ELECTRICITY ACT 1989
TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997
DPEA CODE OF PRACTICE FOR ELECTRICITY ACT INQUIRIES

Submission on METHODS OF CONSTRUCTION AND CONSTRUCTION SPACES

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TEALING TO KINTORE UPGRADE PROJECT (TKUP) TRL-120-1

I am Grant Alexander. I live in Drumoak, in Aberdeenshire. I have taken an interest in the development as it impacts on the local community around Drumoak as well as the wider areas around northeast of Scotland.

I am a retired consulting civil engineer and remain a member of the Institution of Civil Engineers. I have many concerns relating to the proposed line from Kintore to Tealing and, not least the Socio Economic and the Health and Safety impacts, but I have limited this submission to those of an engineering nature.

1 Foundations

The document is non specific about what type of foundation will be required for the towers. It provides different possibilities, those being mini piling, traditional pad and column or rock anchors. The Principal Contractor will be responsible for the foundation design.

However, the foundations would account for the major source of vibration, noise, dust and potential siltation of existing water ways. In addition, they are much larger than generally perceived and there are no foundation drawings to show the extents or details for the specific towers which are proposed.

2 Piled foundations

Piled foundations would be necessary where the soils are soft or the site is unsuitable for other types of foundation. Piling plant is generally noisy and vibrating by its nature. There are methods which are quieter than others, and the specific type of piling proposed along with locations is not provided.

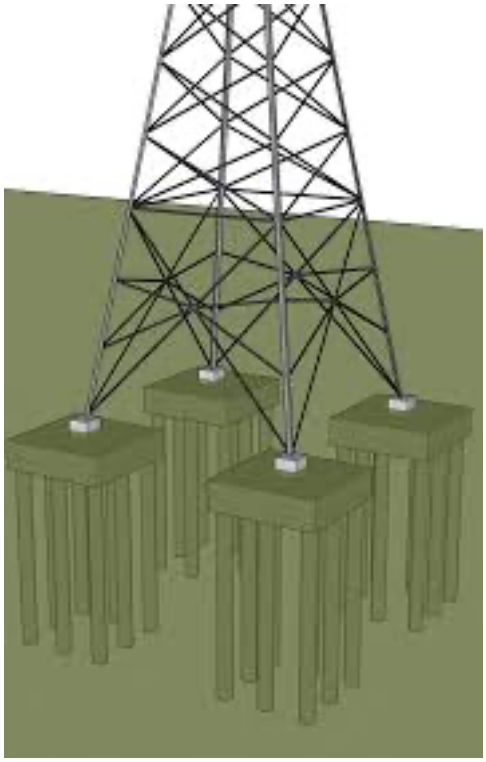

Fig. 1 Typical piled tower base

3 Rock anchored foundations

Where the bedrock is near the surface of the ground, the foundations may incorporate the installation of rock anchors. This operation is also noisy it will impact on the surrounding environment. Where rock is near the surface, there will be a requirement for considerable hydraulic rock breaking to provide a surface suitable for the installation of rock anchors, again a high noise impact. Blasting is not mentioned, and it is presumed use of explosives will be prohibited? It is envisaged that rock of various types will be encountered at a high level along the route.

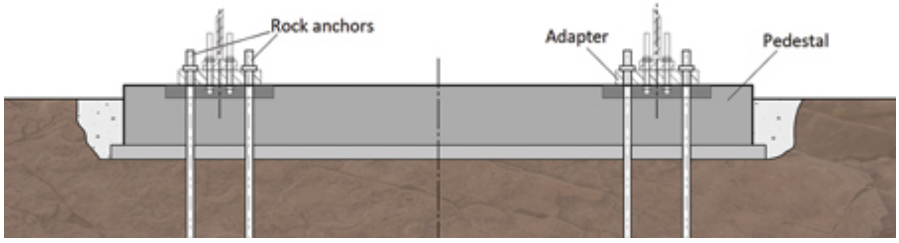

Fig. 2 Typical rock anchor foundations

4 Column and pad foundations

This is the traditional foundation for transmission towers, and it is one of the foundation types suggested in the document. However, as the new towers are large and subject to high loads, such a design will require deep excavations and considerable side slopes, particularly on corner towers. The document considers that the excavation depth might be 4-6m. At this depth, siltation and ground water is very likely to be a problem and constant pumping will be required.

A- Pad & chimney foundation

B- Concrete mat foundation

Fig. 3 Column and Pad Foundations

My view would be that the least disruptive type of foundation would be a raft foundation (which has not been suggested) as shown below.

Fig. 4 Square raft foundation

Foundations will generally contribute to very considerable disruption to farmland, traffic movements from quarries, noise and dust pollution and destruction of the natural environment.

5 Transportation on existing minor roads

The document considers the predicted increase in Heavy Goods Vehicles (HGVs) and cars on the public roads along the route of the line. While much of the site traffic will be on major and trunk roads, there will be considerable use of 'B' roads and other classified unnumbered public routes. These smaller roads are historic, many build of local access over a century ago. They are not designed in terms of either layout or structural strength for HGV axle loads, vis-à-vis, 11 tonne axle loads (known as Ha loading). While many HGVs use them, these vehicles will seldom be fully loaded, 20 – 30 tonne tipper lorries with full loads of crushed stone.

Mobile cranes have increased axle loads of 16.5 tonnes or more (known as Hb loading). Many secondary roads will not have seen loads of this magnitude.

The applicant's document does not consider the damaging effect of repetitive movements of fully loaded HGVs and mobile cranes. The damaging effect of a single HGV is more than 1000 times that of a car (roughly proportional to the fourth power of the axle load). It is understandable therefore how mobile cranes are proportionally highly destructive.

In addition, many secondary side roads, subject to increased and heavier loads, will see damage due to 'age hardened' bitmac. This is caused by long term oxidation and loss of volatile oils. Cracking occurs, water ingress and freezing and thawing cause accelerated failures.

I would conclude that there will be considerable damage to secondary public roads after five years of construction and after the removal of the temporary access roads and working areas.

6 Water run-off from construction working areas, foundation excavations and access roads

The document suggests swales and settlement ponds be provided to deal with silt polluted runoff from construction site. There will be considerable silt and mud, particularly during winter months, with the potential to enter ditches, waterways and potentially streams and rivers. The large working areas, site roads, excavated material and topsoil will be exposed for many months and the document needs to be more detailed on the methodology for safeguarding silt pollution. In addition, occasional accidental pollution may arise from hydraulic oil pipe bursts or fuel spillage

Studies will be required to demonstrate how this will be controlled and how reinstatement will be undertaken following removal of temporary works. There is little written in the document as far as I can see, and the issue, and probably the risk will be pushed on to the Principal Contractor. It is a notorious problem with construction sites and careful planning will be required to mitigate escape of silt to open waterways.

7 Temporary working areas and access tracks

The ‘temporary working areas’ indicated occupy an area of 80 x 80m for linear towers and 100 x 100m for corner towers. These areas are large, and they will need to be flat in order to assemble and lay down the tower sections and to allow the mobile crane(s) to operate safely. If the existing ground slopes, earthworks increase dramatically, for example, if the existing ground slopes at 1 in 10, the working area will have a 5m cut height at the top and a 5m drop on the lower edge of the area. Access roads will need to be positioned to suit these slopes as will the topsoil and excavated material storage areas. The document does not consider this probability, and it is my opinion that the working areas are likely to be too small if column and pad foundations are adopted and all the excavated material and topsoil are stored on the working area.

Parts of the working area where the crane will be working and traversing will require a ‘crane platform’ which comprises engineered rockfill. This will be crushed rock which spread the loads from the outriggers of the crane into the underlying soils safely. Rockfill is compacted with vibratory equipment to a thickness of say, 500 to 1000mm.

The overall quantity of imported rockfill to create the working areas is not specified in the document but an estimate of 350 HGV movements per tower would not be unreasonable. In addition, imported material for site roads between towers and access roads might amount to another 80 HGV movements. The same number would be necessary to transport the same off site. Totalling around 870 for importing stone to and from each tower site.

The document state that the access roads will generally be made up with 6F2 which is crushed demolition waste. This material will not be allowed for this use anywhere along the length, as it can only be used on the site from which it is extracted. It can be tested, redefined as 6F5, and licenced for use outside the original site but it may still contain a level of contaminants unacceptable to be used on arable land.

In addition, access roads will generally be wider than 4.5m stated. They will have to incorporate drainage ditches, verges and passing places. If on sloping ground, cut and fill will be required, increasing the width further. I would suggest that the overall width would be closer to 10m.

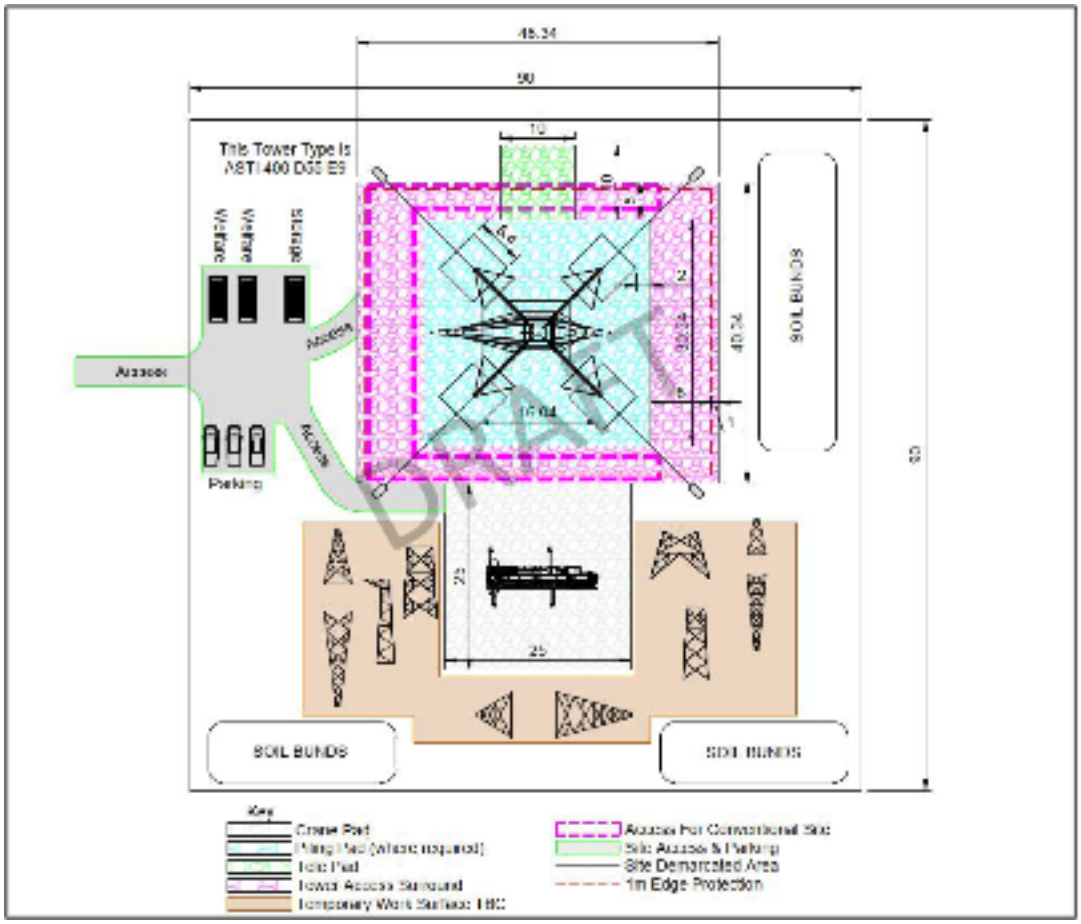

Fig. 5 Illustrative image of Temporary Working Area (SSEN)

8 Topsoil storage

Excavation of topsoil will be extensive, and it will be necessary to store it in mounds for the period of construction. It should be necessary for the topsoil mounds to be clearly indicated prior to planning approval. At present, topsoil appears to be stored on the Working Areas but if space is a problem, I would suggest that this will change.

Fig. 6 Topsoil mound

9 Private Water Supplies V5; App13.2

Like any linear development, it is essential that all the private water supplies are surveyed, and the flows noted both in both wet and dry period. Samples should be taken at both times and if land use changes e.g. cattle are released into the fields. Sampling should be taken for testing for contaminants in a laboratory before, during and after construction to ensure that construction does not affect or contaminate aquifers below ground level which supply private wells.

SSEN should be prepared to provide new wells or boreholes for those who have disrupted supply and to provide a temporary supply if required.

10 Tower Design

The document in V3 Ch3 does not show the full range of tower designs. The maximum height indicated is 57m with a 22m spread across the base. No details are provided of the 70m high towers, including steel sections, arrangements or weights. It is not clear how the towers will be delivered to site, whether in small pieces or prefabricated in sections and each section lifted into place.

For assembly operations, will a 150 tonne mobile crane be sufficient in height and reach for the large heavy base structure and the high top section? I do not know loads or module sizes, but I suspect that a larger crane will be required

The document does not mention tandem lifting where two cranes required to lift a framed structure off the ground. Presumably this is not required as tandem lifting would require a larger temporary working area, sufficient for two cranes

The size and depth of the working area will depend on the size of mobile crane, as will the impact of these cranes on the minor roads and temporary access roads between the towers

There is little information in the document relating to the design parameters of the towers, for example the larger and heavier transmission cables, the dynamic harmonic loads from wind or eccentric loads on corner towers. The tower named in the document is a ASDI400 D55 D9 which is 53.8m high, not 70m

11 Site Boundary, Working Areas, Operational Corridor and Limits of Deviation

The document generally describes the horizontal Limit of Deviation (LOD) as being 100m either side of the centre line of the transmission line and a 200m radius around corner towers (V1; Ch3.5)

The Working Areas are defined as areas at tower locations, 80 x 80m square and 100 x 100m on corner towers, generally at 350m centres.

New access roads are proposed to particular working areas, and to join working areas linearly along the length of the line

The Site Boundary is not defined (as far as I can see) although it will be known ultimately by the Principal Contractor. Is the Site Boundary (as presumably defined in the Conditions of Contract) the same line as the LOD, and can the Principal Contractor use the whole of this land to construct the works? Can he, for example, vary the route of the site roads within the LOD or run plant or store topsoil anywhere within the LOD? If so, the site boundary sterilizes a huge swathe of land which cannot be used for farming. Will the area of the LOD be fenced off to the landowners and the public?

12 **Programme**

The document provides an 'Indicative Construction Programme' spanning the five-year construction. Works on foundations and access tracks start in early 2027. Reinstatement is shown as taking place in the last quarter of 2030. For farmers, four years of loss of production in the 200m wide LOD zone would not appear to be reasonable. For those living in the vicinity of the OHL, four years would not appear to be acceptable.

Grant Alexander
for NOTKUP
April 2026