evaluation phases of the project (see Section 6, above). As a result, all impacts have been assessed as residual impacts, after the application of design mitigation.
- 7.10. Analysis of the changes that would occur in the wider setting of the World Heritage Property is based on field work in order to understand how the bypass would be experienced on the ground. This has been informed by predicted visibility mapping and the production of photomontages that illustrate the predicted appearance of the bypass from selected viewpoints relevant to the experience and appreciation of the World Heritage Property (see Chapter 12 Landscape and Visual of the EIA Report for relevant material).

ASSESSMENT OF CONSTRUCTION-PHASE IMPACTS

- 7.11. The construction of the scheme is predicted to last for 36 months (see Chapter 5 Description of Construction Phase). During this time period, the construction works will be visible within the wider setting of the World Heritage Property, including visibility from important viewpoints that support OUV.
- 7.12. Construction works will include structures and activities that do not form part of the completed scheme, such as temporary works compounds or the presence of cranes during erection of the Boyne Bridge. These will lead to higher levels of visual change and noise levels above those predicted for the operational bypass in some areas.
- 7.13. However, any changes in the visual or noise environment due to these works would be of short-duration and entirely reversed at the end of construction works. As a result of their temporary nature, it is concluded that they would not have any material effect on the setting of the World Heritage Property and therefore on OUV.
- 7.14. Construction-phase impacts are not considered any further in this assessment.

ASSESSMENT OF OPERATIONAL IMPACTS

EXPERIENCE OF THE BYPASS IN THE WIDER SETTING OF THE WORLD HERITAGE PROPERTY

- 7.15. The presence of the proposed bypass in the wider setting of the World Heritage Property has the potential to affect OUV by changing our experience of those elements of the setting that currently support OUV. This could be a result of visual change or change in the noise environment.
- 7.16. The potential for the bypass to change our experience of the World Heritage Property in the vicinity of Slane, is described below, starting from the southern end of the scheme.
- 7.17. Analysis of the predicted visibility of the scheme is based on field work, supported by viewshed analysis and photomontages from the following locations:

Viewsheds

- PV29 Hill of Slane car park (**Figure 3**)
- PV30 Hill of Slane (**Figure 4**)
- PV59 Knowth (**Figure 5**)
- PV63 Red Mountain (**Figure 6**)
- HIA V1 Existing N2 south of Fennor (**Figure 7**)
- Proposed Boyne Bridge (**Figures 8 to 15**)

Photomontages (EIA Vol. 4 Appendix 12.1)

- PV29 Hill of Slane car park (VPT 18, **Figure A12.18a-f**)
- PV30 Hill of Slane (VPT 17, **Figure A12.17.1a-d; Figure A12.17.2a-d**)
- PV59 Knowth (VPT 01, **Figure A12.1a-d**)
- PV87b Newgrange (VPT 02, **Figure A12.2b**)
- HIA V1 (VPT 9, **Figure A12.9a-d**)
- HIA V5 Fennor Lane (VPT 14, **Figure A12.14a-b**)

- 7.18. The viewsheds fall into two groups:
- **Figures 3 to 7** illustrate the extent of land predicted to be visible from selected viewpoints relevant to the setting of the World Heritage Property. These viewsheds are based on a Digital

Surface Model (DSM) which includes vegetation and other surface obstructions; the viewsheds therefore identify areas where the Proposed Scheme is likely to be visible.

- **Figures 8 to 15** provide a detailed analysis of the visibility of the proposed Boyne Bridge and identify locations from where either part or all of the structure could be visible. These viewsheds are based on both a Digital Terrain Model (DTM) and Digital Surface Model (DSM) and therefore illustrate both the predicted bare-ground visibility of the bridge (DTM) and the more realistic (DSM) visibility with vegetation in place.

- 7.19. The photomontages illustrate the predicted appearance of the scheme at Year 1 and Year 10. Visibility of the scheme is described below at Year 1 of operation (immediately after construction) and at Year 10, when any screening planting would have had time to mature and therefore reduce visibility of any elements of the scheme targeted for mitigation.
- 7.20. Visibility of the various elements of the proposed bypass from relevant viewpoints is summarised in Table 2. The predicted visual change at Year 1 and Year 10 from relevant viewpoints is summarised in Table 3.
- 7.21. Information on the predicted change in noise levels has been taken from Chapter 9 Noise and Vibration of the EIA Report. As reported in Chapter 9, s.9.2.2 (Zone of Influence), the study area for the noise and vibration impact assessment was predominantly focused on areas likely to be affected by the proposed road scheme. Therefore it included noise and vibration sensitive receptors within 300 m of the road centrelines and noise and vibration sensitive receptors adjacent to existing roads in proximity to the Proposed Scheme.
- 7.22. The World Heritage Property would be located at least 2km from the Proposed Scheme, outside this study area. However, in view of its high sensitivity to environmental change, it was included as a noise and vibration sensitive receptor and the environmental noise conditions were considered as part of the study.

SOUTH ROUNDABOUT TO THE BOYNE BRIDGE

- 7.23. The south end of the bypass ties in to the existing N2 with a roundabout, just to the north of McGruder's Cross Roads. The south roundabout is screened by Cullen Hill in any views looking out from the World Heritage Property and there are no views towards the World Heritage Property where the roundabout would appear in the foreground.
- 7.24. The roundabout would be illuminated at night but given the screening by landform and use of appropriate lanterns to minimise light spill, there is no reason to predict any change in the night-time experience of the World Heritage Property.
- 7.25. The mainline of the bypass from the south roundabout to the Boyne Bridge is entirely in cutting with two overbridges. Overbridge 1 is for private farm access; Overbridge 2 carries the Rosnaree Road over the mainline cutting immediately to the south of the Boyne Bridge. Both of the proposed overbridges would be constructed at existing ground level.
- 7.26. The photomontage from the top of the mound at Knowth (PV59) indicates that the cutting would be partially visible at Year 1; it would be sufficiently deep to obscure the carriageway and any cars travelling along it, but the tallest HCVs would be partially visible. A similar level of visibility is likely to be experienced in views looking east towards Knowth from the existing N2 south of Fennor (V1).
- 7.27. By Year 10 growth of screening vegetation along both sides the cutting would have screened views of the cutting, overbridges and high-sided vehicles. The experience from both PV59 and V1 would be of an additional field boundary.
- 7.28. The cutting south of the Boyne Bridge would also be visible in views looking south from the Hill of Slane (PV30) but, from here, it would be peripheral to views looking east across the World Heritage Property. The orientation of the cutting as it approaches the Boyne would result in visibility of the carriageway and any vehicles on it in Year 1. Two overbridges would also be visible from these elevated viewpoints. By Year 10, the growth of screening vegetation would have slightly reduced visibility of the cutting from the Hill of Slane.

- 7.29. Visibility of a short section of the mainline south of the Boyne Bridge is predicted at Newgrange (PV87b) but comparison of the photomontage with baseline photography in **Figure A12.2** demonstrates that this does not lead to any detectable change in the landscape.
- 7.30. Regarding all other relevant views that potentially include this part of the landscape, the cutting south of the Boyne Bridge would not be visible from Red Mountain (PV63), Dowth (PV88) and Fennor Lane (V5). In all of these cases, the landform blocks any visibility.

BOYNE BRIDGE

- 7.31. The mainline of the bypass emerges from its cutting under the Rossnaree Road overbridge and runs out on to a short section of embankment to the southern abutment of the Boyne Bridge, which crosses the Boyne Navigation and River Boyne in four spans. There is an acoustic bund on the east side of the carriageway as it emerges from the cutting. There are drainage ponds on the west side of the southern abutment and the east side of the northern abutment, and a bridge for pedestrians and cyclists links the south side of the road bridge down to the Boyne Navigation towpath. The Boyne Bridge would not be illuminated at night.
- 7.32. Viewsheds created for the proposed bridge (**Figures 8 to 15**) can be used to understand where it would be visible in the surrounding landscape. Separate viewsheds have been created for points on the southern and northern bridge abutments and in the centre of the main span across the River Boyne to better understand the visibility of different parts of the bridge, which will generally not be seen as a complete structure. In addition, viewsheds have been created using a Digital Terrain Model (DTM) and Digital Surface Model (DSM) to illustrate both a 'worst-case' bare ground scenario and a more realistic scenario with vegetation.
- 7.33. DTM viewsheds predict bare-ground bridge visibility within the World Heritage Property along its western edge from Knowth southwards for 1km and from the top of the ridge at Newgrange. Predicted visibility in these areas is greatly reduced in the DSM viewsheds, reflecting the presence of woodland and multiple hedgerows in the area between Knowth and Newgrange.
- 7.34. DTM viewsheds also predict visibility of the northern part of the bridge from within the buffer zone on Red Mountain. However, none of the Protected Views within the buffer zone lie within this area of predicted visibility. Again, DSM visibility is much reduced on Red Mountain with only the bridge centre predicted to be seen past screening vegetation.
- 7.35. Predicted visibility in the viewsheds within the World Heritage Property has been tested in photomontages from Newgrange and Knowth.
- 7.36. At Newgrange (**Figure A12.2, PV87b**), the view from the foot of the mound on its west side is heavily obstructed by vegetation as well as a site hut, and no part of the proposed bridge would be visible.
- 7.37. The photomontage facing west from the top of the mound at Knowth (**Figure A12.1**, part of PV59) indicates that, at Year 1, most of the bridge would be screened from view in all seasons by a combination of landform and existing vegetation. The only visible part of the structure would be the southern abutment and an adjoining c.25m section of the southern-most span. The acoustic bund on the east side of the road would block views of the carriageway as it approaches the bridge.
- 7.38. Vehicles would be seen for a short distance (c.35m) as they cross the southern abutment out on to the bridge span and vice versa. Vehicles would be moving along a north-south axis, perpendicular to the line of sight from Knowth. This would lead to minimal visibility of headlights in views from Knowth.
- 7.39. Other structures associated with the bridge, such as the drainage ponds and towpath access bridge would not be visible from Knowth as they would either be hidden by the Boyne Bridge structure or the natural landform.
- 7.40. By Year 10, the growth of vegetation on the acoustic bund would serve to further reduce visibility of vehicles to a c.25m section of the bridge span in views from Knowth.
- 7.41. It is clear from the photomontage that existing vegetation plays a role in screening the proposed bridge in the view from Knowth, in particular an area of woodland on the valley side at Crewbane. Given that the

continued existence of this woodland cannot be guaranteed it is important to note that the DTM viewsheds (**Figures 8 to 10**) demonstrate the centre of the main span over the river and the northern abutment would be screened from view at Knowth by the underlying landform. Therefore, although the woodland at Crewbane provides additional screening, the northern part of the bridge would be fundamentally screened by the landform.

- 7.42. Other than the recognised important panoramic views from PV59 at Knowth, the Boyne Bridge and its associated structures would only be visible in part of one other view considered relevant to the experience of the World Heritage Property, this is V1. Travelling north on the existing N2 from McGruder's Cross Roads towards Fennor, there are sequential but intermittent views looking east to the mound at Knowth (V1). The northernmost point where there is a view towards Knowth is at the Fennor Cross Roads where the N2 turns northwest for the approach to Slane Bridge.
- 7.43. This location is illustrated by LVIA VPT9 (N2 at Fennor Junction). Baseline photography from this viewpoint, looking down the River Boyne, shows the mound at Knowth almost entirely screened by trees and the top of the mound at Newgrange partially visible and inconspicuous behind a pylon. This is representative of the partial and intermittent views provided by V1. Photomontages for VPT9 demonstrate that the proposed Boyne Bridge would be fully visible in the foreground of this view in Year 1. By Year 10, growth of vegetation in a newly planted field boundary would screen much of the bridge from view.
- 7.44. The Boyne Bridge would be the closest part of the Proposed Scheme to be visible from the World Heritage Property, so it is appropriate to consider any predicted change in the noise environment at this point. Knowth is at the western edge of the World Heritage Property, closest to the Proposed Scheme, and therefore most likely to experience a change in noise environment due to operation of the bypass.
- 7.45. The Mound at Knowth was selected as a baseline noise monitoring location (NML) as part of the noise and vibration impact assessment and a measured L_{den} noise level of 47 dB was recorded (NML 24-4, Chapter 9 Tables 9-16 and 9-17). L_{den} is one of the standard noise indicators for quantifying road traffic noise levels. L_{den} is the weighted average of the day, evening and night noise levels with a penalty of 10 dB for night-time periods and 5 dB for evening periods. .
- 7.46. Predicted operational noise levels with all proposed mitigation measures are presented in Appendix 9.5 to Chapter 9; Knowth is included here as Receptor R1320. Predicted L_{den} for the opening year of operation (assumed to be 2026) is 47 dB and in 2041 it is 48 dB (reflecting predicted increase in traffic flow by that date).
- 7.47. These results for Knowth indicate that current low background noise levels in the World Heritage Property would be maintained with no measurable increase in noise levels when the Proposed Scheme first comes into operation. A negligible increase in noise level is predicted by 2041, as a result of increased traffic, but this would also occur if the Proposed Scheme was not constructed (see Appendix 9.5: L_{den} value in 2041 for 'do-minimum' scenario at R1320 is 48 dB).
- 7.48. There are also sequential views towards Knowth from the canal towpath of the Boyne Navigation (Viewpoint V3) which start only 500m east of the proposed Boyne Bridge and continue to the east end of this section of the canal, 1.6km from the bridge. Given the proximity of the west end of Viewpoint V3 to the bridge, there is potential for a detectable change in the noise environment in this location.
- 7.49. The noise model for the proposed scheme with a receptor point on the towpath 500m downstream of the proposed new bridge predicts a 4dB increase in road traffic noise in the year of opening and a 5dB increase in 2041⁶. This traffic noise is likely to be audible, especially when the receptor point is downwind

⁶ The noise model was run by John Mahon, RPS, with a receptor point at Boyne Navigation towpath (697326, 773053) 500m downstream of the proposed new Boyne Bridge. The model predicts a 4 dB increase in road traffic noise in 2026, the year of opening (L_{den} increasing from 47dB to 51 dB) and a 5 dB increase in 2041 (47dB to 52 dB). Measurement of background noise levels at the receptor point over a period of 1 hour recorded an average (L_{Aeq}) of 45 dB. This is the same as the baseline figure for L_{Day} predicted by the noise model.

of the bridge (i.e. a west wind). Traffic noise would reduce as a person walks east towards Knowth along the towpath..

BOYNE BRIDGE TO N51 (INCLUDING N51 RE-ALIGNMENT)

- 7.50. To the north of the Boyne Bridge, the mainline of the bypass runs up the slope in a cutting to reach the existing N51. There is an overbridge for local farm access (Overbridge 3) and a drainage pond on the west side of the carriageway close to the intersection with the N51.
- 7.51. This section of the scheme would be visible from only one viewpoint relevant to the appreciation of the World Heritage Property. This is the view of Knowth looking east when travelling north on the existing N2 towards Fennor (V1). The mainline cutting would be visible from the existing N2 beyond the Boyne in the periphery of views towards Knowth. Visibility of this section of the mainline would be reduced by Year 10 as a result of growth of screening vegetation on both sides of the road.
- 7.52. The intersection of the bypass with the N51 would be a roundabout and the existing N51 on both sides of this roundabout would be subject to minor re-alignment and other improvements. The roundabout would be illuminated at night along with the section of N51 leading west into Slane. The re-aligned section of the N51 to the east of the roundabout would not be illuminated.
- 7.53. The re-aligned section of N51 to the east of the roundabout on the mainline would be partially visible from the Hill of Slane (PV29 and PV30) where it runs through a cutting at Cashel. It would not be visible from Knowth (PV59).
- 7.54. The roundabout and re-aligned section of N51 leading west into Slane would not be visible from any viewpoint relevant to the appreciation of the World Heritage Property. Views from the Hill of Slane (PV29 and PV30) would be obstructed by Norris Hill and the view from Knowth (PV59) would be obstructed by higher land at Cashel.
- 7.55. The N51 roundabout and adjoining section of N51 into Slane would be illuminated at night but, given the screening by landform and use of appropriate lanterns to minimise light spill, there is no reason to predict any change in the night-time experience of the World Heritage Property from this part of the scheme.

N51 ROUNDABOUT TO THE NORTH ROUNDABOUT

- 7.56. The final section of the bypass runs from the N51 roundabout to the northern tie-in to the existing N2 at the north roundabout. This section of the mainline passes to the east of Norris Hill in a cutting followed by alternating sections of embankment and cutting to reach the north roundabout. The north roundabout would be illuminated at night.
- 7.57. This section of the bypass would be visible from the Hill of Slane (both PV29 and PV30). There is also predicted visibility of the north roundabout from Knowth (PV59), but the very minor level of visual change is essentially undetectable on the photomontage.
- 7.58. The photomontages from PV29 and PV30 for Year 1 both show the carriageway emerging from the cutting past Norris Hill and then running on a low embankment before being obscured by the large buildings and surrounding trees of Grassland Agro. The bypass appears again from behind these buildings just to the south of the north roundabout where the bypass ties into the existing N2.
- 7.59. The location of the north roundabout would be peripheral to the view towards the World Heritage Property with Knowth, for example, visible beyond the north end of the cutting past Norris Hill from PV30.
- 7.60. The photomontages at Year 10 indicate growth of screening vegetation along the west side of the mainline and the north roundabout sufficient to obstruct views of the carriageway and the majority of vehicles. Given the elevation of the viewpoints on the Hill of Slane there would be no light spill into these views from lights at the north roundabout.

SUMMARY OF PREDICTED CHANGE IN THE WIDER SETTING OF THE WORLD HERITAGE PROPERTY

- 7.61. Summarising the analysis in the preceding sections, the following key points may be made (also see Table 2 and Table 3).
- 7.62. Of the 13 viewpoints considered to be relevant to an appreciation of the wider setting of the World Heritage Property around Slane, only four would be affected by the Proposed Scheme. These are:
- PV29 (Hill of Slane Car Park), **Figure 3** (Viewshed) and **Figure A12.18a-f** (Photomontage, EIAR Vol. 4 Appendix 12.1)
 - PV30 (Hill of Slane), **Figure 4** (Viewshed) and PT 17, **Figure A12.17.1a-d; Figure A12.17.2a-d** (Photomontage, EIAR Vol. 4 Appendix 12.1)
 - PV59 (Knowth), **Figure 5** (Viewshed) and **Figure A12.1a-d** (Photomontage, EIAR Vol. 4 Appendix 12.1)
 - V1 (N2 south of Fennor), **Figure 7** (Viewshed) and **Figure A12.9a-d** (Photomontage, EIAR Vol. 4 Appendix 12.1)
- 7.63. Experience of the wider setting of the World Heritage Property would, in almost all cases, only be affected by visual change in the setting. Visual change relates to daytime visibility of the bypass and vehicles using it with no material changes in light time illumination affecting the experience of the setting. There would be no material change in the noise environment at any relevant viewpoints with the exception of Viewpoint V3, close to the proposed Boyne Bridge.
- 7.64. Considering the various elements of the scheme:
- The south roundabout would not be visible from any viewpoint
 - The cutting for the mainline south of the Boyne Bridge would be partially visible from Knowth (PV59) and the N2 south of Fennor (V1) in Year 1 but entirely screened by Year 10. It would also be seen in the periphery of views towards the World Heritage Property from the Hill of Slane (PV30) in Year 1 and Year 10.
 - The south end of the Boyne Bridge would be visible from Knowth (PV59) in Year 1 and Year 10. The entire bridge would also be briefly visible in Year 1 at the north end of the sequential views from the existing N2 south of Fennor (V1), but much less visible due to screening vegetation by Year 10.
 - Traffic noise generated by vehicles on the Boyne Bridge may be audible, depending on wind direction, at the western end of Viewpoint V3 on the Boyne Navigation towpath.
 - The mainline between the Boyne Bridge and the N51 would be visible in the periphery of views looking east towards Knowth from the N2 approaching Fennor (V1) in Year 1 and Year 10.
 - The N51 Roundabout and re-aligned section of the N51 running west into Slane would not be visible from any viewpoint.
 - The re-aligned section of N51 east of the roundabout would be partially visible from the Hill of Slane (both PV29 and PV30).
 - The mainline north of the N51 and the north roundabout would be partially visible from the Hill of Slane (both PV29 and PV30) in Year 1, with the north roundabout in the periphery of views towards the World Heritage Property. All of these road elements and most vehicles would be entirely screened by Year 10.

Table 2: Summary of visibility and audibility of main elements of proposed bypass from relevant viewpoints (Y = visible; A = audible; x = not visible/audible)

VIEWPOINT	South Roundabout	Mainline south of Boyne Bridge	Boyne Bridge	Mainline between Boyne Bridge and N51	N51 re-alignment	Mainline between N51 and North Roundabout	North Roundabout
PV29 (Car Park, Hill of Slane)	x	x	x	x	Y	Y	Y
PV30 (Hill of Slane)	x	Y	x	x	Y	Y	Y
PV32 (Carrickdexter Cross)	x	x	x	x	x	x	x
PV34 (Cullen Hill)	x	x	x	x	x	x	x
PV59 (Knowth)	x	Y	Y	x	x	x	Y
PV63 (Red Mountain)	x	x	x	x	x	x	x
PV87b (Newgrange)	x	x	x	x	x	x	x
PV88 (Dowth)	x	x	x	x	x	x	x
V1 (N2 south of Fennor)	x	Y	Y	Y	x	x	x
V2 (Mooretown)	x	x	x	x	x	x	x
V3 (Boyne Navigation Towpath)	x	x	A	x	x	x	x
V4 (Rossnaree Road)	x	x	x	x	x	x	x
V5 (Fennor Lane)	x	x	x	x	x	x	x

Table 3: Predicted change in wider setting of World Heritage Property at relevant viewpoints in Year 1 and Year 10 after construction of Proposed Scheme

Viewpoint	Predicted change Year 1	Predicted change Year 10
PV29 (Car Park, Hill of Slane)	Short section of bypass with vehicles visible to north of cutting at Norris Hill with short section of re-aligned N51 beyond in view looking southeast towards World Heritage Property; North Roundabout with vehicles visible in periphery of this view.	Section of bypass to north of Norris Hill screened by planting along western side of road. North Roundabout screened by planting
PV30 (Hill of Slane)	Short section of bypass with vehicles visible to north of cutting at Norris Hill with short section of re-aligned N51 beyond in view looking southeast towards World Heritage Property; North Roundabout with vehicles visible in periphery of this view.	Section of bypass to north of Norris Hill screened by planting along western side of road. North Roundabout screened by planting
PV32 (Carrickdexter Cross)	No change in view looking east towards World Heritage Property	No change in view looking east towards World Heritage Property
PV34 (Cullen Hill)	No change in view looking east towards World Heritage Property	No change in view looking east towards World Heritage Property
PV59 (Knowth)	Upper lip of cutting to south of Boyne Bridge visible with upper parts of high-sided vehicles potentially visible. South end of the Boyne Bridge visible including southern abutment, short length of bridge span and acoustic bund on east side of abutment. Vehicles visible on span of bridge.	Upper lip of cutting and vehicles in cutting screened by new hedgerow and trees. Acoustic bund and southern abutment screened by planting on bund. Short section of bridge span with vehicles still visible.
PV63 (Red Mountain)	No change in view looking northwest over World Heritage Property towards Slane	No change in view looking northwest over World Heritage Property towards Slane

Viewpoint	Predicted change Year 1	Predicted change Year 10
PV87b (Newgrange)	No change in view looking west towards Cullen and Slane	No change in view looking west towards Cullen and Slane
PV88 (Dowth)	No change in view looking west towards Cullen and Slane	No change in view looking west towards Cullen and Slane
V1 (N2 south of Fennor)	Upper lip of cutting to south of Boyne Bridge visible with upper parts of high-sided vehicles potentially visible. Boyne Bridge briefly visible at Fennor. Bypass visible in periphery of view on valley side to north of River Boyne	Upper lip of cutting and vehicles in cutting screened by new hedgerow and trees. Boyne Bridge briefly visible at Fennor but partially screened by new hedgerow and trees Bypass visible in periphery of view on valley side to north of River Boyne
V2 (Mooretown)	No change in view looking southeast towards World Heritage Property	No change in view looking southeast towards World Heritage Property
V3 (Boyne Navigation Towpath)	No change in view looking east along river towards Knowth but traffic may be audible from viewpoints closest to Boyne Bridge	No change in view looking east along river towards Knowth but traffic may be audible from viewpoints closest to Boyne Bridge
V4 (Rosnaree Road)	No change in view looking east towards Knowth	No change in view looking east towards Knowth
V5 (Fennor Lane)	No change in view looking east towards World Heritage Property	No change in view looking east towards World Heritage Property

OPERATIONAL IMPACT OF THE BYPASS ON THE OUV OF THE WORLD HERITAGE PROPERTY

7.65. Operation of the proposed bypass has the potential to affect the OUV of the World Heritage Property if changes in the wider setting resulting from that operation, directly or indirectly, change setting elements that currently support OUV.

7.66. In Section 5 of this report, the Statement of Significance identifies three ways in which the wider setting around Slane supports the OUV of the World Heritage Property:

Attributes of both the built and natural environment near Slane have functional associations with the monumental landscape of the World Heritage Property and with individual monuments within the property. Appreciation of these associations supports the OUV of the property.

Viewpoints near Slane provide opportunities to experience the monumental landscape of the World Heritage Property and the landscape setting of individual monuments within the property. These opportunities enhance our appreciation of the landscape setting and therefore support the OUV of the property.

The land around Slane features in the background to some important views of the World Heritage Property from within the nominated property and the buffer zone. In these views, it is part of the modern rural agricultural landscape that forms an appropriate green setting for the Neolithic monuments within the nominated property. Experience of the monuments in this rural setting supports the OUV of the property.

7.67. These three aspects of setting provide the framework for an assessment of how the predicted changes in the wider setting would impact on OUV.

PREDICTED IMPACTS ON FUNCTIONAL ASSOCIATIONS

7.68. The Statement of Significance identifies two distinct functional associations relevant to the wider setting around Slane:

- The relationship between Knowth and Slane in the Early Medieval Kingdom of Brega; and
- The role of the River Boyne in the development of the monumental landscape of Brú na Bóinne.

7.69. The relationship between Knowth and Slane is experienced in the reciprocal views between these places (PV29, PV30 and PV59), all illustrated by photomontages (**Figure A12.18a-f**; **Figure A12.17.1a-d** and **Figure A12.17.2a-d**; and **Figure A12.1a-d**). Operation of the Proposed Scheme would not materially change the view from Knowth towards the Hill of Slane.

- 7.70. Parts of the mainline of the bypass north of the N51 Roundabout and a re-aligned section of the N51 would be visible in the foreground of views from the Hill of Slane towards Knowth (PV29 and PV30) with Knowth visible beyond the Grassland Agro buildings from PV29 and the north end of the cutting past Norris Hill from PV30. The cutting, carriageway and moving vehicles would be visible here at Year 1.
- 7.71. The view of Knowth would not be obstructed by the operation of the bypass which would simply add a new man-made feature in the foreground of the view, but it would cause a low level of visual distraction.
- 7.72. From the lower vantage point at the Hill of Slane Car Park (PV29), the visible sections of the bypass and N51 in the view towards Knowth would be seen as part of a foreground already dominated by man-made structures including the Grassland Agro buildings, overhead power lines and metal fencing around a covered reservoir.
- 7.73. From the higher vantage point on the hill, in the churchyard (PV30), the foreground of the view towards Knowth has a more rural character so the bypass would be a more prominent addition. However, it would still represent a relatively minor change in the character of a panoramic view that includes the visually prominent Ledwidge Hall housing estate immediately to the south. The visible section of re-aligned N51 would be a negligible change and have no material impact on the character of the landscape in this view.
- 7.74. Taking these two viewpoints together, it is concluded that the presence of the bypass at Year 1 would have a very limited impact on our ability to experience the relative locations of Slane and Knowth and a very limited impact on our appreciation of their connected histories in the Early Medieval period. There would be an adverse impact of negligible magnitude on OUV.
- 7.75. The photomontages from both PV29 and PV30 indicate that growth of screening vegetation by Year 10 would largely avoid any visibility of the bypass and of vehicles travelling along it, further reducing the limited degree of visual distraction in these views of Knowth. Therefore, by Year 10, there would be no impact on OUV.
- 7.76. Turning to the second functional relationship with the wider setting, the role of the River Boyne in the development of the monumental landscape of Brú na Bóinne is illustrated by views out from the World Heritage Property at Knowth (PV59) and reciprocal views of Knowth from along the Boyne Navigation Towpath (V3) and the Rossnaree Road (V4).
- 7.77. The east-facing viewpoints on the towpath (V3) and Rossnaree Road (V4) are located east of the bypass and would therefore be unaffected by its operation in terms of visual change. However, V3 is the only location in the wider setting where predicted change in noise levels has the potential to affect OUV.
- 7.78. Viewpoint V3 comprises a sequence of views towards Knowth when walking east along the canal towpath of the Boyne Navigation. Knowth can first be appreciated c.500m downstream of the proposed Boyne Bridge so there would be no visual change in views looking east. However, the noise model for the Proposed Scheme predicts an increase in noise levels such that traffic crossing the bridge is likely to be audible, especially if the wind is from the west.
- 7.79. This traffic noise would slightly degrade a viewer's experience of the more-distant views towards Knowth but, as they walked east towards the World Heritage Property, this impact would reduce to undetectable levels. This predicted level of change is considered to have only a negligible impact on our ability to appreciate the historical relationship of Brú na Bóinne and Knowth with the River Boyne.
- 7.80. The bypass would be visible from the top of the mound at Knowth (PV59) and the photomontage at Year 1 indicates how there would be partial visibility of the road cutting south of the Boyne Bridge and of the south end of the bridge itself. It is the visibility of the bridge in the valley of the Boyne that is of particular relevance to the functional relationship under consideration here.
- 7.81. The bridge has been designed to be visually recessive and, in so far as it is visible at all from Knowth (with most of the structure permanently screened from view) it will not be a prominent feature. The scale of the visible section of bridge would be similar to the scatter of houses already present in the same part of the view at Fennor and immediately adjacent to the bridge along the Rossnaree Road. It would therefore not noticeably change the character of this important view up the valley.

- 7.82. Vehicles travelling over the bridge could be more noticeable than the static bridge structure, depending on their height and colour; however any one vehicle would only be visible for a few seconds over a distance of c.25m. It may be noted that, at a distance of 2.7km from Knowth, they would only appear a little closer on the bridge than traffic on the much longer visible section of the existing N2 south of Fennor, 3.0km up the valley from Knowth.
- 7.83. The existing traffic on the N2 is visible but it is not visually distracting at this range and serves as a predictive illustration of the visual impact of traffic on the proposed bridge (which would be slightly closer but visible over a much shorter distance). It should also be noted that the traffic expected to use the proposed bridge currently uses the existing N2 and therefore is already visible in the view looking west from Knowth. There would therefore not be a cumulative visual impact from traffic flows on both roads.
- 7.84. It is concluded that the presence of the bypass would have only a very limited impact on our ability to experience the close physical links between the western end of Brú na Bóinne and the River Boyne and would have a very limited impact on our appreciation of the role that the river may have played in the evolution of this remarkable monumental landscape. There would be an adverse impact of negligible magnitude on OUV at Year 1 and Year 10.

PREDICTED IMPACTS ON VIEWS OF THE WORLD HERITAGE PROPERTY FROM ITS WIDER SETTING

- 7.85. The Statement of Significance identifies a range of viewpoints within the wider setting around Slane where views of the World Heritage Property in its landscape setting add to our appreciation of how and why the monuments were placed in the landscape.
- 7.86. All nine of the viewpoints identified in the wider setting around Slane contribute to a greater or lesser extent to this aspect of OUV. Five of these would be unchanged by the proposed bypass (PV32, PV34, V2, V4, V5) and it follows that their support of the OUV would be unaffected. The four viewpoints where some change would be experienced are PV29, PV30, V1 (all visual change) and V3 (change in noise environment).
- 7.87. The three views where there would be some visual change are PV29 and PV30 on the Hill of Slane (EIAR Vol. 4 Appendix 12.1 Photomontages, **Figure A12.18a-f**, **Figure A12.17.1a-d** and **Figure A12.17.2a-d**) and V1 on the N2 south of Fennor (**Figure A12.9a-d**).
- 7.88. The viewpoints on the Hill of Slane have already been discussed for their role in illustrating the historical relationship between Slane and Knowth. These elevated viewpoints also offer more general views eastwards over the western end of the World Heritage Property but with a clear focus still on Knowth and its position within the wider landscape.
- 7.89. The preceding analysis of visual change in PV29 and PV30 applies equally to this second aspect of OUV and arrives at the same conclusion: that the predicted level of visual change by Year 10 would not materially diminish the contribution these views make to our experience and appreciation of the setting of the World Heritage Property. There would be no impact on OUV.
- 7.90. Viewpoint V1 on the existing N2 south of Fennor provides a sequence of views into the World Heritage Property that are much less informative than those from the Hill of Slane and less-readily appreciated as they are usually only experienced from a moving vehicle. Nevertheless, it is possible to see the mound at Knowth on the skyline in views to the east and there is a brief and partial view of Newgrange from the N2 at Fennor.
- 7.91. The lip of the cutting for the mainline of the bypass might be detected in the foreground in Year 1 with the tops of high-sided vehicles also potentially visible. This would not materially diminish our experience of the glimpsed views to Knowth. Growth of planted vegetation by Year 10 would entirely screen the bypass from view but not obstruct the view to Knowth and there would be no impact on OUV. At Fennor Cross Roads, the proposed Boyne Bridge would be briefly visible in combination with partial views towards Knowth and Newgrange. Given the limited contribution this view makes to appreciation of the World Heritage Property, this is considered to be an impact of negligible magnitude both at Year 1 and Year 10 when the bridge structure would be partially screened.

PREDICTED IMPACT ON VIEWS FROM THE WORLD HERITAGE PROPERTY AND ITS BUFFER ZONE

- 7.92. The third and final aspect of OUV supported by the wider setting around Slane relates to its role as a rural agricultural 'backdrop' to views looking out westwards from within the World Heritage Property and its buffer zone.
- 7.93. Viewpoints relevant to this aspect of OUV fall into two groups: views out from the three large tomb mounds (Knowth PV59, Newgrange PV87b and Dowth PV88) and views across the World Heritage Property from its buffer zone (PV62, PV63, PV64 and PV92).
- 7.94. The views from Knowth (PV59, Photomontage **Figure A12.1a-d**) have already been discussed for their relevance to the functional relationships with Slane and the River Boyne. In this case it is the wider rural landscape that is relevant. The predicted visual change at the Boyne Bridge and cutting to the south of the bridge remain as previously described but should now be assessed as part of a wider panoramic view from Knowth. In this context, the very limited level of visual change at both Year 1 and Year 10 has no impact on our appreciation of the landscape to the west of the World Heritage Property and their relationship.
- 7.95. The tomb mounds at Newgrange and Dowth also provide views out to the landscape west of the World Heritage Property (EIAR Vol.4 **Figure 12.2a-d** and **12.3a-d**). In these two cases, only the higher parts of the landscape around Slane are visible, including the hills at Cullen, Fennor and Slane. The route of the proposed bypass would be entirely hidden from Dowth by the intervening landform. Visibility of a short section of the mainline south of the Boyne Bridge is predicted at Newgrange but comparison of the photomontage with baseline photography in **Figure 12.2** demonstrates that this does not lead to any detectable change in the landscape.
- 7.96. A cluster of four protected views within the buffer zone to the south of the River Boyne all provide the same open elevated view northwest across the World Heritage Property towards Slane. The precise routing of the proposed bypass has resulting in a scheme that would be entirely invisible from these viewpoints (Viewshed for PV63, **Figure 6**; Photomontage EIAR Vol.4 **Figure 12.5a-d**). South of the River Boyne, the route taken by the bypass is screened by the higher ground of Cullen Hill. The Boyne Bridge crosses the river at a low level and therefore is screened by the steep valley sides immediately to the east. North of the river, the route taken lies behind higher ground at Crewbane and Cashel which provides screening as far as the north roundabout.
- 7.97. Drawing together the findings on this third aspect of OUV, it is concluded there would be no impact on OUV.

OPERATIONAL IMPACT - SUMMARY AND CONCLUSIONS

- 7.98. The assessment of predicted operational impacts has considered each of the three aspects of OUV that are supported by elements of the wider setting of the World Heritage Property around Slane.
- 7.99. It is concluded that the only aspect of OUV that would be adversely affected by the operation of the proposed bypass would be the functional relationship between the World Heritage Property and its wider setting; specifically the role of the River Boyne in the development of the monumental landscape of Brú na Bóinne.
- 7.100. It is concluded that partial visibility of the proposed Boyne Bridge in the view looking west from Knowth (PV59) combined with visibility of the bridge from the Fennor Cross Roads (V1) and audible traffic noise at the west end of Viewpoint V3 on the towpath would have a very limited impact on our ability to experience the close physical links between the western end of Brú na Bóinne and the River Boyne and on our appreciation of the role that the river may have played in the evolution of this remarkable monumental landscape. This is considered to be an adverse impact of **negligible magnitude** and **minor significance** on OUV.

ASSESSMENT OF CUMULATIVE IMPACTS

- 7.101. Consideration of cumulative impacts is a standard component both of EIA and the more specific ICOMOS HIA methodology that is being applied to the World Heritage Property in this case.
- 7.102. The potential for significant cumulative impacts on the OUV of the World Heritage Property relates to the ways in which development in the setting of the World Heritage Property can change the appearance and character of valued views and therefore the way in which we experience the World Heritage Property. The essentially rural and agricultural character of the landscape surrounding the World Heritage Property supports its OUV so changes in the character of views due to development could diminish OUV.
- 7.103. Any development in the setting of the World Heritage Property could, in principle, affect OUV but in practice it is a relatively small number of larger-scale developments that have could have a material impact on OUV
- 7.104. The potential for cumulative impacts on the OUV of the World Heritage Property has been assessed using two different approaches to the topic:
- Firstly, and in common with all other disciplines in the EIA, there is a cumulative impact assessment that takes into account the combined impact of the Proposed Scheme together with other approved projects, not yet constructed. These are projects that will materially change the appearance of the World Heritage Property, its buffer zone or wider setting, due to their scale (height, extent) but do not yet form part of the baseline environment.
 - Secondly, there is a cumulative impact assessment that takes into account the combined impact of the Proposed Scheme together with other projects, approved and constructed since the inscription of the World Heritage Property in 1993. These are projects that have already materially changed the appearance of the World Heritage Property, its buffer zone or wider setting since it was designated. This second assessment has been undertaken on the advice of ICOMOS (Ireland) and was originally deployed to inform the route options assessment. The assessment presented here represents an updating of the original assessment to consider the predicted impact of the Proposed Scheme.

CUMULATIVE IMPACTS WITH APPROVED PROJECTS

- 7.105. The projects identified as being relevant to the consideration of cumulative effects are based upon the results of a screening exercise which listed all approved projects within 7km of the World Heritage Property that have not yet been constructed (see Chapter 25 – Cumulative Effects and Appendix 25.2 – CIA Stage 2 Project Screening List).
- 7.106. Each project in the project screening list has been considered on a case-by-case basis for screening in or out of this assessment based on the potential for that project to affect OUV by materially changing the World Heritage Property, its buffer zone or wider setting.
- 7.107. Two projects in the list were initially identified as relevant to the World Heritage Property CIA (PR3 and PR4, both residential developments at Ledwidge Hall, Slane). However, it was then realised that both projects were now under construction. Therefore, instead of treating these developments as part of the CIA, they have been included in the baseline for the main impact assessment of the Proposed Scheme. It should be noted that the baseline photography for the photomontage from PV30 (Hill of Slane, **Figure A12.17.2a-d**) has been updated specifically to include the new housing.
- 7.108. As a result, no approved but not-yet constructed projects have been identified that need to be considered as part of the World Heritage Property CIA. It is therefore concluded that there would be no cumulative impact on OUV as a result of the operation of the Proposed Scheme in combination with any other approved development project.

CUMULATIVE IMPACTS WITH PROJECTS CONSTRUCTED SINCE INSCRIPTION IN 1993

- 7.109. This second cumulative impact assessment considers the potential for the Proposed Scheme to contribute to cumulative impacts on OUV in combination with other major developments in the wider setting of the World Heritage Property since its inscription in 1993.
- 7.110. The full results of this assessment are presented in an appendix to this report (Appendix 2) with the main findings summarised below.
- 7.111. Any development in the setting of the World Heritage Property could, in principle, affect OUV but in practice it is a relatively small number of large-scale developments that have could have a material impact on OUV. This cumulative impact assessment therefore seeks to analyse to what extent large-scale development in the setting, since the designation of the World Heritage Property in 1993, has changed experience of the World Heritage Property and the impact this has had on OUV.
- 7.112. Six developments since 1993 have been identified that fall into this category, all of which either include large skyline structures or, in the case of the residential developments, involve a substantive loss of rural landscape character (see Appendix 2 Table 1 for more details):
- M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)
 - Residential developments at Cruicerath/Stalleen, Donore
 - Extensions to Platin Irish Cement Works
 - Indaver Ireland Incinerator, Carranstown, Duleek
 - Residential development at Ledwidge Hall, Slane
 - Dunmore / Leaby Cross Wind Turbines. Collon, Co. Louth
- 7.113. The degree of change in the setting of the World Heritage Property as a whole has been measured by assessing change at all protected viewpoints ('PV') relevant to the World Heritage Property (as listed in Appendix 10 of the Meath County Development Plan 2021-2027). Information extracted from the County Development Plan on the location of these protected viewpoints, a description of the view and its significance, is summarised in Appendix 2 Table 2.
- 7.114. A clear pattern emerges from the analysis of visual change at protected viewpoints. At most viewpoints there is no visibility of any of the six post-1993 developments and only one (PV30 on the Hill of Slane) has views to all six. This reflects the fact that PV30 provides an exceptionally open and elevated viewpoint and, by chance is close to the Ledwidge Hall residential development, which is invisible from all but one of the other viewpoints.
- 7.115. The other viewpoints from which the developments tend to be visible are the three main passage graves (Knowth, Newgrange and Dowth) which all occupy relatively elevated positions in the centre of the World Heritage Property. The fact that few developments can be seen from the elevated viewpoints on Redmountain reflects the locations of most of the developments which, with the exception of the wind turbines, are hidden behind the landform in these north-facing views.
- 7.116. Turning to the potential for the six developments to affect OUV, it is concluded that two of the developments do not have a material effect. These are the Dunmore / Leaby Cross Wind Turbines which, although visible, are not considered to be visually distracting, and the M1 Boyne Bridge where visibility in Protected Views is limited to a distant view from the Hill of Slane (PV29 and 30, 9.5km) and a closer but partially screened view from the mound at Dowth (PV88, 4km). The other four developments do affect OUV to a greater or lesser extent.
- 7.117. A combination of the post-1993 extensions to the Platin Irish Cement Works, Carranstown Incinerator stack and housing in Donore form a particularly prominent cluster of modern development in the view looking southeast from Dowth (PV88) which materially detracts from the rural agricultural character of the landscape setting of the World Heritage Property at this location. It is important to note again that the cement works was operational pre-1993 and therefore parts of it featured as a detracting element in

the setting of the World Heritage Property from the outset. This pre-1993 component is excluded from the cumulative assessment.

- 7.118. A combination of the cement works and Donore housing also adversely affects views out from Newgrange, Knowth and the Hill of Slane, albeit to a lesser degree than at Dowth. As the main publicly accessible monuments in the World Heritage Property, Dowth, Newgrange and Knowth are considered to be locations particularly sensitive to change in the character of their settings.
- 7.119. Finally, mention must be made of the impact of the Ledwidge Hall housing at Slane on the quality of the view from the Hill of Slane, introducing a visually prominent area of housing into what is otherwise a rural landscape view with the remainder of Slane village hidden by the landform at PV30.
- 7.120. Overall, it is concluded that there is a **cumulative impact of some magnitude** on OUV resulting from the combined impact of the six major post-1993 developments in the wider setting of the World Heritage Property. That impact is primarily due to the cluster of major developments at Platin/Carranstown/Donore and its adverse effect on the rural character of the setting as experienced from Dowth, Newgrange, Knowth and the Hill of Slane.
- 7.121. Having reached a conclusion regarding the cumulative impact of development to date on OUV, it is now necessary to consider the predicted cumulative impact if the Proposed Scheme was added to the existing major developments within the setting of the World Heritage Property.
- 7.122. The impacts identified for the proposed bypass (as described in the assessment of operational impacts) primarily relate to visibility of the proposed new crossing of the River Boyne from PV59 at Knowth. This has been assessed as an impact of negligible magnitude and minor significance on the OUV of the World Heritage Property.
- 7.123. Comparison of the predicted effects of the Proposed Scheme on OUV with those of the existing developments, indicates that the impact of the Proposed Scheme would be much less. The bypass would not involve large skyline structures and material adverse effects are very localised in extent relative to the scale of the wider setting of the World Heritage Property. There is nothing proposed for the Slane Bypass with the extensive visual prominence of the Platin Irish Cement Works. Therefore addition of the proposed bypass to the existing cumulative developments would lead to only a very small incremental addition to the cumulative impact on OUV.
- 7.124. It is concluded that the combined impact of post-1993 development with the Proposed Scheme would result in a cumulative impact of **some magnitude** on OUV, not materially greater than that without the Proposed Scheme. This is judged to be an adverse impact of **moderate significance** with the adverse impact caused almost entirely by existing development in the setting of the World Heritage Property.

8. CONCLUSIONS

- 8.1. This report has presented the results of a heritage impact assessment of the predicted impact of the proposed *N2 Slane Bypass and Public Realm Enhancement Scheme* on the Outstanding Universal Value of Brú na Bóinne World Heritage Property.
- 8.2. The Proposed Scheme would lie within the wider setting of the World Heritage Property. Construction of the Proposed Scheme would change the setting and this could affect the OUV of the World Heritage Property. Change in the setting would not automatically affect OUV; this would depend on the nature of the change and the ways in which this part of the setting supports OUV.
- 8.3. The report therefore has three main objectives:
- To analyse how the setting of the World Heritage Property around Slane currently supports OUV, and how changes resulting from construction of the Proposed Scheme could affect OUV;
 - To explain how the design of the Proposed Scheme has evolved in order to avoid or minimise potential adverse impacts on OUV; and finally
 - To assess how the scheme, as now proposed, would affect OUV.

HOW THE SETTING OF THE WORLD HERITAGE PROPERTY AROUND SLANE SUPPORTS OUV

- 8.4. In Section 5 of the report, the Statement of Significance has identified three ways in which the wider setting around Slane supports the OUV of the World Heritage Property:
- *Attributes of both the built and natural environment near Slane have functional associations with the monumental landscape of the World Heritage Property and with individual monuments within the property. Appreciation of these associations supports the OUV of the property.*
 - *Viewpoints near Slane provide opportunities to experience the monumental landscape of the World Heritage Property and the landscape setting of individual monuments within the property. These opportunities enhance our appreciation of the landscape setting and therefore support the OUV of the property.*
 - *The land around Slane features in the background to some important views of the World Heritage Property from within the nominated property and the buffer zone. In these views, it is part of the modern rural agricultural landscape that forms an appropriate green setting for the Neolithic monuments within the nominated property. Experience of the monuments in this rural setting supports the OUV of the property.*
- 8.5. These three aspects of setting provided the framework for assessment of how the predicted changes in the wider setting caused by the Proposed Scheme would impact on OUV. This, in turn, led to the identification of modifications to the scheme design that would lead to the avoidance or reduction in adverse impacts on OUV.

MITIGATION OF PREDICTED ADVERSE IMPACTS ON OUV

- 8.6. The key aim of the HIA has been to avoid or minimise any adverse impacts on OUV, consistent with the delivery of the public benefits of the project and recognising the need to resolve potential conflicts of interest with other environmental disciplines.
- 8.7. This aim, as reported in Section 6 of the report, was achieved in two main stages:
- Option selection: comparison of the likely impact of the available route options on OUV, leading to a choice of preferred route for the bypass by Meath County Council that takes sufficient account of any implications for the World Heritage Property; and

- Design and Environmental Evaluation: advice to the project design team based on an understanding of OUV, leading to a detailed design proposal that incorporates all opportunities to minimise adverse impacts on OUV from the preferred route of the bypass.
- 8.8. The route option selection process led to the selection of a preferred route for the bypass to the east of Slane, between Slane and the World Heritage Property. This was not the preferred choice from the perspective of protection of OUV as all eastern route option corridors were predicted to cause adverse impacts of some magnitude and moderate significance in the absence of detailed design mitigation. Most western and on-line options were predicted to have no impact on OUV but other material environmental considerations led to the rejection of these route options.
- 8.9. From the perspective of the World Heritage Property, the choice of preferred route represented a compromise, but one that already delivered considerable mitigation embedded in the design. It was the best of the eastern route options from the perspective of predicted impacts on the OUV of the World Heritage Property. This is because it offered more embedded design mitigation at the two most sensitive locations affected by the various eastern route options, minimising visibility of the proposed road in:
- the view looking west from Knowth; and
 - the view of the World Heritage Property from the Hill of Slane.
- 8.10. Accepting that the selected route option could have an adverse impact on OUV, the subsequent design and environmental evaluation stage of the project provided an opportunity to reduce these adverse impacts. The primary aim of mitigation measures at this stage was to reduce the visibility or visual prominence of the proposed bypass, and vehicles using it, in views from Knowth and the Hill of Slane.
- 8.11. This was achieved through refinements to the design of the bypass as follows:
- Selection of a design and materials for the Boyne Bridge that minimise its visual prominence in views from Knowth;
 - Addition of a planted bund that creates additional screening of vehicles immediately to the south of the bridge structure when viewed from Knowth;
 - Planting of hedgerows and trees beside the mainline cutting south of the Boyne Bridge to integrate the cutting into the existing landscape of enclosed fields and to screen the upper parts of high-sided vehicles in views from Knowth; and
 - Planting of a woodland strip along the west side of the mainline between the N51 Roundabout and the north roundabout to screen the bypass and vehicles moving along it when viewed from the Hill of Slane.
- 8.12. The net effect of these additional mitigation measures, after growth of screening vegetation, would significantly reduce the visibility of the proposed bypass in key views from Knowth and the Hill of Slane. This, in turn, would reduce the magnitude of impact on OUV of the World Heritage Property below that identified in the option selection assessment.

ASSESSMENT OF PREDICTED IMPACTS ON OUV

- 8.13. Assessment of the predicted impact of the Proposed Scheme, as finally designed, is presented in Section 7 of the report. Separate conclusions are reached regarding construction-phase impacts, operational impacts and cumulative impacts.
- 8.14. *Construction-phase impacts:* The construction of the scheme is predicted to last for 36 months. During this time period, construction works will be visible within the wider setting of the World Heritage Property, including visibility from important viewpoints that support OUV.
- 8.15. Any changes in the visual or noise environment due to these works would be of short-duration and entirely reversed at the end of construction works. As a result of their temporary nature, it is concluded that they would not have any long-term or permanent adverse effect on the setting of the World Heritage Property and therefore **no impact** on OUV.

- 8.16. *Operational impacts:* The assessment of predicted operational impacts has considered each of the three aspects of OUV that are supported by elements of the wider setting of the World Heritage Property around Slane.
- 8.17. It is concluded that the only aspect of OUV that would be adversely affected by the operation of the proposed bypass would be the functional relationship between the World Heritage Property and its wider setting; specifically the role of the River Boyne in the development of the monumental landscape of Brú na Bóinne.
- 8.18. It is concluded that partial visibility of the proposed Boyne Bridge in the view looking west from Knowth (PV59), combined with visibility of the bridge from the Fennor Cross Roads (V1) and audible traffic noise at the west end of Viewpoint V3 on the towpath, would have a very limited impact on our ability to experience the close physical links between the western end of Brú na Bóinne and the River Boyne and therefore very little impact on our appreciation of the role that the river may have played in the evolution of this remarkable monumental landscape. This is considered to be a permanent **adverse impact of negligible magnitude** and **minor significance** on OUV.
- 8.19. *Cumulative impacts:* The potential for cumulative impacts on the OUV of the World Heritage Property has been assessed using two different approaches to the topic:
- the combined impact of the Proposed Scheme together with other approved projects, not yet constructed; and
 - the combined impact of the Proposed Scheme together with other projects, approved and constructed since the inscription of the World Heritage Property in 1993.
- 8.20. In the first case, it is concluded that there would be **no cumulative impact** on OUV as a result of the operation of the Proposed Scheme in combination with any other approved development project.
- 8.21. In the second case, it is concluded that the combined impact of post-1993 development with the Proposed Scheme would result in a cumulative impact of **some magnitude**. This cumulative impact is judged to be an **adverse impact of moderate significance**. However, it should be noted that the cumulative adverse impact of post-1993 developments on OUV, excluding the Proposed Scheme, is already of some magnitude. Addition of the Proposed Scheme would lead to only a negligible incremental addition to the cumulative impact on OUV.

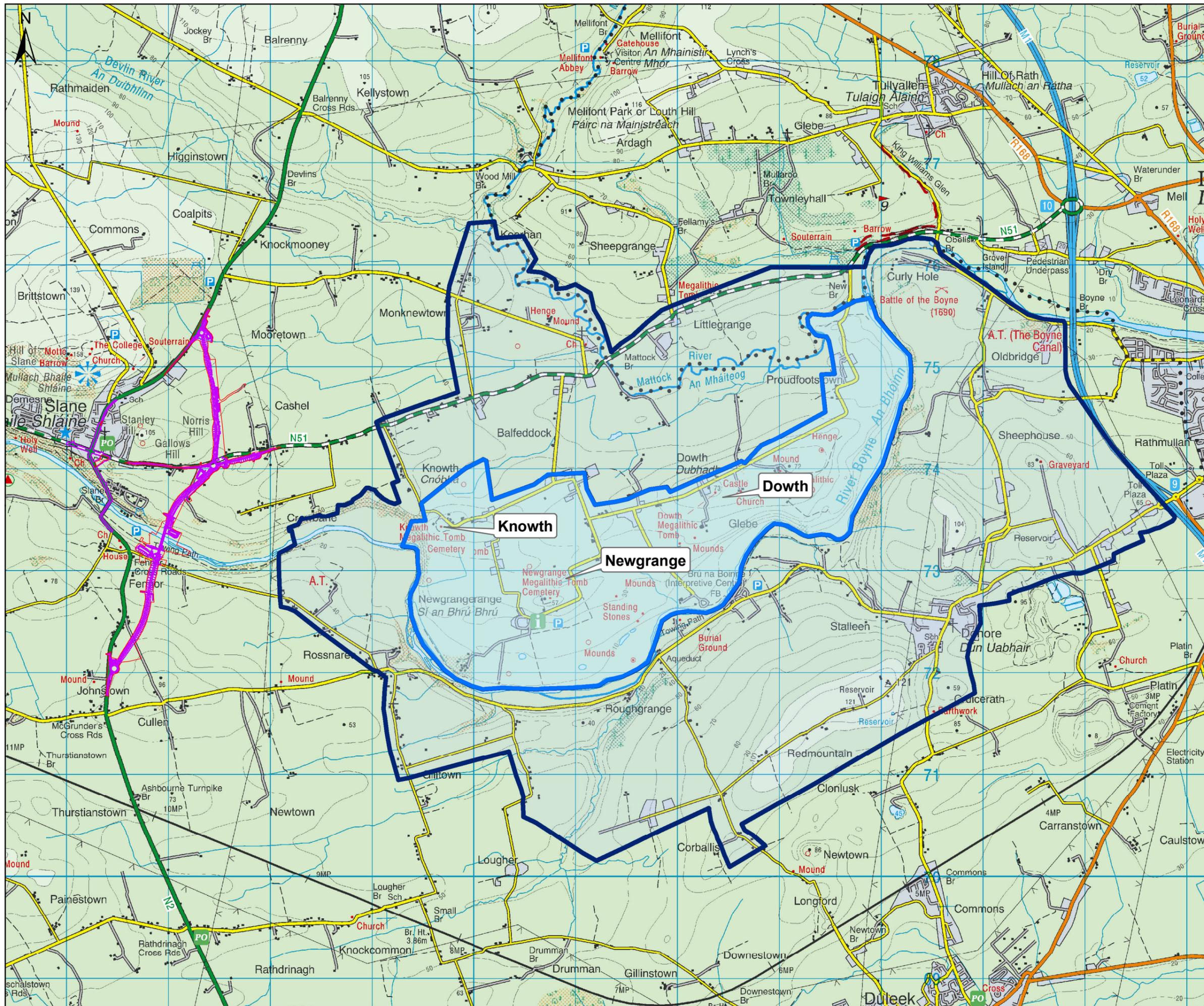
ACCEPTABILITY OF THE PROPOSED SCHEME

- 8.22. UNESCO guidance on the assessment of impacts on OUV gives the following advice regarding the acceptability of proposed actions:
- “The evaluation should result in a clear conclusion about whether the likely impacts of a proposed action on OUV overall are acceptable or not. If the proposed action would have negative impacts on OUV, the report should give one of three conclusions:*
- *The negative impact would be negligible and raises no concerns*
 - *The negative impact would be significant, but with avoidance and mitigation measures it could be eliminated or minimized to an acceptable level*
 - *The negative impact would be significant and could not be avoided or mitigated, so the proposed action should not proceed”.* (UNESCO 2022, s.6.9, page 44)
- 8.23. Assessment has concluded that operation of the Proposed Scheme (with all relevant mitigation measures embedded in the scheme design) would result in a negligible negative impact on the OUV of the World Heritage Property. This conclusion applies to an assessment of the impact of the Proposed Scheme alone and to its contribution to cumulative impact on OUV since inscription in 1993.
- 8.24. In terms of the UNESCO 2022 guidance, avoidance and mitigation measures implemented during the design of the Proposed Scheme have reduced any negative impacts on OUV to an acceptable level. The impact is therefore judged to be acceptable in a World Heritage context.

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- UNESCO (2021) *Operational Guidelines for the Implementation of the World Heritage Convention*
- UNESCO (2022) *Guidance and Toolkit for Impact Assessments in a World Heritage Context*

FIGURES



Legend

- Proposed Scheme
- Proposed Scheme Boundary

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Data source: Protected Viewpoints and World Heritage Property boundaries from Meath County Development Plan 2021-2027

0 0.375 0.75 1.5 Kilometres

Client
Meath County Council

N2 Slane Bypass and Public Realm Enhancement Scheme

Title
**Figure 1:
Location of Proposed Scheme
relative to Brú na Bóinne World
Heritage Property**

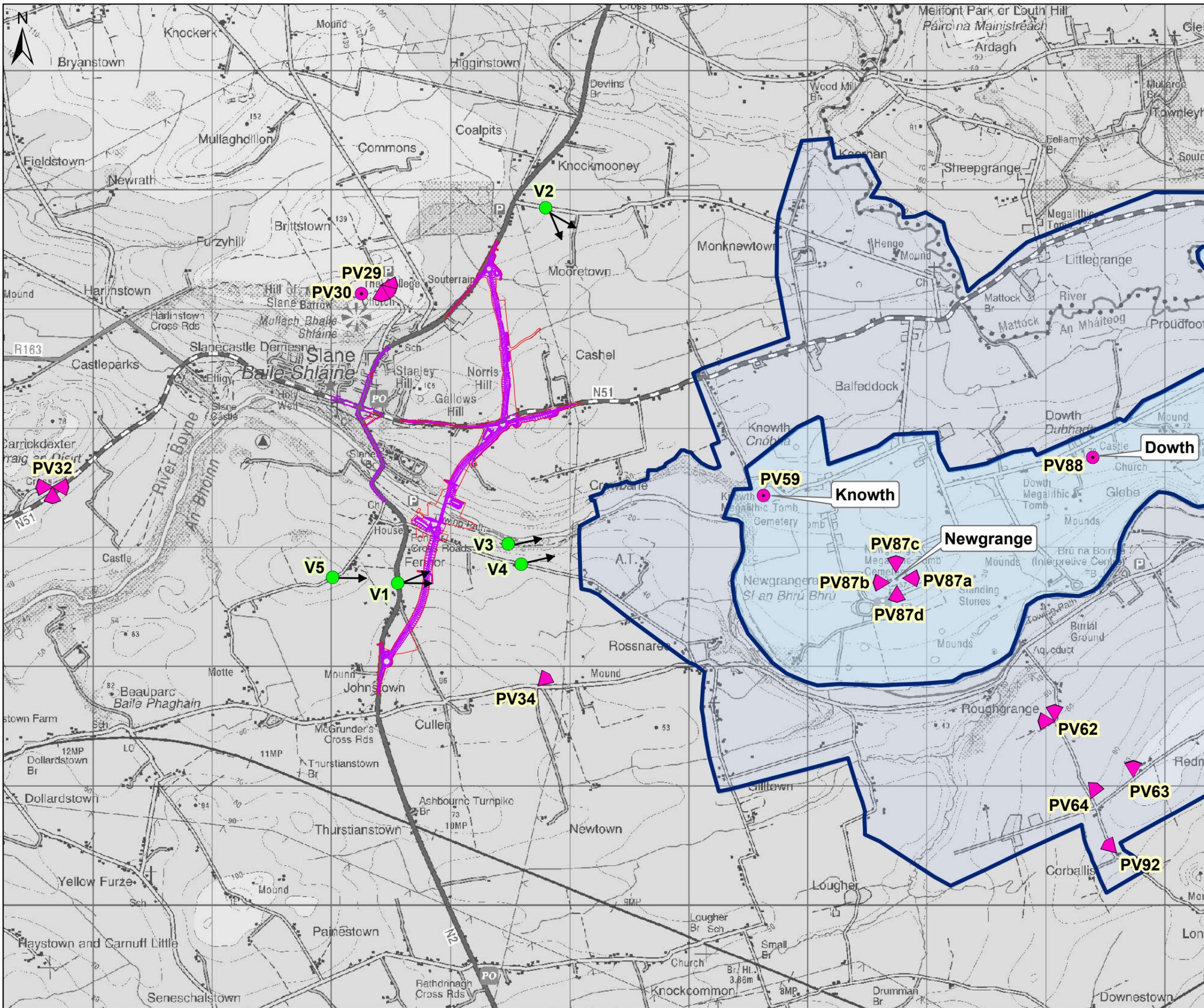
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Issue Details

File Identifier:
MDT0806-RPS-00-N2-DR-Z-AG-3054

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
Drawn: NR	Date: 13/06/2023	
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Approved: SC	Projection: ITM	

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Legend

- Proposed Scheme
- Proposed Scheme Boundary
- CDP Protected View
- CDP Protected View (Panorama)
- HIA View

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Data source: Protected Viewpoints and World Heritage Property boundaries from Meath County Development Plan 2021-2027

0 0.375 0.75 1.5 Kilometres

Client
Meath County Council

N2 Slane Bypass and Public Realm Enhancement Scheme

Title
**Figure 2:
Wider Setting of Brú na Bóinne
World Heritage Property in the
Vicinity of Slane**

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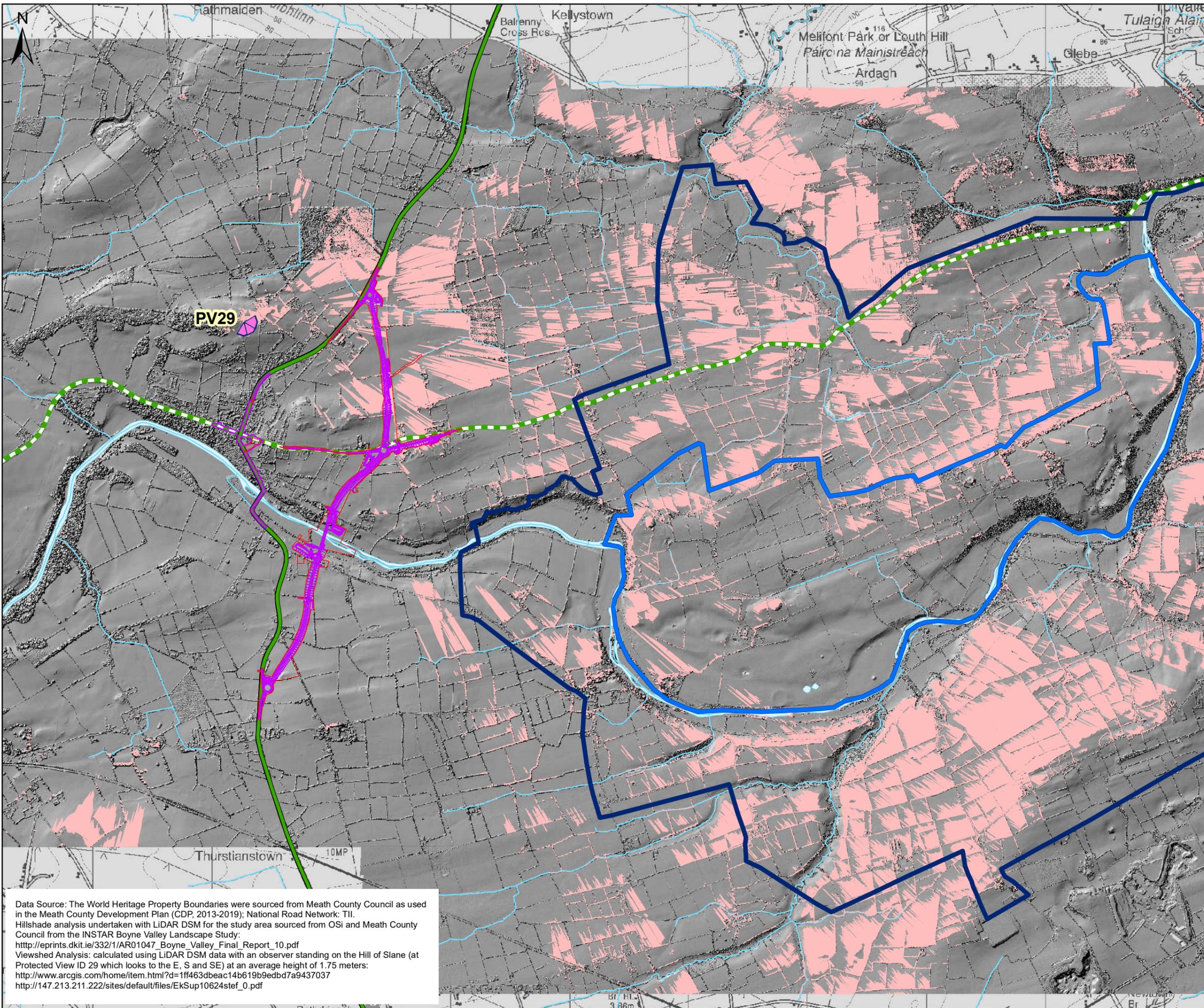
Issue Details

File Identifier:
MDT0806-RPS-00-N2-DR-Z-AG-3055

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
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Legend

- Proposed Scheme
- Proposed Scheme Boundary
- ▲ CDP Protected View

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Existing National Road

- N2
- N51

Viewshed from Protected View ID 29 (Hill of Slane, observer height: 1.75m)

LIDAR DSM Hillshade

- High : 254
- Low : 0

Note: The hillshade layer has been created from a Digital Surface Model (DSM) which shows surface features such as trees and hedges.



Client
Meath County Council

N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure 3

Viewshed Analysis from Hill of Slane (Protected View 29)

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Issue Details

File Identifier:
MDT0806-RPS-00-N2-DR-Z-AG-3056

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-N2-M2-C-XR9000
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Drawn: NR	Date: 13/06/2023
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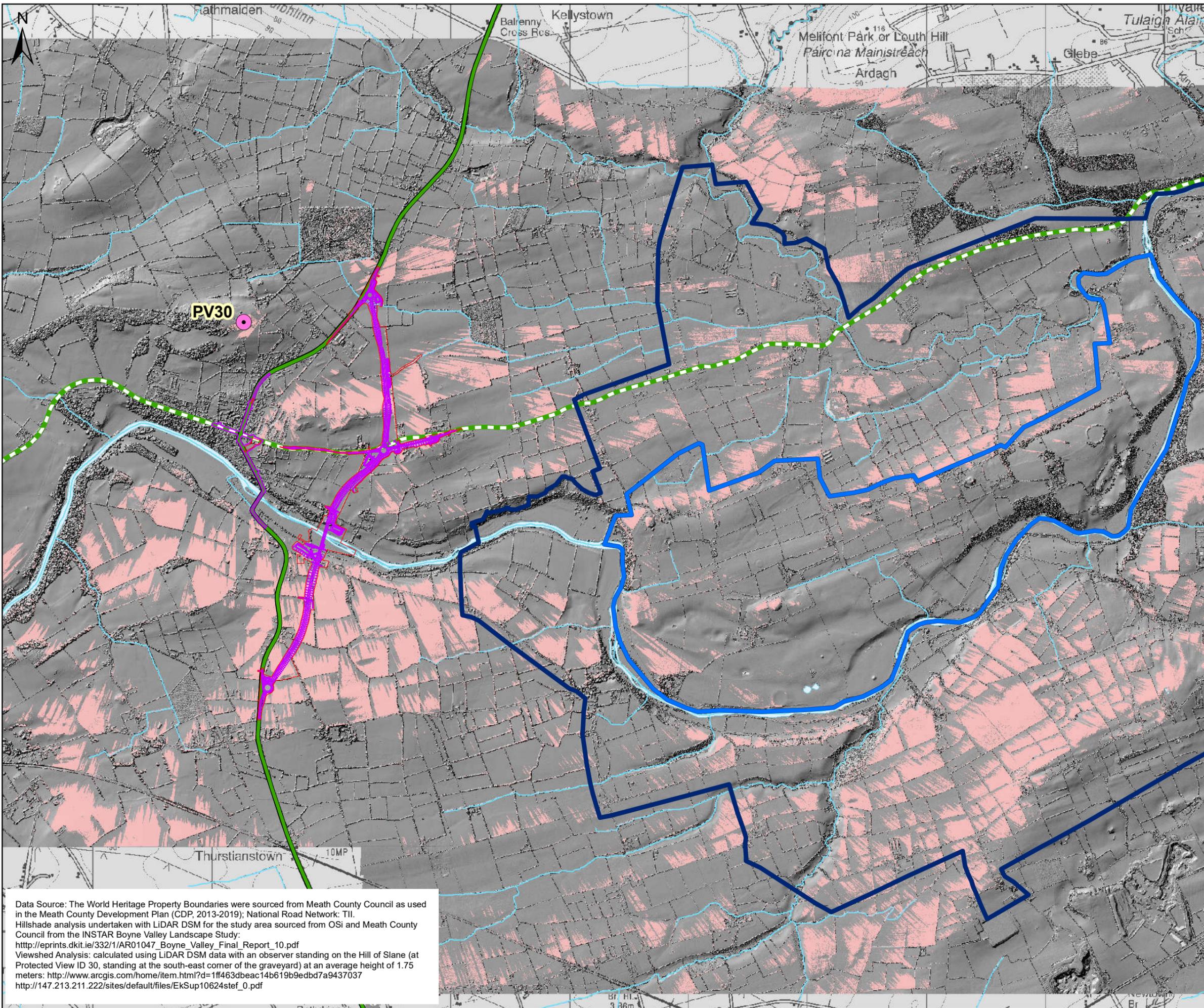
Checked: NO'N	Scale: 1:30,000 (A3)
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Approved: SC	Projection: ITM
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Legend

- Proposed Scheme
- Proposed Scheme Boundary
- CDP Protected View

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Existing National Road

- N2
- N51

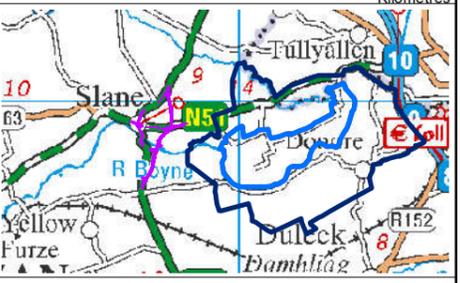
Viewshed from Protected View ID 30 (Hill of Slane, observer height: 1.75m), modified, view from south-east corner of graveyard

LiDAR DSM Hillshade

- High : 254
- Low : 0

Note: The hillshade layer has been created from a Digital Surface Model (DSM) which shows surface features such as trees and hedges.

0 0.4 0.8 1.6
Kilometres



Client
Meath County Council

N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure 4

Viewshed Analysis from Hill of Slane (Protected View 30, south-east corner of graveyard)

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Co Dublin, Ireland. W rpsgroup.com/ireland

Issue Details

File Identifier:
MDT0806-RPS-00-N2-DR-Z-AG-3057

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
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Drawn: NR	Date: 13/06/2023
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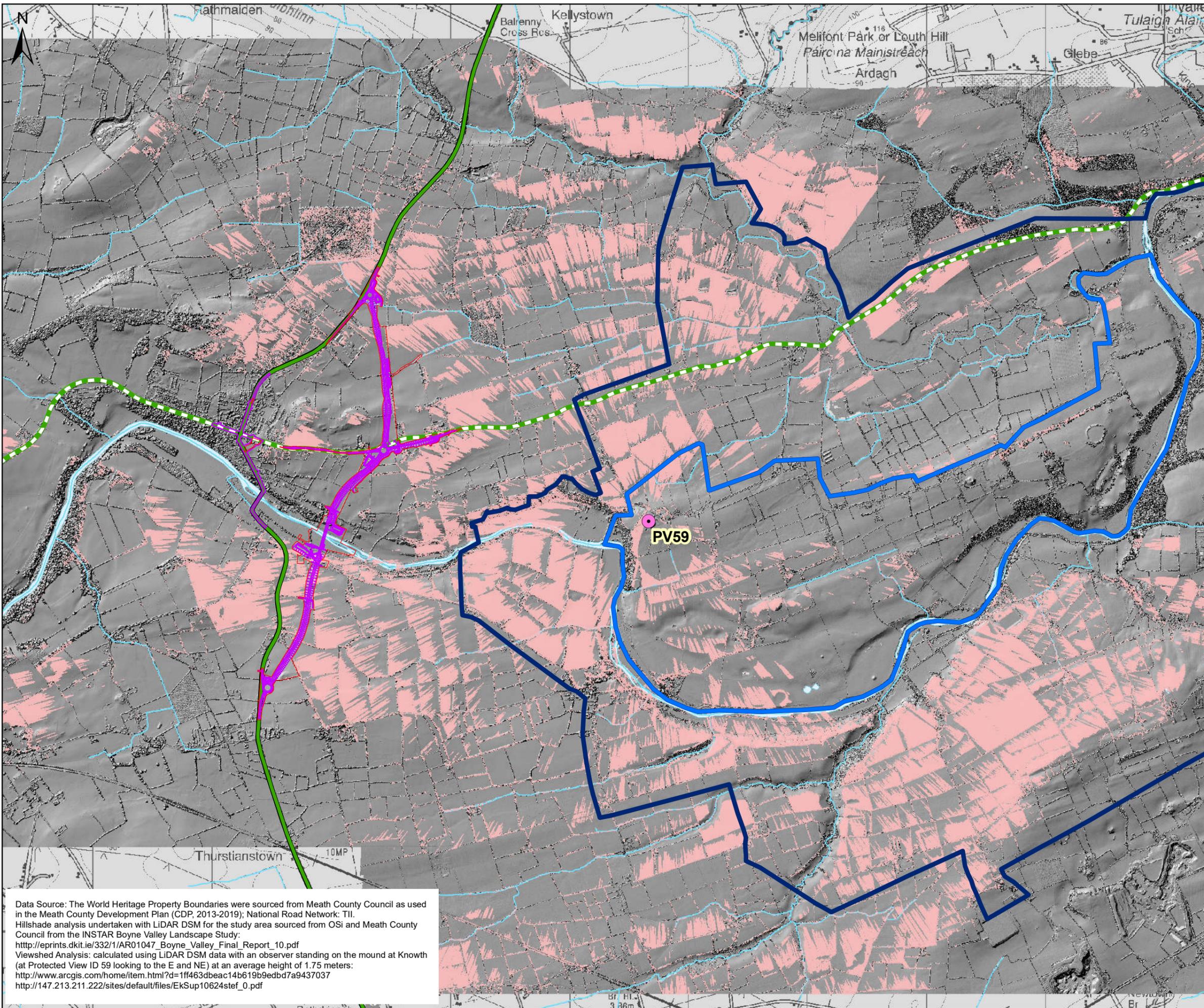
Checked: NO'N	Scale: 1:30,000 (A3)
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Data Source: The World Heritage Property Boundaries were sourced from Meath County Council as used in the Meath County Development Plan (CDP, 2013-2019); National Road Network: TII.
Hillshade analysis undertaken with LiDAR DSM for the study area sourced from OSI and Meath County Council from the INSTAR Boyne Valley Landscape Study:
http://eprints.dkit.ie/332/1/AR01047_Boyne_Valley_Final_Report_10.pdf
Viewshed Analysis: calculated using LiDAR DSM data with an observer standing on the Hill of Slane (at Protected View ID 30, standing at the south-east corner of the graveyard) at an average height of 1.75 meters: <http://www.arcgis.com/home/item.html?id=1f463d3beac14b619b9edbd7a9437037>
http://147.213.211.222/sites/default/files/EKSup10624stef_0.pdf



Legend

- Proposed Scheme
- Proposed Scheme Boundary
- Knowth

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

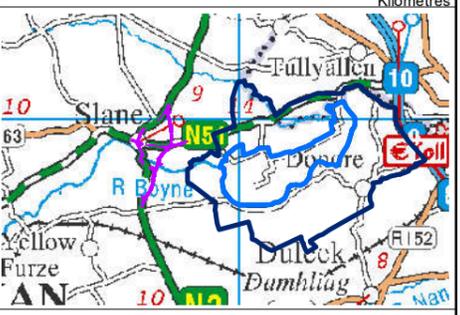
Existing National Road

- N2
- - - N51

Viewshed from top of Knowth (Observer height: 1.75m)

LIDAR DSM Hillshade
High : 254
Low : 0

Note: The hillshade layer has been created from a Digital Surface Model (DSM) which shows surface features such as trees and hedges.



Client
Meath County Council
N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure 5
Viewshed Analysis from Knowth (Protected View 59)

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File Identifier:
MDT0806-RPS-00-N2-DR-Z-AG-3058

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
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Drawn: NR	Date: 13/06/2023
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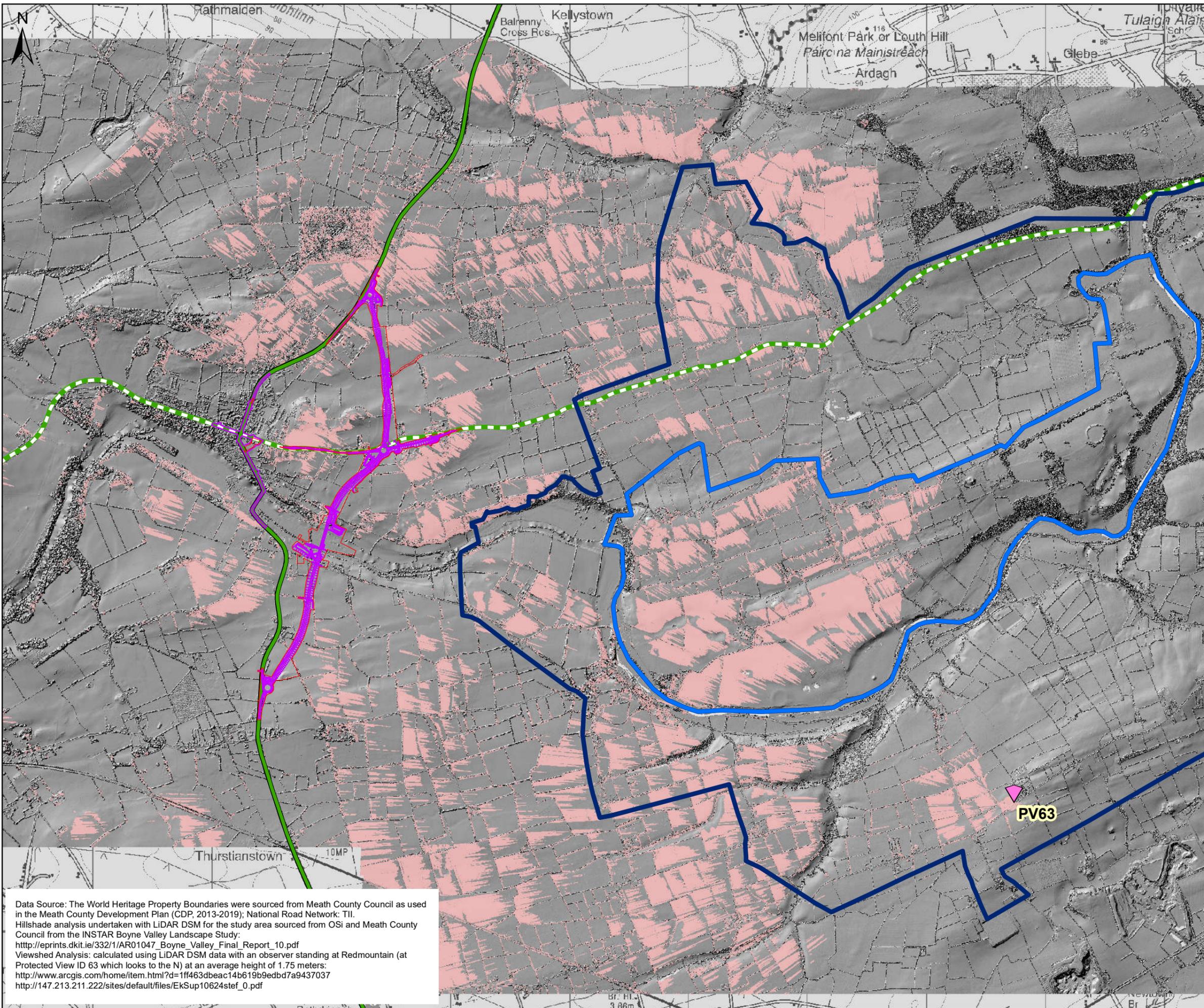
Checked: NO'N	Scale: 1:30,000 (A3)
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Hillshade analysis undertaken using LIDAR DSM for the study area sourced from OSI and Meath County Council from the INSTAR Boyne Valley Landscape Study:
http://eprints.dkit.ie/332/1/AR01047_Boyne_Valley_Final_Report_10.pdf
Viewshed Analysis: calculated using LIDAR DSM data with an observer standing on the mound at Knowth (at Protected View ID 59 looking to the E and NE) at an average height of 1.75 meters:
<http://www.arcgis.com/home/item.html?id=1ff463d3beac14b619b9edbd7a9437037>
http://147.213.211.222/sites/default/files/EKSup10624stef_0.pdf



Legend

- Proposed Scheme
- Proposed Scheme Boundary
- Redmountain

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Existing National Road

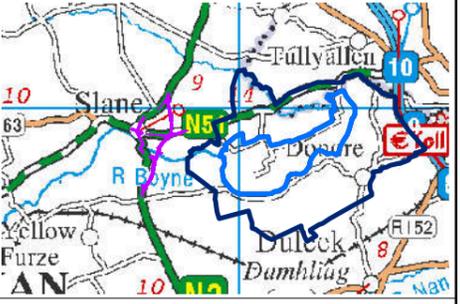
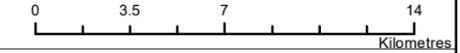
- N2
- N51

Viewshed from Protected View ID 63 (WHS Buffer Zone, observer height: 1.75m)

LiDAR DSM Hillshade

- High : 254
- Low : 0

Note: The hillshade layer has been created from a Digital Surface Model (DSM) which shows surface features such as trees and hedges.



Client
Meath County Council
 N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure 6
 Viewshed Analysis from Redmountain (Protected View 63)

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Issue Details

File Identifier:
 MDT0806-RPS-00-N2-DR-Z-AG-3059

Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
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Drawn: NR	Date: 13/06/2023
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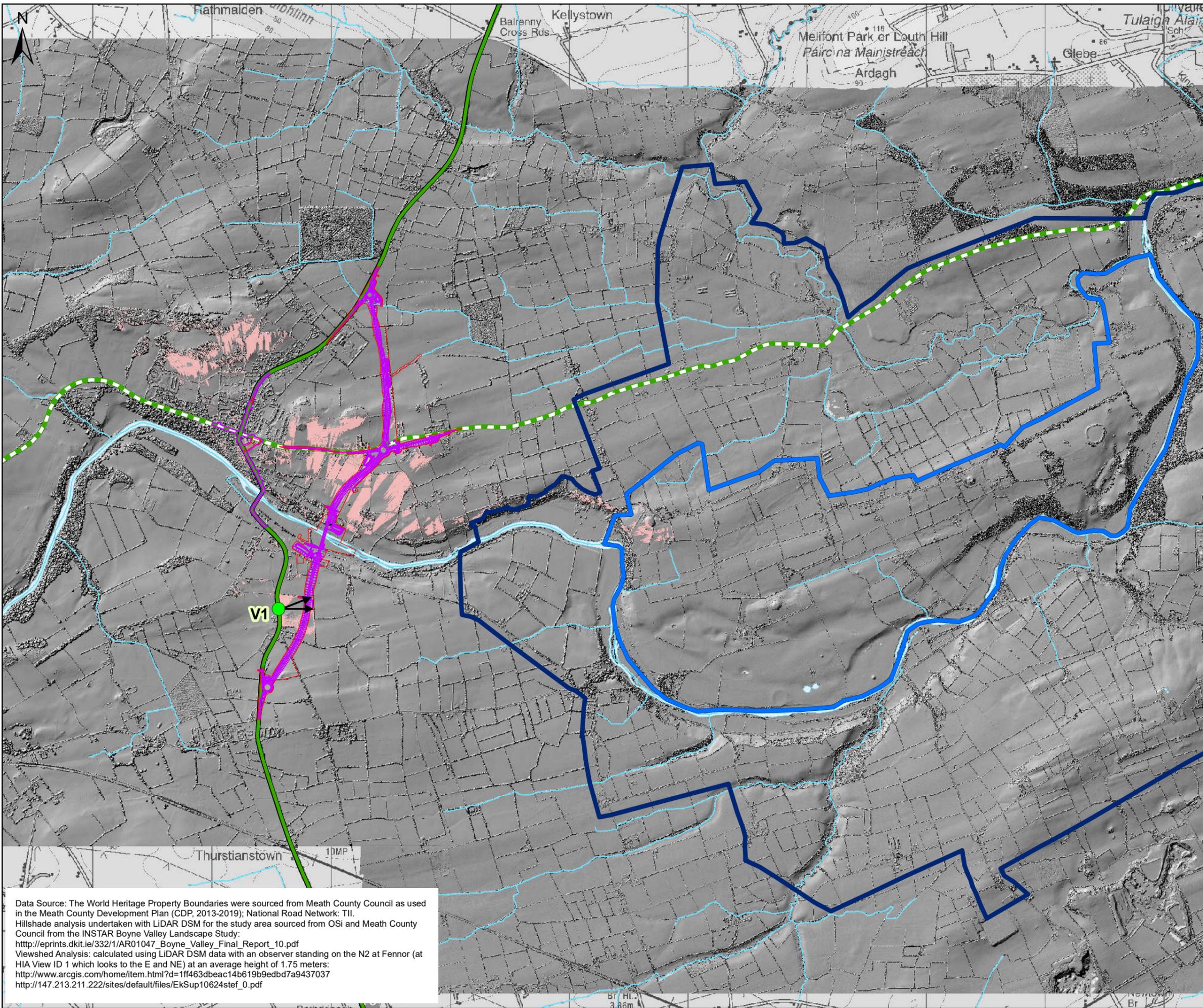
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 Hillshade analysis undertaken with LiDAR DSM for the study area sourced from OSI and Meath County Council from the INSTAR Boyne Valley Landscape Study:
http://eprints.dkit.ie/332/1/AR01047_Boyne_Valley_Final_Report_10.pdf
 Viewshed Analysis: calculated using LiDAR DSM data with an observer standing at Redmountain (at Protected View ID 63 which looks to the N) at an average height of 1.75 meters:
<http://www.arcgis.com/home/item.html?id=1f463d3beac14b619b9edbd7a9437037>
http://147.213.211.222/sites/default/files/EKSup10624stef_0.pdf



Legend

- Proposed Scheme
- Proposed Scheme Boundary
- HIA View

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Existing National Road

- N2
- N51

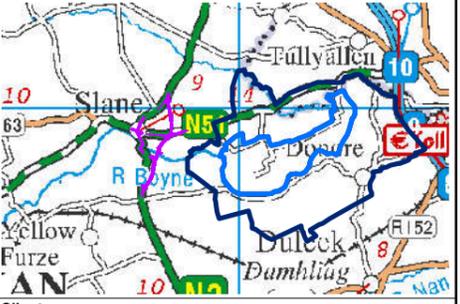
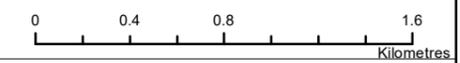
Viewshed from HIA View 1 (Observer height: 1.75m)

-

LiDAR DSM Hillshade

- High : 254
- Low : 0

Note: The hillshade layer has been created from a Digital Surface Model (DSM) which shows surface features such as trees and hedges.



Client
Meath County Council
N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure 7

Viewshed Analysis from the N2 at Fennor (HIA View 1)

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File Identifier:
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Status: A1	Rev: C01	Model File Identifier: MDT0806-RPS-01-N2-M2-C-XM1001 MDT0806-RPS-01-PR-M2-C-XR9000
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Drawn: NR	Date: 13/06/2023
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Checked: NO'N	Scale: 1:30,000 (A3)
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http://eprints.dkit.ie/332/1/AR01047_Boyne_Valley_Final_Report_10.pdf
 Viewshed Analysis: calculated using LiDAR DSM data with an observer standing on the N2 at Fennor (at HIA View ID 1 which looks to the E and NE) at an average height of 1.75 meters:
<http://www.arcgis.com/home/item.html?id=1ff463d8beac14b619b9edbd7a9437037>
http://147.213.211.222/sites/default/files/EKSup10624stef_0.pdf

Figure 8: Proposed Boyne Bridge Viewshed Analysis. DTM Visibility, Southern Abutment Viewpoint

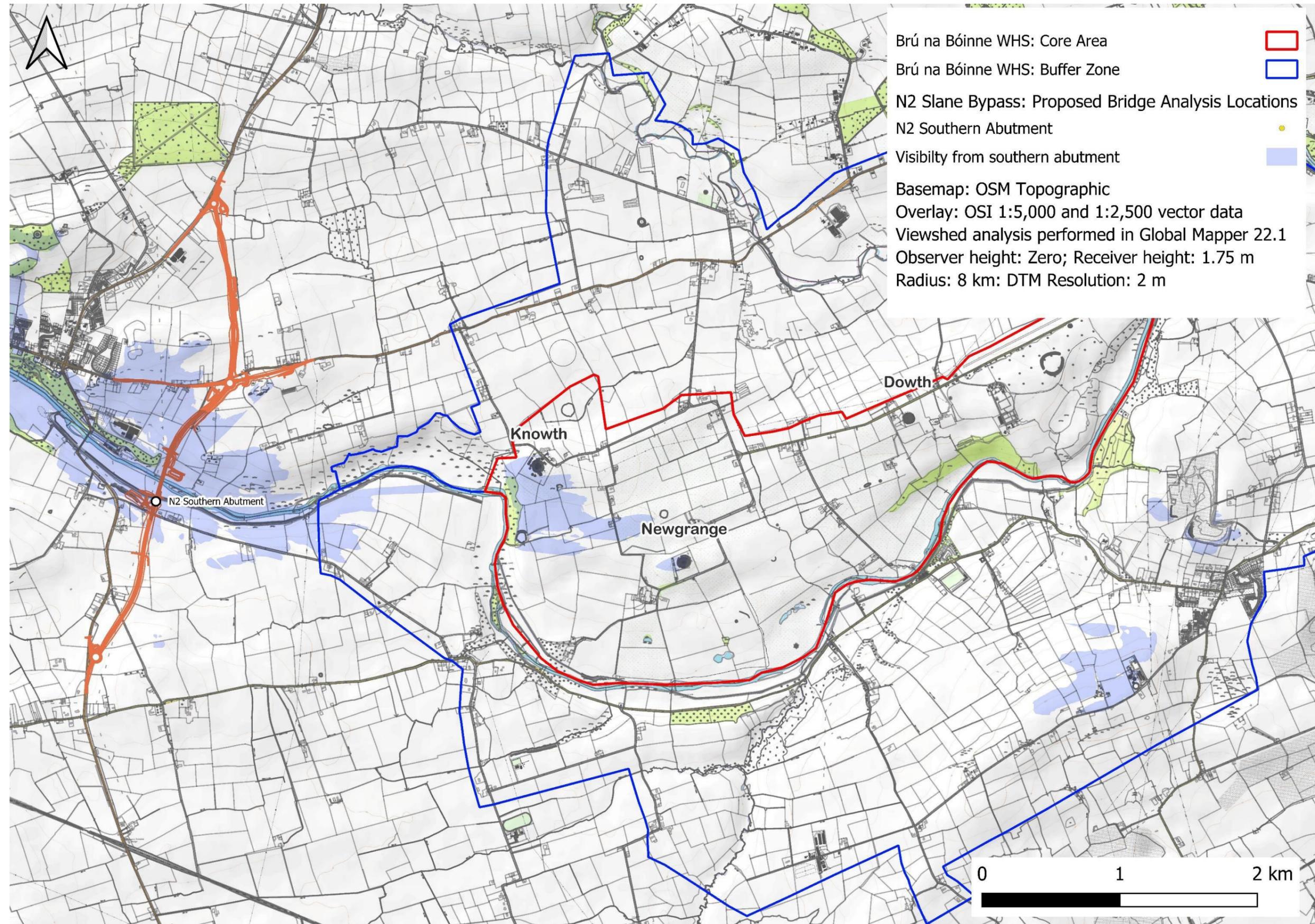


Figure 9: Proposed Boyne Bridge Viewshed Analysis. DTM Visibility, Centre of Bridge Viewpoint

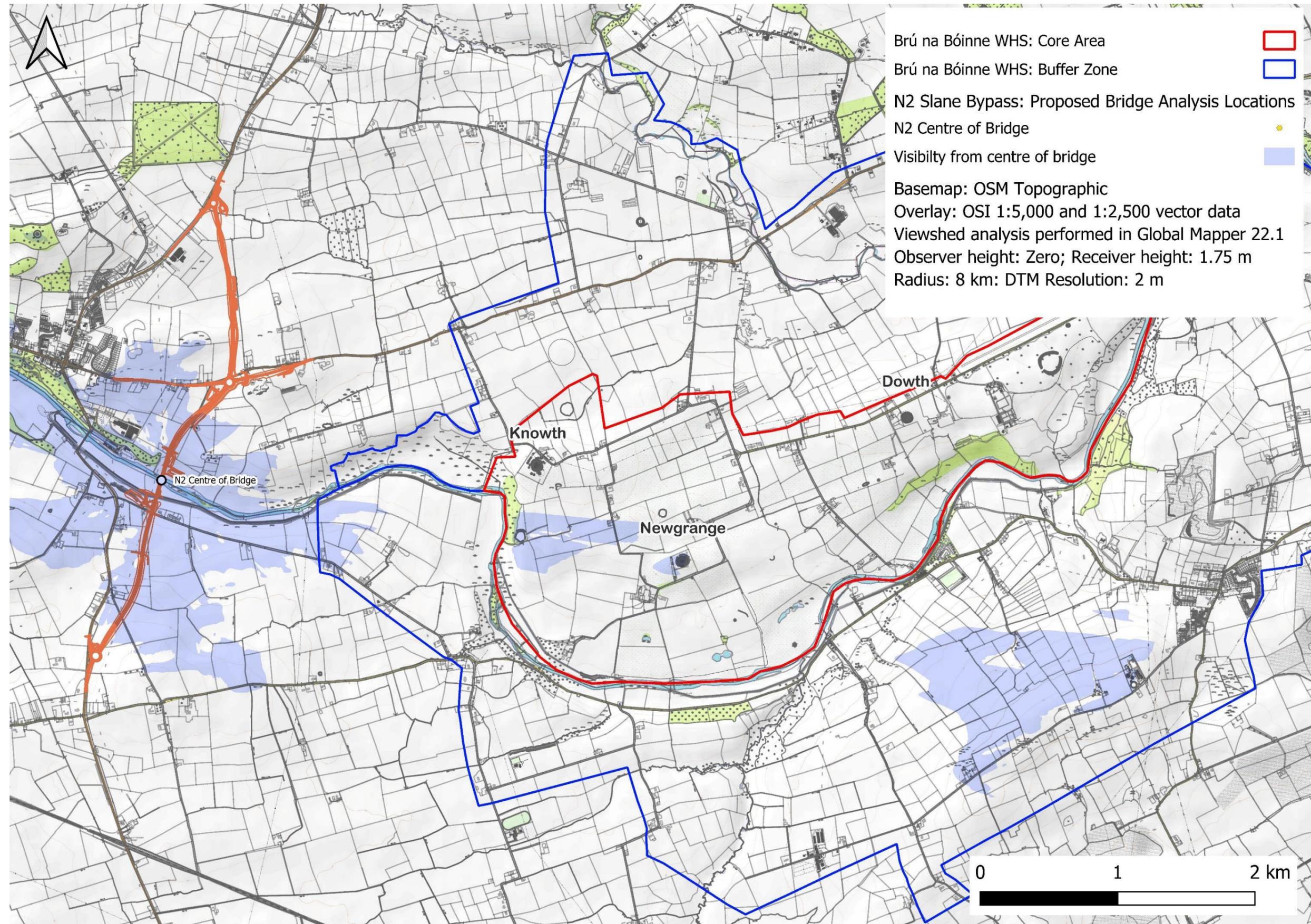


Figure 10: Proposed Boyne Bridge Viewshed Analysis. DTM Visibility, Northern Abutment Viewpoint

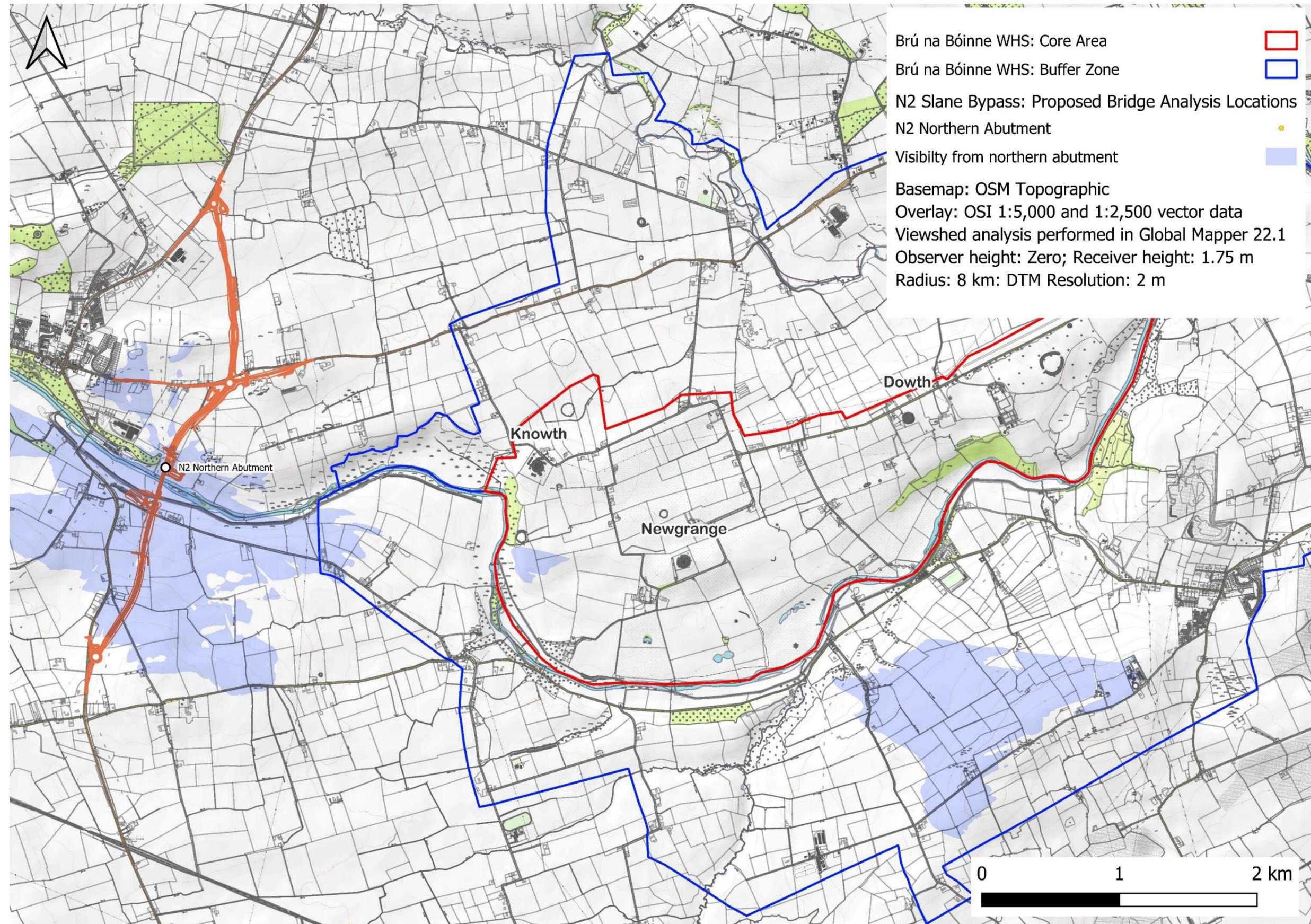


Figure 11: Proposed Boyne Bridge Viewshed Analysis. DTM Visibility, Combined Viewpoints

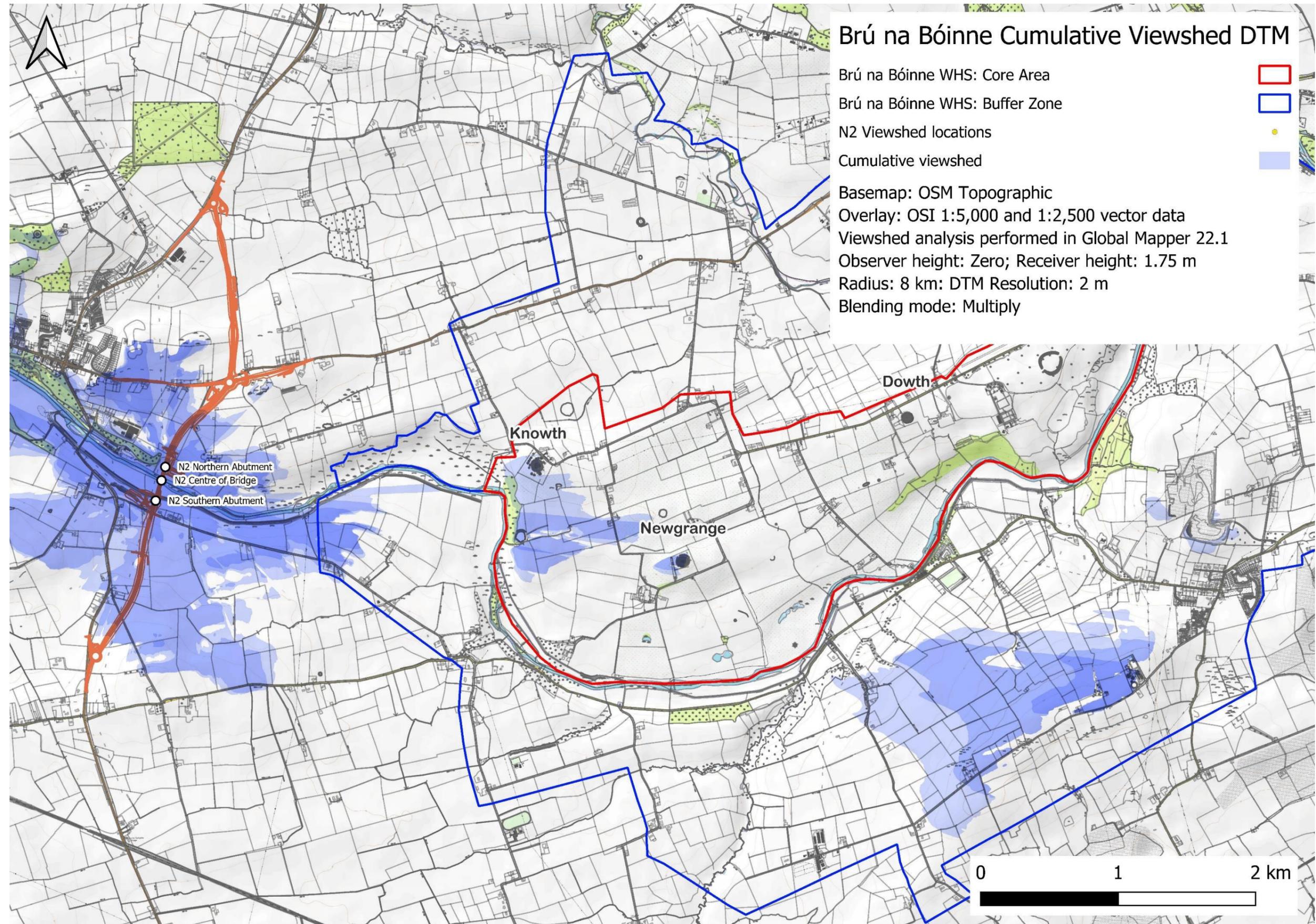


Figure 12: Proposed Boyne Bridge Viewshed Analysis. DSM Visibility, Southern Abutment Viewpoint

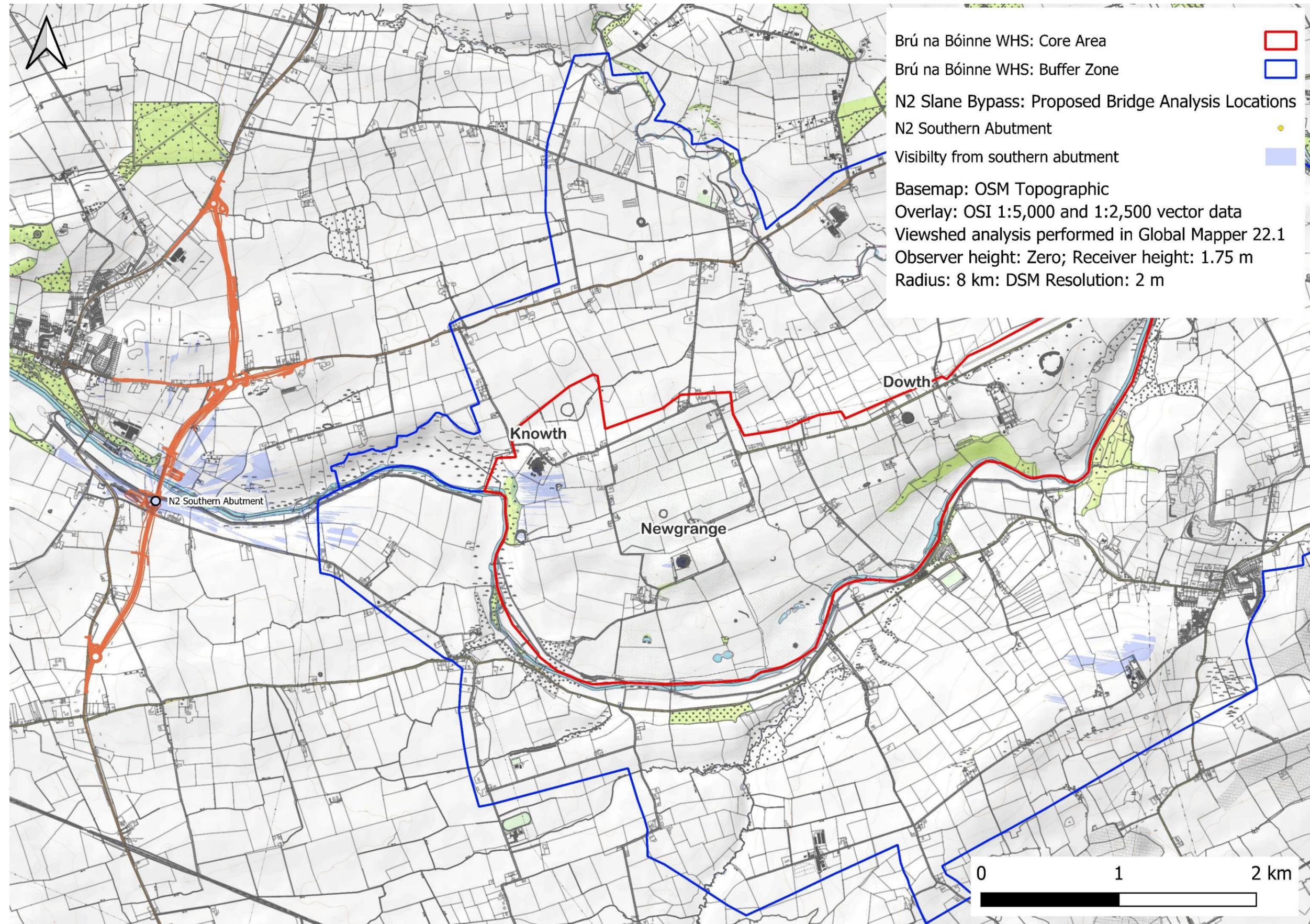


Figure 13: Proposed Boyne Bridge Viewshed Analysis. DSM Visibility, Centre of Bridge Viewpoint

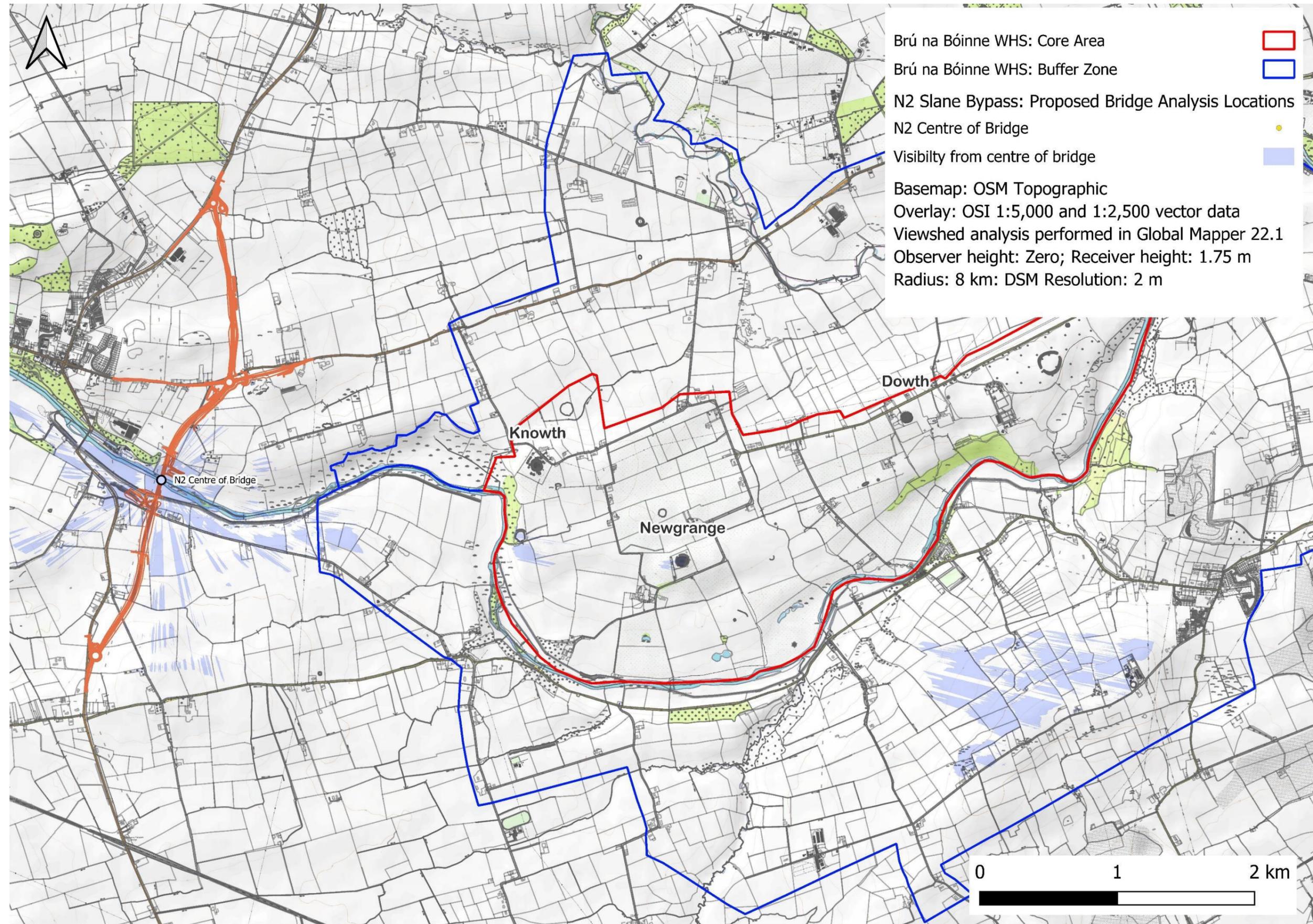


Figure 14: Proposed Boyne Bridge Viewshed Analysis. DSM Visibility, Northern Abutment Viewpoint

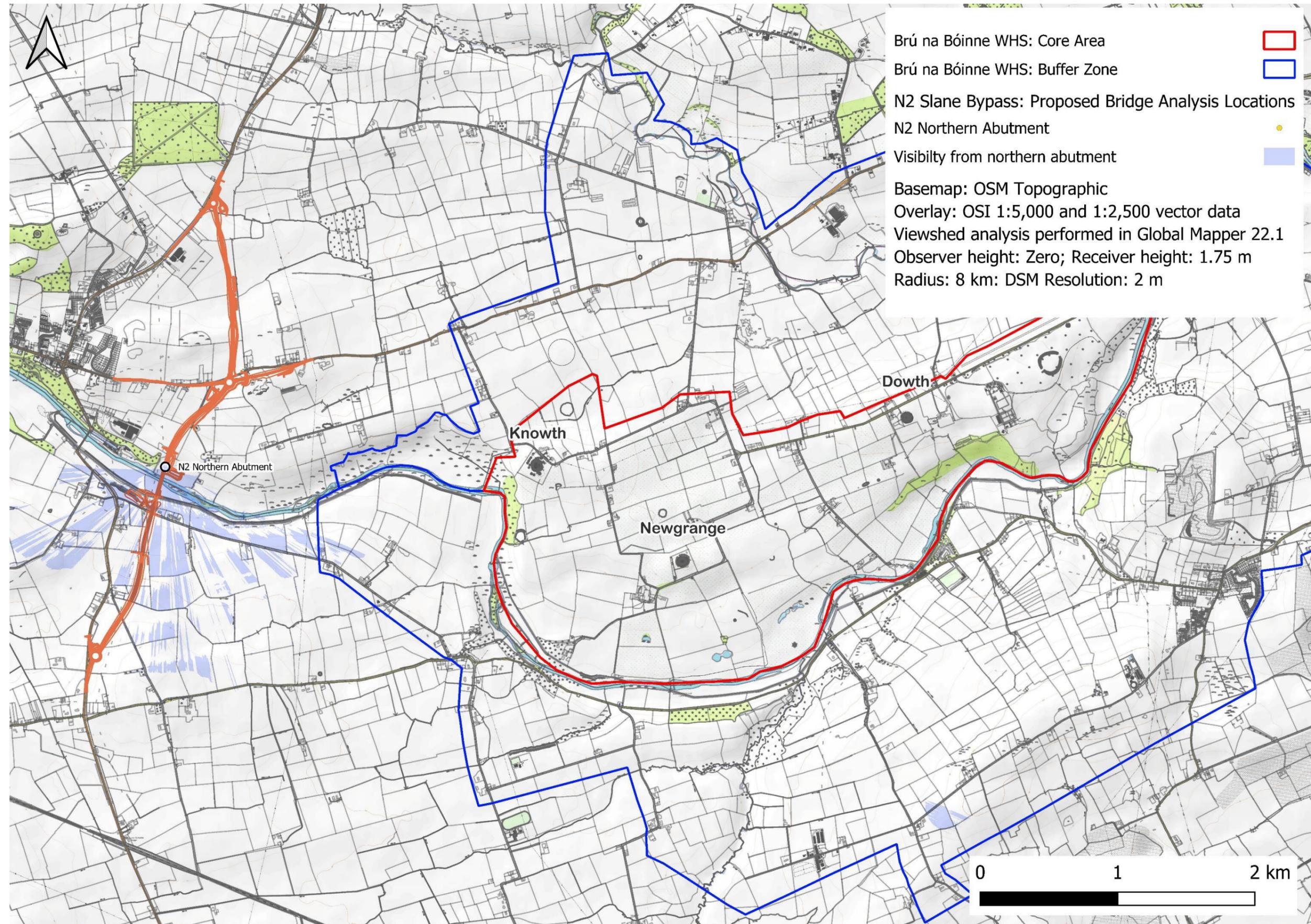
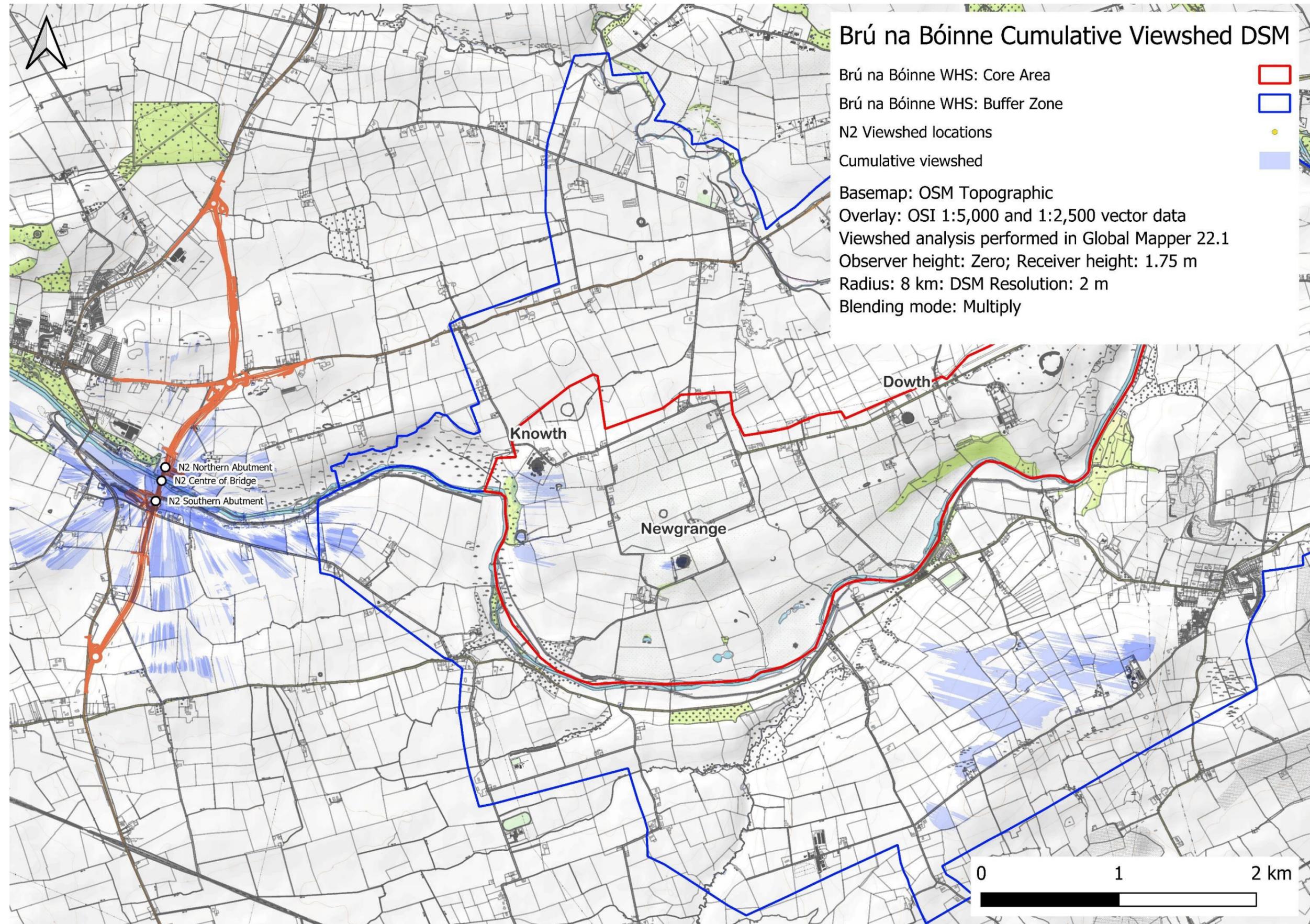


Figure 15: Proposed Boyne Bridge Viewshed Analysis. DSM Visibility, Combined Viewpoints



10. APPENDIX 1:

BRÚ NA BÓINNE WORLD HERITAGE PROPERTY, RETROSPECTIVE STATEMENT OF OUTSTANDING UNIVERSAL VALUE (2013)

BRIEF SYNTHESIS

Bounded on the south by a bend in the River Boyne, the prehistoric site of Brú na Bóinne is dominated by the three great burial mounds of Knowth, Newgrange and Dowth. Surrounded by about forty satellite passage graves, they constitute a funerary landscape recognised as having great ritual significance, subsequently attracting later monuments of the Iron Age, early Christian and medieval periods.

Located about 40 km north of Dublin on a ridge between the rivers Boyne and Mattock, within several kilometres of other prehistoric mounds, the site is part of an area rich in stories of Ireland's ancient past. Predominantly agricultural at the present time the area has been extensively explored for more than a hundred years by archaeologists and historians, with excavations revealing many features.

The Knowth group, where the earliest features date from the Neolithic period and the latest from the Anglo-Norman period, has produced thirty monuments and sites that figure on the official inventory; these include passage graves adorned with petroglyphs, enclosures, occupation sites and field systems. The Newgrange group is purely prehistoric, with a ringfort, cursus, passage graves and a henge. The Dowth group is similar to that at Newgrange but there is medieval evidence in the form of a church and a castle.

Criterion (i): The Brú na Bóinne monuments represent the largest and most important expression of prehistoric megalithic plastic art in Europe.

Criterion (iii): The concentration of social, economic and funerary monuments at this important ritual centre and the long continuity from prehistory to the late medieval period make this one of the most significant archaeological sites in Europe.

Criterion (iv): The passage grave, here brought to its finest expression, was a feature of outstanding importance in prehistoric Europe and beyond.

INTEGRITY

The 780-ha area of the World Heritage property Brú na Bóinne encapsulates the attributes for which the property was inscribed on the World Heritage List. In addition to the large passage tombs of Knowth, Newgrange and Dowth, 90 recorded monuments – as well as an unknown quantity of as yet unrecorded sites – remain scattered across the ridge above the Boyne and over the low-lying areas and floodplain closer to (the present course of) the rivers.

The buffer zone is comprised of 2,500 hectares, the boundary lines respecting carefully mapped views into and out of the property. Since inscription in 1993, views out of the property have been impacted by the M1 bridge crossing the River Boyne to the east of the property; the addition of a third chimney and other structures to the cement factory on the skyline to the east south-east near Duleek; the addition of an incinerator stack to the skyline at Carranstown and a housing development. The ambiance of the ritual centre is vulnerable to such disturbances which could potentially threaten the integrity of the property. The local authority (Meath County Council) has in place planning policies and procedures to deal with applications for developments which may either incrementally or individually have potential impact on the integrity of the World Heritage property.

AUTHENTICITY

The archaeological remains on the site, both above and below ground are wholly authentic.

Major excavations have been carried out at Newgrange and Knowth and have been fully published. Many small excavations and surveys have been carried out in the area. The main conservation works have concentrated on the two main passage tombs at Newgrange and Knowth subsequent to the excavations undertaken at these sites. All conservation and restoration work has been carried out by skilled professional staff.

At Newgrange, there has been comprehensive anastylosis of the kerbstones and the revetment wall, though the latter has been curtailed to allow access by visitors. The passage roof was completely dismantled to allow the orthostats to be returned to the vertical, with the introduction of reinforcement, and a cowl has been constructed over the chamber area. The cairn itself has been stabilised by means of thin revetments of cairn stones.

At Knowth, structures from all periods are being conserved. In some passage tombs outer support walls have been built for the burial chambers, involving the use of modern materials such as cement and plastic. Where such new additions are visible they are clearly distinguished in appearance from original materials, but in other cases they are completely concealed.

The restoration work on these monuments, the result of close collaboration between archaeologists and conservation architects, conforms with the principles enunciated in Article 7 of the International Charter for Archaeological Heritage Management of 1990.

PROTECTION AND MANAGEMENT REQUIREMENTS

The protection and conservation of Brú na Bóinne is provided by a range of national legislation, international guidelines, statutory and non-statutory guidance. These provisions include the National Monuments Acts of 1930-2004, the Wildlife Acts of 1976 and 2000, the Planning and Development Acts, various EU Directives and international charters. The national monuments legislative code makes provision for the protection and preservation of national monuments and for the preservation of archaeological objects in the State. The Planning and Development Acts provide a framework to protect against undesirable development.

Most of the 780 hectare site is in private ownership. At the time of inscription only 32 hectares, largely around Knowth and Newgrange, were in State ownership (in 2011, 42.75 hectares are in State ownership). The State-owned part of the property has been under the direct management of the Office of Public Works. This State Office uses its professional staff of conservation architects, engineers, land managers and craftsmen in the day to day management activities. Archaeological input to the conservation and presentation of the property is provided by the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht. The State Exchequer provides the funding needed for maintenance, management and conservation.

The local authority development plan (Meath County Development Plan) for the area in which Brú na Bóinne is situated seeks to protect the archaeological and cultural landscape and to enhance views within and adjacent to the World Heritage property. The protection of views within and out of the property is a major factor contributing to retention of the property's integrity.

The Brú na Bóinne Visitor Centre opened to the public in June 1997. Its primary purpose is to manage the flow of visitors to the megalithic tombs of Newgrange and Knowth. Education, public awareness and an emphasis on local engagement are also central to the role of the Centre. The number of visitors to these monuments each day is limited to the maximum that can be accommodated with due regard to the protection of the monuments. Access to the monuments is by guided tour only.

11. APPENDIX 2: ASSESSMENT OF CUMULATIVE IMPACT ON OUV OF THE PROPOSED SCHEME IN COMBINATION WITH OTHER DEVELOPMENTS CONSTRUCTED SINCE INSCRIPTION OF THE WORLD HERITAGE PROPERTY IN 1993

INTRODUCTION

- 11.1. This appendix contains a report on the assessment of cumulative impacts on OUV resulting from the operation of the Proposed Scheme in combination with other developments in the setting of the World Heritage Property, all constructed since inscription of the site in 1993.
- 11.2. The topic of cumulative impacts on the OUV of the World Heritage Property was raised by ICOMOS (Ireland) in discussions with the project team in 2018, during Phase 2 of the project (Option Selection). ICOMOS (Ireland) was concerned that, since inscription in 1993, the World Heritage Property had been adversely affected by a number of large-scale developments in its setting which have the potential to cause significant adverse cumulative impact on OUV.
- 11.3. ICOMOS (Ireland) considered that the proposed Slane Bypass could represent another large-scale development which might be assessed as acceptable in isolation but unacceptable in terms of its combined impact along with other existing developments. ICOMOS (Ireland) therefore recommended that the selection of a preferred route option for the Slane Bypass should be informed by an assessment of predicted cumulative impacts as well as the impact of the various route options in isolation.
- 11.4. Consideration of cumulative effects is a standard component both of EIA and the more specific UNESCO (2022) HIA methodology that is being applied to the World Heritage Property in this case. The project team had initially assumed that a cumulative impact assessment would form part of the Phase 3 EIA for the preferred route. However, the project team agreed with the logic of the ICOMOS (Ireland) advice and included an assessment of cumulative impacts as part of the Phase 2 project work. The results of this assessment were reported in Section 7 of *N2 Slane Bypass Route Options Study. Assessment of Predicted Impacts on the Brú Na Bóinne World Heritage Site* (February 2019).
- 11.5. The approach adopted for the cumulative impact assessment of route options has now been applied to the Proposed Scheme and the results of this updated assessment are presented below.

METHODS

- 11.6. The potential for significant cumulative impacts on the OUV of the World Heritage Property relates to the ways in which development in the setting of the World Heritage Property can change the appearance and character of valued views and therefore the way in which we experience the World Heritage Property. The essentially rural and agricultural character of the landscape surrounding the World Heritage Property supports its OUV so changes in the character of views due to development could diminish OUV.
- 11.7. Any development in the setting of the World Heritage Property could, in principle, affect OUV but in practice it is a relatively small number of large-scale developments that could have a material impact on OUV. This cumulative impact assessment therefore seeks to analyse to what extent large-scale development in the setting, since the designation of the World Heritage Property in 1993, has changed our experience of the World Heritage Property and the impact this has had on OUV.
- 11.8. Six developments since 1993 have been identified that fall into this category, all of which either include large skyline structures or, in the case of the residential developments, involve a substantive loss of rural landscape character:
- M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)

- Residential developments at Cruicerath/Stalleen, Donore
 - Platin Irish Cement Works
 - Indaver Ireland Incinerator, Carranstown, Duleek
 - Residential development at Ledwidge Hall, Slane
 - Dunmore / Leaby Cross Wind Turbines. Collon, Co. Louth
- 11.9. The locations of these developments are shown in **Figure A3** and more details of the developments are provided in Appendix 2 Table 1.
- 11.10. The cumulative impact assessment takes the situation in 1993 as its baseline and examines the effect of the six developments, approved since that date, that are considered to be of sufficient scale to materially change the setting of the World Heritage Property.
- 11.11. The degree of change in the setting of the World Heritage Property as a whole has been measured by assessing change at all protected viewpoints ('PV') relevant to the World Heritage Property (as listed in Appendix 10 of the Meath County Development Plan 2021-2027). These are the viewpoints that have been identified as important to the experience and appreciation of the World Heritage Property and therefore worthy of protection. Information extracted from the County Development Plan on the location of these protected viewpoints, a description of the view and its significance, is summarised in Appendix 2 Table 2.
- 11.12. All of the viewpoints were visited over a period of two days (30th and 31st of January 2019) by Siobhán Deery and Clare Crowley of Courtney Deery Heritage Consultancy with Niall Roycroft of Meath County Council. The 30th was a dry and sunny day with mostly clear skies; the internationally significant 360° viewpoints from the World Heritage Property and the Hill of Slane were visited. All other viewpoints (with the exception of PV74, which is a private viewpoint at Rosnaree House) were visited on the 31st which was overcast with some wet spells and, as a result, visibility altered throughout the day. Lack of foliage and roadside hedgerows that were recently cut generally maximised visibility at the roadside views. An additional site visit was carried out by Clare Crowley in December 2021 to re-assess PV34, following the change of location for this viewpoint in the newly published Meath County Development Plan 2021-2027.
- 11.13. The analysis of visual change at each viewpoint is summarised in a series of tables, one for each viewpoint (Appendix 2 Table 3). Based on an understanding of how these views support OUV, the observations have been used to assess each of the post-1993 developments and arrive at an overall judgement on cumulative impact on OUV. The following development scenarios have been assessed:
- Combined impact of development from 1993 to present.
 - Combined impact of development from 1993 to present plus the proposed N2 Slane Bypass
- 11.14. The assessments lead to conclusions regarding the nature and degree of cumulative impact since inscription of the World Heritage Property and the degree to which the Proposed Scheme would add to that cumulative impact.

COMBINED IMPACT OF DEVELOPMENT FROM 1993 TO PRESENT

M1 BOYNE BRIDGE (MARY MCALEESE BOYNE VALLEY BRIDGE)

- 11.15. The M1 crosses the River Boyne on a 3.7km span bridge opened in 2003. Elements of the bridge are up to 96m high and it is illuminated at night. The bridge is located in the wider setting of the World Heritage Property, just outside the eastern edge of the buffer zone.
- 11.16. The bridge can be seen from three of the fifteen protected viewpoints. It is visible looking east over the World Heritage Property at a range of over 9km from both of the viewpoints on the Hill of Slane (PV29 and PV30). The bridge is viewed against the backdrop of Drogheda with the sea visible beyond it. This greatly reduces any prominence it may otherwise have on the horizon. It is not distracting and tends to

blend into the overall landscape view. This is further assisted by the relatively small scale of the bridge at this distance and in such an expansive view.

- 11.17. The only other protected viewpoint with a view of the bridge is the top of the mound at Dowth (PV88). From here, the bridge is barely visible through a narrow gap in the trees to the north-east and may not be visible at all in summer.

RESIDENTIAL DEVELOPMENTS AT CRUICERATH/STALLEEN, DONORE

- 11.18. Between 2000 and 2004 there have been various residential developments in Cruicerath and Stalleen on the edge of Donore village, within the buffer zone and roughly 1km from the southern edge of the World Heritage Property. Donore is sited in a gap in the Redmountain ridge that forms the southern edge of the buffer zone.
- 11.19. At least part of these developments can be seen from five of the fifteen protected viewpoints. Housing is visible looking east over the World Heritage Property at a range of 8km from both of the viewpoints on the Hill of Slane (PV29 and PV30). The development is visible but not prominent or distracting, the result of the relatively small scale of the development at this distance and in such an expansive view.
- 11.20. The housing development is also partially visible from the three main passage graves, Knowth (PV59), Newgrange (PV87) and Dowth (PV88). Dowth is the closest of the three (c.2km) and the view from the top of the mound includes the upper floors of two-story houses and their roofs. From Newgrange (3.5km) and the top of the mound at Knowth (4.5km) only roofs are visible and are not visually intrusive. The colour of the grey roof slates allows the development to blend into the surrounding countryside.

PLATIN IRISH CEMENT WORKS

- 11.21. The Platin Irish Cement Works is located in the wider setting of the World Heritage Property, 1.3km southeast of the buffer zone. The works existed at the time of inscription in 1993, including the two tall red and white stacks, but there have been substantial additions to the works since that date. These include an additional third chimney stack (24.2m) and scrubber, two silos (49.5m) and most recently a 40m high cement silo at Kiln 3.
- 11.22. The cement works are located on the far side of the Redmountain ridge from the World Heritage Property but the higher parts of the complex are visible from seven of the fifteen protected viewpoints through the gap in the ridge at Donore.
- 11.23. From PV29 (Hill of Slane car park) the cement works are prominent on the skyline in the view over the World Heritage Property at a range of 11km, creating a distraction from the view of the World Heritage Property. The additional elements, post-inscription, have increased the scale of the works and make them a more conspicuous presence on the horizon. The works are equally visible from PV30, higher on the Hill of Slane but the visual distraction is less as the works are experienced as part of a much wider panoramic view.
- 11.24. There is a distant view of the cement works from PV34, screened for the most part by the trees along the road and field boundaries, even in winter time. It is only just within sight of the protected view when facing NE (it requires turning slightly to the ENE) and does not distract from the PV. This intermittent view of the cement works would likely be entirely screened when the hedgerows and trees are in full summer foliage.
- 11.25. The cement works are also partially visible from the three main passage graves, Knowth (PV59), Newgrange (PV87) and Dowth (PV88). Dowth is the closest of the three (c.4.5km) and the view towards the southeast from the top of the mound is dominated by the works. The works are equally visible from the top of the mound at Knowth but at a range of 7km.
- 11.26. The works appears on the skyline close to Newgrange where it draws the eye and creates a distraction in this important view between the two mounds. From Newgrange, only the highest parts of the cement works show above the ridge to the west of Donore and the level of visual distraction is much less than that experienced at Dowth or Knowth.

- 11.27. The cement works are also visible from PV58, approaching Knowth from the north, but the works are well-separated from the protected view towards Knowth and are largely screened by vegetation in the foreground.
- 11.28. In all seven cases, it appears that the cement works would have already been visible in 1993 but, again in all seven cases, the expansion of the works since that date has tended to increase the prominence and degree of visual distraction.

INDAVER IRELAND INCINERATOR, CARRANSTOWN, DULEEK

- 11.29. The incinerator at Carranstown is located in the wider setting of the World Heritage Property, c. 1.5km south-east of the buffer zone close to the Platin Irish Cement Works. Like, the cement works, it is beyond the Redmountain ridge so only the one tall element of the facility (a 65m stack) is visible from the World Heritage Property. However, as it is located further west than the cement works, this stack can only be seen from one of the fifteen protected viewpoints, PV88 at Dowth. Redmountain (c.90m higher than the site of the incinerator) obstructs any views from Newgrange, Knowth and the Hill of Slane.
- 11.30. From the top of the mound at Dowth, most of the stack can be seen at a range of 4.5km, immediately to the right of the tall elements of the cement works, adding to the visual distraction in this view towards the south-east.

RESIDENTIAL DEVELOPMENT AT LEDWIDGE HALL, SLANE

- 11.31. This housing estate, built in 2007 on the eastern edge of Slane, is located in the wider setting of the World Heritage Property, 800m from the Hill of Slane and 1.8km from the western edge of the buffer zone.
- 11.32. The estate is visible from two of the fifteen protected viewpoints, PV 30 (Hill of Slane) and PV34 (Cullen Hill). From the southern edge of the graveyard on the Hill of Slane, this development is a prominent feature in the foreground of the view out over the World Heritage Property, distracting by virtue of its proximity and the white painted facades of the houses in an area that was formerly fields. The houses are also visible but much less prominent looking north from PV34 where they are experienced as part of Slane village. They have no effect on the actual protected view here, which is east facing towards Knowth and Newgrange.

DUNMORE / LEABY CROSS WIND TURBINES, COLLON, CO. LOUTH

- 11.33. There are five wind turbines (75-120m to blade tip) at Dunmore and Leaby Cross, west of Collon in Co. Louth, 7.5 north of the northern edge of the buffer zone. They can be seen on the skyline from any location within the World Heritage Property with open views to the northern horizon and are therefore visible from the Hill of Slane (PV30), Cullen Hill (PV34), Knowth, Newgrange and Dowth (PV59, 87 and 88) and various north-facing viewpoints on Redmountain (PV62, 63, and 92).
- 11.34. In all cases where the wind turbines are visible, the slender towers and blades are not visually prominent and can be hard to locate under varying lighting conditions. They are not visually distracting in views across the World Heritage Property from Redmountain and peripheral to views from the Hill of Slane and Cullen Hill.

CUMULATIVE IMPACT ON OUV

- 11.35. A clear pattern emerges from the analysis of visual change at protected viewpoints. At most viewpoints there is no visibility of any of the six post-1993 developments and only one (PV30 on the Hill of Slane) has views to all six. This reflects the fact that PV30 provides an exceptionally open and elevated viewpoint and, by chance, is close to the Ledwidge Hall residential development, which is invisible from all but one of the other viewpoints.
- 11.36. The other viewpoints from which the developments tend to be visible are the three main passage graves (Knowth, Newgrange and Dowth) which all occupy relatively elevated positions in the centre of the World Heritage Property. The fact that few developments can be seen from the elevated viewpoints on

Redmountain reflects the locations of most of the developments which, with the exception of the wind turbines, are hidden behind the landform in these north-facing views.

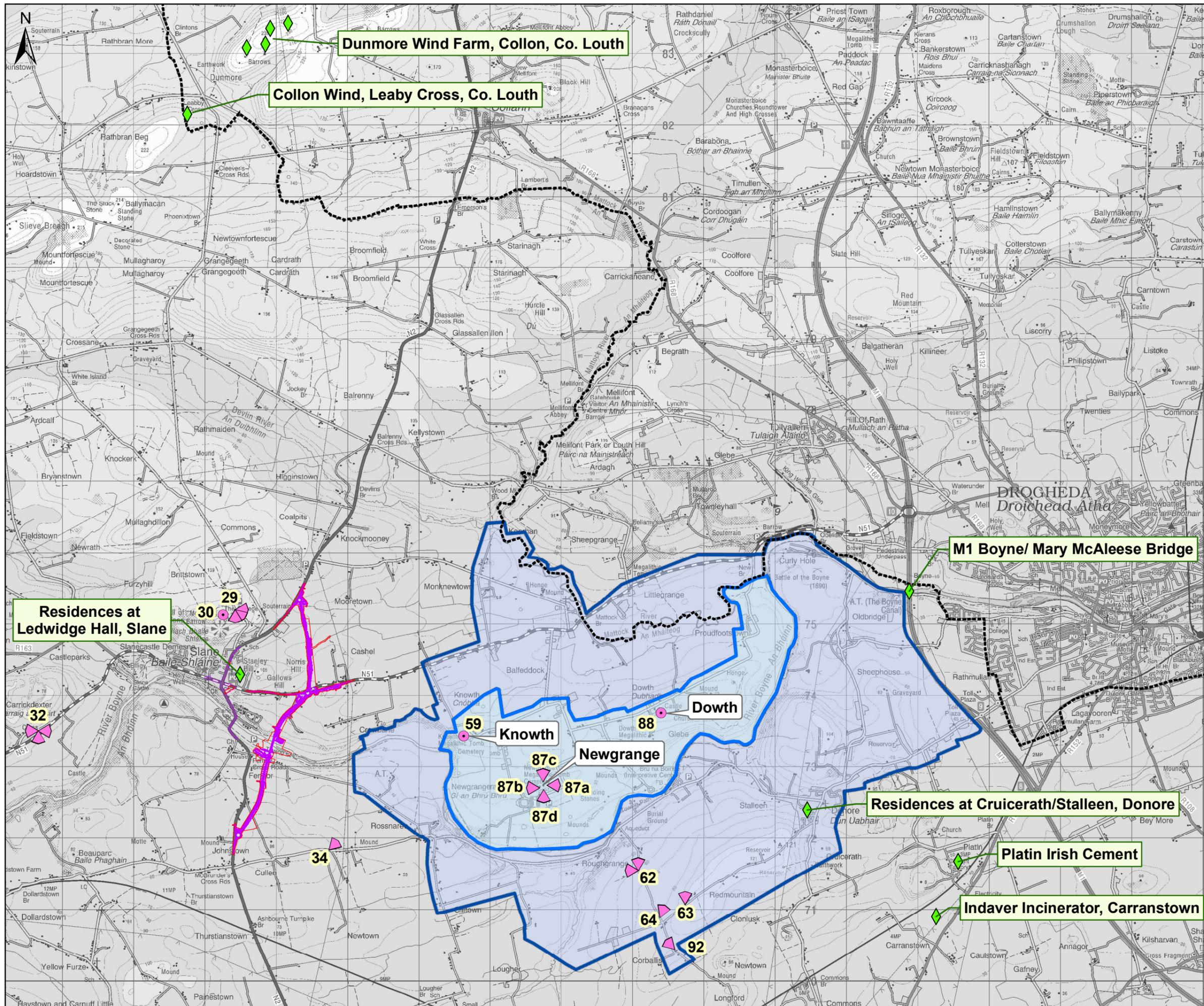
- 11.37. Turning to the potential for the six developments to affect OUV, it may be concluded that two of the developments do not have a material effect. These are the Dunmore / Leaby Cross Wind Turbines which, although visible, are not considered to be visually distracting, and the M1 Boyne Bridge where visibility is essentially limited to a distant view from the Hill of Slane (PV29 and 30). The other four developments do affect OUV to a greater or lesser extent.
- 11.38. A combination of the post-1993 extensions to the Platin Irish Cement Works, Carranstown Incinerator stack and housing in Donore form a particularly prominent cluster of modern development in the view looking southeast from Dowth (PV88) which materially detracts from the rural agricultural character of the landscape setting of the World Heritage Property at this location. It is important to note again that the cement works was operational pre-1993 and therefore parts of it featured as a detracting element in the setting of the World Heritage Property from the outset. This must be excluded from the cumulative assessment.
- 11.39. A combination of the cement works and Donore housing also adversely affects views out from Newgrange, Knowth and the Hill of Slane, albeit to a lesser degree than at Dowth. As the main publicly accessible monuments in the World Heritage Property, Dowth, Newgrange and Knowth are considered to be locations particularly sensitive to change in the rural character of their settings.
- 11.40. Finally, mention must be made of the impact of the Ledwidge Hall housing at Slane on the quality of the view from the Hill of Slane, introducing a visually prominent area of housing into what is otherwise a rural landscape view with the remainder of Slane village hidden by the landform at PV30.
- 11.41. Overall, it is concluded that there is a cumulative impact of some magnitude on OUV resulting from the combined impact of the six major post-1993 developments in the wider setting of the World Heritage Property. That impact is primarily due to the cluster of major developments at Platin / Carranstown / Donore and its adverse effect on the rural character of the setting as experienced from Dowth, Newgrange, Knowth and the Hill of Slane.

COMBINED IMPACT OF DEVELOPMENT FROM 1993 TO PRESENT PLUS PROPOSED SCHEME

- 11.42. Having reached a conclusion regarding the cumulative impact of development to date on OUV, it is now necessary to consider the predicted cumulative impact if the Proposed Scheme was added to the existing major developments within the setting of the World Heritage Property.
- 11.43. The impacts identified for the proposed bypass primarily relate to visibility of the proposed new crossing of the River Boyne from PV59 at Knowth. This has been assessed as an impact of negligible magnitude and minor significance on the OUV of the World Heritage Property.
- 11.44. Comparison of the predicted effects of the proposed bypass on OUV with those of the existing developments, indicates that the impact of the Slane Bypass would be much less. The bypass would not involve large skyline structures and material adverse effects (at the Boyne crossing) are very localised in extent relative to the scale of the wider setting of the World Heritage Property. There is nothing proposed for the Slane Bypass with the extensive visual prominence of the Platin Irish Cement Works. Therefore addition of the proposed bypass to the existing cumulative developments would lead to only a very small incremental addition to the cumulative impact on OUV.
- 11.45. It is concluded that the combined impact of post-1993 development with the Proposed Scheme would result in a cumulative impact of some magnitude, not materially greater than that without the Proposed Scheme. This is judged to be an adverse impact of moderate significance with the adverse impact caused almost entirely by existing development in the setting of the World Heritage Property.

Appendix 2 Table 1: Brú na Bóinne World Heritage Property cumulative impact assessment: major developments constructed post-1993 within the setting of the world Heritage Property

Scheme	Date	Description	Location
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Const. 2000; opened 2003	3.7km span of the Boyne River, 35m wide deck. Cable-stayed structure with a 96m Y-shaped tower pylon at the S side supporting the structure with 14 pairs of stay cables. Illuminated at night.	In the wider setting of the WHS, just outside the E edge of the buffer zone
Residential developments Cruiserath/Staleen, Donore	Phased developments From c.2000 & c.2004	'The Grange', approx. 77 no houses 'Murray's View', several detached dormer dwellings	Within the buffer zone of the WHS in Donore Village, E & W of the Drogheda/ Mullaghacrone Rd. c.1km to the SE of the WHS.
Platin Irish Cement Works	(post-1993) Additional elements constructed 1999-2015	Additional (3 rd) chimney stack 24.2m and scrubber; 2 Silos (49.5m high, after 1999). Cement Silo 40m high at Kiln 3 (after 2015)	In the wider setting of the WHS, 1.3km from the buffer zone and 3km to the SE of the WHS
Indaver Ireland Incinerator, Carranstown, Duleek	(Operational 2011)	65m chimney stack on a 10ha site	In the wider setting of the WHS, the stack is c. 1.5km from the buffer zone, 3.5km to the SE of the WHS
Ledwidge Hall, Slane	2007	Residential housing estate	In the wider setting of the WHS, 800m from the Hill of Slane and 1.8km from the buffer zone.
Dunmore / Leaby Cross Wind Turbines, Collon Co. Louth	2006 (x2 turbines), 2008 (x2 turbines) 2015/2016 (1 turbine)	2 wind turbines of up to 55m hub height up to 26m blade length, 2 turbines 49m height and 52m blade sweep 1 turbine at Leaby Cross, max. hub height 80m, max. blade length 40m.	In the wider setting of the WHS, 7.5km NNE of the buffer zone



Legend

- Proposed Scheme
- Proposed Scheme Boundary
- County Boundary
- CDP Protected View
- CDP Protected Panoramic View
- Projects Constructed since Inscription of the WHP

World Heritage Property: Brú na Bóinne

- Core Zone
- Buffer Zone

Data source: Protected Viewpoints and World Heritage Property boundaries from Meath County Development Plan 2021-2027; county boundary (20 m generalised, 2019) from OSI/data.gov.ie.

0 0.5 1 2 Kilometres

Client
Meath County Council
 N2 Slane Bypass and Public Realm Enhancement Scheme

Title
Figure A3:
Location of Projects Constructed since Inscription of the World Heritage Property

Issue Details

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Appendix 2 Table 2: Brú na Bóinne World Heritage Property cumulative impact assessment: Protected Views relevant to assessment (as listed in Meath County Development Plan 2021-2027, Appendix 10)

PV	Location	Direction	Description	Significance
29	Car Park at Hill of Slane	East, South East & South	Extensive view from east to south east across open working and settled landscape. Modern housing and agricultural development visible.	National
30	Hill of Slane	Panorama	Extensive panorama across open working and settled landscape. Modern housing and agricultural development visible.	National
31	County road between Boyne Canal and Roughgrange	North	Intermittent views of the main tumulus in Newgrange can be obtained from many points along this road and adjacent areas. Visibility often [less in summer] determined by the season and the current state of hedgerow maintenance.	International
34	On local road L1600-28 between McGruder's Cross and Newtown/Rosnaree	North East	View of Boyne Valley with open view of Knowth and Newgrange. Mixed composition of working landscape. Slane visible on left (west). Roads, power lines and housing visible.	International
58	County road between N51 and Knowth	South	First view of tumulus looking south.	Regional
59	Knowth Tumulus	Panorama	Panoramic views in all directions from top of Knowth tumulus. Extensive views across a working countryside.	International
62	County road between Duleek and Boyne Canal I	North & West	Panoramic views across mixed agriculture and tillage, pasture and woodland. Views to north and west - dense woodland. Distant horizon skyline to north and west.	International
63	County road between Donore and Redmountain	North	Extensive view to north across woodland, pasture and tillage. Middle distance views of Newgrange and Knowth in centre of view and very little development visible.	International
64	County road between Duleek and Boyne Canal II	North West	Extensive view to north across woodland, pasture and tillage. Middle distance views of Newgrange and Knowth in centre of view and very little development visible.	International
74	Boyne valley from Rosnaree House	East	Boyne valley from Rosnaree House.	National
87 a to d	Newgrange Passage Tomb	East, West, North & South	Elevated panoramic View across the landscape within the World Heritage Property of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, infrastructure.	International
88	Dowth Passage Tomb	Panorama	Elevated panoramic View across the landscape within the World Heritage Property of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, infrastructure.	International
89a	Views towards Brú na Bóinne from N51	South	Views along the N51 looking south into the Core Area of the World Heritage Property.	National
89b	Views towards Brú na Bóinne from N51	South	Views along the N51 looking south into the Core Area of the World Heritage Property.	National

PV	Location	Direction	Description	Significance
89c	Views towards Brú na Bóinne from N51	South	Views along the N51 looking south into the Core Area of the World Heritage Property.	National
90	West of the crossroads of Monknewtown.	South	Views at Monknewtown towards the core area of the WHS.	Regional
91	Views from Boyne and Towpath	North and North West (sample view is from Staleen area)	All views from within the World Heritage Property boundaries along the Boyne / Boyne Navigation tow path and proposed greenway looking towards the core area of the World Heritage Property.	International
92	Corballis	North West	Views in from the road at Corballis looking in north westerly directions towards the Core Area of the World Heritage Property.	Regional
93a	Local Road L16002, 1.2km east of Fennor Cross Roads	North East	View towards the Core Area of the World Heritage Property.	Regional
93b	Local Road L16002, 0.7km west of Rossnaree	East	View towards the Core Area of the World Heritage Property.	Regional
93c	Local road L16002, 1.65km east of Fennor Cross Roads	East	View towards the Core Area of the World Heritage Property.	Regional

Appendix 2 Table 3: Brú na Bóinne World Heritage Property cumulative impact assessment: Analysis of visual change in Protected Views due to major developments since 1993

PV 29: “Car Park at Hill of Slane. Direction E, SE, S. Extensive view from east to south east across open working and settled landscape. Modern housing and agricultural development visible. International.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Visible to E	The bridge is clearly visible, but it sits against the backdrop of Drogheda’s urban sprawl, with the sea visible beyond it. This greatly reduces any prominence it may otherwise have on the horizon. It is not distracting and tends to blend into the overall landscape view. This is further assisted by the relatively small scale of the bridge at this distance and in such an expansive view. Not visually intrusive.
Residential developments at Cruicera / Stalleen, Donore	Rooflines and upper storeys visible to ESE	The residential development is visible but not prominent or distracting, the result of the relatively small scale of the development at this distance and in such an expansive view. Generally absorbed well into the surrounding landscape.
Platin Irish Cement Works	Whole plant is visible to ESE	The cement works dominate the view of the ridgeline to the ESE. While it doesn’t sit between the Hill of Slane and the WHS, it very much draws the eye and holds the gaze. This creates a distraction from the view towards the WHS. The additional elements post-inscription – the scrubber, third chimney stack and tall silos – have increased the scale of the works and make them a more conspicuous presence on the horizon.
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
*General comment: The black metal fence of the reservoir immediately in front of the car park dominates the foreground of the view eastwards and is visually intrusive.		

PV 30: “Hill of Slane. Direction Panorama. Extensive panorama across open working and settled landscape. Modern housing and agricultural development visible. National.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Visible to E	The bridge is clearly visible, but it sits against the backdrop of Drogheda’s urban sprawl, with the sea visible beyond it. This greatly reduces any prominence it may otherwise have on the horizon. It is not distracting and tends to blend into the overall landscape view. This is further assisted by the relatively small scale of the bridge at this distance and in such an expansive view. Not visually intrusive.
Residential developments at Cruicerath / Stalleen, Donore	Rooflines and upper storeys visible to ESE	The residential development is visible but not prominent or distracting, the result of the relatively small scale of the development at this distance and in such an expansive view. Generally absorbed well into the surrounding landscape.
Platin Irish Cement Works	Whole plant is visible to ESE	The cement works are prominent on the ridgeline to the ESE. The additional elements post-inscription – the scrubber, third chimney stack and tall silos – have increased the scale of the works and make them a more conspicuous presence on the horizon. However, the breadth of the view is greatly increased compared to that from car park, opening out into a panorama. This lessens the impact of the visual distraction – just one jarring point along the expansive stretch of horizon.
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Visible to SSE	From the south side of the hill, this development is in the foreground of your field of vision. It is quite distracting by virtue of its proximity and the white painted facades of the houses.
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	All turbines visible to the N	The turbines are visible on the ridgeline to the north, but they are not visually dominant or intrusive in the broad sweeping view.

PV 31: “County road between Boyne Canal and Roughgrange. Direction North. Intermittent views of the main tumulus in Newgrange can be obtained from many points along this road and adjacent areas. Visibility often [less in summer] determined by the season and the current state of hedgerow maintenance. International.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
*General comment: Views north are enclosed by the valley slopes, with no distant views and none of the developments. There are intermittent views of Knowth and Newgrange, as well as a view of Dowth from the roadside at the Newgrange Lodge B&B.		

PV 34: "On local road L1600-28 between McGruder's Cross and Newtown/Rosnaree. Direction NE. View of Boyne Valley with open view of Knowth and Newgrange. Mixed composition of working landscape. Slane visible on left (west). Roads, power lines and housing visible. International."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Visible	A distant view of the cement works, screened for the most part by the trees along the road and field boundaries, even in winter time. It is only just within sight of the protected view when facing NE (it requires turning slightly to the ENE) and does not distract from the PV. This intermittent view of the cement works would likely be entirely screened when the hedgerows and trees are in full summer foliage.
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible in direction of protected view. <i>Can be seen to NW below the Hill of Slane, but not in the direction of the protected view</i>	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible in direction of protected view. <i>Can be seen to NW, but not in the direction of the protected view</i>	N/A

PV 58: "County road between N51 and Knowth. Direction South. First view of tumulus looking south. Regional."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible in the direction of the protected view. <i>Can be seen on the horizon to the east, but mostly screened by the field boundary in the foreground.</i>	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A

Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
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PV 59: "Knowth Tumulus. Direction Panorama. Panoramic views in all directions from top of Knowth tumulus. Extensive views across a working countryside. International."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Rooflines / ridges visible to ESE, to a slightly greater degree than at Newgrange	Not visually intrusive. Colour of the grey roof slates allows the development to blend into the surrounding countryside
Platin Irish Cement Works	Whole plant is visible on the skyline to ESE	The cement plant (its scale and dominance on the skyline) draws the eye and creates a distraction, detracting from the view towards Newgrange, which is a critical view. If the chimney stacks were discharging, this would probably increase the level of visual distraction.
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Partly visible to NNE	Top of 3 turbines visible. Again, not visually intrusive. They don't interrupt the enjoyment of the extensive landscape view. The ridgeline is still legible. The nature of the development is one of visual permeability in direct contrast to Platin.

PV 62: "County road between Duleek and Boyne Canal I. Direction North & West. Panoramic views across mixed agriculture and tillage, pasture and woodland. Views to north and west - dense woodland. Distant horizon skyline to north and west. International."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Visible on ridgeline to N	At least 3 of the turbines are visible on the ridgeline, but they don't dominate the skyline or the view. Not visually intrusive.

PV 63: "County road between Donore and Redmountain. Direction North. Extensive view to north across woodland, pasture and tillage. Middle distance views of Newgrange and Knowth in centre of view and very little development visible. International."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	All turbines visible to north	Turbines visible on the ridgeline, NE of Newgrange. They offer no distraction from the view, however, as the eye is consistently drawn to the monuments, the valley and the Hill of Slane in the distance. Not visually intrusive.

PV 64: "County road between Duleek and Boyne Canal II. Direction North West. Extensive view to north across woodland, pasture and tillage. Middle distance views of Newgrange and Knowth in centre of view and very little development visible. International."

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A

PV 74: “Boyne valley from Rosnaree House. Direction East. Boyne valley from Rosnaree House. National.” **Not a publicly accessible view**

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Unknown	
Residential developments at Cruicerath / Stalleen, Donore	Unknown	
Platin Irish Cement Works	Unknown	
Indaver Ireland Incinerator (Carranstown, Duleek)	Unknown	
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A

PV 87 a to d: “Newgrange Passage Tomb. Direction East, West, North & South. Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, infrastructure. International.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Rooftops / ridges just about visible, from E and S sides of the mound	Barely distinguishable from the surrounding tree tops. Effectively screened from view.
Platin Irish Cement Works	Partly visible from E and S sides of the mound	Elements of the plant can be seen above the saddle of the hill, with the remainder screened by the landform. The top half of one chimney and a third of another are visible (both in place before inscription?). Notably the large steel tank of the scrubber (post-inscription) is visible, and because of the material, it catches the morning sun, which glints off the surface and catches the eye. However, as much of the plant is screened, these elements are not overly dominant, being one relatively small intrusion in a broad and sweeping landscape view.
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Partly and intermittently visible from W and N sides of the mound. The visibility depends on the time of day, type of weather and cloud cover.	3 turbines visible. Not dominant on the skyline nor particularly conspicuous. As this type of development is visually permeable, it is not intrusive or distracting. They don't interfere with the intervisibility between the monuments (e.g. out of the sightline when looking towards Knowth and the Hill of Slane). They don't take away from the sense of enclosure in the landscape that is created by the surrounding hills.
*General comment: There is no sense of intrusion on the monument or its setting from external modern large-scale development		

PV 88: “Dowth Passage Tomb. Direction Panorama. Elevated panoramic View across the landscape within the World Heritage Site of Brú na Bóinne. Note that this is a working landscape containing agricultural structures, dwellings, infrastructure. International.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Barely visible - can be glimpsed through a narrow gap in the trees at Dowth Hall (may not be visible at all in summer)	The bridge is only just visible through a gap in the winter treeline of Dowth Hall. Not at all visually intrusive.
Residential developments at Cruicerath / Stalleen, Donore	Rooflines and upper storeys can be seen.	These three developments are all visible in the one viewshed, looking SE (120 degrees), forming a prominent cluster of modern development in the valley and up the valley slopes. The narrow valley at this point / in this direction, focuses the eye. Although part of the more extensive views from the mound, when looking SE from Dowth, it is a more concentrated view that draws your gaze to the narrow valley. This makes the developments there distracting and intrusive.
Platin Irish Cement Works	Majority of the plant is visible, dominating the view SE	
Indaver Ireland Incinerator (Carranstown, Duleek)	Most of the chimney stack and its plume of smoke (the active discharge increases the visual distraction)	
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	All turbines visible to NW	Due to the nature of the development, the turbines are not visually intrusive or distracting.
General comment: Of all the protected views, this seems the most affected by the developments		

PV 89a: “Views towards Brú na Bóinne from N51. Direction South. Views along the N51 looking south into the Core Area of the World Heritage Site. National.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
*General comment: This section of the N51 is too dangerous to stop on. Knowth is visible intermittently where the hedgerows are lower. Appears similar to the regional view (PV58), except that Platin is not visible.		

PV 89b: “Views towards Brú na Bóinne from N51. Direction South. Views along the N51 looking south into the Core Area of the World Heritage Site. National.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
*General comment: Nothing of the WHS is visible at either PV 89b or c, even where the hedgerows are low or at gaps. The landform here appears to restrict the view.		

PV 89c: “Views towards Brú na Bóinne from N51. Direction South. Views along the N51 looking south into the Core Area of the World Heritage Site. National.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A
*General comment: Nothing of the WHS is visible at either PV 89b or c, even where the hedgerows are low or at gaps. The landform here appears to restrict the view.		

PV 90: “West of the crossroads of Monknewtown. Direction of view south. Views at Monknewtown towards the core area of the WHS. Regional.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A

PV 91: “Views from Boyne and Towpath. Direction North & North West (sample view is from Stalleen area). All views from within the World Heritage Site boundaries along the Boyne / Boyne Navigation tow path and proposed greenway looking towards the core area of the World Heritage Site. International.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A

PV 92: “Corballis. Direction North West. Views in from the road at Corballis looking in north westerly directions towards the Core Area of the World Heritage Site. Regional.”

	Visibility:	Degree / nature of visible change due to development:
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A

Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	1 turbine visible	1 turbine is visible in the distance within the sightline of the view. Not visually intrusive.

PV 93a: "Local Road L 16002, 1.2km east of Fennor Cross Roads. Direction North East. View towards the Core Area of the World Heritage Site. Regional."

	<i>Visibility:</i>	<i>Degree / nature of visible change due to development:</i>
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A

PV 93b: "Local Road L 16002, 0.7km west of Rossnaree. Direction East. View towards the Core Area of the World Heritage Site. Regional."

	<i>Visibility:</i>	<i>Degree / nature of visible change due to development:</i>
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A

Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible in direction of view. <i>(Tops of 3 turbines can be seen on a low elevation to NE. Mostly screened by hill)</i>	N/A

PV 93c: "Local road L16002, 1.65km east of Fennor Cross Roads. Direction East. View towards the Core Area of the World Heritage Site. Regional."

	<i>Visibility:</i>	<i>Degree / nature of visible change due to development:</i>
M1 Boyne Bridge (Mary McAleese Boyne Valley Bridge)	Not visible	N/A
Residential developments at Cruicerath / Stalleen, Donore	Not visible	N/A
Platin Irish Cement Works	Not visible	N/A
Indaver Ireland Incinerator (Carranstown, Duleek)	Not visible	N/A
Ledwidge Hall residential development (Slane)	Not visible	N/A
Dunmore / Leaby Cross Wind Turbines (Collon, Co. Louth)	Not visible	N/A



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Headland Archaeology Scotland
13 Jane Street
Edinburgh EH6 5HE
t 0131 467 7705
escotland@headlandarchaeology.com

Headland Archaeology Yorkshire & North
Units 23-25 & 15 | Acorn Business Centre | Balme Road
Cleckheaton BD19 4EZ
t 0127 493 8019
eyorkshireandnorth@headlandarchaeology.com

Headland Archaeology South & East
Building 68C | Wrest Park | Silsoe Bedfordshire
MK45 4HS
t 01525 861 578
esouthandeast@headlandarchaeology.com

Headland Archaeology Midlands & West
Unit 1 | Clearview Court | Twyford Rd
Hereford HR2 6JR
t 01432 364 901
emidlandsandwest@headlandarchaeology.com

Headland Archaeology North West
Fourways House | 57 Hilton Street
Manchester M1 2EJ
t 0161 236 2757
enorthwest@headlandarchaeology.com

www.headlandarchaeology.com