

Section 3
SITE SELECTION, DESIGN AND EVOLUTION

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Glossary

Term	Definition
Capacity factor	The capacity factor of any power plant is the percentage of generation of its actual generation against its theoretical maximum generation.
Cumulative impacts	The state in which a series of repeated actions have an impact greater than the sum of their individual impacts.
Environmental Impact Assessment	The process by which information about the environmental effects of a project is evaluated and mitigation measures are identified.
Environmental Impact Assessment Report	Statutory obligation to provide environmental impact assessments for certain projects or developments. The Environmental Impact Assessment Report (EIAR) is the collation of these assessments.
Meteorological Mast	Mast used for housing meteorological measuring equipment to measure wind speed and direction.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
Sustainable	Avoidance of the depletion of natural resources in order to maintain an ecological balance
Tip height	The distance measured from the surface of the wind turbine tower foundation to the maximum height the turbine tip reaches when the turbine blade is in a vertical position.
Wind Turbine	The structure comprising the tower, nacelle and blades that generate power from the wind by the rotation of the blades.

Abbreviations

Abbreviation	Description
AGL	Above Ground Level
AI	Additional Information
AOD	Above Ordnance Datum
CWL	Community Windpower Ltd
DGC	Dumfries and Galloway Council
EIAR	Environmental Impact Assessment Report
GIS	Geographic Information Systems
GPA	Glasgow Prestwick Airport
GWDE	Groundwater Dependent Terrestrial Ecosystems
Km	Kilometre
kV	Kilovolt
LCT	Landscape Character Type
LVI	Landscape Visual Impact
m	Metre
m/s	Metres Per Second
MoD	Ministry of Defence
MW	Megawatt
NATS	National Air Traffic Services
NOABL	Numerical Objective Analysis Boundary Layer
NPF4	National Planning Framework 4
OS	Ordnance Survey
OWPS	Onshore Wind Policy Statement
RSA	Regional Scenic Area
SES	Scottish Energy Strategy
SPP	Scottish Planning Policy

Section 3: Site Selection, Design and Evolution

3.1 Introduction

- 3.1.1 This Section explains the selection criteria used by the Applicant when looking for potential wind farm sites to develop. It describes the initial site selection process for the proposed Scoop Hill Community Wind Farm and the reasons behind the selection of this site.
- 3.1.2 This Section also considers the details of the design evolution of the proposed wind farm and explains how potential environmental effects which have emerged during the Environmental Impact Assessment Report (EIAR) and Additional Information (AI) process have informed the final design of the proposed development. Consultant responses and their influence of the design changes are also discussed within this Section.
- 3.1.3 This Section of the AI has been written to fully replace Section 3 in the EIAR and should be read in conjunction with the Design and Access Statement (DAS) which accompanies this AI.

3.2 Site Selection Process and Criteria

- 3.2.1 CWL began site searching in 2001 and the process has yielded eight sites which have successfully progressed to operational wind farms and a further two which have been consented, one of which is currently under construction. CWL and the Applicant are engaged in a continual search and assessment of potential wind farm sites throughout Scotland to progress and develop into wind farm applications. This pipeline of potential sites is commercially sensitive and is not considered to be alternative sites to the Proposed Development. Therefore, alternative sites are not considered further in the AI.
- 3.2.2 Wind power development is constantly evolving and becoming more efficient. This efficiency consists of taller turbines which benefit from more consistent wind speeds, and longer blades which cover a wider swept area which increases the capacity of the turbine. This evolution has led to wind power becoming a leading green renewable energy technology.
- 3.2.3 This ‘new generation’ of larger wind turbines has been universally adopted by the onshore wind energy industry, and the Scottish Government’s acceptance of larger turbines has been demonstrated with the consent of 12 onshore wind farm developments in Scotland since 2020, with tip heights of 200m and above. Details of these wind farms are shown in Appendix 3.1, with Rothes III currently having the tallest turbines consented by the Scottish Government at 225m to tip.
- 3.2.4 It is environmentally beneficial to site wind farms in areas of high wind speeds, on high ground, to maximise the generation capability of the wind turbines. Given this, Scotland is a preferred location for wind farms as it has an average wind speed of 12.32 m/s at 200m above ground level (agl) which is the highest average wind speed in Europe. By comparison, Germany, France, Spain and Sweden, where wind farms are currently the most established as a renewable energy technology, have windspeeds of 10.38 m/s, 9.95 m/s, 9.13 m/s and 10.18 m/s at 200m agl, respectively (Global Wind Atlas, 2021).

Policy and Guidance

- 3.2.5 In the first instance, national, regional and local policy is reviewed in order to find the best possible location for a wind farm site.

- 3.2.6 National policy is generally supportive of onshore wind developments. In NatureScot’s Strategic Locational Guidance for Onshore Windfarms, three zones are identified which are described as follows:

- **Zone 1: Lowest natural heritage sensitivity** identifies areas at the broad scale with least sensitivity to wind farms, with the greatest opportunity for development, within which overall a large number of developments could be acceptable in natural heritage terms, so long as they are undertaken sensitively and with due regard to cumulative impact.
- **Zone 2: Medium natural heritage sensitivity** identifies areas with some sensitivities to wind farms. However, by careful choice of location within these areas there is often scope to accommodate development of an appropriate scale, siting and design (again having regard to cumulative effects) in a way which is acceptable in natural heritage terms.
- **Zone 3: High natural heritage sensitivity** identifies areas of greatest sensitivity to wind farms, which place the greatest constraint on their development, and where, in general, proposals are unlikely to be acceptable in natural heritage terms. There may however be some sites in this zone where wind farm development of appropriate scale and careful design could be accommodated if potential impacts on the natural heritage are fully explored and guarded against by employing the highest standard in siting and design.

- 3.2.7 Large sections of central southern Scotland are categorised as Zone 1 which is where the Proposed Development is located.

- 3.2.8 In addition to this, Scottish Planning Policy (SPP) Table 1 was considered in the first instance. Group 1 designations; National Parks and National Scenic Areas, were avoided to comply with this policy and Group 2 designations were also considered alongside possible mitigation.

- 3.2.9 Dumfries and Galloway Local Development Plan (adopted in 2014) was considered in the early development of this proposal, with the updated Local Development Plan 2 and Dumfries and Galloway Council’s Landscape Capacity Study (Supplementary Guidance) only being considered after Scoping due to these policies being adopted at a later date.

- 3.2.10 The Local Development Plan 2 identifies the Southern Uplands with Forest Landscape Character Type (LCT) as having some of the best capacity in this region for turbines of the size and scale proposed, therefore this was deemed as a good starting point for the location of the Proposed Development. This is shown in AI Figure 3.14 which shows that the Proposed Development is located in an area deemed as an area with potential for wind farm development and for turbines of the largest typology.

- 3.2.11 More recently, post EIAR submission, National Policy Framework 4 (NPF4) and the new Onshore Wind Policy Statement (OWPS) were published. These policy updates are significantly more supportive of onshore wind development in order for national and legally binding renewable energy targets to be achieved.

- 3.2.12 The policies which are relevant to the proposed development are:

- Policy 1: Tackling the climate and nature crises;
- Policy 2: Climate mitigation and adaptation;
- Policy 3: Biodiversity;
- Policy 4: Natural places;
- Policy 5: Soils;
- Policy 6: Forestry, woodlands and trees;
- Policy 7: Historic assets and places; and

- Policy 11: Energy.

3.2.13 Given that national policy is supportive of onshore wind, the Dumfries and Galloway region was then selected due to its high wind speeds and that the physical characteristics of the area demonstrated capacity to accommodate the size and scale of turbines envisaged. On further review of the regional and local policy, it was deemed that there was scope for a wind farm development in the area proposed in this application.

3.2.14 More information on the Policy and Guidance in relation to this wind farm can be found in Section 4: Renewables, Planning and Policy, alongside the DAS and the revised Planning Statement which all form part of the AI.

Initial Environmental and Technical Criteria and Constraints

3.2.15 After an area of land is selected based on a policy review, it can then be refined and a site boundary created based on a variety of environmental and technical criteria and constraints identified through desk-based studies. These are listed below and discussed in more detail in Table 3.1:

- Landowner interest - a site has to have willing owners or be available for purchase.
- Area available for wind turbines - there needs to be enough area available to ensure the schemes viability.
- A minimum wind speed of 7.0 metres per second (m/s) at 45 m above ground level (agl), as identified using the ETSU NOABL wind speed atlas.
- Proximity of existing wind farms or sites with planning permission for a wind farm with a 45km radius of the area of interest.
- Turbine offset distance from the nearest non-financially involved property has been maximised.
- Availability and proximity of a potentially suitable and economically viable grid connection point.
- Potential of existing transport network to allow for the transportation of wind farm delivery vehicles and construction traffic to the site.
- Aviation consultation and assessment.
- Consideration of potential landscape and visual impacts, including national landscape designations
- Ecological considerations including ecological designations.
- Ground conditions and their suitability.
- The presence and location of cultural heritage sites of national importance and the location and setting of Scheduled Monuments.
- Existing land use and Public Rights of Way; and
- Presence and location of existing infrastructure (e.g. mobile phone networks and electromagnetic paths).

3.2.16 Once a boundary has been drawn, an indicative turbine layout is designed based on the constraints bullet-pointed above. This is then refined through consultation with key stakeholders and consultees which is summarised in Section 3.6 of this Chapter. Environmental survey results are also used to ensure that infrastructure is placed in the best possible location with minimal environmental impacts. These are summarised in Section 3.5 of this Chapter.

3.2.17 This design process is a constraint led process which means that it is continuously changing through the EIA and AI process as more data and information becomes available to the Applicant.

3.2.18 The overall selection process of an appropriately located wind farm site is lengthy, with the vast majority of sites being deemed unsuitable or too heavily constrained to develop. Even when a suitable site has been

found, constraints can continue to arise during the course of the project's development, which can at a later stage undermine the whole scheme.

3.3 The Site and its Surroundings

3.3.1 The Scoop Hill Community Wind Farm site was identified as one of the most appropriate locations for a wind energy development as it was successful in relation to meeting policy requirements and the initial site selection criteria. Namely, the site lies entirely within the area identified by NatureScot as having least sensitivity to wind farms and by Dumfries and Galloway Council, as it lies within a preferred area with potential for a wind farm development comprising the largest typology turbines, as shown in AI Figure 3.14. The site also lies within the only area DGC identified in their 2017 landscape capacity study as having increased scope for large turbines due to the absence of wind farm development in this area, the expansive scale of the landscape and its distance from sensitive receptors.

3.3.2 The site is located approximately 5km southeast of Moffat and 11km northeast of Lockerbie. The site is located to the west of the Teviot Valley which contains the A7 and several small settlements. The proposed wind farm will cover an area of around 5,685 hectares (ha) with the main land use being rough grazing upland moorland and commercial forestry.

3.3.3 To the east of the Proposed Development, the land falls away, but retains some topography at heights above 400m AOD, such as Ashy Bank, which peaks at 430m AOD. An equally prominent landform here is the 1.5km long, Black Esk reservoir, fed by the Muckle White Hope River and its tributaries.

3.3.4 To the south, the topography falls away much faster than to the east, with heights reaching no greater than 331m AOD at Hart Fell. Continuing south, there are several consented and operational wind farms, alongside the 44MW Stevens Croft biomass power station. The Dryfe Water, which can be found in the development area, flowing south to west through the village of Boreland and into Lockerbie.

3.3.5 To the west of the development area, the topography is that of the Annan valley, which has been exaggerated in size by the A74(M), on the valley floor, which is mirrored by the B7076. There is also an existing 275Kv power line utilising large steel lattice pylon/towers, which connects to the substation at Bearholm. On the western side of the valley lies the range of hills upon which the operational wind farm Minnygap is found.

3.3.6 When looking north of the development area, the topography begins to increase in height, with the prominent landforms of Loch Fell at 688 AOD and Croft Head at 637m AOD. Beyond this there are steep valleys which belong to the tributaries of the Moffat Dale.

3.3.7 AI Figure 3.16 shows the topography of the site in its entirety.

3.3.8 The site covers three catchment areas; Newbigging Burn catchment to the west, encompassing the western site access, Wamphray Water catchment running through the centre and Dryfe Water catchment to the east. All catchments run from north to south through the site, and flow into the River Annan, which discharges into the Solway Firth. The watercourses and the associated 50m buffers are shown in AI Figure 3.1. More information on these catchment areas can be found in Section 10: Hydrology, Geology and Hydrogeology of the EIA and this AI.

3.4 Initial Site Evaluation

- 3.4.1 The Proposed Development was initially considered in 2015. Given this, the more recent policies, for example Dumfries and Galloway Local Development Plan 2 was not published and therefore not considered in the early site selection process.
- 3.4.2 The results of the initial desk-based assessment for Scoop Hill Community Wind Farm are reported and summarised in Table 3.1 below:

Table 3.1 – Site Selection Criteria Summary for Scoop Hill Community Wind Farm

Criteria	Comments
Availability of the Site	The wind farm footprint is available to lease from the landowners for the 40-year lifetime of the wind farm.
Available Area for Wind Turbines	The Proposed Development has an area of over 5,685 Hectares (ha) with the potential to accommodate enough turbines to make a financially viable scheme.
Wind Resource	An initial assessment of the wind resource was undertaken using the ETSU wind speed database, calculated from the NOABL wind flow model. The model estimates annual wind speed at a specified height for every square kilometre (km ²) of the United Kingdom, based on information from long-term meteorological station records throughout the UK. This has been supported by accurate onsite data from a temporary meteorological mast, which has recorded average on-site wind speeds of above 10 m/s which is well above the 7 m/s criteria.
Ministry of Defence (MoD)	Airports and MoD radars were initially mapped alongside the 50km Eskdalemuir Seismological Recording Station safeguarding area. Due to previous and ongoing work in the area, the Applicant believes that there is mitigation regarding turbines located within the 50km zone. Work to confirm this and consultation with the MoD began in the early site identification stage and is ongoing. More information regarding this topic can be found in Section 14: Other Considerations of this AI.
Proximity and Suitability of Grid Connection Point	Proximity to substations and the grid network is an important criterion when selecting a suitable site. In this case, the sites' proximity to Moffat substation and its capacity for grid connection in the near term without significant transmission reinforcement works made it an excellent candidate location to take forward. After looking into this further, it was proposed that the underground 33 kV cables routed from the turbines would be brought to three satellite substations where the voltage would be stepped up to 132kV. From the satellite substations, 132kV cables would transmit the generated electricity to the primary onsite substation. The primary onsite substation will connect to the grid substation at Bearholm which is approximately 2.6km away. For additional information regarding the grid connection route, please see the Grid Connection section which can be found in Section 2: Detailed Project Description of this AI.

On Site Access	Through the review of topography data, the land has been deemed of a suitable gradient for turbine vehicles to manoeuvre around the site. Through this Section 36 Application, the Applicant is applying for the creation of site entrances and access tracks of a sufficient standard to accommodate the wind farm components. During the design process of the wind farm, existing forestry tracks were utilised where possible to reduce the amount of new track needed. The access tracks and site entrances are shown on AI Figure 3.12 and more details are presented in Section 2: Detailed Project Description and Section 12: Traffic and Transport of this AI.
Transportation Route to Site	Initially when looking for a wind farm site, proximity to major roads is an important factor to consider, in order to transport wind farm components to the site. As the site is situated near the A74(M), it was deemed to have suitable access routes to site. Abnormal load studies were undertaken to determine the potential access routes for delivering the turbine components. Proposed access onto the site will utilise the A74(M) to the west of the site. From the A74(M), three main access points have been identified and assessed. These can be found in more detail in Section 12: Traffic and Transport Assessment of the EIAR and this AI.
Planning Policies at National, Regional and Local Level	National, Regional and Local policy positively provide for renewable energy development. A full policy assessment can be found in Section 4 of this AI, the Planning Statement and it is also briefly summarised in Section 3.2 of this chapter.
NatureScot Strategic Locational Guidance	The entirety of the development area falls within zone 1, least sensitive. These are areas of greatest potential for a wind farm development due to the lack of environmental constraints.
International Designated Areas	There are no international designated area/zones within the development area.
National Designated Areas	The Dryfe Water Site of Special Scientific Interest (SSSI) lies partly within and alongside the development boundary to the south. This was taken into consideration when designing the wind farm layout and resultantly, the closest infrastructure to this SSSI is Turbine 51 which lies 528m to the west of the SSSI and access tracks which lie 476m to the east of the SSSI. Section 7.4 of the outline CEMP lists several mitigation measures which are to be implemented to ensure the SSSI is protected from construction works.
Regional Scenic Areas	There are no regional designated scenic area/zones within the development area.
Proximity to Residential Properties	No residential properties are within 1,000m of the proposed wind turbines (which are not financially involved with the project).
Proximity to Core Paths	Consideration has been given to the existing core path network and where possible, turbines have been located more than 200m from core paths.
Presence of Existing and Consented Wind Farms	There are 14 operational and consented wind farms which are located in clusters to the southeast and to the west of Scoop Hill. The nearest is Little Hartfell which is 6.5km away from the nearest proposed turbine. Table 3.2 lists all operational and consented schemes within 20km, and a plan for which can be found in Volume II AI Figure 6.14 of this AI. An in-depth cumulative assessment is also included in Section 6: Landscape and Visual Impact Assessment of this AI.
Existing Land Use	The development site is located within rough grazing upland moorland and managed commercial forestry.

Communication Signals	Multiple fixed link communication links operate outwith of the site boundary. Through consultation, telecommunication operators have reported that they do not see the project having any effect on their links. This is included in more detail in Section 14 of the EIAR and this AI.
Cultural Heritage	There are local, regional and nationally important cultural heritage assets within and beyond the site boundary. These were plotted in the early stages on the site selection process. The Dryfe Archaeological Sensitive Area lies outside the site boundary to the south. The scheduled ancient monument Laverhay Cottage (Scheduled Monument, Index no. 12721) lies within the development area. A full assessment of heritage assets within the 25km study area can be found in Section 9: Cultural Heritage of this AI.
Peat Depth and Quality	The NatureScot peatlands and soils classification (2016) shapefile indicates that only 31ha, spread across 2 areas, of the 5,685ha development boundary, contains class 1 peat. Turbine 75 (of the current AI layout) is located within the areas of Class 1 peat furthest north, however, after detailed site surveys, it was found that peat depths in this locality were only 0.3m, thus would be classed as peaty soils. The 2 nd area of Class 1 peat is located near Turbine 2, however this only contains tracks which will be floated. AI Figure 3.15 shows the Carbon and Peatland (NatureScot) Classification alongside the site infrastructure. More information on peat and the surveys conducted can be found in Section 10 of this AI and its technical appendices.

Table 3.2 – Existing and Consented Wind Farms within 20km

Wind Farm	Status	Distance from Development (Km)
Little Hartfell	Consented	6.5
Crossdykes	Operational	8.0
Minnygap	Operational	9.0
Ewe Hill	Operational	10.0
Hopsrig	Consented	10.0
Harestanes	Operational	10.5
Loganhead	Consented	11.0
Minsca	Operational	13.0
Craig (and extension)	Operational	14.0
Clyde	Operational	15.0
Lion Hill	Consented	17.0
Solway Bank	Operational	17.0
Whitelaw Brae	Consented	17.0

- 3.4.3 Given the criteria assessed in Table 3.1, the Applicant deemed the area to be suitable for a wind farm and the site was selected for further investigation and possible eventual progression through the planning process, providing that no unacceptable adverse environmental impacts were identified during the scoping and EIA work.

3.5 Site Evolution

Design Elements and Principles

- 3.5.1 A typical wind farm site consists of wind turbines, access tracks, hardstands, temporary borrow pits, a substation and control room. These features for the Scoop Hill proposal have been carefully placed in order to have minimal impact on the surrounding environment. This is discussed in the following paragraphs.

Wind Turbines

- 3.5.2 When choosing the locations for the wind turbines, all environmental factors have been considered to ensure they are placed sensitively in the landscape. This was an evolving process and has changed considerably over the years, details of which can be found in Table 3.3.
- 3.5.3 Due to changes in Scottish Policy and also the wind industry, the Applicant felt it was appropriate to consider using taller turbines which have an increased efficiency and make a site more viable.
- 3.5.4 This is an option which has not only been considered by the Applicant, but also by other developers in the area and across Scotland. Examples of this are the nearby sites of Hopsrig, Crossdykes and Loganhead, all of which have lodged resubmissions to Dumfries and Galloway Council to increase the turbine tip heights after receiving planning consent for the original smaller turbines. This highlights that larger, more efficient turbines are becoming the new 'normal' when it comes to wind farm design.
- 3.5.5 It should also be noted that taller turbines will lead to a decrease in the number of turbines on a wind farm, as it requires increased separation distances between individual turbines.
- 3.5.6 Scoop Hill Community Wind Farm has been designed with a range of tip heights. This has been done in order to be sympathetic to the landscape. As shown in AI Figure 3.12, it is the turbines on the outskirts which have a lower tip height in order to minimise the landscape and visual impacts from settlements which lie to the north, west and south.
- 3.5.7 Following the submission of the EIAR and additional consultation with the communities surrounding the site, 17 turbines were removed from the site in order to improve landscape and visual concerns amongst other things. A further 4 turbines were reduced in tip height and 2 new turbines have been added within the forestry. These changes in the layout are summarised in Table 3.3 and the related figures.
- 3.5.8 More information regarding the different turbine specifications can be found in Section 2: Detailed Project Description of this AI. For further information on the landscape and visual assessment of the revised scheme, please see Section 6 of this AI, however a small summary will be included in this Section.

Access Tracks and Hardstands

- 3.5.9 From the outset and the early stages of the wind farm design process, particular attention has been paid to the existing forestry access tracks.
- 3.5.10 Experienced civil engineers from Community Windpower are satisfied that the existing access track quality, is suitable for that of wind farm usage, during the construction, operation and decommissioning phases. Therefore, in order to minimise the construction of new access tracks, this existing network has been utilised to its full extent.
- 3.5.11 Several environmental factors have been considered for any new track which is to be constructed, this includes but is not limited to GWDTE, peat, watercourse crossings, ecology, ornithology and cultural heritage.
- 3.5.12 With the removal of the 17 turbines in the submission of the AI, the amount of access track required has been reduced.
- 3.5.13 More information regarding the specifications of the access tracks and hardstands can be found in Section 2: Detailed Project Description of this AI.

Borrow Pits

- 3.5.14 When choosing the locations for borrow pits, key environmental factors have been considered including but not limited to geology, peat, watercourses and GWDTE.
- 3.5.15 A number of borrow pit locations have been micro-sited or in some cases have been removed from the scheme since the submission of the EIAR. This is due to more suitable locations being highlighted that had a reduced risk on GWDTE and other ecological features, and because less stone is required to build the wind farm due to the removal of turbines and a reduction in the length of access tracks which are required.
- 3.5.16 Borrow pits N6, N7 and N8 have been relocated, and 2 further borrow pits have been removed completely – N1 and N4. These changes are discussed in Appendix 2.3: Borrow Pit Assessment & Outline Scheme of Works which supports Section 2 of the AI.
- 3.5.17 Where possible, existing borrow pits and quarries are to be used to avoid further environmental impacts.
- 3.5.18 Both the new and existing borrow pits, alongside the areas of search are shown in AI Figure 3.12. More information regarding the borrow pits can be found in Section 2: Detailed Project Description of this AI.

Substation & Control Room and Energy Storage Facilities

- 3.5.19 Prior to the establishment of GWDTE communities, utilising local geology data to locate high productivity baseline geology which would lead to the creation or possibility of a GWDTE community was used.
- 3.5.20 Using this data, it was determined that the initial siting of the substation and its associated infrastructure would have directly impacted highly sensitive GWDTE habitat.
- 3.5.21 To rectify this, the substation and associated infrastructure were relocated more than 250m south so that it was out with this sensitive habitat.
- 3.5.22 This movement can be seen in AI Figure 3.13 and was done prior to the submission of the EIAR.

- 3.5.23 This movement may cause a small increase in the zone of theoretical visibility, however this is a necessary balancing act, where one environmental receptor takes precedence over another.

Site Reconnaissance and Data collection

- 3.5.24 After the initial site criteria were met, further studies were commissioned and undertaken by independent specialists in the relevant fields. These surveys consisted of the following:
- Cultural Heritage
 - Ecology
 - Ornithology
 - Hydrology, geology and hydrogeology
 - Noise
 - Landscape and Visual.
- 3.5.25 These surveys correspond to Sections within the EIAR and this AI and the results of which were used to influence the original design of the site including wind turbine locations, access tracks, hardstands, borrow pits, substation and control room, as well as the changes made as part of this AI submission.

Cultural Heritage

- 3.5.26 In the first instance when looking at cultural heritage, a 10m buffer was placed around all known assets. These were then surveyed in more detail during the assessment undertaken by Headland Archaeology. This consisted of several site visits from February 2020 through to April 2023.
- 3.5.27 The full assessment consisted of the following stages:
- Definition of baseline conditions, comprising desk-based study and visits to heritage assets, leading to the identification of the cultural significance and importance of heritage;
 - Assessment of the magnitude of impacts (physical, indirect, setting and cumulative) during construction and operation of the Proposed Development. These are informed by baseline information, site visits, Zone of Theoretical Visibility (ZTV) mapping, wireframes and photomontages;
 - Proposal of mitigation measures to eliminate, reduce or offset adverse effects; and
 - Assessment of the significance of effects, broadly a product of the asset's importance and the magnitude of the impact.
- 3.5.28 The Dryfe Archaeological Sensitive Area (ASA) lies to the south of the Proposed Development (number 20, DGC, 2018) which is an area of archaeological importance as designated by DGC. In the early stages of site design and evolution, the boundary was altered to move the development out with of the ASA.
- 3.5.29 Within the ASA is Rangecastle hill (Viewpoint 5). This viewpoint aided in the EIAR design and layout of turbines and was consequently also part of the reasoning behind the reduction in height and removal in a number of turbines in the southern areas of the development. This was further remedied by the removal of four turbines in the south and the reduction in tip heights of another four turbines during the AI changes which are shown in Layout H, details of which are found in Table 3.3.
- 3.5.30 The full study methodology and results can be found in Section 9 of this AI which has been written to fully replace the previous EIAR chapter on cultural heritage.

Ecology

3.5.31 The ecology surveys were undertaken by Starling Learning, who first began surveys on this site in 2017. These surveys consisted of the below bullet points with the exception of the electrofishing surveys which were conducted by the River Annan District Salmon Fishery Board in summer 2018.

- Phase 1 habitat survey*;
- NVC survey*;
- Bats;
- Badgers ;
- Otters;
- Water voles;
- Red squirrels;
- Pine martens;
- Reptiles; and
- Amphibians.

3.5.32 Where possible access tracks have avoided areas of GWDTE and remain outside their respective 100m buffer. In some instances, access tracks are to be floating tracks removing any potential impact on GWDTE.

3.5.33 All borrow pits have been positioned more than 250m from the nearest GWDTE. Therefore, no impact is predicted. Appropriate pollution prevention methods can be found in the outline CEMP submitted with the EIAR.

3.5.34 In a previous iteration of the wind farm infrastructure design, shown in Table 3.3 an additional borrow pit was located in the north-west of the development. However, upon further ecological surveys it was discovered that the borrow pit was located in close proximity to either one or a series of badger sets. It was therefore decided to remove this borrow pit.

3.5.35 Further surveys were done on assessments marked with an asterisk listed above in paragraph 3.5.31 which were then used to inform the AI layout.

3.5.36 More information regarding the ecology surveys, methodology and results can be found in Section 8: Ecology of this AI and the original EIAR.

Ornithology

3.5.37 The ornithology surveys were undertaken by Starling Learning and began in 2017 with a Scoping Survey. Following this, the surveys lasted for two years with some additional surveys in 2020. These consisted of the following:

- Vantage point surveys during the breeding, non-breeding and migration seasons (500m buffer);
- Breeding bird surveys including Brown and Shepherd Wader Survey (500m buffer);
- A bird habitat appraisal;
- Walkovers and point counts (500m);
- Nightjar survey (1km);
- Black Grouse Survey (1.5km); and
- Raptor survey (2km) and golden eagle (6km).

3.5.38 All site infrastructure placement has also considered the results of the ornithology surveys in order to reduce the potential for impacts on birds.

3.5.39 More information regarding the ornithology surveys, methodology and results following the revised layout, can be found in Section 7 of this AI.

Hydrology, Geology and Hydrogeology

3.5.40 In the first instance, a 50m buffer was applied to all watercourses within and surrounding the site. No infrastructure is to be placed within this buffer in order to protect the watercourses from pollution. More mitigation measures are detailed in the outline CEMP.

3.5.41 Natural Power were commissioned to undertake in depth studies of the site in relation to hydrology, geology, and hydrogeology. These surveys stated in 2019 and included:

- Watercourse Crossing Assessment;
- Peat Stability Risk Assessment;
- Private Water Supply Risk Assessment; and
- Phase 1 and 2 Peat Depth surveys.

3.5.42 The peat surveys found that there are only isolated pockets of deep peat within the development boundary. In some instances, it has not been possible for access tracks to avoid these locations and an engineered mitigation solution is proposed in the form of floating tracks. Details of the proposed floating roads can be found within the Peat Management Plan.

3.5.43 Using the initial phase 1 peat surveys, borrow pits have been positioned where peat depths are only 0.5m or less. These can be classed as peaty soils, thus the total extraction of peat is zero. Further information in regard to peat can be found in EIAR Section 10: Hydrology in Technical Appendix 10.3: Peat Management Plan.

3.5.44 More information on hydrology, geology and hydrogeology can be found in Section 10 of the EIAR and updated information in Section 10 of this AI.

Proximity of Dwellings

3.5.45 Potential noise, shadow flicker and residential visual amenity impacts have been given consideration during the design iterations to ensure minimal effects on nearby residents.

3.5.46 In the first instance, a 1km buffer was placed on all residential properties to not only mitigate against residential amenity impacts, but also to reduce the noise impacts and reduce shadow flicker.

3.5.47 Turbines T52, T53, T54, T55, T57, T09 and T10 from the scoping layout as presented in AI Figure 3.3 have been removed or relocated in the development area and T58 has been moved north-west by 500m. This has increased the distance from the nearest turbine between the development and the village of Boreland by 1.8km. The turbine in closest proximity to Boreland is now 4km away.

3.5.48 A further 17 turbines were removed after the EIAR was submitted, which set the turbines back further from residential areas and properties in the south and west of the development.

3.5.49 Hayes McKenzie undertook a detailed noise assessment which is found in Section 11: Noise of this AI. The results of this and also the residential amenity assessment (Section 6: Landscape and Visual Impact Assessment, Appendix 6.2) were used to ensure the turbines were placed appropriately as to ensure minimal

impact to surrounding properties. Shadow flicker is also considered in Section 14: Other Considerations of the AI.

Landscape and Visual

3.5.50 Landscape and visual factors were taken into considerations during the early stages of the project, as these were understood to be key to the progression of the project. A number of information sources were used at the time to inform the design. It is important to note that a number of new policies and guidance have emerged during the evolution of the wind farm and when these have been released, the Applicant has reviewed the documents and taken them into account where necessary. These include, but are not limited to, the following:

- Dumfries and Galloway Wind Farm Landscape Capacity Study (2017); and
- Dumfries and Galloway Council's Landscape Capacity Study (Supplementary Guidance, February 2020).

3.5.51 Independent landscape architect, Optimised Environments Limited known as OPEN, have worked closely with the Applicant from the outset, reviewing the siting and design of the wind farm in order to minimise, as far as practical, the potential landscape and visual and cumulative effects of the Proposed Development.

3.5.52 As previously detailed, the Proposed Development consists of several different turbine heights due to taller turbines having access to more laminar wind which makes them more efficient. When evaluating whether a turbine was suitable for an increase in tip height, considerable thought was given to the landscape and visual impact on key receptors such as the Dryfe ASA, the village of Boreland, the town of Moffat and the approaches to the town.

3.5.53 The Applicant used the detailed viewpoint list and feedback from the site visits and fieldwork by CWL's Landscape consultant Optimised Environments Ltd (OPEN), alongside the response from North Milk Community Council, to create wireframes using the ReSoft WindFarm Software. This allowed the impact of any tip height changes (increased or decreased) to be evaluated per turbine and per viewpoint. Only where turbines posed no additional impact, were they chosen for an increase in tip height.

3.5.54 As a result, turbines which are in the centre of the of the proposed development and to the east, situated in extensive commercial forestry, have been increased in tip height by 10m from the turbine layout submitted at scoping. All turbines which are 225m and 250m tip heights are located within LCA 19a, which in Dumfries and Galloway Councils wind farm capacity study (2017) is the only area in Dumfries and Galloway that can accommodate very large turbines.

3.5.55 Following consultation post EIAR submission, a further 4 turbines were dropped in tip height from 200m to tip, to 180m to tip. This was done to alleviate the landscape and visual impacts, and residential amenity impacts to the south of the development. This was in addition to the removal of 17 turbines located at the edges of the development. More details regarding the design changes are shown in Table 3.3.

3.5.56 In response to the concerns over aviation lighting for turbines greater than 150m to tip, a number of photomontages can be found in Volume III of the AI which provide an updated illustration of how it may appear from 3 different viewpoints which form part of the night time visible aviation lighting assessment by OPEN. It is also important to note that the EIAR determined the worst-case scenario with all turbines being lit with 2,000 candela (cd) lighting. This is a worst-case scenario, and a more likely scenario was also demonstrated using 200 cd lighting.

3.5.57 Post EIAR and following further concerns raised by consultees in relation to the visual impact of the aviation lighting on the Proposed Development, CWL commissioned an independent aviation consultant, Aviatica, to prepare a reduced lighting scheme that could significantly reduce the number of aviation lights required if approved by the CAA.

3.5.58 As a result, the number of visible, medium intensity, nacelle lights have reduced from 75 in the EIAR layout to 17 in the revised Proposed Development, together with the removal of all 225 low intensity mid-tower lights. This reduced aviation lighting scheme has been reviewed and approved by the CAA and MoD, and it is presented within this AI. More detail on the reduced lighting scheme can be found in AI Section 14: Other Considerations.

3.5.59 Consideration of the Proposed Development in relation to other constructed, under construction, consented and submitted developments in the area is fundamental to fully assess the potential landscape and visual effects of the wind farm. Detailed consideration to design from a landscape and visual perspective is presented in Section 6: Landscape and Visual Impact Assessment of this AI.

Conclusion

3.5.60 By utilising a modern layout design set out above provides the following benefits;

- Reduced total number of foundation excavations;
- Reduction in access tracks required;
- Reduction in stone quarries required;
- Reduction in the number of turbines;
- Reduced removal of peat;
- Reduced number of abnormal loads;
- Reduced felling requirement which utilises keyhole felling;
- Increased site efficiency, displacing greater quantities of greenhouse gases; and
- Reduced ecological impact on sensitive receptors.

3.6 Consultation

3.6.1 Consultation is an important part of the evolution of a site and is carried out to:

- Identify any further key considerations;
- Clarify the key points raised during the initial feasibility assessment;
- Promote communication with both statutory and non-statutory consultees and other stakeholders concerning key issues; and
- To confirm and agree the proposed methods for survey, evaluation and assessment.

3.6.2 The evolution of a viable wind farm design relies on consultation and guidance provided by statutory and non-statutory consultees. The Applicant submitted a scoping request in May 2019 and subsequently received the scoping in August 2019. This prompted further engagement with consultees in order to achieve a viable design.

3.6.3 The EIAR was submitted in November 2020 which also received feedback from consultees and led to further design changes based on these comments. Both the scoping responses and the EIAR feedback is summarised below, along with subsequent design changes that were considered as a result of this feedback.

Dumfries and Galloway Council – Landscape Architect

- 3.6.4 One key factor in determining the viability of the proposed wind farm was the Dumfries and Galloway Council Local Development Plan (adopted in 2014) and later the 2017 wind farm guidance.
- 3.6.5 Post scoping, and before the EIAR was submitted, the Dumfries and Galloway Local Development Plan 2 (adopted in October 2019) was considered to further ensure that the wind farm was sited in an area preferable for wind energy development. Specifically, the Wind Energy Spatial Framework ‘MAP 8’, which identifies the development site as an ‘Area with potential for wind farm development’. Notwithstanding this, CWL and the Applicant sought guidance from the Dumfries and Galloway Landscape Architect both at scoping and thereafter.
- 3.6.6 Dumfries and Galloway Councils response to the scoping request failed to include any representations from their Landscape Architect and referred only to the characteristics of the various landscape character types that may be affected by the Proposed Development. This response provided only the planning and policy guidance background as captured in the Councils adopted Development Plan. Site specific comments were limited only to the viewpoint selection and sensitive receptors to be considered.
- 3.6.7 Comments from the Dumfries and Galloway Council Landscape Architect to the scoping request were subsequently submitted to the Applicant on 4th June 2020, some thirteen months later. Unfortunately, this delay meant the wind farm design and LVIA methodology, visualisations and figures were already completed, before this response was issued.
- 3.6.8 Following the submission of the EIAR in November 2020, interim comments were received from Dumfries and Galloway Councils Landscape Architect in November 2021. The report recommended that the Council object to the scheme for the following reasons:
- To the west and south of the scheme, where turbines would be overwhelming to the setting, scale character, views and visual amenity of the main Annandale valley, the upper glen of the Annan, the Wamphray Water and the Dryfe Water valleys.
 - The scale of turbines to the north of the scheme, where proximity to the Moffat Hills Regional Scenic area (RSA), the Talla-Hart Fell Wild Land Area (WLA), and views from long distance recreational routes would be constraints to development.
 - The prominent day-time effects of the turbines would be exacerbated by aviation lighting, which would impact on the night sky for sensitive residential, recreational, and ‘dark sky’ receptors.
- 3.6.9 This report also recommended the following revisions to the EIAR scheme:
- The removal of 24 turbines;
 - The reduction in scale of a further 10 turbines;
 - An additional 4 turbines to either be removed or reduced in scale; and
 - The implementation of radar-activated aviation lighting or the resizing of all turbines to less than 150m to tip.
- 3.6.10 Following the receipt of these comments, several consultation meetings have been held between DGC and the Applicant and their landscape consultant from OPEN. DGC have also provided further landscape and visual comments to the Applicant and their landscape consultant during the design review process. Several ‘mitigation by design’ measures were adopted by the Applicant which resulted in the removal of 17 turbines and the reduction in tip height of a further four, which have led to positive changes in the following places:

- Views looking down Annandale along the A701 towards Moffat. The removal of turbines from the foothill’s benefits views from here.
- Views entering Moffat from the north and from within the town centre and conservation area. Turbines are much less prominent here and fewer are visible.
- From within Annandale, to the south of Moffat, views have improved by setting turbines further back into the uplands.
- Several residential properties have improved views and some even have no visibility.
- The field of view has been dramatically decreased along the Dryfe Water Valley.
- The turbines in closest proximity to Boreland have been removed which have improved views considerably.
- Visibility at Sandyford has been largely removed.

- 3.6.11 While the AI layout doesn’t incorporate all of the DGC Landscape Architects recommendations, as this would make the scheme unviable, the Applicant believes that the changes that have been made represent a good balance between alleviating landscape and visual concerns and the viability of the scheme. DGC’s Landscape Architect will be formally reconsulted as part of the AI process.

NatureScot

- 3.6.12 CWL and the Applicant have engaged with NatureScot on a number of occasions since the scoping request was submitted, with most of the communication relating to landscape and visual, ornithology and ecology. The comments/guidance in NatureScot’s scoping response focused on viewpoints, the Wild Land Area and turbine aviation lighting.
- 3.6.13 Following the submission of the EIAR, NatureScot submitted a formal response to the ECU. This included comments on landscape and visual impacts, ornithology, ecology, wild land areas and peat. Following this response, the Applicant has had several meetings with NatureScot to discuss their comments in more detail. Following meetings with NatureScot on 5th November 2021, 27th January 2022 and 27th July 2022, the Applicant decided to remove a total of 13 turbines from the western side of the scheme, 4 turbines from the south-eastern side of the site, and another 4 turbines were also reduced in height to the south of the development. Removal of these turbines from the open ground, primarily the 13 turbines to the west, takes on board NatureScot recommendations to make changes to the wind farm layout and the Applicant has applied mitigation through design, as per the Mitigation Hierarchy table.

RSPB

- 3.6.14 In 2018, the Applicant met with officials from both NatureScot and RSPB to discuss how the findings from the first year of ecological and ornithological surveys would impact on the second year of assessments. It was determined that particular attention should be paid to badgers, along with raptor species. RSPB and NatureScot suggested that key-hole felling would preserve the ecological standard better and compensatory planting may be better suited off-site.
- 3.6.15 At another joint meeting with NatureScot & RSPB, CWL and their ornithological consultant in February 2020, the findings of the two years of ecological and ornithology surveys were discussed at length.
- 3.6.16 Following RSPB’s consultation response from the EIAR, concerns in relation to osprey, golden eagle and black grouse have been addressed and further detail on this can be found in Section 7: Ornithology of this AI. This has been addressed through mitigation by design, as per the Mitigation Hierarchy Table, with the removal of 17 turbines. RSPB were informed of the changes to the layout at the end of 2022.

Scottish Water

- 3.6.17 Following scoping, The Applicant liaised with Scottish Water in order to minimise the potential impact on the adjacent Black Esk drinking water catchment.
- 3.6.18 During further consultation with Scottish Water it was determined that the proposed wind farm would propose a ‘Low’ risk to the drinking water catchment. Scottish Water requested that post planning, they would be involved with the final design of infrastructure that is located in close proximity to the catchment to ensure there is no risk to the Black Esk reservoir.
- 3.6.19 Following the submission of the EIAR and receipt of a further consultation response, Scottish Water were content that the submission contained all the relevant information and asked again that they have further involvement at the more detailed design stages, to determine the most appropriate proposals and mitigation within the catchment to protect water quality and quantity.
- 3.6.20 The Applicant is fully committed to working alongside Scottish Water and other consultees post-consent and pre-construction to ensure the protection of the Black Esk reservoir and its catchment.

SEPA

- 3.6.21 Following scoping, the Applicant attended a meeting with SEPA on 18th December 2019.
- 3.6.22 Potential issues and concerns with the proposal at scoping were raised, regarding peat, GWDTE, forestry, hydrology, borrow pits, pollution and waste management.
- 3.6.23 SEPA raised concerns on the proximity of the project to the Black Esk Drinking Water Catchment and they advised liaising with Scottish Water which was completed by the Applicant, as is discussed in the paragraphs above.
- 3.6.24 Concerns were raised over the quantity and quality of the stone required from on-site borrow pits and requested the stone was tested. During the construction phase of the wind farm, borrow pits would only be opened as required, and existing quarries would be used wherever possible to avoid excess excavations. In addition, the Applicant commissioned a stone quality assessment survey to ensure that the onsite material is of adequate quality and thus borrow pits with poor, fine material would not be opened, to reduce the risk of harming water quality.
- 3.6.25 Regarding the extensive onsite commercial forestry and associated felling required, SEPA requested that forestry waste is minimised and it should be considered within the Forestry chapter of the EIAR. This information can be found in Section 13: Forestry of this AI, with additional measures in the outline CEMP. Post planning there will also be a site waste management plan.
- 3.6.26 In addition, it was made clear by SEPA that sensitive ecological habitats must be protected by intelligent site design. During the design process every effort has been made to avoid siting infrastructure within ‘High’ and ‘Medium’ GWDTE. This has meant through the design process, there has been the movement of several borrow pits and the Substation and its associated infrastructure into ‘Low’ GWDTE areas.
- 3.6.27 With regards to hydrology, SEPA wished to see a thorough hydrological section submitted as part of the EIAR, which illustrates how the wind farm will have a minimal impact on private water supplies, flood risk and the hydrological environment of the development site. This was covered in Section 10: Hydrology, Geology and Hydrogeology of the EIAR and the updated section of this AI.

- 3.6.28 In their EIAR consultation response, SEPA raised concerns relating to peat depths and GWDTE. Following further correspondence between SEPA and the Applicant, concerns were alleviated resulting in SEPA removing their objection. Where appropriate, text has been included within this AI to cover SEPA’s comments, however no material design changes were needed in this instance.

Historic Environment Scotland (HES), Dumfries and Galloway Council Archaeology Officer and Built Heritage Policy Officer

- 3.6.29 During the site design process, CWL and archaeological consultant, Headland Archaeology, have discussed in detail the requirements of the Cultural Heritage assessment with Historic Environment Scotland (HES). CWL and Headland Archaeology have provided substantial information during the design process, including wireframes and ZTV’s.
- 3.6.30 HES outlined the most prominent heritage assets from their prospective, that lie within close proximity to the proposed wind farm, that should be taken into consideration in regard to turbine placement and height. Wireframes and/or photomontages of several assets as per the request of HES, have been completed and were incorporated into the EIAR.
- 3.6.31 Following receipt of the Dumfries and Galloway Council Archaeology Officer comments on the EIAR, it was recommended that DGC object to the scheme based on issues in relation to Policy HE3 in respect of the forts at Dundoran Hill and Rangepcastle Hill. The Built Heritage Officer also raised concerns about the potential impact of the proposed development on the Moffat Conservation Area and the Listed Buildings in the town. Five Listed Buildings were identified where the Officer would like to see further analysis.
- 3.6.32 As a result of the revisions to the layout, low magnitude impacts on one scheduled monument and one non-designated heritage asset, resulting in adverse operational effects of minor significance, have been designed out, with no impacts now identified upon MDG8943 Dundoran Hill fort (through the removal of T1-T7 leaving important views of this asset unaltered) and SM714 Wamphray Motte (through deletion of T1-T7, T35, T37 and T38 leaving important views of this asset unaltered).
- 3.6.33 The Applicant has also submitted revised visualisations and a revised assessment as part of Section 9 of the Additional Information and DGC will be reconsulted in relation to these matters.

Aviation and Infrastructure

- 3.6.34 The Applicant have engaged with BT, Atkins and JRC to establish if there are likely to be any impacts on microwave links as a result of the development.
- 3.6.35 When the final EIAR turbine design was established earlier in 2020, the Applicant re-contacted each of the consultees listed above with the final turbine layout.
- 3.6.36 All three consultees responded to confirm that they still anticipated no interference with their operational and planned links, and this was the case when they were consulted by the ECU following the submission of the EIAR in November 2020.
- 3.6.37 These Consultees will be reconsulted following the submission of this AI due to the revised layout proposal, however CWL expects all the responses to remain the same and that no objections will be raised. Therefore, no mitigation will be required.

3.6.38 More information regarding this can be found in Section 14: Other Considerations, of this AI and the original EIA.

Local Communities

3.6.39 CWL have actively engaged with the local host communities through meetings with Community Councils and public exhibitions. Community Councils were also invited to respond to the Applicants scoping request, EIA and this AI will also be circulated to them for comments.

3.6.40 In July 2019, three public exhibitions were held introducing the communities to the proposal and providing them with the opportunity to ask questions and comment on the proposal. These comments fed directly into the final design of the wind farm.

3.6.41 Further meetings with Community Councils were held throughout February and March 2020, providing local residents and businesses with an update on the evolving design and development programme. The Covid-19 pandemic then prevented further in person consultation, and virtual methods were used instead, where possible.

3.6.42 Below is a summary of the points that were raised by communities during consultation that took place before the EIA was submitted. More detail can be found in the Pre-Application Consultation report which accompanies the EIA. (Note: Turbine numbers referred to below are for those featured in AI Figure 3.3).

- Members of the community raised concerns over turbines (Scoping Layout Numbers) T52-T55 and their proximity to the Dryfe Archaeologically Sensitive Area (ASA);
- The proximity of turbines T52, T53, T54, T55, T57, T58, T10 and T09 and their visual impact on the village of Boreland and some of the more sensitive receptors such as the village Church;
- The Landscape and Visual Impact (LVI) of turbines T74, T75, T77 and T78 on the town of Moffat;
- The potential for increased flooding or the exacerbation of flooding which occurs in the Dryfe Valley, as a result of increased felling of commercial forestry and an increase in non-permeable surfaces;
- Access travelling through Boreland and North Milk could lead to a severe degradation of roads and significant disturbance to the residents who live on those roads;
- Concerns on cumulative LVI with the operational and consented schemes in the area;
- Proximity of turbines to local properties;
- The impact that the proposal could have on local tourism. Many local people operate their own tourist businesses; and
- The impact of Turbine Aviation Lighting on the Moffat dark sky area.

3.6.43 Following the submission of the EIA, a further four public exhibitions were held during July 2021. During these events, information was made publicly available regarding the submission and staff were on hand to answer any questions and to take on board any concerns raised.

3.6.44 Following this and the consultee consultation in relation to the revised proposal, the Applicant organised and attended a joint community council meeting on the 19th January 2023 to provide an in-depth update to representatives from the community councils on the changes to the scheme and all the work that had been done since the end of 2021.

3.6.45 Below is a summary of the points that were raised by communities during these consultations post EIA. More detail can be found in Section 5: Socio-Economics, Population & Community Involvement which accompanies this AI.

- Landscape and visual effects;
- Visual effect on residential amenity;
- Effects on the setting of cultural heritage assets;
- Potential ornithological impacts;
- Visual effects from aviation lighting mounted on the turbines; and
- Community benefit commitment.

3.6.46 The Applicant has listened to all of this feedback and has adjusted the Proposed Development to mitigate the potential for adverse environmental effects in relation to the above concerns.

3.6.47 Regarding the final bullet point, the Applicant has now committed to supporting the local host communities by awarding £5,000 per MW, which is expected to be a total of £2.16 million per annum. This will help with the delivery of the long-term community assets, as required by the local people, and is in line with the Scottish Government guidelines in relation to community benefits from onshore wind farms.

3.6.48 A summary of all the different design iterations can be found below in Table 3.3. These different iterations take into account the different site surveys and consultation responses discussed in this section.

Table 3.3 – Summary of the Evolution of the Wind Farm Layout

Layout	Development Stage/Date	Description	No. turbines	AI Fig. No.
A	Pre-scoping Report 2016	Initial turbine layout developed based on initial desktop assessments and initial site visits, 90 turbines proposed at 150 m to tip and a total capacity of 360MW.	90	3.2
B	Scoping Report April 2019	Revised layout issued as part of the 2019 Scoping Report. Following a more detailed site investigation, ongoing changes within the Onshore Wind sector, and availability of new land areas, it was decided to use larger turbines. Wind flow modelling illustrated that the revised, larger turbine layout provides greater wind capture and greater turbine performance, which would be beneficial in the post-subsidy era of Onshore Wind. Tip heights were increased to 240m, thus the separation between turbines increased. This resulted in a total of 80 turbines with an increased capacity of 560MW as 7MW turbines could be implemented. Following a re-assessment of environmental and technical constraints within and near the development area, several turbine clusters were re-located and/or re-adjusted following the increase in turbine size.	Maximum of 80	3.3
C	August 2019	Following scoping responses, community consultation and meetings with local people, the Applicant endeavoured to meet all appropriate recommendations. Several turbines were re-located or removed to reduce LVI and impact on	78	3.4

		<p>the Dryfe Archaeological Sensitive Area and larger population areas such as Boreland and Moffat.</p> <p>This included detailed analysis of turbine visibility and views from key viewpoints including Samye Ling, Boreland Church, Moffat High Street, A401 north of Moffat, Southern Upland way and Range Castle Hill.</p> <p>Following this, all turbines were initially reduced to 200m tip heights and turbines T52, T53, T54, T55, T57, T58 were either removed or relocated further into the development.</p> <p>Initial survey results from some of the consultancy works such as phase 1 peat surveys and ecology & ornithology surveys, were also taken into consideration.</p>		
D	<p>EIAR Turbine Layout</p> <p>November 2020</p>	<p>From the previous layout, T09 and T10 were moved further north in the development to reduce views from the Dryfe Water Valley and Range Castle Hill.</p> <p>T72, T74, 75 and T77 were dropped from 200m to tip to 180m to tip, whilst T78 was removed completely. This was to reduce the visual impact on Moffat even further. T62 was removed to reduce visual impact on residential receptors in the Wamphray area.</p> <p>The final wind turbine design contains 75 wind turbines, 4 at 180m to tip, 2 turbines at 225m to tip, 47 at 200m to tip and 22 turbines at 250m to tip.</p> <p>Turbines in most appropriate areas were increased to 250m tip heights. This counteracts a decrease in turbine spacing to increase turbine density in parts of the development with reduced turbine visibility.</p> <p>It was at this stage that wind farm infrastructure was also added to the final layout, this included hardstands and access tracks which were designed to avoid sensitive areas where possible, as well as minimise visual impact. Other infrastructure, including construction compounds, substations, borrow pits and a meteorological mast. The final design was further refined with advice and recommendations from the EIA consultants and key consultees. Specifically, the movement of the substation, and construction compounds which were relocated slightly south west to avoid GWDTE.</p> <p>The wind turbines were also re-numbered to give continuity after turbines were removed from the scheme.</p>	75	3.5

E	Turbines 8, 9 and 10 Removed	Following a number of meetings with DGC and NatureScot and discussions about the mitigation options available for the Proposed Development, the Applicant decided to remove 10 turbines, T1-T10, from the west of the scheme.	72	3.7
F	Turbines 1, 2 and 3 Removed	The removal of these turbines also improves the landscape and visual impacts on Moffat, its Conservation Area and Dundoran Hill Fort which is in line with recommendations from DGC’s Landscape Architect and Archeologist.	69	3.8
G	Turbines 4, 5, 6 and 7 Removed	<p>Removal of these turbines from the open ground takes on board NatureScot recommendations to make changes to the wind farm layout and the Applicant has applied mitigation through design, as per the Mitigation Hierarchy table.</p> <p>This was done in stages (Layouts E to G) in order for the impacts from each stage to be fully assessed to ensure that the schemes viability would remain intact, and that the turbines’ removal was having the most impactful benefits to the wider area.</p> <p>To ensure that the area was used to its maximum potential in terms of energy generation, a further two turbines were added back into the scheme – turbines 76 and 77. These were located within a forested area so as not to impact the ornithology in the area.</p> <p>Due to these changes in turbines, there has also been subsequent changes to the access tracks.</p>	67	3.9
H	Southern Layout Changes	<p>Turbines 54, 56, 61 and 62 were removed from the southern edge of the development, turbine 63 was micro-sited 99m south east and the tip height reduced to 180m for turbines 51, 53, 55 and 57.</p> <p>The removal of these turbines and reduction in tip height reduces the impact on residential properties in Sandyford and Boreland. Specifically, the removal of outlying turbines 61 and 62 reinforces the impression that the turbines are now located within the upland parts of the foothills.</p> <p>In addition to this, some of DGC’s built heritage concerns were also addressed by these changes as there is a reduced impact on Rangecastle Hill.</p>	63	3.10
I	Final AI Layout	<p>Finally, turbines 35, 37 and 38 were removed from the south-western edges of the development.</p> <p>The removal of these turbines reduces landscape and visual impacts on Wamphray, and the residential amenity impact on Wamphraygate which will in fact have no visibility.</p>	60	3.11 3.12

		<p>This final design also saw:</p> <ul style="list-style-type: none"> • An increase in size of the substation construction compound as this will become the location for the primary battery energy storage system. This is shown in AI Figure 3.13. • The relocation of borrow pits N6, N7 and N8 and the removal of borrow pits N1 and N4; • Removal of one temporary construction compound located within Wamphray Water valley, south of Braefield; and • Removal of three satellite battery storage facilities, there will just be one main storage facility located on the temporary construction compound adjacent to the main substation. 		
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3.6.49 The different stages of the wind farm iteration process are shown in AI Figures 3.2 to 3.11 and the final turbine and infrastructure layout is illustrated in AI Figure 3.12.

3.7 Final Turbine and Infrastructure Locations

3.7.1 The final turbine layout has been designed to effectively capture the energy from the wind in order to maximise the energy yield from the site, whilst minimising potential impacts to the environment.

3.7.2 The final design of the wind farm features 60 turbines comprising of:

- 6 wind turbines will have a maximum tip height of 180m (increased by 2 turbines since EIAR);
- 29 wind turbines will have a maximum tip height of 200m (reduced by 18 turbines since EIAR);
- 2 wind turbines will have a maximum turbine height of 225m; and
- 23 wind turbines will have a maximum tip height of 250m (increased by 1 turbine since EIAR).

3.7.3 The candidate turbines have a minimum rated capacity of 7.2 MW, so the combined generating capacity of the wind farm will be around 432 MW.

3.7.4 Following ongoing consultation during the scoping process and post EIAR, the Applicant has endeavoured to address the majority of the landscape and visual concerns raised by local communities and statutory consultees and ultimately reduce the footprint of the wind farm infrastructure. This has subsequently involved a reduction in the scheme from the first layout design in AI Figure 3.2 of up to 90 turbines down to 60 turbines in the layout presented in this AI in AI Figure 3.12.

3.7.5 The results of the site evolution and design process demonstrate that the turbine layout is considerably improved and refined in terms of the visual impact from key viewpoints. The resultant reduction in the scheme to 60 turbines and the further reduction in height of turbines is considered to be an appropriate number of turbines to be accommodated on the site, within the design parameters.

3.7.6 The benefits of the final turbine and infrastructure layout are as follows:

- Reduces the prominence of a number of turbines from key viewpoints;
- Reduces the potential visual appearance of turbines in residential areas;
- South-westerly turbines have been removed which tightens up the layout and reduces the overall development envelope;
- Turbines and infrastructure have been located out with of areas of deepest peat wherever possible, to protect the valuable carbon store. In the limited cases where this is not possible, suitable mitigation has been provided;
- The layout is more cohesive and reduced the number of ‘clusters’ within the development area;
- Consideration has been given to the existing core path network and where possible turbines have been located more than 200m from core paths. Upgrades to the core path network are suggested in the Section 5: Socio-Economics, Population & Community Involvement and the Commitment to Communities report;
- Keeping turbines in the less sensitive landscapes of Southern Uplands, Foothills and Foothills with forestry reduces the visual impact;
- Existing forestry and agricultural access tracks and existing quarries/borrow pits have been utilised where possible to reduce the requirement for new access tracks, gates and new borrow pits; and
- Reduction in the quantity of commercial forestry felling by utilising taller turbines.

3.8 Conclusion

3.8.1 The site selection process has identified that Scoop Hill is an excellent location for a wind farm and the following warrant its development:

- The development falls almost entirely within the only preferred area for wind farms with very large turbines in Southern Scotland, as seen in AI Figure 3.14 and Map 8 within the Dumfries and Galloway Council Local Development Plan 2 (2019);
- A strategic and significant contribution to Net Zero energy supplies can be achieved quickly once planning permission is granted as the Applicant has a contracted 500MW grid connection date of August 2025, thus positively contributing towards the Scottish Governments renewable energy targets for 2030 and net-zero by 2045;
- The site possesses exceptionally high average wind speeds, well above 7 m/s. It is anticipated that the capacity factor will be 45% for the Scoop Hill scheme;
- The wind farm will harness the latest technological advancements in wind turbine technology, allowing more efficient and productive wind turbines to contribute to the ambitious targets as set out in the Draft Energy Strategy and Just Transition Plan ;
- The site is located significantly in an area of extensive commercial forestry in an upland setting, which has been identified by the local authority as the “only” area for large wind farm development;
- Proximity to the A74M allows for access to the development with less disruption than more rural and isolated development;
- The wind farm would generate clean, green electricity, using the natural resource of the wind, powering over 450,000 homes and displacing almost 29.5 million tonnes of carbon dioxide over the 40-year operational lifetime of the wind farm;
- The wind farm development would deliver significant economic investment into the local area and Scotland as a whole, through business and job opportunities, local expenditure, development of community assets and over £85m in community funds for Just Transition.

- 3.8.2 The final AI layout of the turbines and site access tracks has been developed through an iterative design process based upon the assessment of technical, planning and environmental constraints and following extensive consultation with key consultees, communities and EIAR consultants.
- 3.8.3 For all these reasons, the Applicant believes this final scheme is an appropriate and well-designed scheme, strategically located in an established and accepted wind farm landscape, is sustainable, and will deliver a substantial contribution towards Scotland and UK targets for renewable energy generation, helping to achieve a net-zero energy mix and a reduction in carbon dioxide emissions.

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Appendix 3.1 – Consented sites since 2020 with tip heights of 200m and above

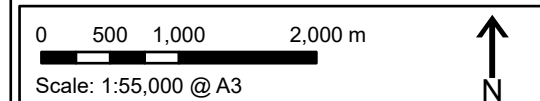
Project Name	Tip Height	Year Consented
Lethans Wind Farm (2019)	220	2020
Hagshaw Hill Wind Farm Repowering	200	2020
Cumberhead West Wind Farm	200	2021
Arecleoch Wind Farm Extension	200	2021
Douglas West Wind Farm Extension	200	2021
Crystal Rig Wind Farm (Phase IV)	200	2021
Fetteresso	200	2022
Roths III	225	2022
Kennoxhead Wind Farm Extension II	220	2023
Strathy South	200	2023
Margree (Revised)	200	2022
Fell	200	2021

374 Scoop Hill

Legend

- Site Boundary
- Residential Buffer (1000m)
- Watercourse Buffer (50m)
- Railway Buffer (275m)
- Road Buffer (275m)
- Site of Special Scientific Interest (SSSI)
- Special Protection Area
- Ancient Woodland
- Semi-Natural Woodland
- Scheduled Monuments
- Listed Buildings
- Gardens and Designated Landscapes
- Conservation Area
- Archaeologically Sensitive Area

Notes: N/A
Revisions: N/A

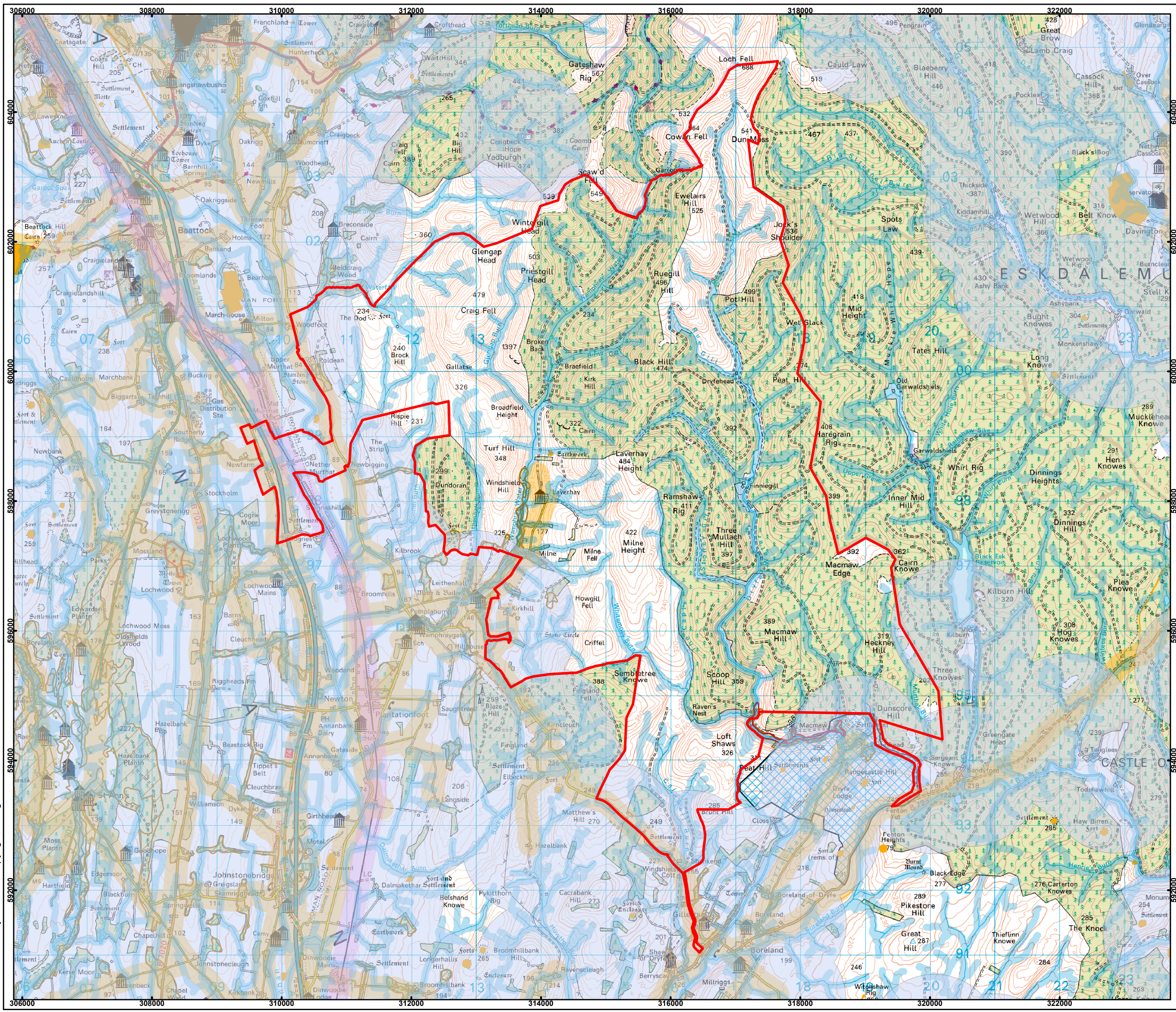


AI Figure 3.1:
Constraints Assessment

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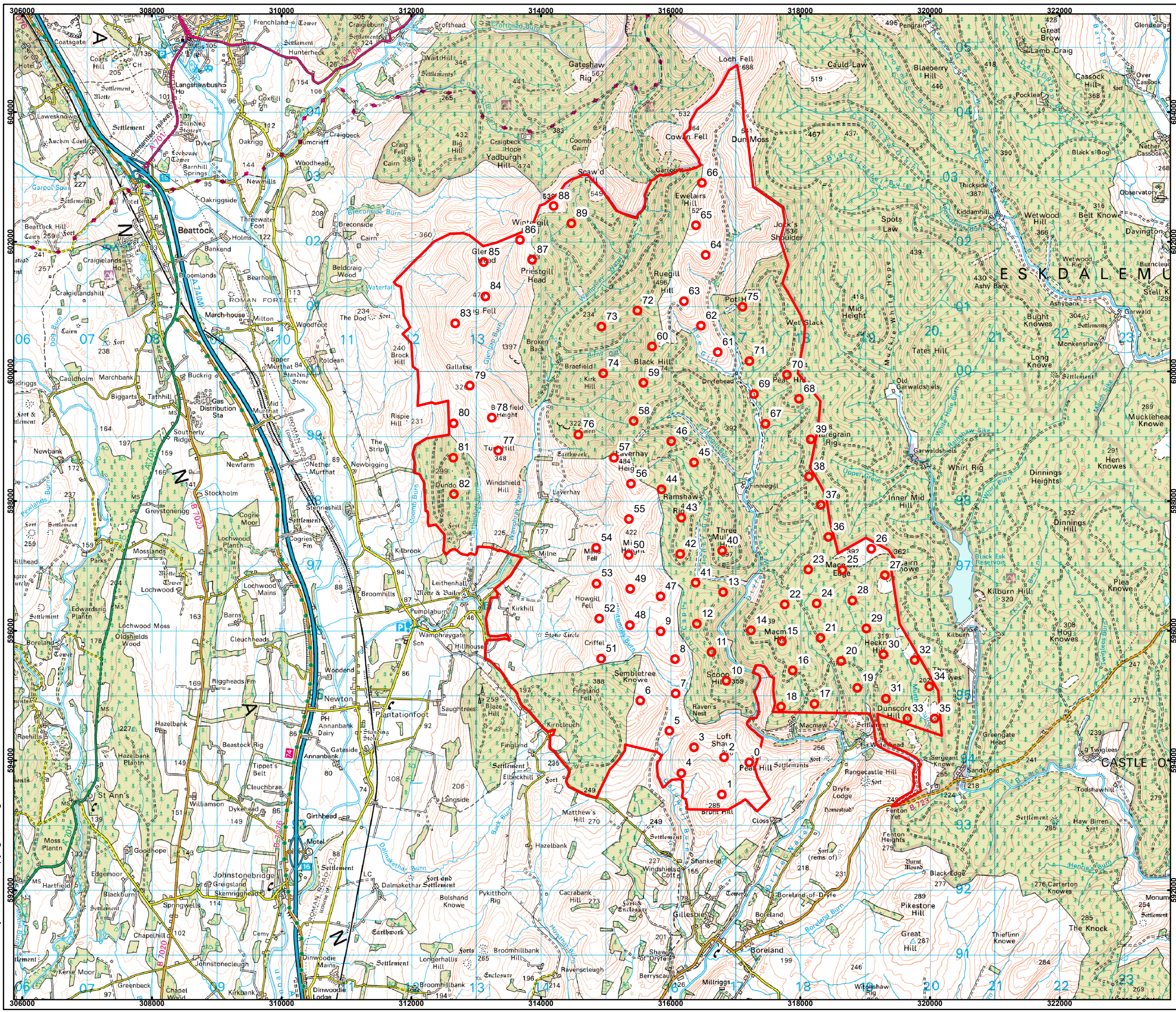
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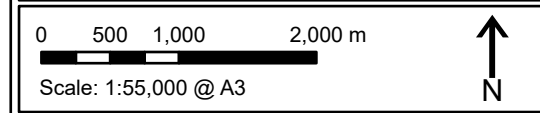
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (150m to Tip)



Notes: N/A
Revisions: N/A



AI Figure 3.2 - Layout A

Date: 05/05/2023 Ref: 374-230505-7764
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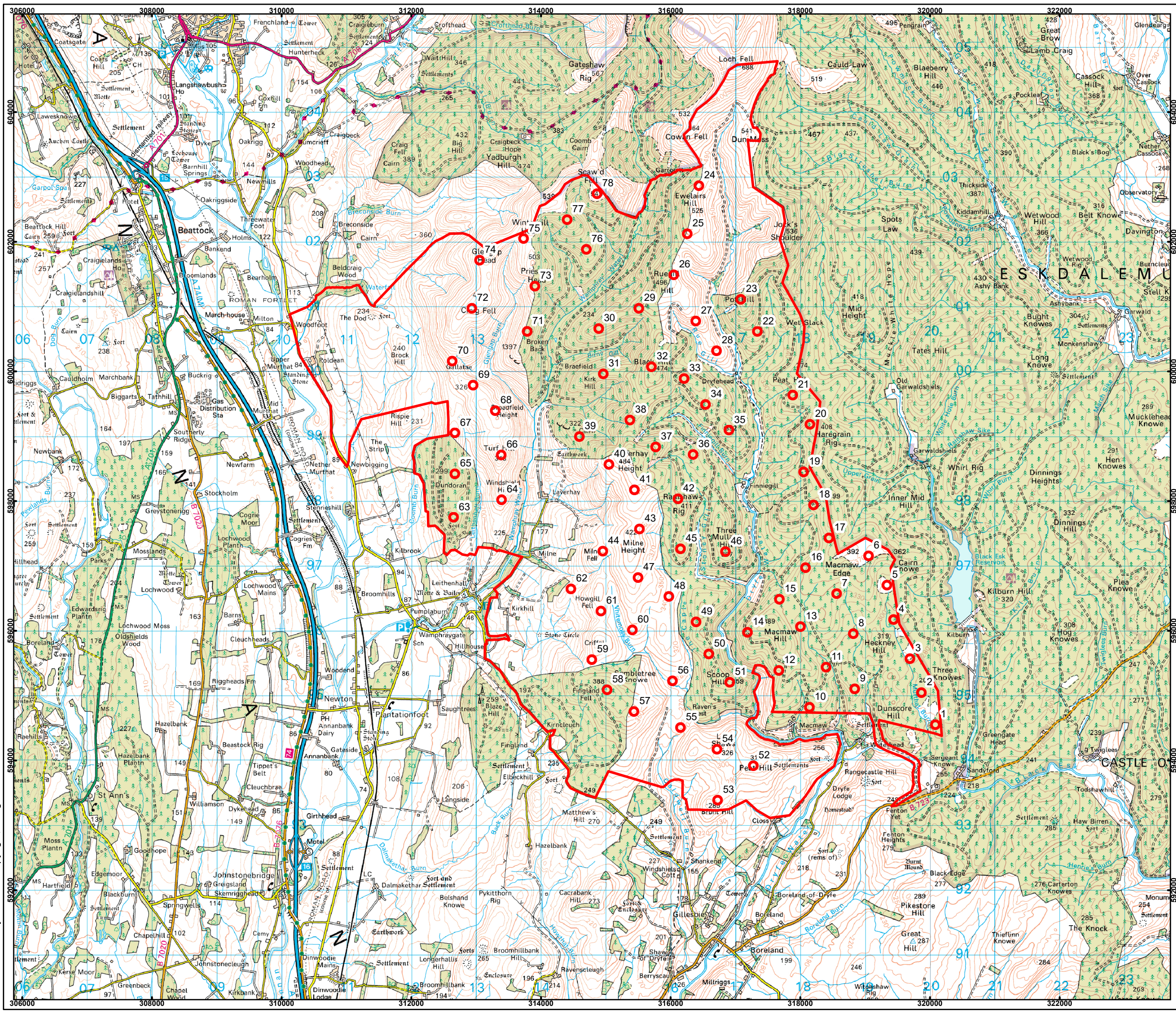
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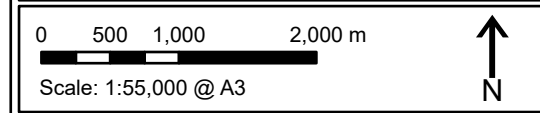
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (240m to Tip)



Notes: N/A
Revisions: N/A



AI Figure 3.3 - Layout B

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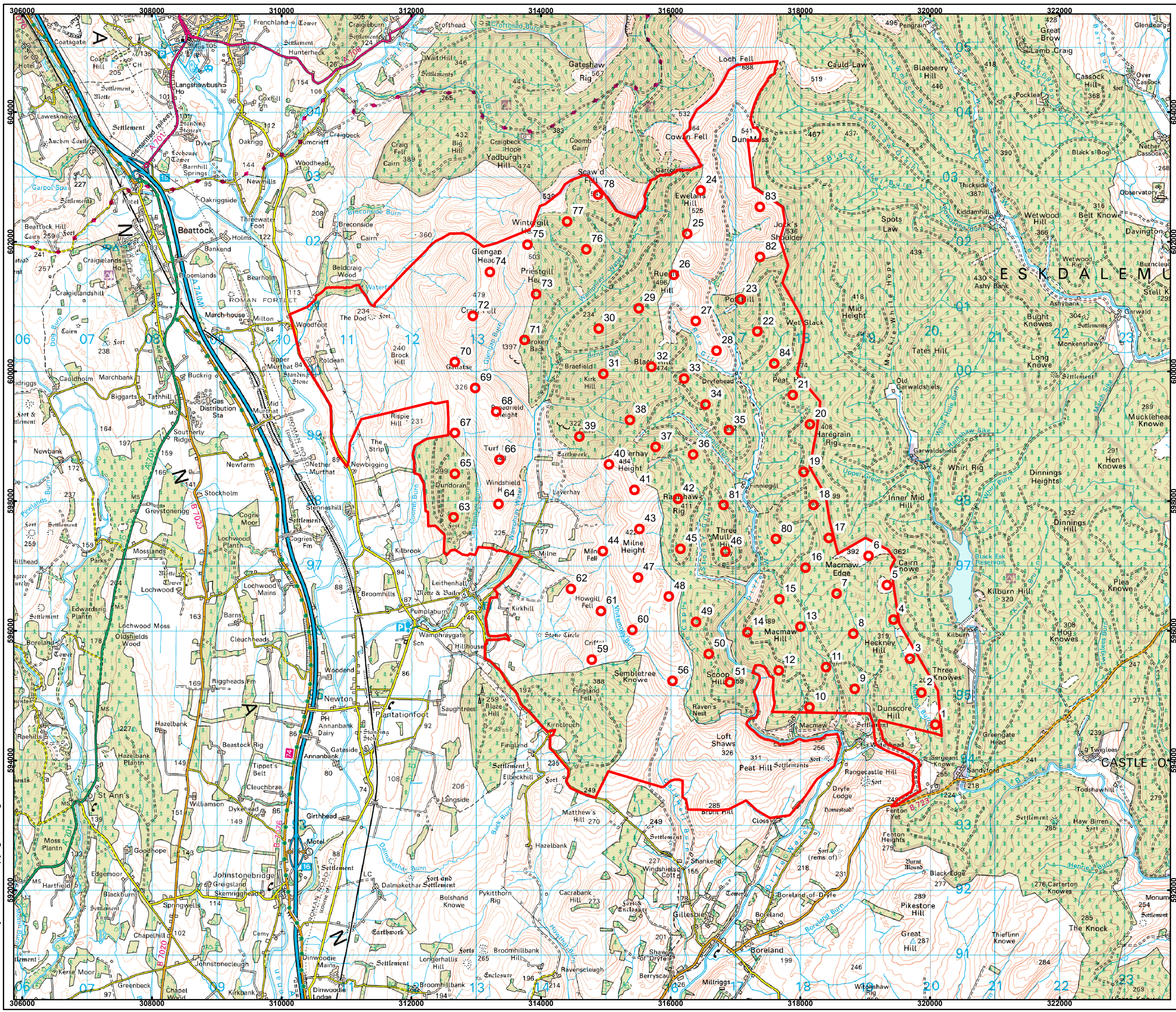
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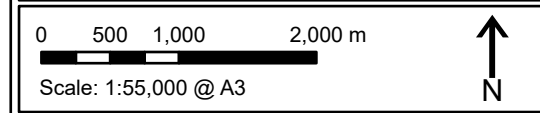
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (200m to Tip)



Notes: N/A
Revisions: N/A



AI Figure 3.4 - Layout C

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Produced: TR Reviewed: DW Approved: GC








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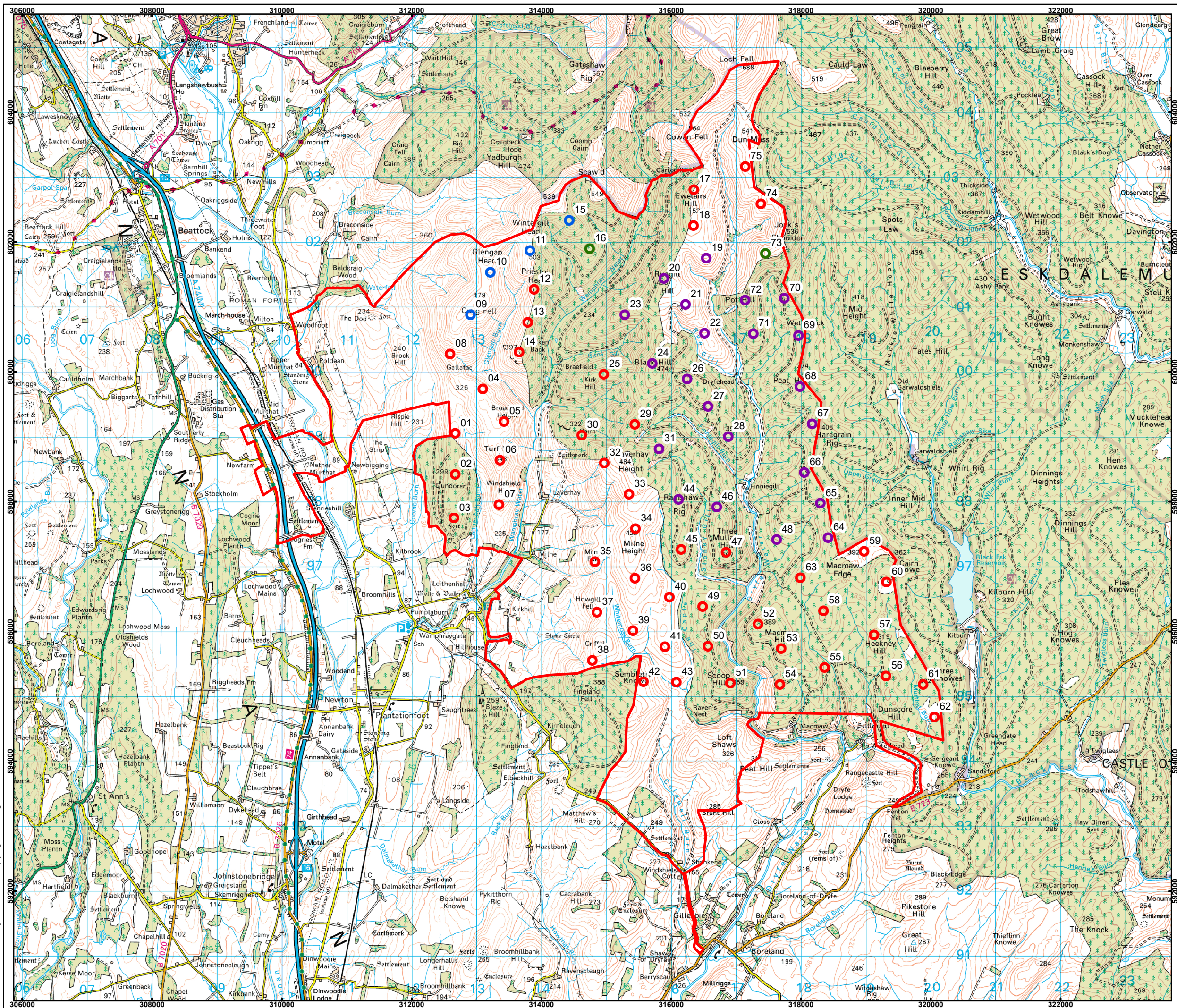
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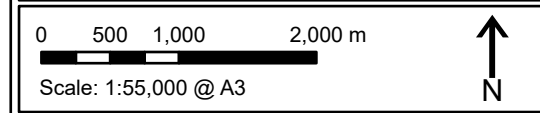
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)



Notes: N/A
Revisions: N/A



AI Figure 3.5 - EIAR Layout

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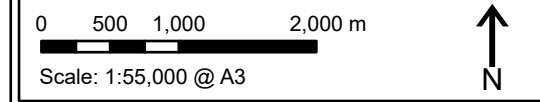
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374 Scoop Hill

Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- ◆ Permanent Met Masts
- Access Tracks
- Site Entrance
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Notes: N/A
Revisions: N/A



AI Figure 3.6 - EIA Layout with Infrastructure

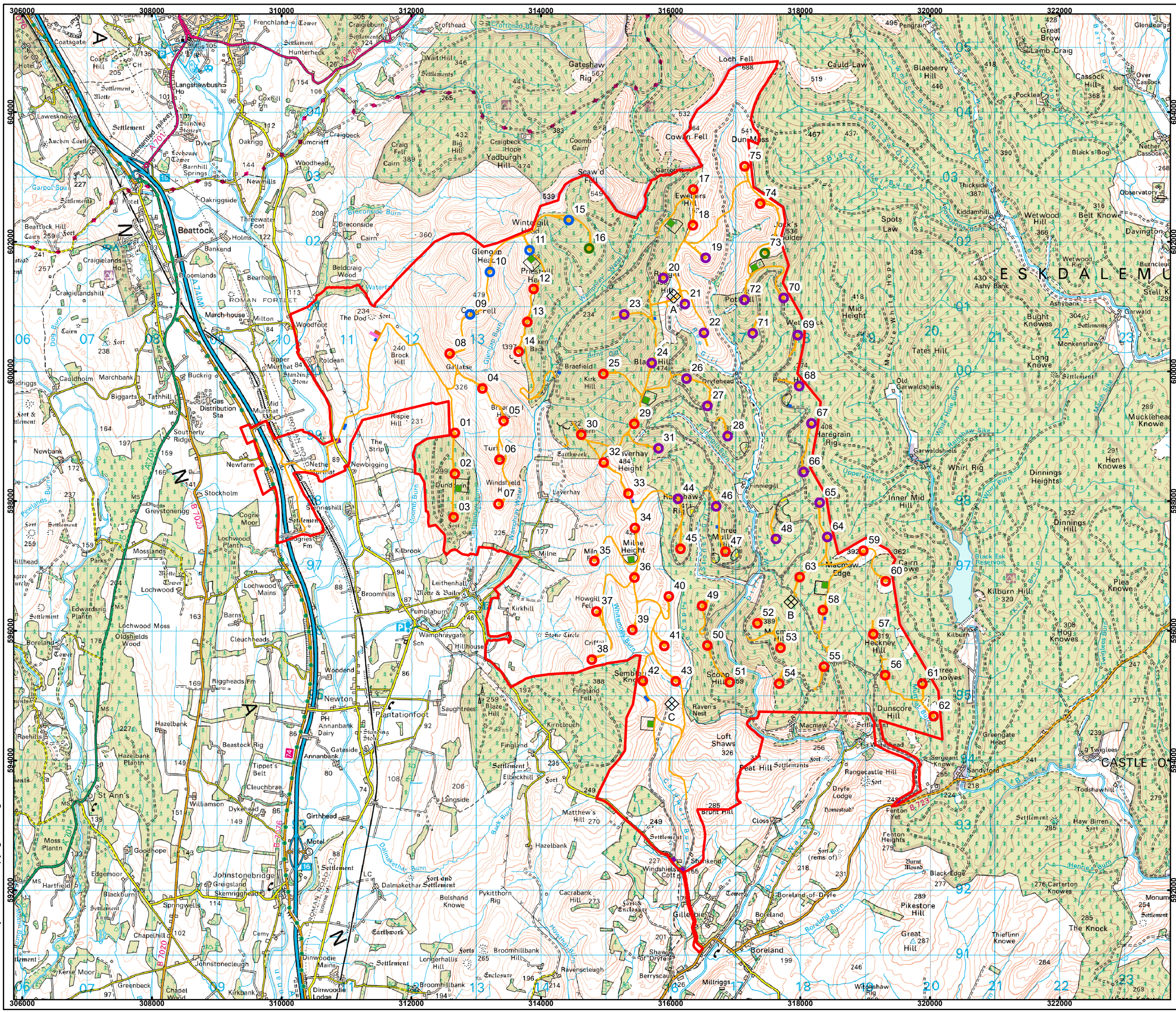
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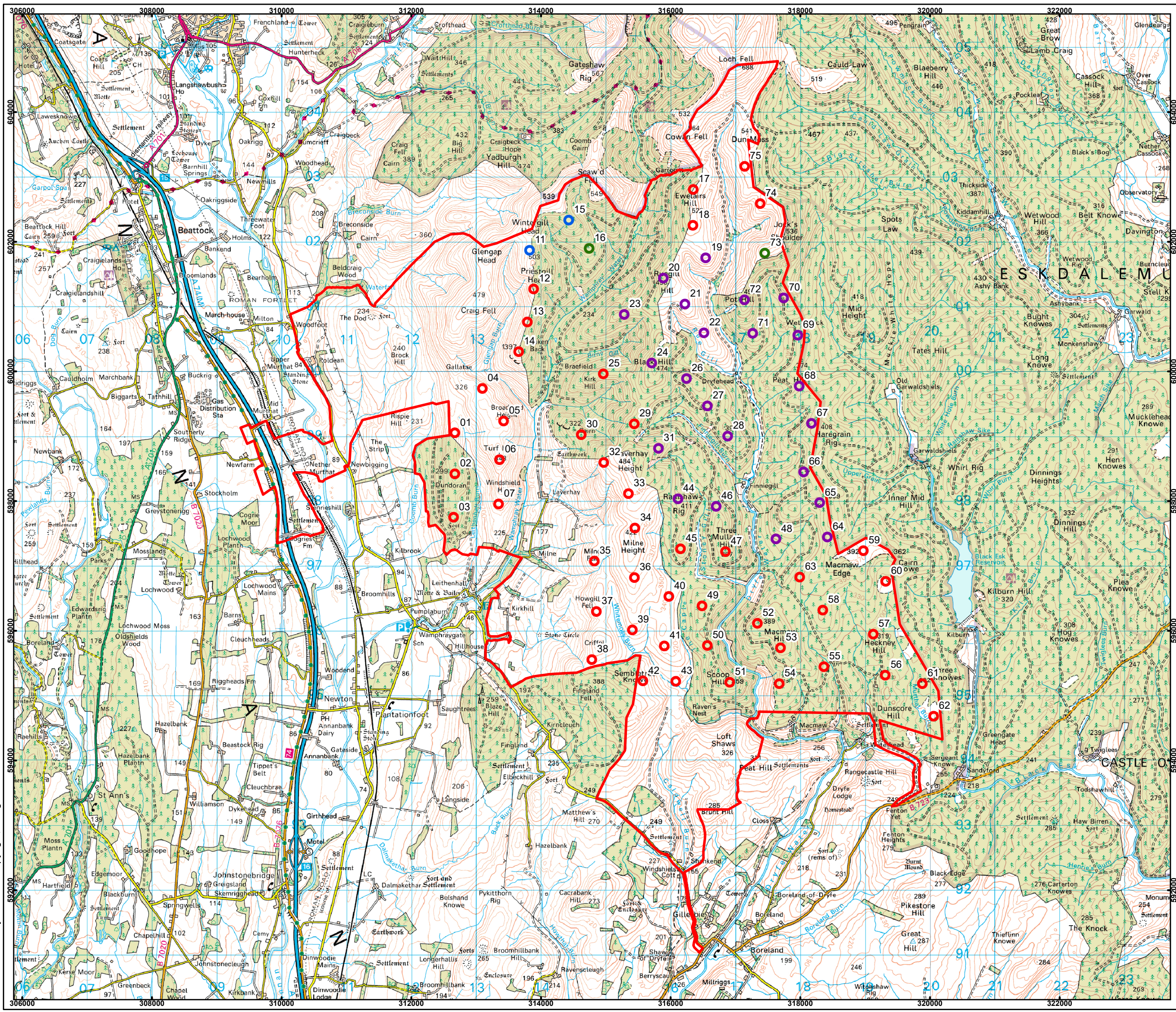
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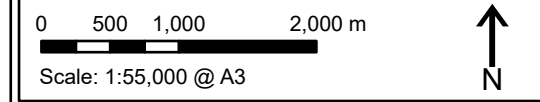
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)



Notes: N/A
Revisions: N/A



AI Figure 3.7 - Turbines 8, 9 and 10
Removed

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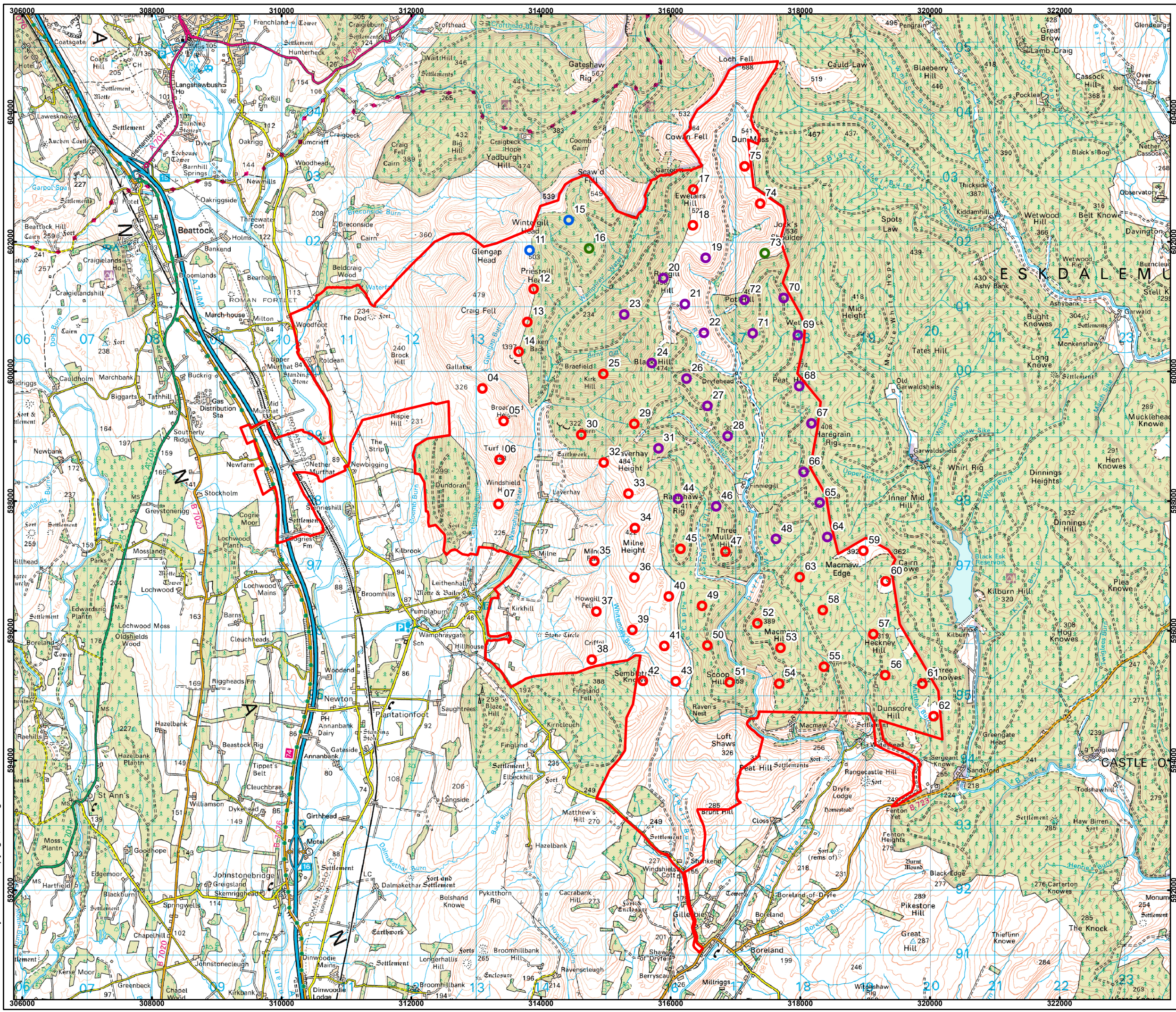
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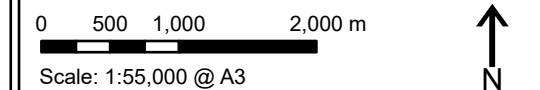
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)



Notes: N/A
Revisions: N/A



AI Figure 3.8 - Turbines 1, 2 and 3
Removed






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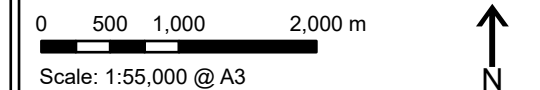
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374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)

Notes: N/A
Revisions: N/A



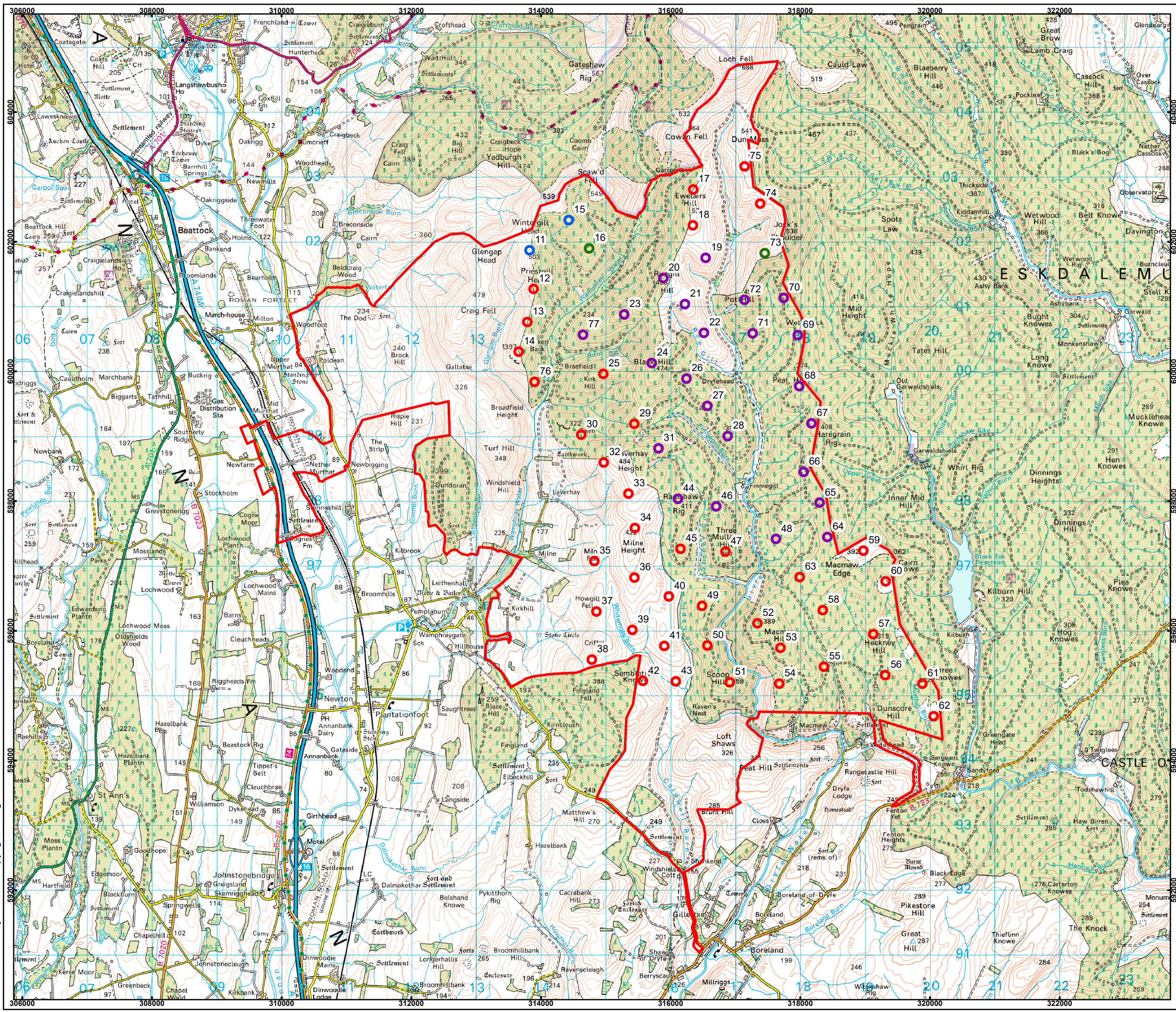
AI Figure 3.9 - Turbines 4, 5, 6 and 7 Removed

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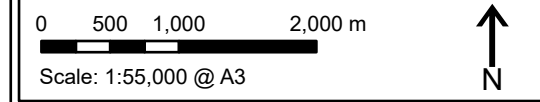


374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)

Notes: N/A
Revisions: N/A



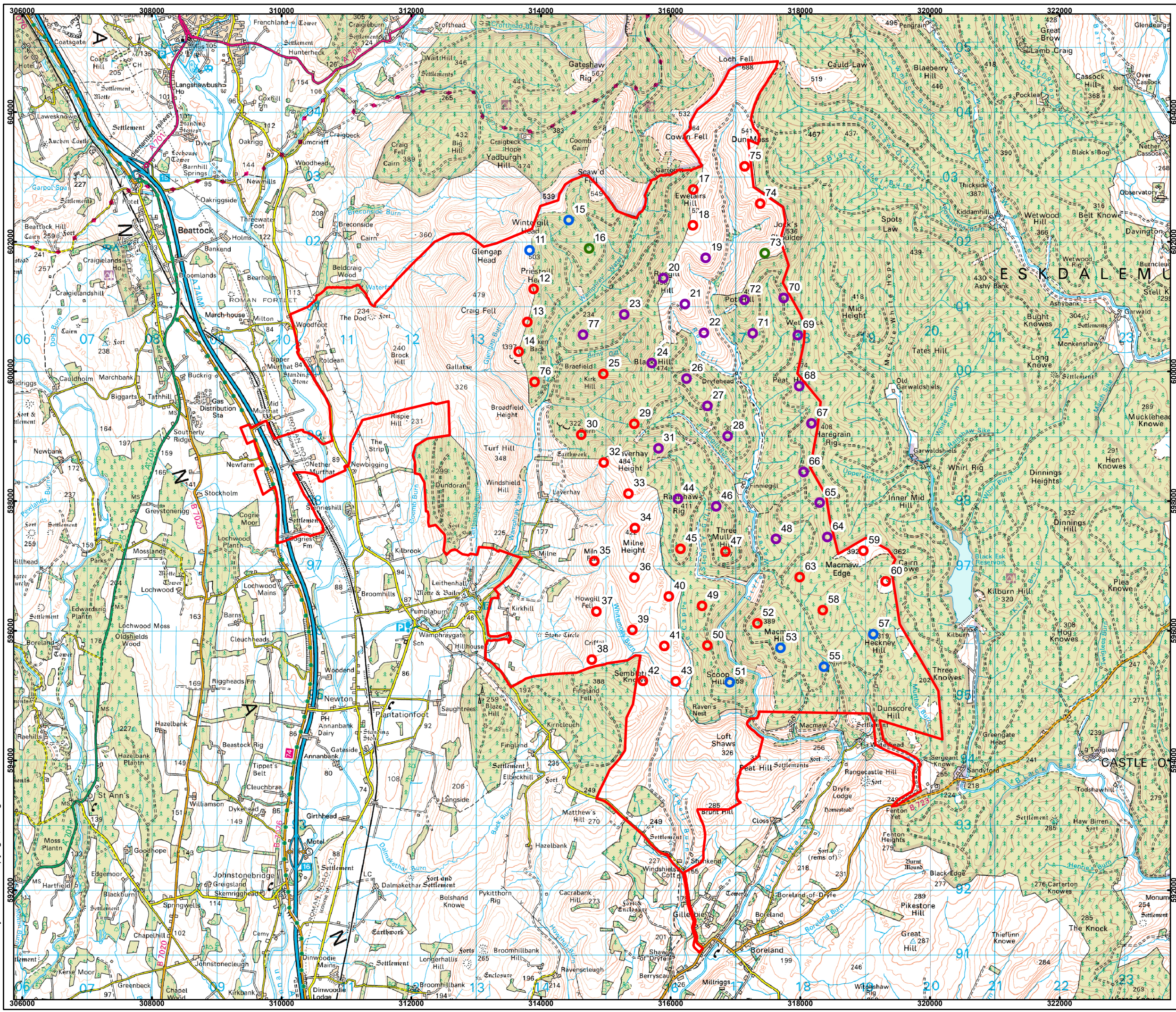
AI Figure 3.10 - Southern Layout Changes

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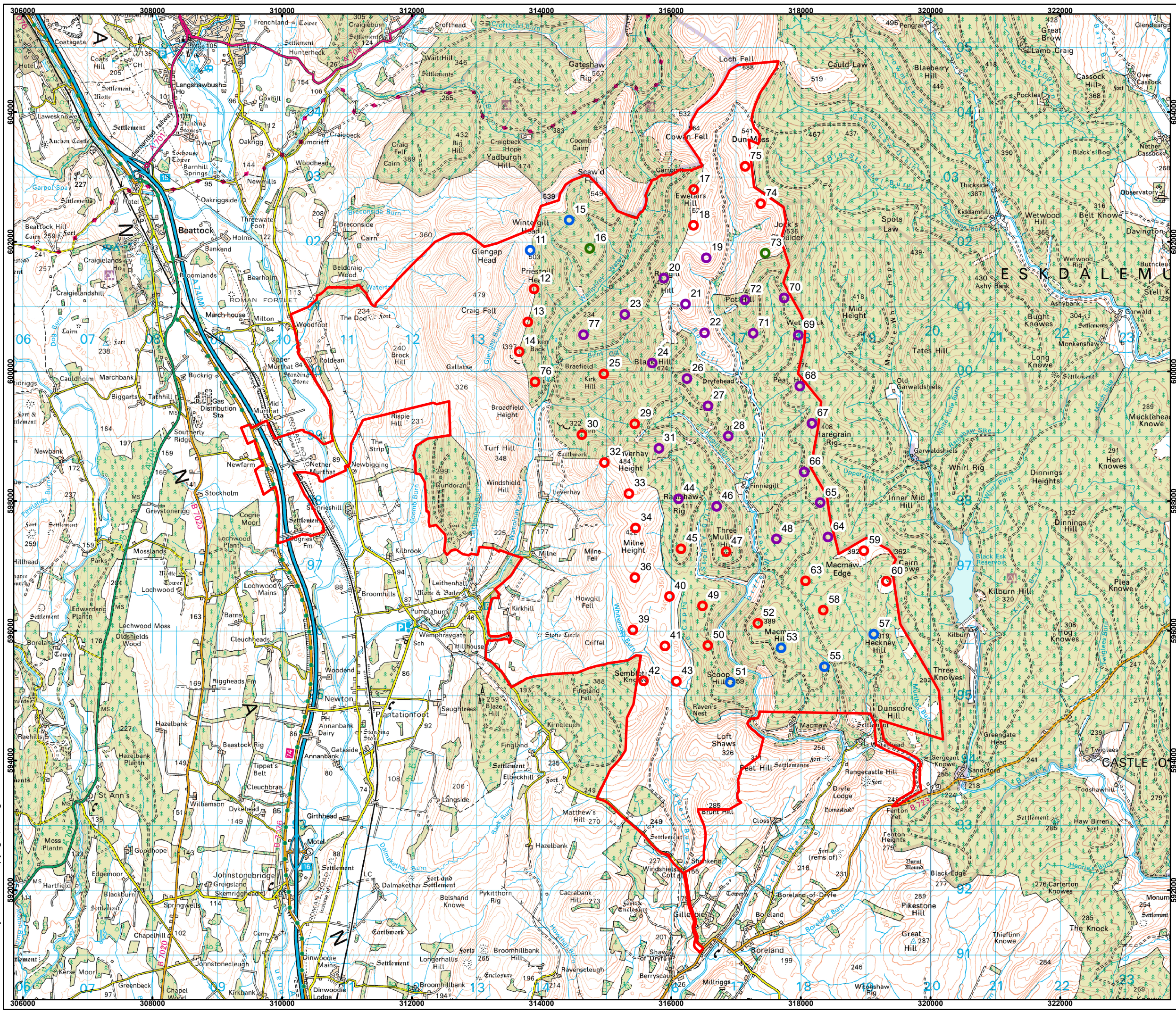
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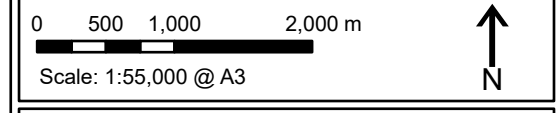
374 Scoop Hill

Legend

-  Site Boundary
-  Wind Turbine (180m to tip)
-  Wind Turbine (200m to tip)
-  Wind Turbine (225m to tip)
-  Wind Turbine (250m to tip)



Notes: N/A
Revisions: N/A



AI Figure 3.11 - Final AI Layout

Date: 09/05/2023 Ref: 374-230509-7774
Produced: TR Reviewed: DW Approved: GC



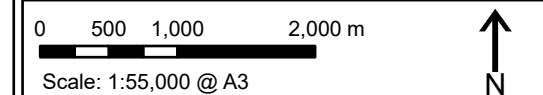
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374 Scoop Hill

Legend

- Site Boundary
- Wind Turbine (180m to tip)
- Wind Turbine (200m to tip)
- Wind Turbine (225m to tip)
- Wind Turbine (250m to tip)
- Permanent Met Masts
- Access Tracks
- Site Entrance
- Existing Access Tracks to be Upgraded
- Substation & Control Room
- Substation & Control Room Construction Compound
- Temporary Construction Compound
- Borrow Pit
- Existing Quarries or Borrow Pit
- Borrow Pit Area of Search

Notes: N/A
Revisions: N/A



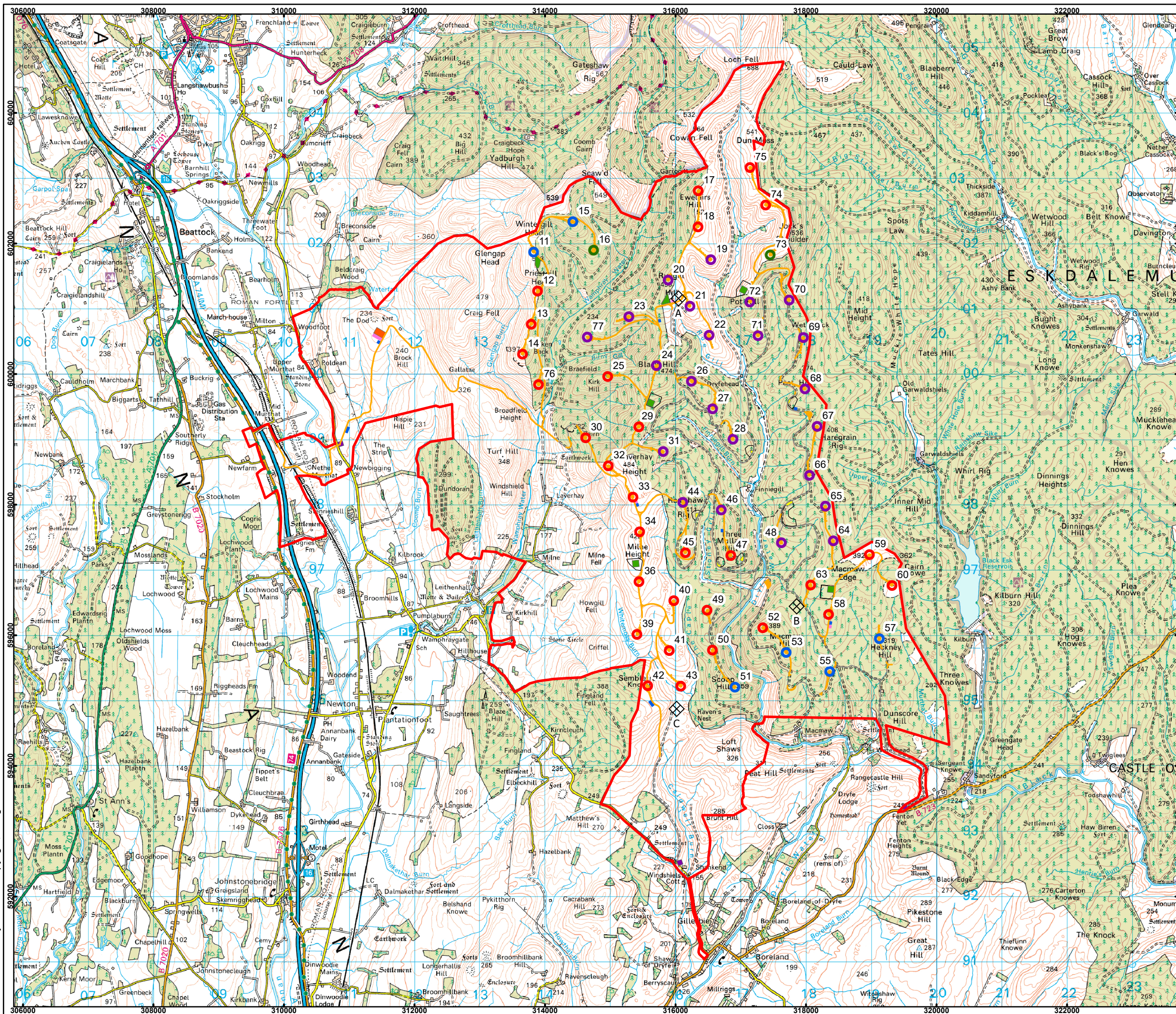
AI Figure 3.12 - Final AI Layout with Infrastructure

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374 Scoop Hill

Legend

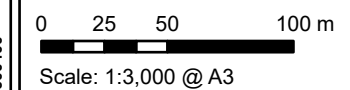
- Original EIAR Locations
- Access Tracks
- Substation & Control Room
- Substation Construction Compound
- Temporary Construction Compound
- Intergranular & Fracture Flow; Very High Productivity

Notes:

Changes Pre Environmental Impact Assessment:
Substation and Control Room specification updated between final and original location due to GWDTE.

Changes Post Environmental Impact Assessment:
Substation Construction Compound updated again between the EIAR and AI to include a larger area.

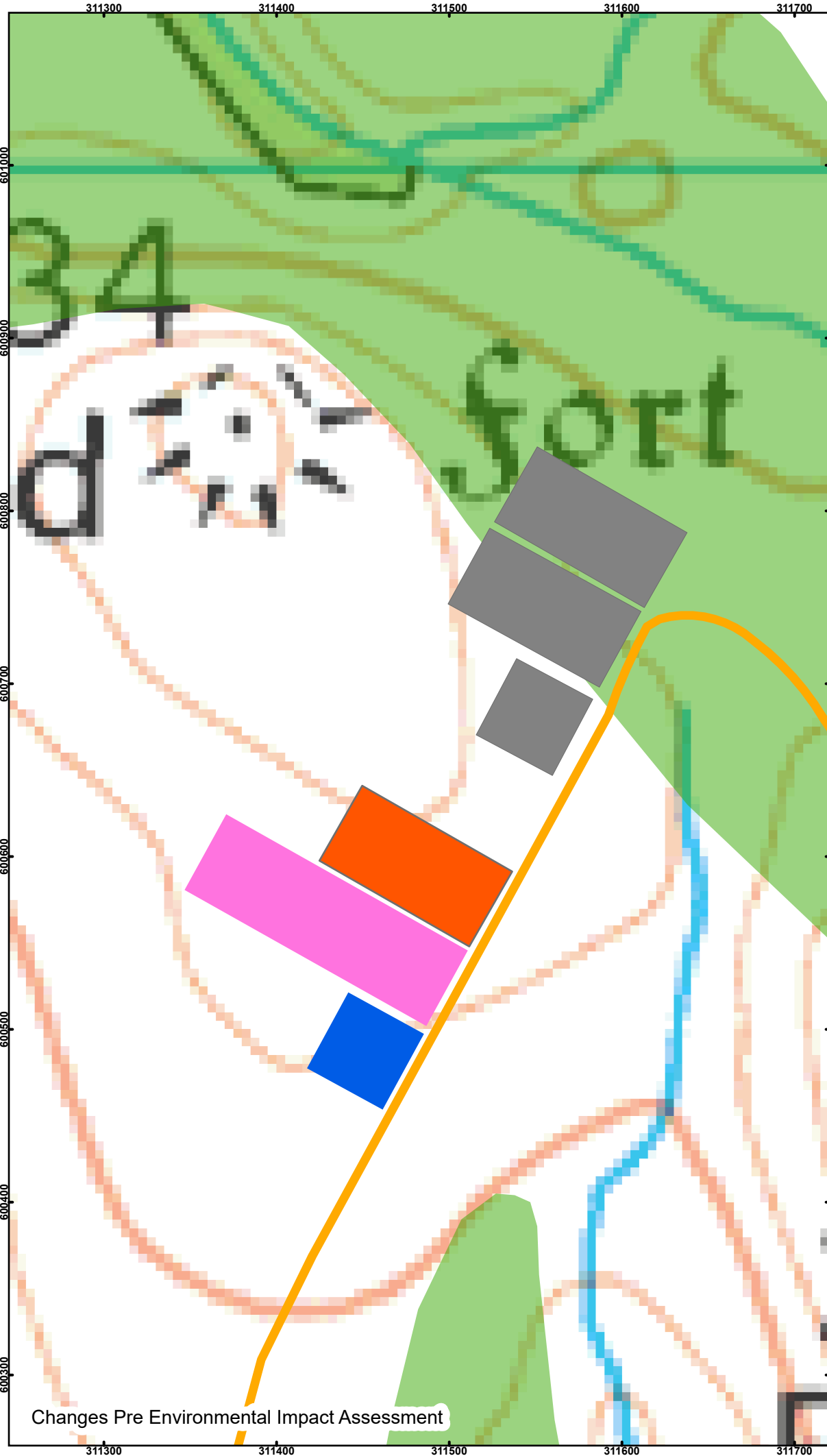
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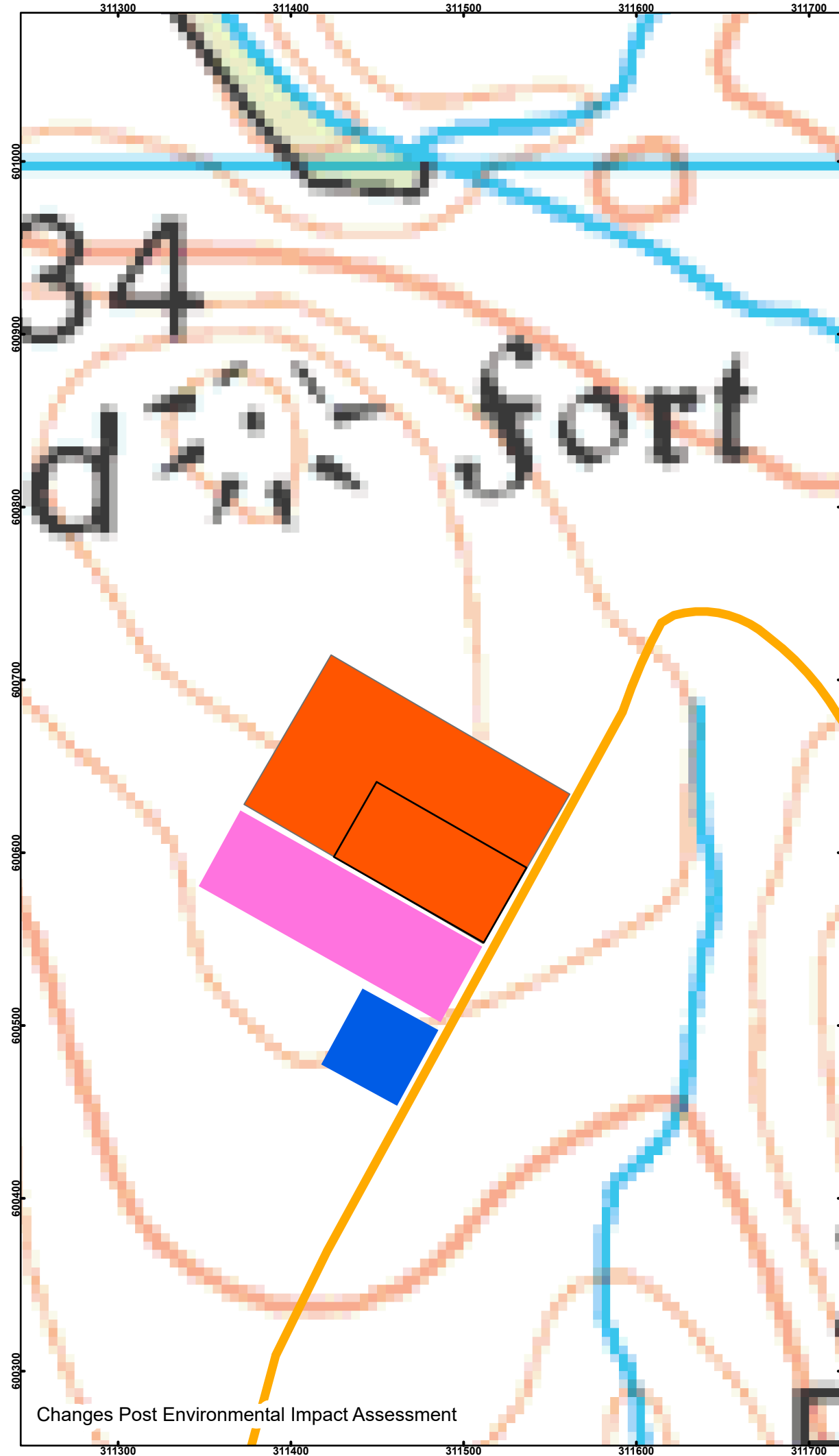
AI Figure 3.13 - Relocation of Substation, Control Room and Compounds

Date: 19/05/2023 Ref: 374-230509-7776-A
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Changes Pre Environmental Impact Assessment



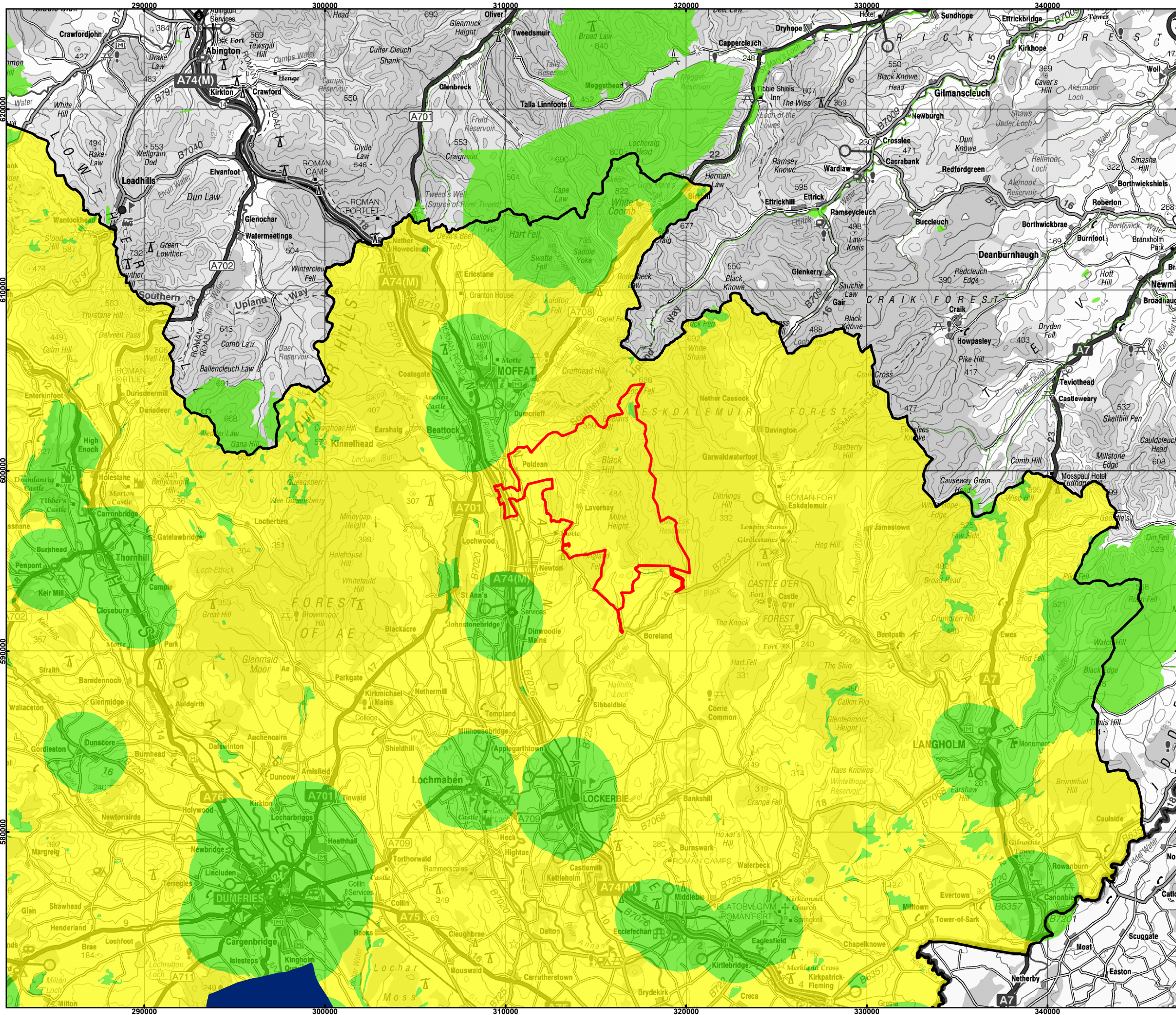
Changes Post Environmental Impact Assessment

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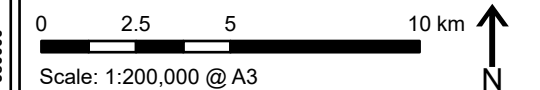
374 Scoop Hill

Legend

- Site Boundary
- Dumfries and Galloway Council Boundary
- Areas where wind farms will not be acceptable
- Areas with potential for wind farm development
- Areas of Significant Protection



Notes: N/A
 Revisions: Data sourced from Dumfries and Galloway Council in June 2023



AI Figure 3.14 DGC LDP2 Wind Farm Spatial Framework

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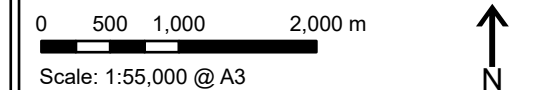
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374 Scoop Hill

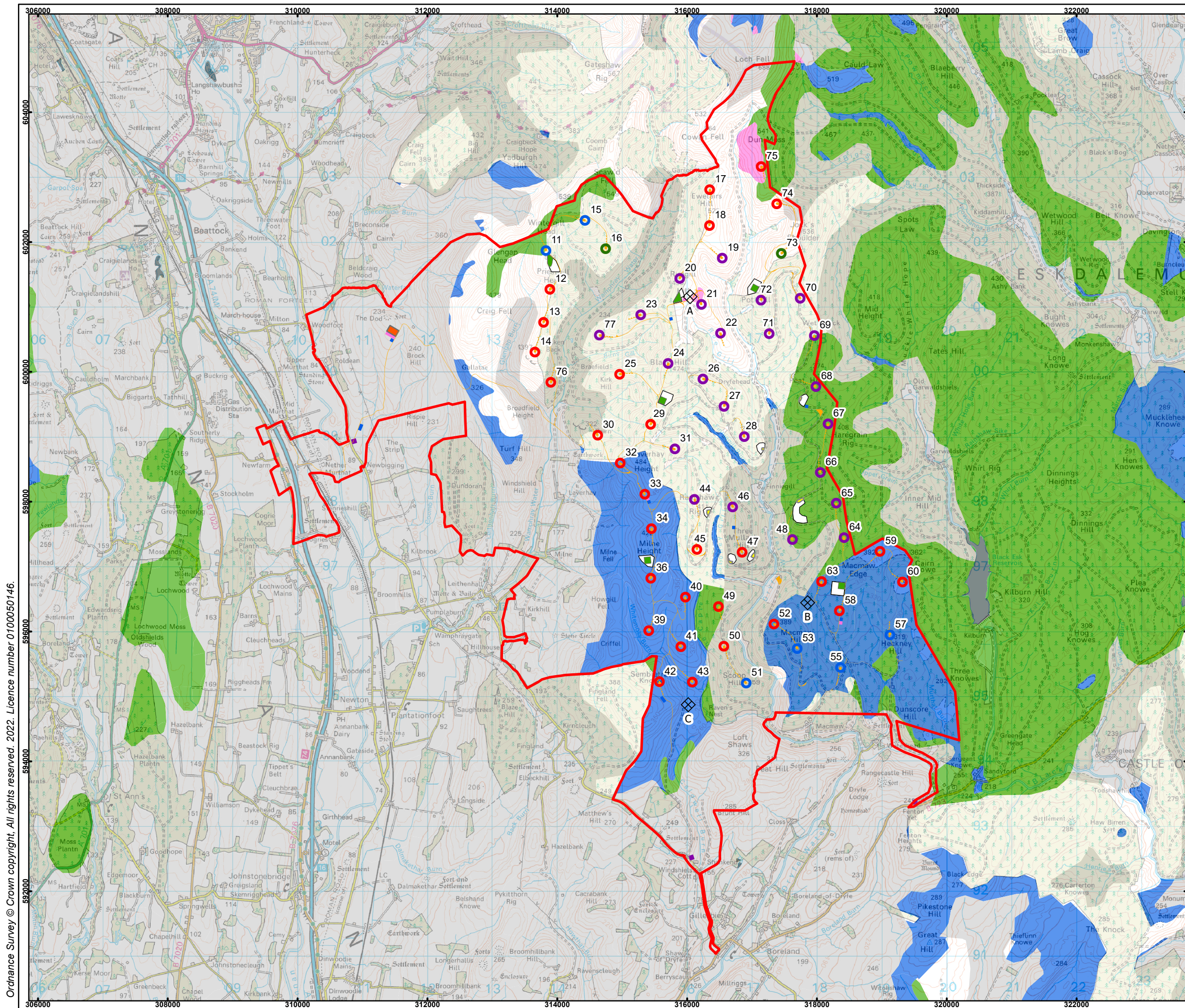
Legend

- Site Boundary
 - Wind Turbine (180m to tip)
 - Wind Turbine (200m to tip)
 - Wind Turbine (225m to tip)
 - Wind Turbine (250m to tip)
 - ◇ Permanent Met Masts
 - Access Tracks
 - Site Entrance
 - Existing Tracks to be Upgraded
 - Substation and Control Room
 - Substation and Control Room Construction Compound
 - Temporary Construction Compounds
 - Borrow Pits
 - Existing Quarries and Borrow Pits
 - Borrow Pit Area of Search
- Carbon and Peatland (SNH) Class:
- Class 1
 - Class 2
 - Class 3
 - Class 4
 - Class 5
 - Class 0: Mineral soils
 - Class -1: Unknown soil type
 - Class -2: Non-soil



AI Figure 3.15 - Carbon and Peatland (NatureScot) Classification

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 Produced: TR Reviewed: DW Approved: GC

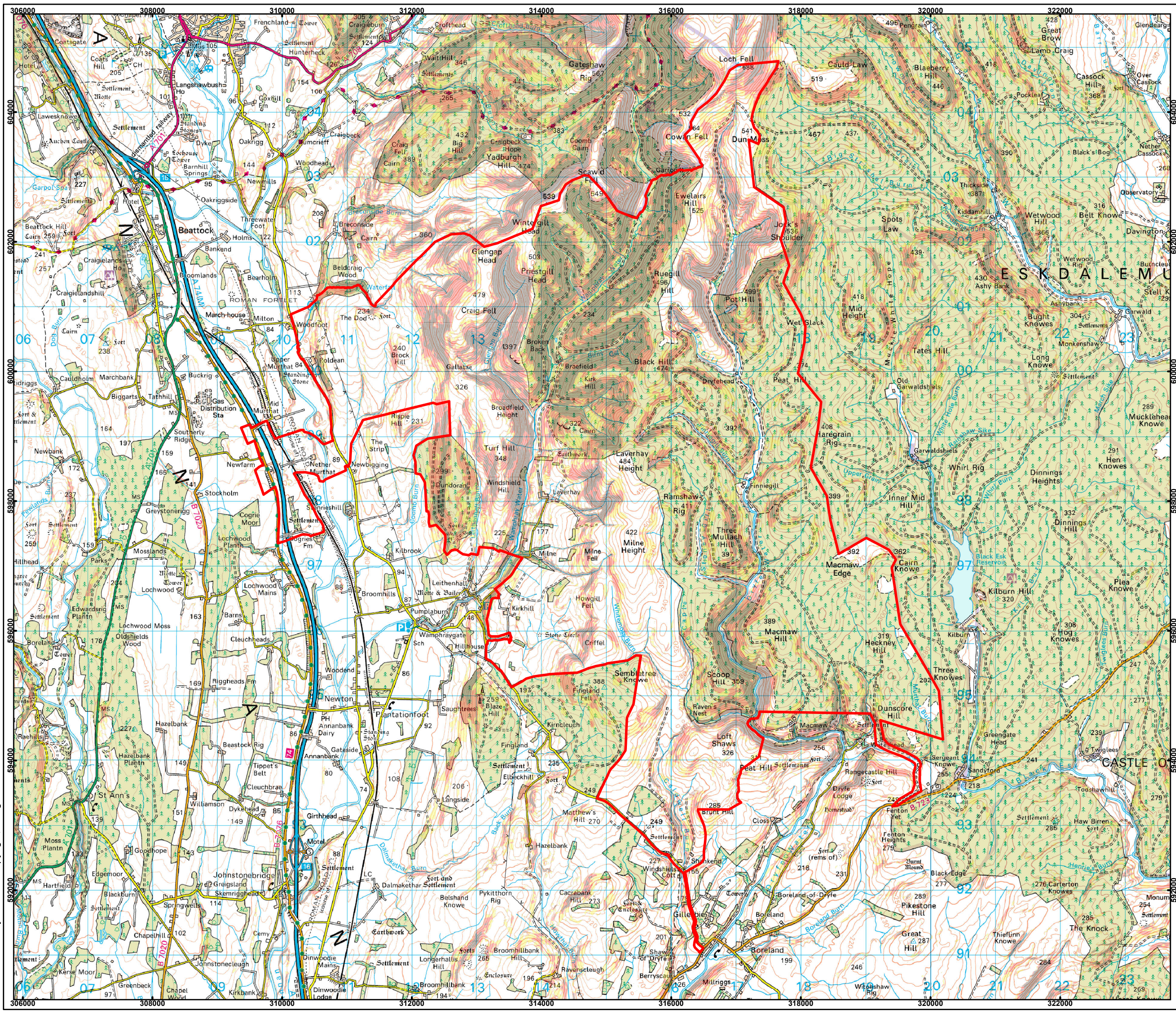


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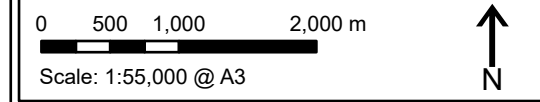
374 Scoop Hill

Legend

- Site Boundary
- Slope
- Percentage Class
- 0 - 12%
- 12 - 15%
- 15 - 20%
- 20% - Max



Notes: N/A
Revisions: N/A



AI Figure 3.16 - Topography

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