An Roinn Comhshaoil,
Aeráide agus Cumarsáide
Department of the Environment,
Climate and Communications

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Central Planning Unit
Donegal County Council
County House
Lifford
County Donegal
F93 Y622

04 March 2021

Re: Proposed Variation to the County Donegal Development Plan 2018-2024 in respect of the TEN-T Priority Route Improvement Project, Donegal

Your Ref: CPU/243 (VAR. 1) TEN-T
Our Ref: 21/63 [cf. 20/89, 20/90]

Geological Survey Ireland is the national earth science agency and has datasets including Bedrock Geology, Quaternary Geology, Geological Heritage Sites, Mineral deposits, Groundwater Resources, Geohazards and the Irish Seabed. These comprise maps, reports and extensive databases that include mineral occurrences, bedrock/mineral exploration groundwater/site investigation boreholes, karst features, wells and springs. Please see our website for data availability and we recommend using these various data sets, when undergoing the EIAR, planning and scoping processes. Geological Survey Ireland should be referenced to as such and should any data or geological maps be used, they should be attributed correctly to Geological Survey Ireland.

Dear Sir/Madam,

With reference to your letter dated 02 March 2021, concerning the Proposed Variation to the County Donegal Development Plan 2018-2024 in respect of the TEN-T Priority Route Improvement Project, Donegal, Geological Survey Ireland (a division of the Department of the Environment, Climate and Communications) would like to make the following comments.

Geoheritage

Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.

County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online Map Viewer.

The audit for Co. Donegal was published in November 2020. The audit of County Geological Sites in Donegal is a compilation of two reports:

- An audit of County Geological and Geomorphological Sites in north Donegal carried out by Ronan Hennessy, Robert Meehan, Vincent Gallagher, Matthew Parkes and Sarah Gatley on behalf of Geological Survey Ireland; and

- An audit of County Geological Sites in south Donegal carried out by Malcolm McClure, Vincent Gallagher, Robert Meehan and Sarah Gatley on behalf of Geological Survey Ireland.

The overall Donegal Geological Heritage Project was supported by Geological Survey Ireland, Donegal County Council and The Heritage Council. The resulting report is a contribution to the County Donegal Heritage Plan 2011-2016. The Geological Heritage of Donegal Main Report is currently being finalised, please contact Dr Clare Glanville for details at Clare.Glanville@gsi.ie. Individual County Geological Site reports are available here.

Our records show that there is a CGS in the vicinity of the preferred route corridor for Section 2 (N56/N13 Letterkenny to Manorcunningham).

> **Lough Swilly**, Co. Donegal (GR 231555, 432016), under IGH theme: IGH 13 Coastal Geomorphology. Link to Site Report: ND015. A long, wide fjord, bordered by high, bold cliffs in the north, passing to gentler coastal slopes and shallow flats along its southern reaches. As well as being one of Ireland's few glacial fjords, the cliffs, beaches, mudflats, salt marshes, polders and headlands at Lough Swilly make this County Geological Site a classic textbook locality for coastal erosion and deposition features. Parts of the site include Lough Swilly SAC (002287) and pNHA (000166), the North Inishowen Coast SAC and pNHA (002012), and Ballyhoorisky Point to Fanad Head SAC and pNHA (001975).

With the current plan, there may be potential impacts on the integrity of current CGS envisaged by the proposed development, should this site not be assessed as a constraint. Ideally, the site should not be damaged or integrity impacted or reduced in any manner due to the proposed development. However, this is not always possible, and in this situation appropriate mitigation measures should be put in place to minimize or mitigate potential impacts. Where the integrity cannot be preserved we would ask that careful consideration be given in design to accommodating preservation of road cutting faces and access to the site during construction to record the exposures to strengthen our knowledge and datasets.

We would also ask that the design of any future development considers the use of information panels as appropriate to highlight the significance of the impacted CGS. Please contact Clare Glanville (Clare.Glanville@gsi.ie) for further information and possible mitigation measures if applicable.

Groundwater

Groundwater is important as a source of drinking water, and it supports river flows, lake levels and ecosystems. It contains natural substances dissolved from the soils and rocks that it flows through, and can also be contaminated by human actions on the land surface. As a clean, but vulnerable, resource, groundwater needs to be understood, managed and protected.

Geological Survey Ireland's Groundwater and Geothermal Unit, provides advice, data and maps relating to groundwater distribution, quality and use, which is especially relevant for safe and secure drinking water supplies and healthy ecosystems.

Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our Map viewer. which should include: wells; drinking water source protection areas; the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps. For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turlough water levels (gwlevel.ie). Background information is also provided in the Groundwater Body Descriptions. Please read all disclaimers carefully when using Geological Survey Ireland data.

Groundwater flooding maps (historic & predictive) are available through our web viewers. The historic flood maps provide information of historic flooding, both surface water and groundwater. The predictive groundwater flood map provides information on the probability of future karst groundwater flooding (where available). For information on the development and limitations of these flood maps, please check the user guidance notes on our website.

Geological Mapping

Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that is reliable and accessible including depth to bedrock and physiographic maps. These datasets include bedrock data and subsoil classifications. We would encourage you to use these data which can be found here, in your future assessments.

Geological Survey Ireland is continually developing new 3D models and improving upon existing models, as new geological data and software tools emerge. Our 3D models are accessible on our model viewer, where they can be interrogated, faults and stratigraphic units examined, virtual cross-sections and boreholes created. Depending on their intended application and audience, models are developed at different scales and to different depths below the ground surface. Our 3D models offer a key element of geotechnical risk management by identifying areas requiring more site investigation.

Geohazards

Geohazards can cause widespread damage to landscapes, wildlife, human property and human life. In Ireland, landslides, flooding and coastal erosion are the most prevalent of these hazards. We recommend that geohazards be taken into consideration, especially when developing areas where these risks are prevalent, and we encourage the use of our data when doing so.

Landslides are common in areas of peat, rock near surface and in fine to coarse range materials (such as glacial tills), areas which are found within the proposed route improvement project. Geological Survey Ireland has information available on landslides in Ireland via the National Landslide Database and Landslide Susceptibility Map both of which are available for viewing on our dedicated Map Viewer. Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.

Geological Survey Ireland also engaged in a national project on Groundwater Flooding. The data from this project may be useful in relation to Flood Risk Assessment (FRA) and management plans, and is described in more detail under 'Groundwater' above.

Coastal Vulnerability while seen as a potential geohazard, is discussed in more detail under our marine and coastal unit information below.

Natural Resources (Minerals/Aggregates)

Geological Survey Ireland provides data, maps, interpretations and advice on matters related to minerals, their use and their development in our Minerals section of the website. The Active Quarries, Mineral Localities and the Aggregate Potential maps are available on our Map Viewer.

We would recommend use of the Aggregate Potential Mapping viewer to identify areas of High to Very High source aggregate potential within the area. In keeping with a sustainable approach we would recommend use of our data and mapping viewers to identify and ensure that natural resources used in the proposed development are sustainably sourced from properly recognised and licensed facilities, and that consideration of future resource sterilization is considered.

Geotechnical Database Resources

Geological Survey Ireland continues to populate and develop our national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our Geotechnical Map Viewer. We would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site specific investigations that may be designed as part of the project.

Marine and Coastal Unit

Our marine environment is hugely important to our bio-economy, transport, tourism and recreational sectors. It is also an important indicator of the health of our planet. Geological Survey Ireland's Marine and Coastal Unit in partnership with the Marine Institute, jointly manages INFOMAR, Ireland's national marine mapping programme; providing key baseline data for Ireland's marine sector. The programme delivers a wide range of benefits to multi-sectoral end-users across the national blue economy with an emphasis on enabling our stakeholders. Demonstrated applications for the use of INFOMAR's suite of mapping products include Shipping & Navigation, Fisheries Management, Aquaculture, Off-shore Renewable Energies, Marine Leisure & Tourism and Coastal Behaviour.

INFOMAR also produces a wide variety of seabed mapping products that enable public and stakeholders to visualize Ireland's seafloor environment https://www.infomar.ie/maps/downloadable-maps/maps. Story maps have also been developed providing a different perspective of some of the bays and harbors of the Irish coastline https://www.infomar.ie/maps/story-maps/exploring-dingle-bay-different-perspective. We would therefore recommend use of our Marine and Coastal Unit datasets available on our website and Map Viewer.

The Marine and Coastal Unit also participate in coastal change projects such as CHERISH (Climate, Heritage and Environments of Reefs, Islands, and Headlands) and are undertaking mapping in areas such as coastal vulnerability and coastal erosion. Further information on these projects can be found at **here**.

Guidelines

The following guidelines may also be of assistance:

- Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of the Soils, Geology and Hydrogeology Chapters of Geology in Environmental Impact Statements.
- National Roads Authority, 2009. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

Other Comments

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. Should any significant bedrock cuttings be created, we would ask that they will be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. In areas where natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface and could be included as additional sites of the geoheritage dataset, if appropriate. Alternatively, we ask that a digital photographic record of significant new excavations could be provided. Potential visits from Geological Survey Ireland to personally document exposures could also be arranged.

The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to Beatriz Mozo, Land Mapping Unit, at Beatriz.Mozo@gsi.ie, 01-678 2795.

I hope that these comments are of assistance, and if we can be of any further help, please do not hesitate to contact me (Trish.Smullen@gsi.ie), or my colleague Clare Glanville (Clare.Glanville@gsi.ie).

Yours sincerely,

Trish Smullen
Geological Survey Ireland