Appendix 12.1: Transport Assessment

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Appendix 12.1 Transport Assessment

Purpose of Report

Pell Frischmann (PF) has been commissioned by Orkney Islands Council (OIC) "the Applicant" to undertake a Transport Assessment (TA) of the transport issues associated with the Proposed Development at Wee Fea, to the west of Lyness, Hoy.

The report identifies the key transport and access issues associated with the Proposed Development, including the route for abnormal loads. The TA identifies where the Proposed Development may require mitigation works to accommodate the predicted traffic; however, the detailed design of these remedial works is beyond the agreed scope of this report.

Report Structure

Following this introduction, the TA report is structured as follows:

- Description of the Proposed Development;
- Review of the relevant transport and planning policies;
- The methodology used within this assessment;
- The baseline transport conditions;
- The trip generation and distribution of traffic in the study area;
- The traffic impact assessment;
- The mitigation proposals for the Proposed Development related traffic within the study network;
- Issues relating to abnormal and hazardous loads;
- Indicative launch day traffic management proposals; and
- Summary of the findings of the TA and outlines the key conclusions.

Site Background

The location of the Proposed Development is shown in Figure 1.

Figure 1: Site Location Plan

Contains Google Map data © 2020 Google

The Proposed Development will comprise:

- Six wind turbines (maximum blade tip height of 149.9 m) with associated turbine foundations and hardstanding areas;
- A network of underground cables linking the turbines to a grid connection point (please note that the off-site grid connection is the subject of a separate consenting process and as such is not covered in this assessment);
- On-site access tracks connecting the turbine locations with the public road network;
- A control and maintenance building;
- Temporary works including a construction compound;
- Borrow pit; and
- A permanent anemometer mast to measure wind speed and wind direction.

Candidate Turbines

The applicant has indicated that they wish to consider turbines in the 133 to 136 m rotor diameter range at a tip height of 149.9 m as the candidate turbine for this application. A full Route Survey Report has been undertaken and a copy is contained in Annex A.

A review of likely turbines has been undertaken. Details of the proposed components are summarised in Table 1.

Table 1 - Turbine Size Summary

Component	Length (m)	Width (m)	Height (m)	Weight (t)
Blade	66.650	4.265	3.124	13.6
Tower	29.960	4.000	3.930	64.0

These sections were used for the subsequent swept path assessment of the proposed loads along the access route.

The selection of the final turbine model and specification will be subject to an appropriate procurement process following consent of the application. The assumed dimensions may therefore vary slightly from those assumed as part of this assessment.

To provide an accurate assessment scenario based upon the known issues along the access route, it has been assumed that all blades would be carried on a Super Wing Carrier trailer to reduce the need for physical mitigation in constrained sections of the route.

Given the sizes of the proposed mid and top tower sections, these along with other loads such as the hub and nacelle housing would be carried on a six-axle step frame trailer. The base tower would be carried in a 4+7 clamp trailer.

Examples of the vehicles and trailers are shown in Photographs 1 and 2.

Photograph 1 - Super Wing Carrier carrying Turbine Blade

Photograph 2 - Base Tower Transport

Policy Context

An over review of relevant transport planning policies has been undertaken and is summarised below for national and local government policies.

Policy & Guidelines

Planning Advice Note (PAN) 75

Planning Advice Note (PAN) 75: Planning for Transport provides advice on the requirements for Transport Assessments. The document notes that:

"… transport assessment to be produced for significant travel generating developments. Transport Assessment is a tool that enables delivery of policy aiming to integrate transport and land use planning."

"All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of the impact of the proposal…For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact."

Transport Assessment Guidance (2012)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

The document notes that a TA will be required where a development is likely to have significant transport impacts but that the specific scope and contents of a TA will vary for developments, depending on location, scale and type of development.

Onshore Wind Turbines; Online Renewables Planning Advice (May 2014)

The most recent Scottish Government advice note regarding onshore wind turbines was published in 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines

including landscape impact, impacts on wildlife and ecology, shadow flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.

In terms of road traffic impacts, the guidance notes that in siting wind turbines close to major roads, pre-application discussions are advisable. This is important for the movement of abnormal indivisible loads during the construction period, ongoing planned maintenance and for the decommissioning phase.

Orkney Local Development Plan

The Orkney Local Development Plan (LDP) was adopted by Orkney Islands Council in April 2017 and is the established planning policy for the Orkney Isles. It sets out a settlement strategy and spatial framework for how the Council foresees development occurring in the forthcoming twenty-year period.

Within the plan, relevant transport elements include:

"Developments that have the potential to generate significant levels of freight will be directed to industrial allocations beside key ports and harbour facilities (Hatston, Copland's Dock and Lyness)."

"Development will only be permitted where due regard has been paid to Designing Streets and the proposal demonstrates that:

i. It is well connected to the existing network of roads, paths and cycleways and will not create a barrier to future development;

ii. It can be safely and conveniently accessed by service, delivery and other goods vehicles, as appropriate to the development;

iii. Any new access, or upgrades to an existing access, linking to the adopted road network has been designed to an adoptable standard as defined by the National Roads Development Guide (new accesses should be resource efficient, safe for all road users, and convenient for sustainable travel modes); and

v. There are satisfactory arrangements to ensure that there is provision for the long term maintenance."

A Supplementary Energy Guidance noted is included within the LDP. With regards to transport and access, the supplementary note advises that:

"The developer must liaise with the Council as Roads Authority in relation to access and egress from the proposed development site. This must include for all works associated with alterations to the existing roads infrastructure required to transport materials to and from the development site and to all works associated with construction, maintenance and decommissioning.

Depending on the scale of the turbine(s) and the sensitivity of the site, all scales of wind energy developments could be required to submit a method statement for the construction of their proposal in support of the application. This statement would cover the phasing of construction, associated timescales and methods for transporting equipment to and from the site. This is to ensure minimal impacts on the surrounding environment and users."

Policy Summary

The Proposed Development can accord with the stated policy objectives and the design of the site and proposed mitigation measures will ensure compliance with national and local objectives.

Study Methodology

There are two phases of the life of the Proposed Development. Both have been considered in this assessment and are as follows:

- The Construction Phase; and
- The Operational Phase.

Project Phases – Transport Overview

The greatest traffic volumes are associated with the project construction phase. The operational phase is restricted to occasional maintenance operations which generate significantly lower volumes of traffic that are not considered to be in excess of daily traffic variation levels on the road network.

The 'worst case' transport scenario is the construction phase and this assessment concentrates on this phase of the Proposed Development.

It should be noted however that the construction effects are short lived and transitory in nature.

Scoping Discussions

The Applicant submitted a scoping report to Orkney Islands Council in respect of the Environmental Impact Assessment which included a section considering traffic and transport. A full review of that scoping opinion is provided in the Transport Chapter of the EIA (Chapter 12).

Baseline Conditions

Access Arrangement

The Proposed Development would be accessed directly from an upgraded access track off the B9047 to the west of Lyness. The access track would be extended into the wind farm site.

The access track would be designed to accommodate all predicted loads and traffic for both the construction and operational phases of the Proposed Development.

Study Area Determination

Experience from other wind farm developments has helped identify likely access routes for construction materials, whilst likely locations for staff residences has been used to help inform the extents of the likely study area.

The study area for this assessment is as follows:

- The B9048 from the ferry terminal to the junction with the B9047;
- The B9047 from the B9048 junction to Hurliness;
- The access track leading from the B9047 / B9048 junction to the site entrance; and
- The A964 from Houton to Kirkwall on the Orkney Mainland.

The B9048 covers the access road from the ferry terminal and quayside at Lyness to the junction with the B9047. This will be the principal access route from imported materials, staff and turbine components for use on the site.

The B9047 is the principal access route connecting the north and south of the island. All materials from the ferry terminal and the quay will cross the B9047 to gain entry to the site which is available from the existing access track.

The B9047 and B9048 are both public roads that are approximately 6m wide and feature metalled road surfacing. The access track leading to site is single lane and whilst features a metaled surface, the road surface is deteriorating at the western half of the road.

The B9047 to the south of the B9048 junction provides access to the south of the island. The road can be used to access the existing quarry at Witter Quarry near Hurliness. This quarry was proposed for use in the consented Binga Fea wind turbine scheme and could be used for initial deliveries to the Proposed Development at the initial construction stage.

Access for some staff maybe available from the Mainland of Orkney. For these staff, access would be made via shuttle bus from Kirkwall, with the route travelling to Houton ferry terminal. Access to Houton would be taken via the A964.

The study area network on Hoy is illustrated in Figure 2.

Pedestrian and Cyclist Networks

There are no specific rights of way recorded by Orkney Islands Council near the Proposed Development. The B9047 and B9048 do not have any dedicated pedestrian or cyclist infrastructure.

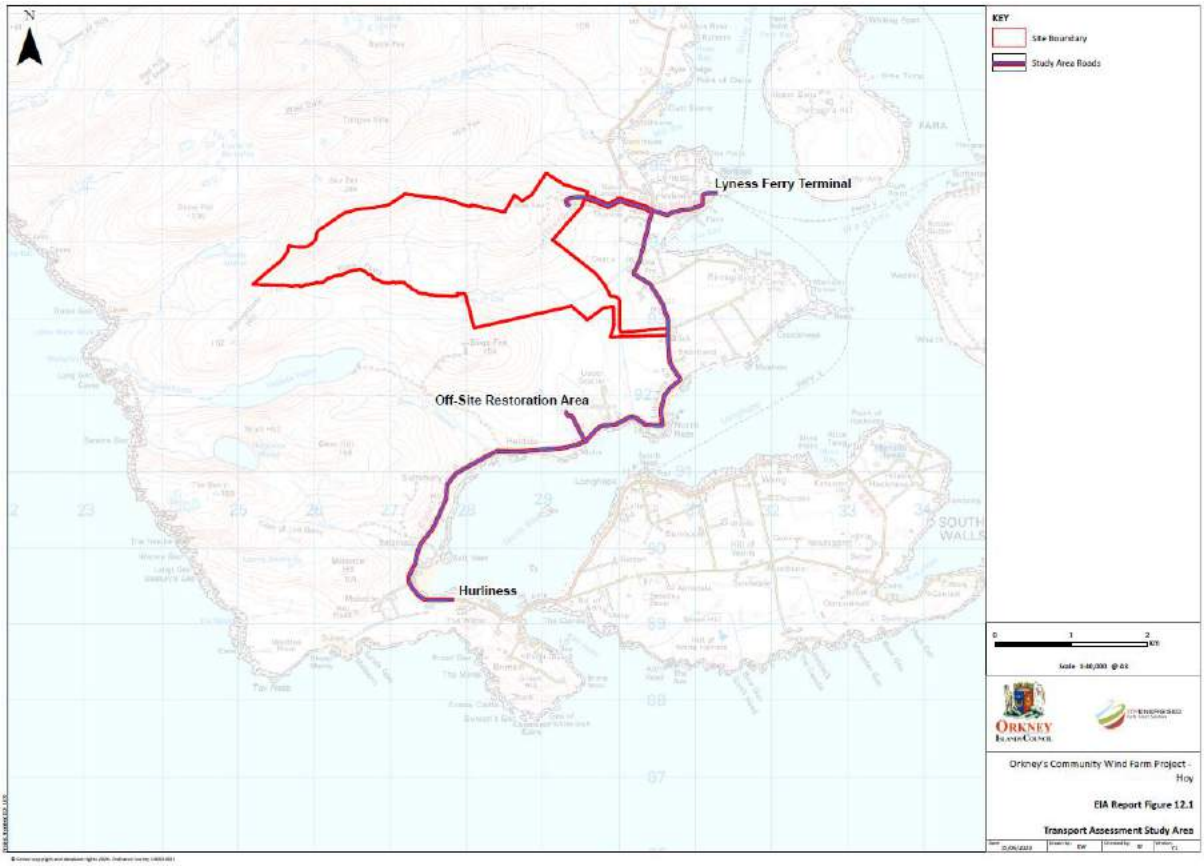
Core Path H7 (Wea Fee) connects the junction of the B7047 and B7048 with the former naval buildings at Wee Fea.

The area with the highest pedestrian use are in the vicinity of the ferry terminal and the Scapa Flow Museum, located to the west of the ferry terminal.

A review of the Sustrans cycle network plan of the United Kingdom indicates that there are no recommended National Cycle Routes (NCR) within the study area on Hoy. The A9964 between Kirkwall and Kirkbister is part of NCR 1.

The access track from the B9047 / B9048 junction is used by hill walkers accessing Wee Fea but does not feature any specific infrastructure.

Figure 2: Study Area Network



Road Access

Access to the site would be taken directly from the existing access track which would be widened and improved to enable HGV and turbine load access. The access track would be re-surfaced and re-constructed to adoptable standards (within the current limits of road adoption). The section leading into the wind farm site would be surfaced for the first 20 m in the interests of keeping the remaining road clear of mud and site debris.

The B9047 and B9048 are both local access roads. Both roads are approximately between 6 m in width and are subject to a 60 mph speed limit.

The A964 is also subject to a 60 mph speed limit within the main study area, although this reduces in urban areas. The road is a local distributor road and provides access between the southern communities of the Mainland of Orkney.

Existing Traffic Conditions

Traffic flows on Hoy are low given the current population and that access is available for car by one ferry link from the Orkney Mainland.

The volume of construction traffic that the Proposed Development will attract to this type of road network will exceed the criteria for assessment and interventions. This is due to the low existing levels of traffic on the network.

The ferries to Hoy at peak service operate six crossings to and from Hoy. MV Hoy Head is the largest of the two ferries to operate to Lyness and has capacity for 24 cars (OIC – the vessel has capacity for twenty four cars or three HGV and seven cars). As the ferry also serves Flotta, it is assumed that throughout the day 80 % of the total journey capacity would be available for vehicle transport to Hoy. With this assumption, up to 231 vehicles

per day could be expected to travel to and from the ferry terminal. This traffic would then turn onto the B9047, to the north or south. For B9047 flows, it is assumed that the flows are those of the B9048.

Hoy has a population of circa 272 residents according to the latest census data. 84 % of the general Orkney population are of an age where it is legal to drive, indicating a potential driving population of 228 people. With a vehicle ownership rate of 92 %, this would suggest approximately 210 vehicles on the island (not all of which would be used daily).The total of thirty vehicles per day are assumed to use the access track to Wee Fea for access to the residential properties, farms and for recreational uses. This is based upon the number of properties on the road, an estimate of likely service and agricultural vehicle movements and the capacity of the viewpoint parking area.

Department for Transport (DfT) data is available for the A964 and this has been used in the assessment elements on the Mainland of Orkney.

Construction of the project could commence in 2024 / 2025 and its assumed for the purpose of the assessment that the peak period is likely to occur during 2025 if consent is granted. It and is anticipated to take up to 18 months depending on weather conditions and ecological considerations. Given the constrained nature of traffic growth that is possible on Hoy, it is assumed that no traffic growth would occur, providing a worst case scenario for the impact assessment.

Table 2: 2025 24 hour Average Traffic Data

Location	**Cars & Lights**	**HGV**	**Total**
Site Access Track	*30*	*0*	*30*
B9048	*231*	*0*	*231*
B9047	*231*	*0*	*231*
A964	*1005*	*49*	*1054*

Accident Review

Road traffic accident data for the five year period commencing 1 January 2015 through to 31 December 2019 was reviewed using the online resource crashmap.co.uk which uses data collected by the police about road traffic crashes occurring on British roads.

The statistics indicate that there have been no recorded traffic accidents on Hoy in that period. Only one accident is recorded on the A964 in the same period. This was a “Slight” category accident occurring on 14 October 2017 and involving car traffic, resulting in damage to vehicles only.

Trip Generation and Distribution

Construction Phase

General Methodology

During the 18 month construction period, the following traffic will require access to the Site:

- Staff transport, in either cars or staff minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as concrete and cabling sand; and
- Abnormal loads consisting of the wind turbine sections and also a heavy lift crane.

Average monthly traffic flow data were used to establish the construction trips associated with the site based on the assumptions detailed in the following sections.

Construction Staff

Staff would arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce on-site will depend on the activities undertaken, but, based on previous wind farm construction site experience for a project of this scale which suggests three staff per turbine during the short peak period of construction is likely, the maximum number of staff expected on-site could be around 18 per day.

For the purposes of estimating traffic movements, it was assumed that 60 % of staff would be transported by crew minibus and 40 % would arrive by car (single car occupancy was assumed as the worst case at this stage with potentially fewer movements through car sharing).

It is assumed that those driving to site will be living on Hoy during the construction process and that those using the crew minibus will be resident on the Mainland of Orkney. Those living on the mainland have been assumed to travel from the Kirkwall area to the site using the ferry. The crew minibus would be left at Houton and a separate vehicle would be provided at Lyness to access the site to avoid unnecessary vehicles being placed on the ferry every day.

Abnormal Indivisible Load Deliveries

The turbines are broken down into components for transport to the site. The nacelle, blade and tower sections are classified as Abnormal Indivisible Loads (AIL) due to their weight, length, width and height when loaded. For the purposes of the report, the 'worst case' numbers of components requiring transport are illustrated in Table 3.

In addition to the turbine deliveries, two high capacity erection cranes would be needed to offload a number of components and erect the turbines. The cranes are likely to be mobile cranes with a capacity up to 1,000 tonnes that are escorted by boom and ballast trucks to allow full mobilisation on-site. Smaller erector cranes would also be present to allow the assembly of the main cranes and to ease the overall erection of the turbines.

All abnormal loads (cranes and turbine components) would be offloaded at Lyness Quay, with components being stored on the laydown areas located nearby. Access to site would then be via the B9048 and the access track to Wee Fea.

Escort vehicles would accompany the AIL convoys to support the traffic management measures. Given the short nature of the site access road, it has been assumed that the Police will only escort from the quayside to the B9047 / B9048 junction and use only two escort vehicles. It has also been assumed that three turbine components would be delivered per convoy. This would result in 21 convoys on the network, with a total of 84 escort journeys (42 trips in and 42 trips out).

The escort vehicles have been assumed to be police cars and light goods vehicles. Motorcycles may be deployed instead, depending upon Police resources.

Table 3: Turbine Components

Component	*Number of Components per turbine*
Rotor Blades	3
Tower Sections	*4*
Nacelle	*1*
Hub	*1*
Drive Train	*1*
Container	*1*
Nose Cone	*0.5*
Footings	*1*
Site Parts	*0.2*

General Deliveries

Throughout the construction phase, general deliveries will be made to site via HGV. These would include fuel, site office supplies and staff welfare.

At the height of construction, it is assumed that up to 40 journeys to site are made (20 in and 20 out) per month. These are assumed to originate at Kirkwall and will travel to site via the existing ferry service.

Separate to general welfare deliveries, a site compound will be established on-site and will be removed following the commissioning stage of the construction process. This will be constructed of modular buildings and a provision of 50 journeys has been established for this element. This will be delivered directly to Lyness Quay by a specific service and would not access Hoy via scheduled ferry service.

Material Deliveries

Various materials will need to be delivered to site to form the site based infrastructure.

Road stone from the existing quarry at Hurliness could be used for the initial track improvement works. It is proposed that crushed stone for use on the initial access track improvements could be sourced from this site if required. The material estimates for this and resultant traffic flow is illustrated in Table 4.

Table 4: Road and Track Material Deliveries

Element	*Volume / installation (m3)*	*Weight (t)*	*Lorry Capacity (m3)*	*Inbound Trips*	*Total Journeys*
Road & Track Construction Materials	1620	3564	20	179	358

Should sourcing this material not be possible from Hurliness, it could be imported from alternative sources within Orkney or from the Scottish Mainland by ship to Lyness Quay.

The proposed design of the site has achieved a cut and fill balance, so there is no need to import further material on the site for the purposes of on-site track construction.

At the outset, up to 30 HGV deliveries will deliver plant and initial material deliveries to the site to enable the formation of the site compound and access tracks

The site is remote to existing concrete producers, so a local batching plant will need to be created at the port. A discussion with the Orkney Islands Ports team has been undertaken and it would be possible to create a concrete batching plant at Lyness for the production of concrete for use in in the turbine and substation foundations.

Raw materials would be imported from alternative sources within Orkney or from the Scottish Mainland via specific vessels. The batching plant would then supply the development site using standard HGV mixers.

Steel will also be imported for use as reinforcement in the foundations and will come to Lyness Quay as part of the concrete material deliveries.

Foundation calculations for the turbine bases and the substation are detailed in Tables 5 and 6 below.

Table 5: Concrete Trip Estimation

Element	*Volume / installation (m3)*	*Total Volume (m3)*	*Lorry Capacity (m3)*	*Inbound Trips*	*Total Journeys*
Turbine Foundation	750	4500	6	750	1500
Substation / Control Building Foundation	*100*	*100*	*6*	*17*	*34*

Table 6: Reinforcement Trip Estimation

Element	*Weight / installation (t)*	*Total Weight (t)*	*Lorry Capacity (t)*	*Inbound Trips*	*Total Journeys*
Turbine Foundation	100	600	30	20	40
Substation / Control Building Foundation	*20*	*20*	*30*	*1*	*2*

The access roads linking the turbines would generally be 4.5 m in width and would be designed to accommodate 13 tonne axle loads. In addition to the roads, crane pads will be constructed to enable the turbine erection process. The road materials for these elements would be sourced on-site using a cut and full balance.

Both the roads and crane pads will require geotextile in the foundations. Up to 26 deliveries of geotextile rolls for the roads, hardstands and compounds will be required. These are to be delivered via container, direct from the Scottish Mainland.

Cables will connect each turbine to the internal substation and control building. Trip estimates for the cable materials are provided below in Tables 7, 8 and 9.

Three cables are to be provided within each cable trench and would be backfilled with cable sand. Geotextiles would be used around the trench and ducting would be used to protect the cable when it runs under roadways. The cable sand material would be likely sourced from the Mainland of Orkney or the Scottish Mainland direct to Lyness Quay by specific vessel. Access to site would then be via HGV tipper.

Table 7: Cabling Trip Estimation

Element	*Total Cable Length (m)*	*Length per Drum (m)*	*Number of Drums*	*Inbound Trips*	*Total Journeys*
Cables	6642	500	40	5	10

Cables, ducting and geotextile will be imported to Hoy via direct vessel delivery to Lyness Quay.

Table 8: Cable Sand Trip Estimation

Element	*Volume / installation (m3)*	*Lorry Capacity (t)*	*Inbound Trips*	*Total Journeys*
Cable Sand	2242	20	180	360

Table 9: Geotextile and Ducting Trip Estimation

Element	*Weight / length (m)*	*Length per Drum (m)*	*Number of Drums*	*Inbound Trips*	*Total Journeys*
Cable Geotextile	6642	75	89	5	10
Ducting	200	5	40	2	4

A substation and control building will be constructed on the site. This will require deliveries of building materials, electrical components and structural elements and would result in a further 150 journeys. These would also be delivered directly from the Scottish Mainland via specific vessel delivery.

Peat displaced from its original setting will be either used within the site or transported off site for peatland habitat restoration. Peat used for restoration within the site will not attract any further off-site traffic.

Peat to be removed from the site and used in peatland habitat restoration will be transported to a site located to the south of the site via the access track and the B9047 using HGV tippers of a 35 m^3 capacity. Up to 12,785 m^3 of material will require transport from the site, resulting in 730 additional HGV journeys (365 outbound and 365 inbound).

Further details of the peatland restoration area are provided in the EIA report (Chapter 8, Appendix 8.5).

Peak Construction Period

A construction programme has been developed for the project. This has been used to determine timescales for the various deliveries and trips.

A trip programme has been developed and is illustrated in Table 10. Please note that the figures quoted in Table 10 are average flows that have been rounded to the nearest whole number. As such, there may be minor rounding errors reported.

The results conclude that Month 7 is likely to be the peak period for the construction phase. The activities are anticipated to generate an average of 46 movements per day (23 trips in and 23 trips out), of which 16 would be made by light vehicles (site staff) and 30 by HGV.

The traffic impact assessment focuses on the peak period traffic flows to illustrate the potential effects on the study network.

Table 10: Construction Programme

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Establishment	20	30	30														40	40
General Site Delivery	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Access Track Works			10	90	90	90	90	10										
Peat Extraction			122	122	122	122	122	122										
Reinforcement							11	11	11	11								
Concrete Deliveries							384	384	384	384								
Cable Deliveries										10	4							
Cabling Sand										90	90	90	90					
Geotextile Deliveries			26							10								
Substation Deliveries															50	50	50	
Cranage												20					20	
AIL Deliveries													38	38	38	38		
AIL Escorts													21	21	21	21		
Commissioning																	132	132
Staff	139	202	282	361	361	361	361	361	361	361	361	361	361	361	282	202	139	139
Total HGV per Day	3	3	10	11	11	11	30	26	20	25	6	7	8	4	6	6	7	4
Total Cars / LGV per Day	6	9	13	16	16	16	16	16	16	16	16	16	17	17	14	10	12	12
Total per Day	**9**	**12**	**18**	**23**	**28**	**28**	**46**	**42**	**36**	**41**	**22**	**23**	**25**	**21**	**20**	**16**	**19**	**16**

Operational Phase

It is predicted that during the operation of the Site there would be up to 2 vehicle movements per week for maintenance purposes. There may be occasional abnormal load movements to deliver replacement components in the unlikely event of a major failure.

Construction Traffic Impact Assessment

The peak construction month occurs in Month 7. Using the distribution of traffic described in the previous section, the proposed traffic flows on the study area network at the peak of construction are illustrated in Table 11.

Table 11: Peak Construction Month Daily Traffic Data

Location	**Cars & Lights**	**HGV**	**Total**
Site Access Track	*16*	*30*	*46*
B9048	*16*	*20*	*36*
B9047	*0*	*10*	*10*
A964	*2*	*2*	*4*

The peak month traffic data was combined with the future year (2025) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in Table 12.

Table 12: 2025 Peak Month Daily Traffic Data

Location	**Cars & Lights**	**HGV**	**Total**	**Cars & Lights % Increase**	**HGV % Increase**	**Total Traffic % Increase**
Site Access Track	46	30	76	*55%*	*n/a**	*153%*
B9048	*247*	*20*	*267*	*7%*	*n/a**	*16%*
B9047	*231*	*10*	*241*	*0%*	*n/a**	*4%*
A964	*1007*	*51*	*1058*	*0.2%*	*4%*	*0.4%*

* Infinite number due to no existing HGV traffic flow in base case

It is anticipated that should any significant weekend working take place, it would involve limited numbers of staff and associated vehicle movements and no deliveries by HGV (except for abnormal loads which may be delivered under Police escort). As such no detailed weekend analysis has been undertaken.

The total traffic movements will increase substantially on Hoy, due to low numbers of existing traffic movements. The impact on the Mainland of Orkney is considered to be minimal.

Whilst this increase in HGV traffic between Lyness and the site and between the peatland restoration area and the site are statistically significant, it is generally caused by the low HGV flows on the network. The actual numbers of HGVs on the network will be 30 additional vehicles per day at the peak of construction (15 inbound and 15 outbound movements). This represents approximately 2 HGV journeys every hour during construction activities, which is not considered significant in operational terms.

A review of existing road capacity has been undertaken using the Design Manual for Roads and Bridges, Volume 15, Part 5 “The NESA Manual”. The theoretical road capacity has been estimated for each of the road links that makes up the study area. The results are summarised in Table 13.

Table 13: 2025 Road Capacity Review Summary

Location	**2025 Baseline Flow**	**Theoretical Road Capacity (12hour)**	**2025 Baseline + Development Flows**	**Spare Road Capacity (%)**
Site Access Track	30	46	3360	98.62%
B9048	*231*	*247*	*21600*	*98.85%*
B9047	*231*	*231*	*21600*	*98.93%*
A964	*1005*	*1058*	*28800*	*96.33%*

The results indicate that there are no road capacity issues with the Proposed Development and that ample spare capacity exists within the study road network.

Abnormal Indivisible Load Summary

A Route Survey Review has been undertaken and is attached in Annex A. The assessment is based on a rotor diameter of 136m at a maximum tip height of 149.9m.

The assessment details the proposed route and the required physical mitigation works that are required along the proposed access route form the ports to the site access junction.

Port Management Plan

Following discussions with Orkney Islands Council's Ports team, it is apparent that Lyness Quay is suitable for the import of components, has a heavy load lift area and has enough space for the temporary laydown of sections.

Following consent, the Applicant will need to undertake a procurement exercise with the turbine suppliers to agree timescales for the import of components through Lyness Quay. As part of this process, the turbine suppliers will be required to formulate a Port Management Plan with the harbour authorities. The management plan will:

- Agree timescales for deliveries to be made;
- Agree quay space and temporary storage areas;
- Agree crane and stevedore access arrangements;
- Book quay space;
- Detail the vessels that will undertake the deliveries; and
- Agree access rights along the access road from the pier and the convoy management with the Council, ports team and Police.

To ensure that there are no detrimental issues at Lyness Quay, the Applicant requests that the Council require that a Port Management Plan is provided by planning condition and that this should be agreed prior to the delivery of the first turbine component.

General Comments

A review of the following would be required prior to the delivery of the abnormal loads, to ensure load and user safety:

- A review of clear heights with utility providers and the transport agencies along the route;
- Ensure any vegetation which may foul the loads is trimmed back to allow passage (this is of concern to the hauliers once the load is on the local road network and should be assessed for summer conditions);
- Confirm there are no roadworks or closures that could affect the passage of the loads;
- Check no new or diverted underground services on the proposed route are at risk from the abnormal loads;
- Confirm Police Scotland is satisfied with the proposed movement strategy; and
- The Applicant contacts the appropriate agencies to ensure that the above points are reviewed before the transport of the components commences.

Proposed Traffic Mitigation Measures

Construction Phase

A Construction Traffic Management Plan (CTMP) would be prepared and agreed with the Council prior to construction works commencing. The following measures would be implemented through the CTMP during the construction phase:

- All materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads;
- Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- Wheel cleaning facilities will be established on the site;
- Appropriate traffic management measures would also be put in place at the site access junction to advise drivers to slow down and be aware of turning traffic;
- Provision of construction updates on the project website and distribution of a newsletter to residents within an agreed distance of the site;
- Requirement for all delivery drivers to attend an induction to include a safety briefing, the need for appropriate care and speed control, particularly in sensitive areas, identification of specific sensitive areas, identification of the specified route, and the requirement not to deviate from the specified route; and
- The production and implementation of a Staff Travel Plan which will include pick up times and car sharing information for those travelling to and from site.

The Council may require an agreement to cover the cost of abnormal wear and tear on roads not designed for that purpose.

Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction stage of the Proposed Development. Any necessary repairs would be coordinated with the Council. Any damage caused by traffic associated with the Proposed Development, during the construction period that would be hazardous to road users, would be repaired immediately.

Any damage to road infrastructure caused directly by construction traffic would be made good, and street furniture that is removed on a temporary basis would be fully reinstated.

There would be a daily road edge review and any debris and mud removed from the public carriageway using an onsite road sweeper to keep the road clean and safe during the initial months of construction activity, until the construction junction and immediate access track works were complete.

Abnormal Load Transport Management Plan

There are a number of traffic management measures that could help reduce the effect of deliveries and abnormal load convoys.

All abnormal load deliveries would be undertaken at appropriate times (to be discussed and agreed with the relevant roads authorities and police) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys would travel in the early morning periods, before peak times while general construction traffic would generally avoid localised peak periods.

The majority of potential conflicts between construction traffic and other road users will occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

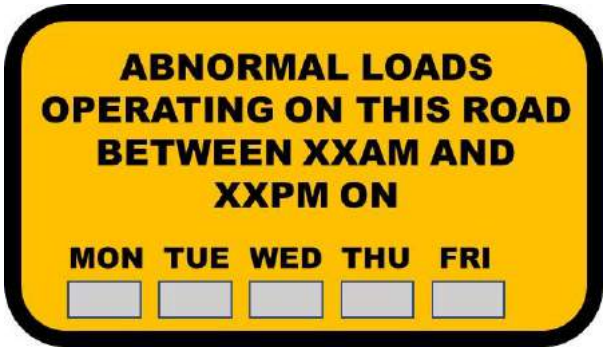
Potential conflicts between the abnormal loads and other road users can occur at a variety of locations and circumstances. The main potential conflicts are likely to occur:

- Where loads depart the storage areas at Lyness Quay and enter the B9048;
- On the B9048; and
- At the junction of the B9047 and B9048.

To avoid impacts on ferry traffic, no abnormal loads will be moved within 30 minutes of a ferry arrival or departure. This will allow unimpeded access to the ferry terminal for other road users.

Advance warning signs would be installed on the approaches to the affected road network. Information signage could be installed to help assist drivers and an example is illustrated in Figure 3. Flip up panels (shown in grey) would be used to mask over days where convoys would not be operating. When no convoys are moving, the sign would be bagged over by the Traffic Management contractor.

Figure 3: Example Sign Plate



This signage will assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist).

The location and numbers of signs would be agreed post consent and would form part of the wider Traffic Management Proposal for the project.

The Abnormal Load Transport Management Plan would also include:

- Procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay over areas to allow overtaking;
- A diary of proposed delivery movements to liaise with the communities to avoid key dates such as local events etc;
- A protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and
- Proposals to establish a construction liaison committee to ensure the smooth management of the project / public interface with the applicant, the construction contractors, the local community, and if appropriate, the police forming the committee. This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

Public Information

Information on the turbine convoys would be provided to local media outlets such as local papers and local radio to help assist the public.

Information would relate to expected vehicle movements from the port of entry through to the site access junction. This will assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

The Applicant would also ensure information was distributed through its communication team via the project website, local newsletters and social media.

Convoy System

A police escort would be required to facilitate the delivery of the predicted abnormal loads. The police escort would be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible.

The abnormal loads convoys would be no more than three AILs long, or as advised by the police, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so.

The times in which the convoys would travel will need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

Operational Phase Mitigation

Site entrance roads will be well maintained and monitored during the operational life of the development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operation and to ensure there are no run-off issues onto the public road network.

Summary & Conclusions

Summary

This report provides an assessment of the transport issues associated with the Proposed Development located to the west of Lyness, Hoy.

The construction traffic would result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. During the construction of the Proposed Development, the associated traffic effects are predicted to be greatest on the B9048 and the Wee Fea access track leading to the site access.

The maximum traffic effect associated with construction of the Proposed Development is predicted to occur in Month 10 of the programme. During this month, an average of 41 vehicles movements is predicted per day.

A review of the local road network was undertaken to assess the feasibility of transporting turbines to the development Site. No overall road link capacity issues are expected on any of the roads assessed.

Conclusions

The assessment has identified the following:

- That the construction phase of the project will generate the highest level of traffic and that a robust assessment assuming site supply by ready mix concrete, rather than on-site batching has been used;
- The construction traffic during the most intensive phase of the construction programme will be short lived;
- The disruption caused by construction activity is short lived and of a transitory nature. As such, there are no long lasting effects associated with the Proposed Development;
- That the surrounding road network has enough capacity to accommodate the temporary construction traffic;
- That the route from the proposed ports of entry is suitable for turbine delivery; and
- That a traffic management plan is required to control construction traffic in the interests of road safety and efficiency.

Annex A: Abnormal Load Route Survey

Pell Frischmann

Orkney's Community Wind Farm: Hoy

Abnormal Indivisible Load Route Survey

January 2020

Revision Record

Document2

Rev	Description	Date	Originator	Checker	Approver
A	Draft	09/01/2020	J Stirrat	G Buchan	G Buchan
B	Minor comments	10/02/2020	S McGarva	S McGarva	S McGarva
C	Final	24/08/2020	J Stirrat	S McGarva	G Buchan

Prepared for:

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Pell Frischmann

Contents

Figures

Tables

Appendices

1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by ITP Energised to undertake a survey of the Abnormal Indivisible Load (AIL) delivery route for wind turbine loads associated with the construction and development of Hoy Wind Farm, located to the west of Lyness.

The Route Survey Review (RSR) has been prepared to help inform ITP Energised on the issues associated with the development of the site with regards to off-site transport and access for AIL traffic.

The report identifies the key issues associated with AIL deliveries and notes that remedial works, either in form of physical works or as traffic management interventions will be required to accommodate the predicted loads.

The detailed designs of any remedial works are beyond the agreed scope of works between PF and ITP Energised at this point in time.

It is the responsibility of the turbine supplier to ensure that the entirety of the proposed access route is suitable and meets with their satisfaction. The supplier will be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety consideration for all road users is in line with the relevant legislation at the time of delivery.

2 Site Background

2.1 Site Location

The development site is located to the west of Lyness. Figure 1 illustrates the general site location.

Figure 1:Site Location Plan

Contains Google Map data © 2020 Google

2.2 Candidate Turbines

There is no candidate turbine at present as the turbine tender selection process will be undertaken post consent. To review the access issues relating to the site, a 136m diameter rotor turbine at a tip height of 149.9m has been undertaken.

The assessment has assumed the use of Vestas V136 turbine. Details of the V136 turbine have been obtained directly from Vestas. The details of the components are summarised in Table 1.

Table 1: Turbine Size Summary

Component	Length (m)	Width (m)	Height (m)	Weight (t)
Blade	66.650	4.265	3.124	13.600
Tower 1	19.640	4.310	4.310	75.000
Tower 2	29.960	4.000	4.000	64.000
Tower 3	30.000	3.650	3.650	45.500
Nacelle	12.861	4.004	3.412	64.938
Hub	5.469	3.773	3.964	34.196
Drive Train	7.323	3.500	3.200	61.059

The subsequent assessment has been based upon the worst case loads being:

- Vestas V136 Turbine blade 66.650 m long; and
- Vestas V136 Tower section, 29.960 m long 4.000 m in diameter.

Figure 2: Superwing Carrier Trailer

Figure 3: Tower Trailer

3 Access Route Review

3.1 Port of Entry

The nearest feasible Port of Entry for the site is Lyness. Lyness is a former navel base and features depths between 5m and 9m along two wharfs, Lyness Wharf (123m in length) and Golden Wharf (180m in length).

The port is operated by Orkney Islands Council and has been used for supporting the fish farm industry and as a base for wave energy testing. The port features a heavy lift pad to ease offload from vessel and there are large areas of brownfield land nearby that could be used for storage of components.

Figure 4 illustrates the Lyness Wharf, whilst Figure 5 illustrates the Golden Wharf.

Figure 4: Lyness Wharf

Figure 5: Golden Wharf

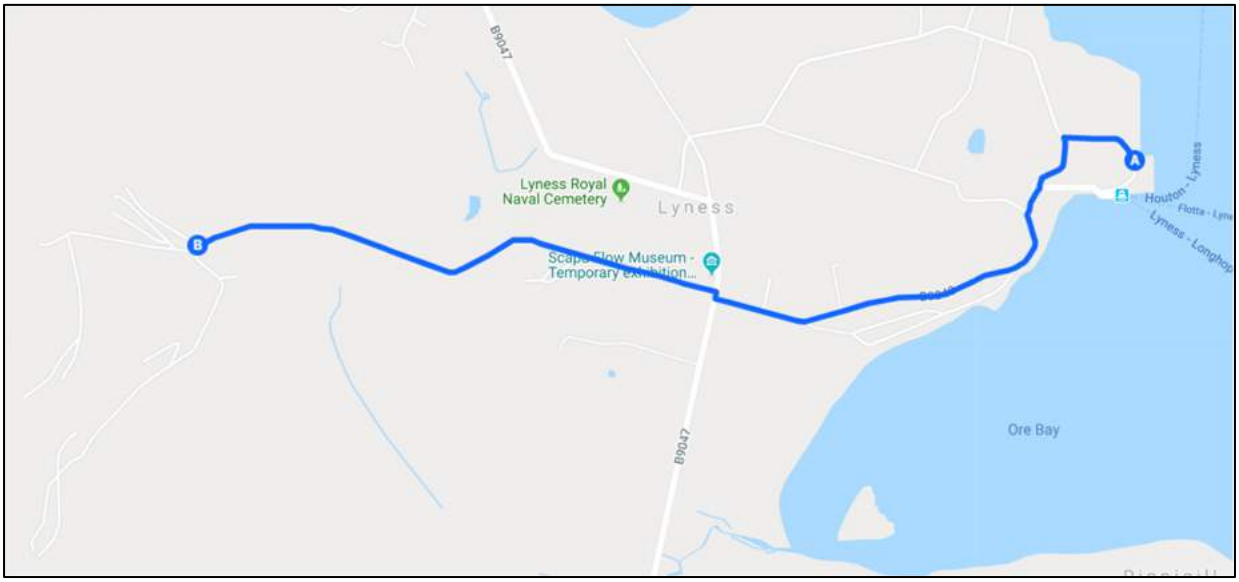
3.2 Access Route

The route from Lyness Port to the site has been revised during a site visit undertaken in September 2019. The proposed access route to the site access junction is as follows:

- Loads will head northwest away from the port;
- Loads will turn left towards the B9048 and will join the B9048 proceeding westbound;
- Loads will cross the B9047 and will join an unclassified track heading west;
- Loads will proceed along the track which will be rebuilt to comply with turbine delivery specifications. The track will then merge into the new site access track network.

The proposed access route is illustrated in Figure 6.

Figure 6: Proposed Access Routes



Contains Google Map data © 2020 Google

3.3 Route Constraints

The constraints noted in the review of the route from Lyness port are detailed in Table 2.

Plans illustrating the location of the constraints and a detailed list of POI are provided in Appendix A.

Table 2: Contraint Points and Details

POI	Key Constraint	Details
1	**Lyness Port**  	Loads will be offloaded from the delivery vessel at the harbour. Delivery to Lyness Wharf has been assumed as this has a greater depth of water and is in closer proximity to the heavy lift area. A swept path assessment of movements within the port has been undertaken. This indicates that up to three lighting towers within the port area should be removed. Loads will over-sail and over-run the existing brownfield land on the access track leading from the port. The landownership of these areas has been identified by OIC as being under their control. All obstructions identified will need to be removed. An over-run surface should be provided. To enable loads to line up with the Naval Museum junction and to avoid works to the existing bunds, an over-run surface will need to be provided on brownfield land to create a temporary access track. Permission to access this land will be required.

POI	Key Constraint	Details
2	**Naval Museum Junction** 	Loads will proceed ahead from the port onto the B9048 at the junction at the entrance to the naval museum. A swept path assessment of the movement has been undertaken and indicates that loads will pass over the splitter island feature near the museum access. All street furniture in the island will need to be removed and a load bearing surface provided. The landownership of this area has been identified by OIC as being under their control.
3	**B9048 Bend** 	Loads will proceed ahead through the bend. A swept path assessment has been undertaken and this indicates that loads will over-sail the outside and inside of the bend. The embankment on the inside of the bend may need to be reprofiled and a topographical survey of this area is required to inform any necessary ground works. The landownership of these areas has been identified by OIC as being under their control.
4	**B9048 Vertical Alignment** 	Loads will continue westbound on the B9048. The vertical profile of the road at this location is pronounced. The vertical clearance should be reviewed at the test run stage or via a topographical survey. Reprofiling works to the road may be necessary pending the results of the test run or survey. Loads should be set on their highest suspension settings to avoid loads grounding. The landownership of these areas has been identified by OIC as being under their control.

POI	Key Constraint	Details
5	**B9048 Bend 2** 	Loads will proceed ahead through the bend. A swept path assessment has been undertaken and this indicates that loads will over-sail both sides of the road at this location. A third party land review is necessary at this location. Land ownership of the area to the north has been identified by OIC as being under their control. To wholly utilise this land and attempt to avoid oversail to the south would result in the requirement to construct an over run area to to the north of the access road.
6	**B9048 / B9047 Junction** 	Loads will proceed cross the junction and will join the unclassified road to the west. A swept path assessment has been undertaken and this indicates that loads will need to cut into third party land on the southwest of the junction. Agreement with the owner of this land will be required to enable to over-run surface to be provided. To enable the over-run of the corner, the existing fence will need to be removed along with three road signs. A ditch will need to be culverted where the over-run surface passes over it and the land profiled to provide a flat transition between the two roads.

POI	Key Constraint	Details
7	**Unclassified Road** 	The Unclassified Road will need to be widened and re-engineered to comply with turbine access track standards. The road will need to be widened to a minimum of 4.5m along its entire length. There is slight bend in the road surface at this location. This will need to be straightened to allow abnormal load deliveries and a ditch should be culverted. This area is indicated in the swept path drawings.
8	**Unclassified Road** 	Loads will continue on the road. A swept path assessment has been undertaken at this bend and this indicates that loads will over-run both sides of the road. A land ownership review is required at this location. On the inside of the bend, the existing fence and vegetation should be removed. In addition, a section of over-run surfacing is required and all underground services should be protected.
9	**Unclassified Road Cattle Grid** 	Loads will pass over the cattle grid, heading towards the site. The cattle grid will need to be strengthen to accommodate the proposed axle loads of 12 tonnes and the existing fence poles and gates on either side will need to be removed to allow wide loads to over-sail the verge.
10	**Unclassified Road** 	Loads will continue ahead on the road. A swept path assessment has been undertaken at this bend and this indicates that an over-run area will be required on the side of the bend. A third party land review is required at this location. Loads will continue from this point to the site access junction. It is assumed that track from this point onwards is private and would be reconstructed as part of the wider access track design.

3.4 Swept Path Assessment Results and Summary

The detailed swept path drawings for the locations assessed are provided in Appendix B for review. The drawings in Appendix B illustrate tracking undertaken for the worst case loads at each location.

The colours illustrated on the swept paths are:

- Grey / Black – OS / Topographical Base Mapping;
- Green – Vehicle body outline (body swept path);
- Red – Tracked pathway of the wheels (wheel swept path); and
- Purple – The over-sail tracked path of the load where it encroaches out with the trailer (load swept path).

Where mitigation works are required, the extents of over-run and over-sail areas are illustrated on the swept path drawings.

Please note that where assessments have been undertaken using Ordnance Survey (OS) base mapping, there can be errors in this data source. Please note that PF cannot accept liability for errors on the mapping data source, be that OS base mapping or client supplied data.

3.5 Weight Review

A weight review has been undertaken via the ESDAL (Electronic Service Delivery for Abnormal Loads) contacts database using the Highways Agency website www.esdal.com.

All of the relevant ESDAL contacts are noted in Table 3 and all have been contacted to ascertain if there are any relevant constraints that should be noted.

Table 3: ESDAL Contacts

Organisation	Email Address
Orkney Islands Council	developmentandinfrastructure@orkney.gov.uk
Police Scotland	OSDAbnormalLoadsScotland@scotland.pnn.police.uk

The responses from the ESDAL search to date are contained in Appendix C.

3.6 Land Ownership

The limits of road adoption can vary depending upon the location of the site and the history of the road agencies involved. The adopted area is generally defined as land contained within a defined boundary where the road agency holds the maintenance rights for the land. In urban areas, this usually defined as the area from the edge of the footway across the road to the opposing footway back edge.

In rural areas the area of adoption can be open to greater interpretation as defined boundaries may not be readily visible. In these locations, the general rule is that the area of adoption is between established fence / hedges lines or a maximum 2m from the road edge. This can vary between areas and location.

3.7 Summary Issues

It is strongly suggested that following a review of the RSR, ITP Energised should undertake the following prior to the delivery of the first abnormal loads, to ensure load and road user safety:

- A detailed review of axle loading on structures along the entire access route with the various road agencies is undertaken;
- A review of clear heights with utility providers and the transport agencies along the route to ensure that there is sufficient space to allow for loads plus sufficient flashover protection (to electrical installations);
- That any verge vegetation and tree canopies which may foul loads is trimmed prior to loads moving;
- That a review of potential roadworks and or closures is undertaken once the delivery schedule is established in draft form;
- That a test run is completed to confirm the route and review any vertical clearance issues; and
- That a condition survey is undertaken to ascertain the extents of road defects prior to loads commencing to protect the developer from spurious damage claims.

The developer should undertake the necessary land negotiations and obtain the rights and permits to upgrade the roads as appropriate. The liaison with overhead utility providers and an ecological review of the tree canopy should be undertaken.

4 Summary

4.1 Summary of Access Review

PF has been commissioned by ITP Energised to prepare a Route Survey Report to examine the issues associated with the transport of AIL turbine components to the development site.

This report identifies the key points and issues associated with the proposed route and outlines the issues that will need to be considered for successful delivery of components.

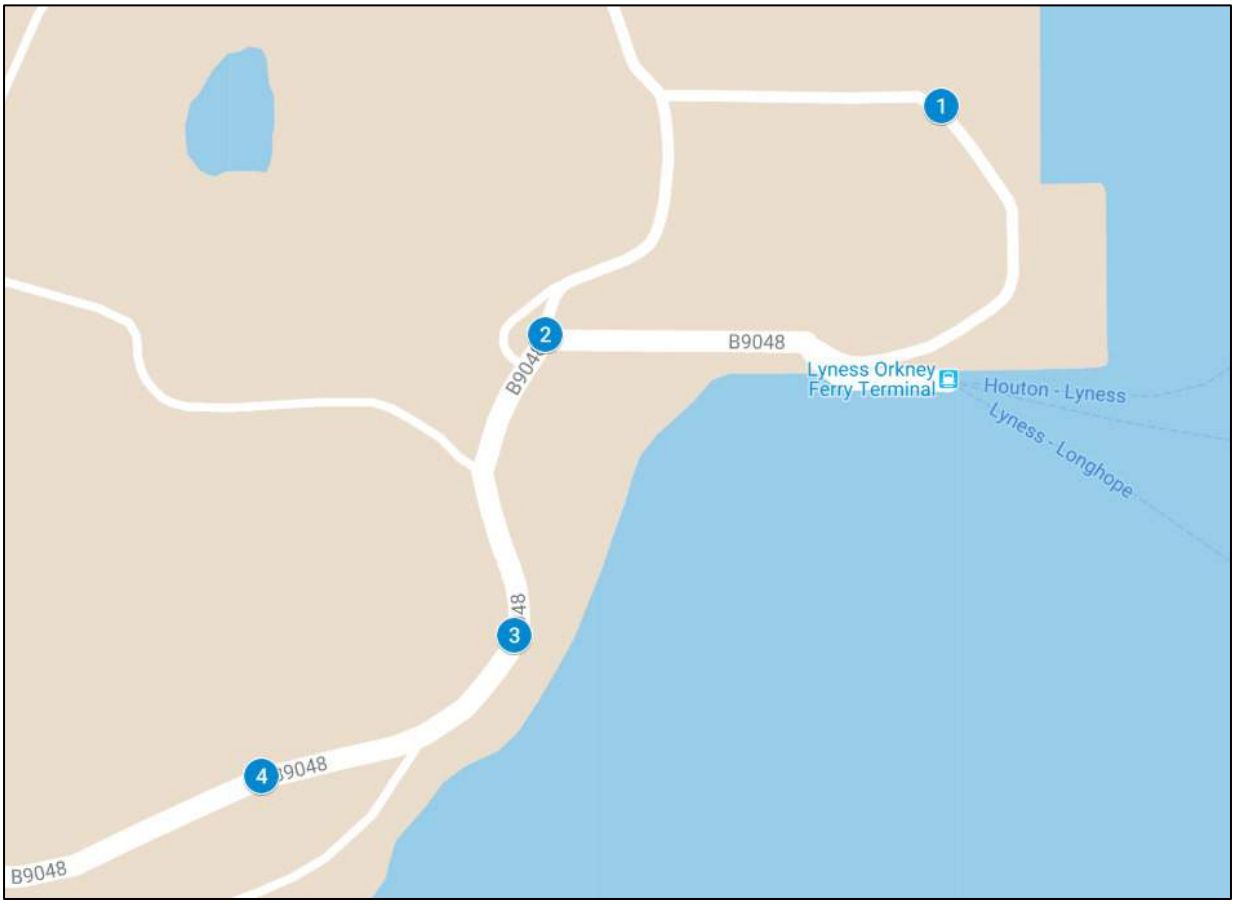
The report is presented to ITP Energised for consideration. Various road modifications and interventions are required to successfully access the site. If these are assessed, approved and undertaken, access to the consented wind farm site is considered feasible.

4.2 Further Actions

The following actions are recommended to pursue the transport and access issues further:

- Obtain the necessary land rights;
- Prepare detailed mitigation design proposals to help inform consultee / licence discussions;
- Undertake discussions with the affected utility providers and roads agencies;
- Obtain the necessary statutory licences to enable the mitigation measures; and
- Develop a detailed operational Transport Management Plan to assist in transporting the proposed loads.

Appendix A
Points of Interest Locations


1
2
B9048
Lyness Orkney
Ferry Terminal
Houton - Lyness
Lyness - Longhope
3
4
B9048


B9047
B9047
B9047
8
9
10
7
6
B9048
French Rd
5
B9048
B9047
B9047

Appendix B
Swept Path Assessments

Blade

L Twrs

Bollards

El Sub Sta

Ly Ness

Bollards

Landing Stage

Lyness

L Twrs

L Twr

Bollards

Tank

PC

L Twrs

Beacon

Lyness Ferry Terminal

Mean Low Water Springs

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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: Lyness Port

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		1; 2

Scale: 1:1000 @ A3

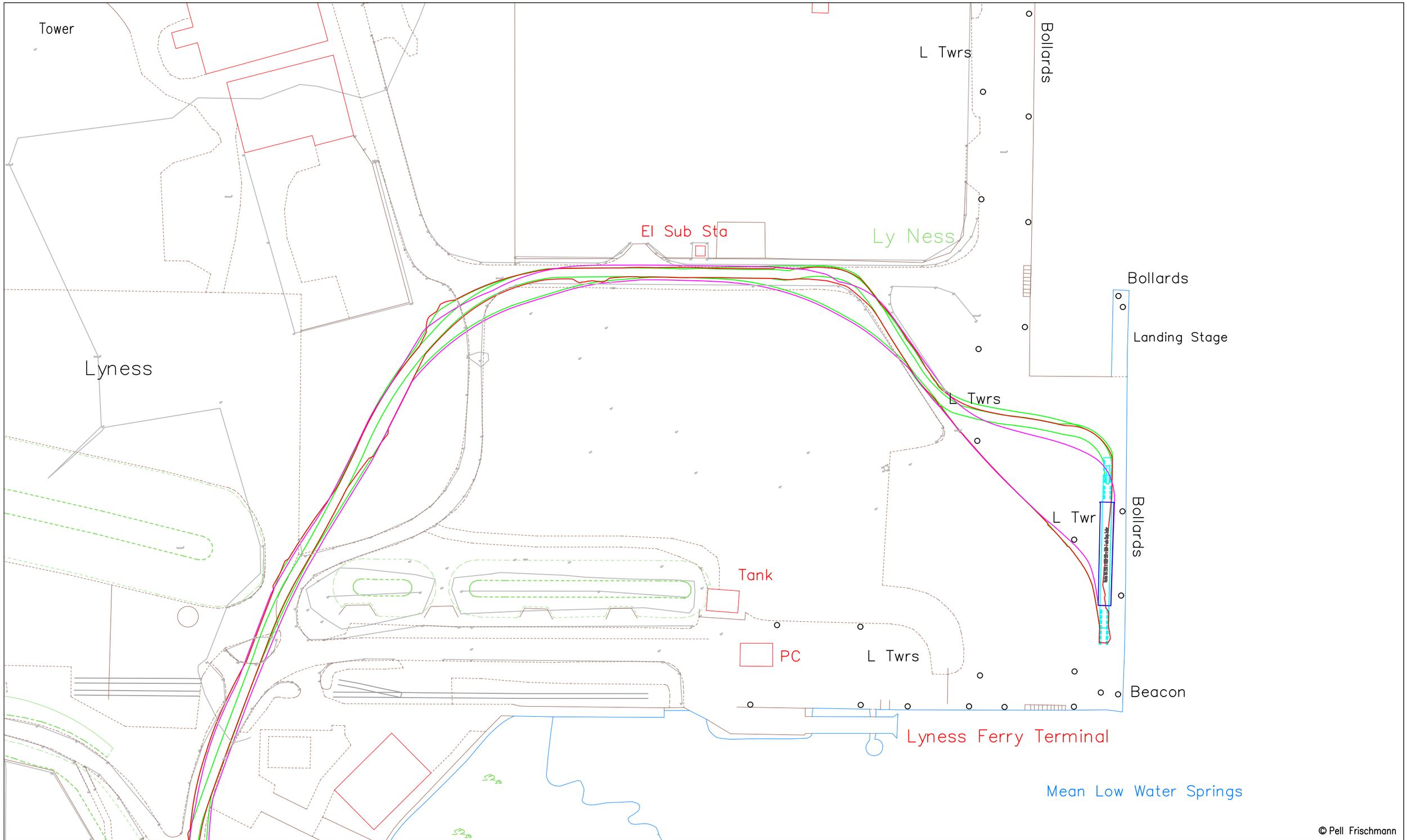
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK01

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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SPA Location: Lyness Port

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		1; 2

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

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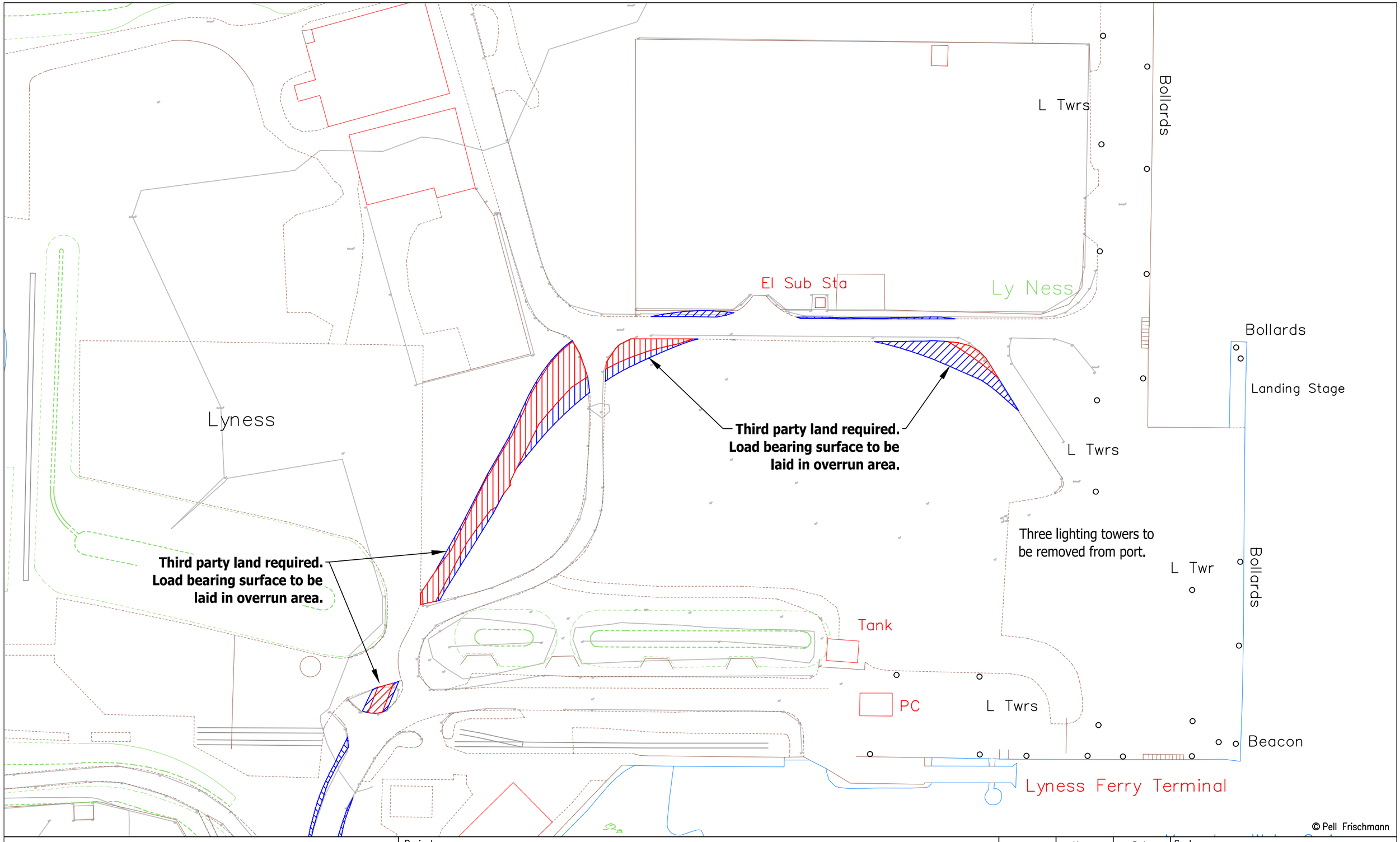

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Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: Lyness Port

	Name	Date
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Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		1; 2

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK01B

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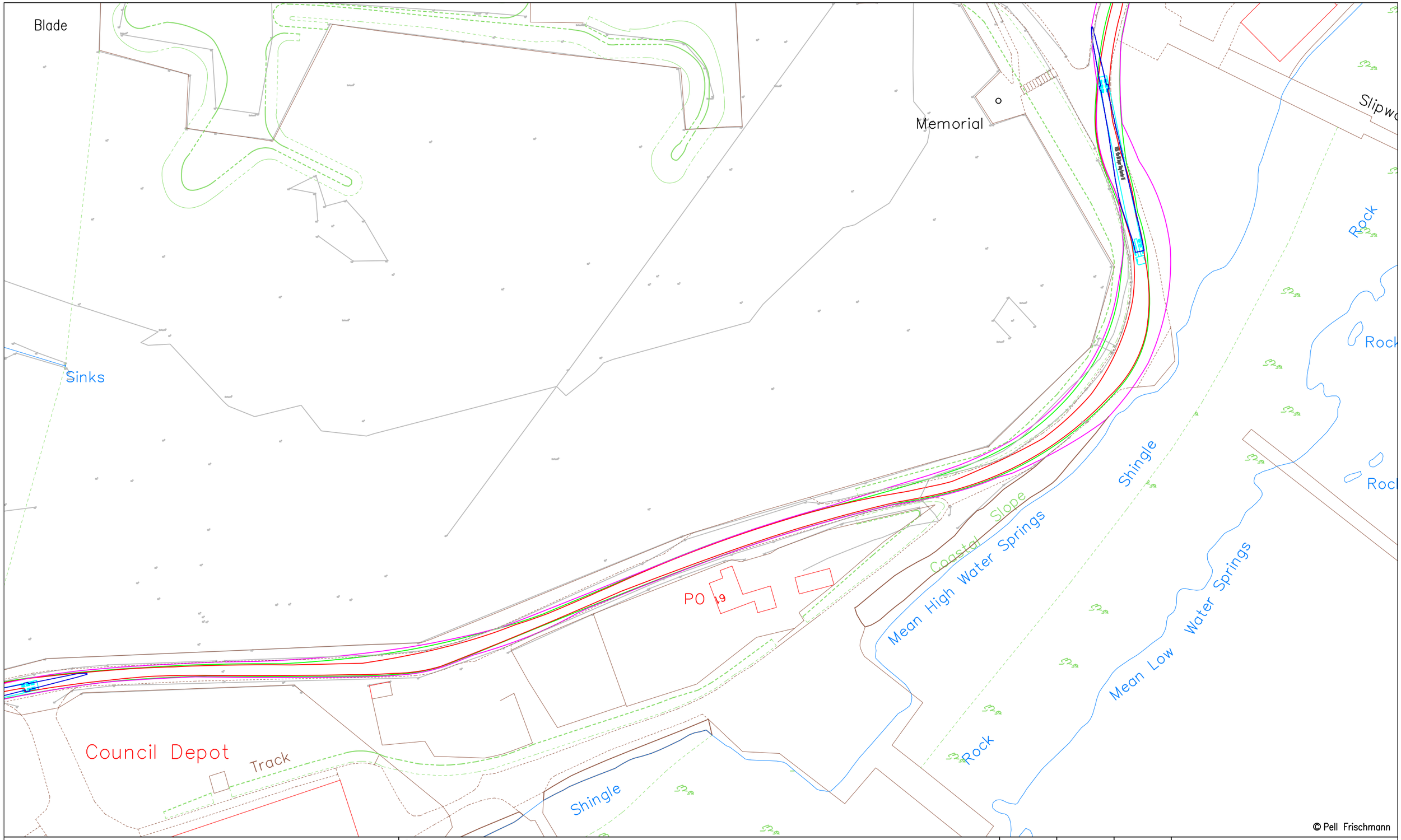

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Client: ITPEnergised

Key: Wheel SPA; Body SPA; Load SPA; Indicative; Over-run; Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 Bends

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Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		3; 4

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File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK02

Notes:
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Revision: 1

Tower

Memorial

Sinks

Shingle

Coastal Slope

Mean High Water Springs

Mean Low Water Springs

Rock

PO 19

Council Depot

Track

Shingle

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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 Bends

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Designed	JS	09/01/2020
Checked	GB	17/01/2020
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File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK02A

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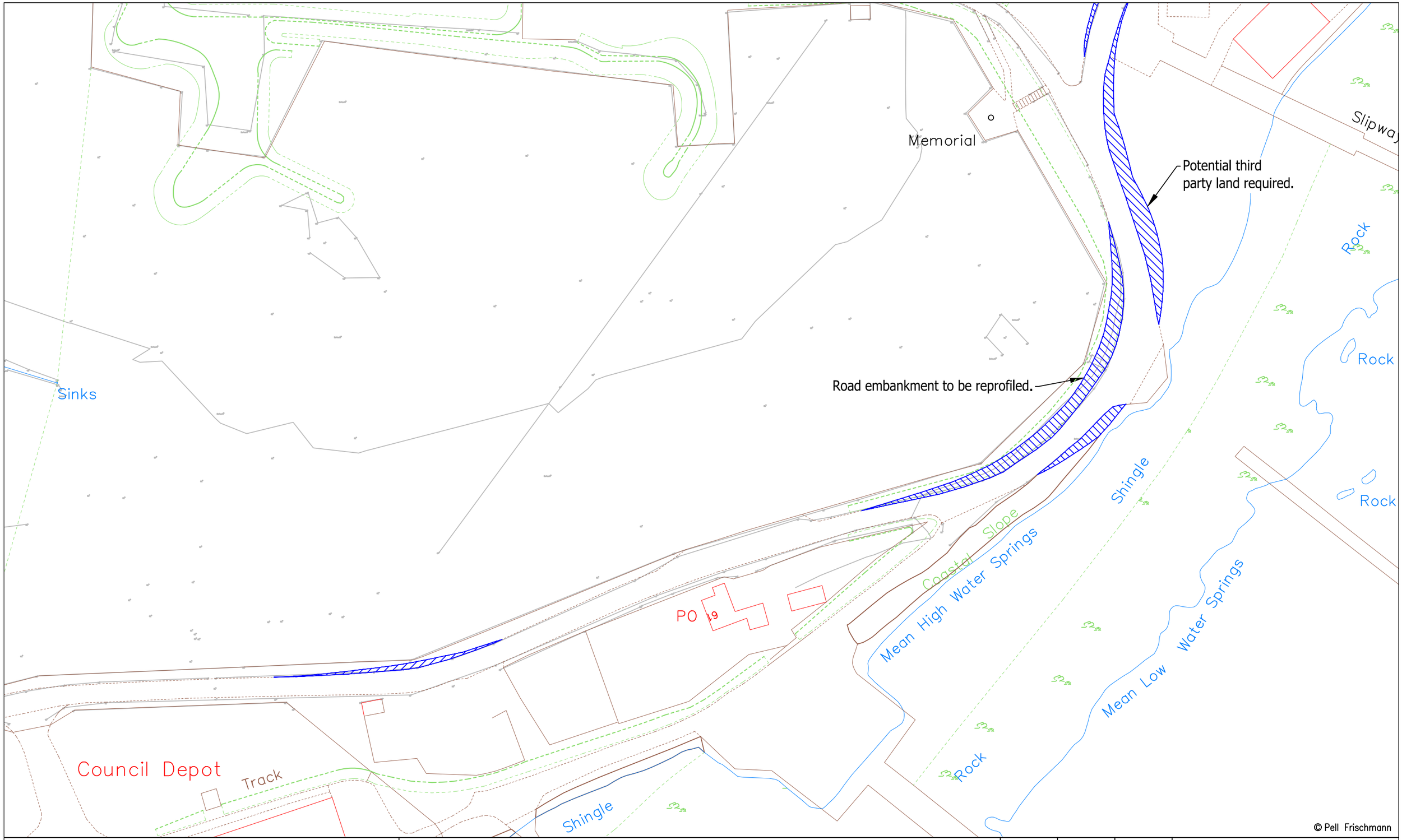

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Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 Bends

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		3; 4

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK02B

Notes:
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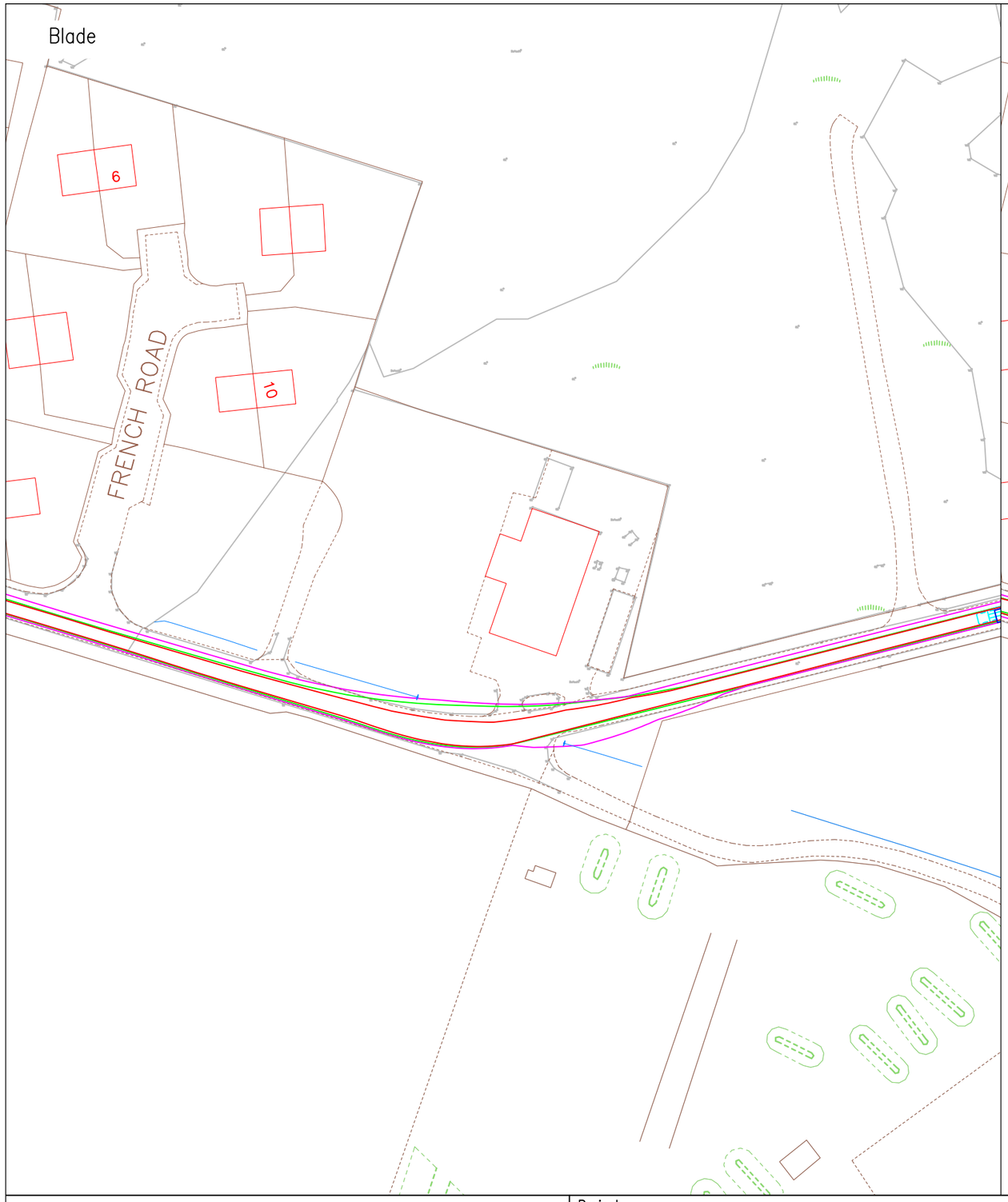
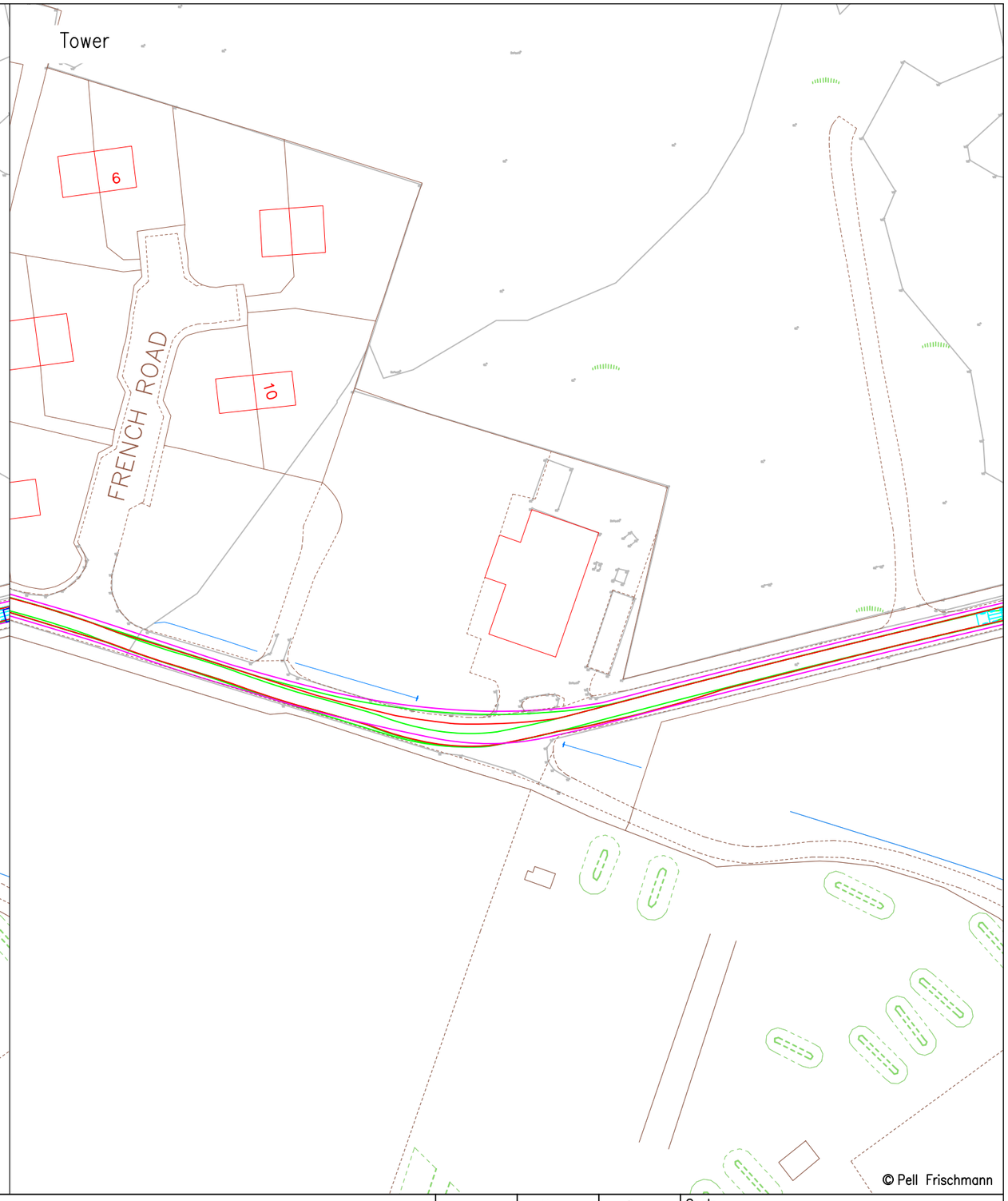
Revision: 1

Blade



Tower



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 Right Bend

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		5

Scale: 1:1000 @ A3

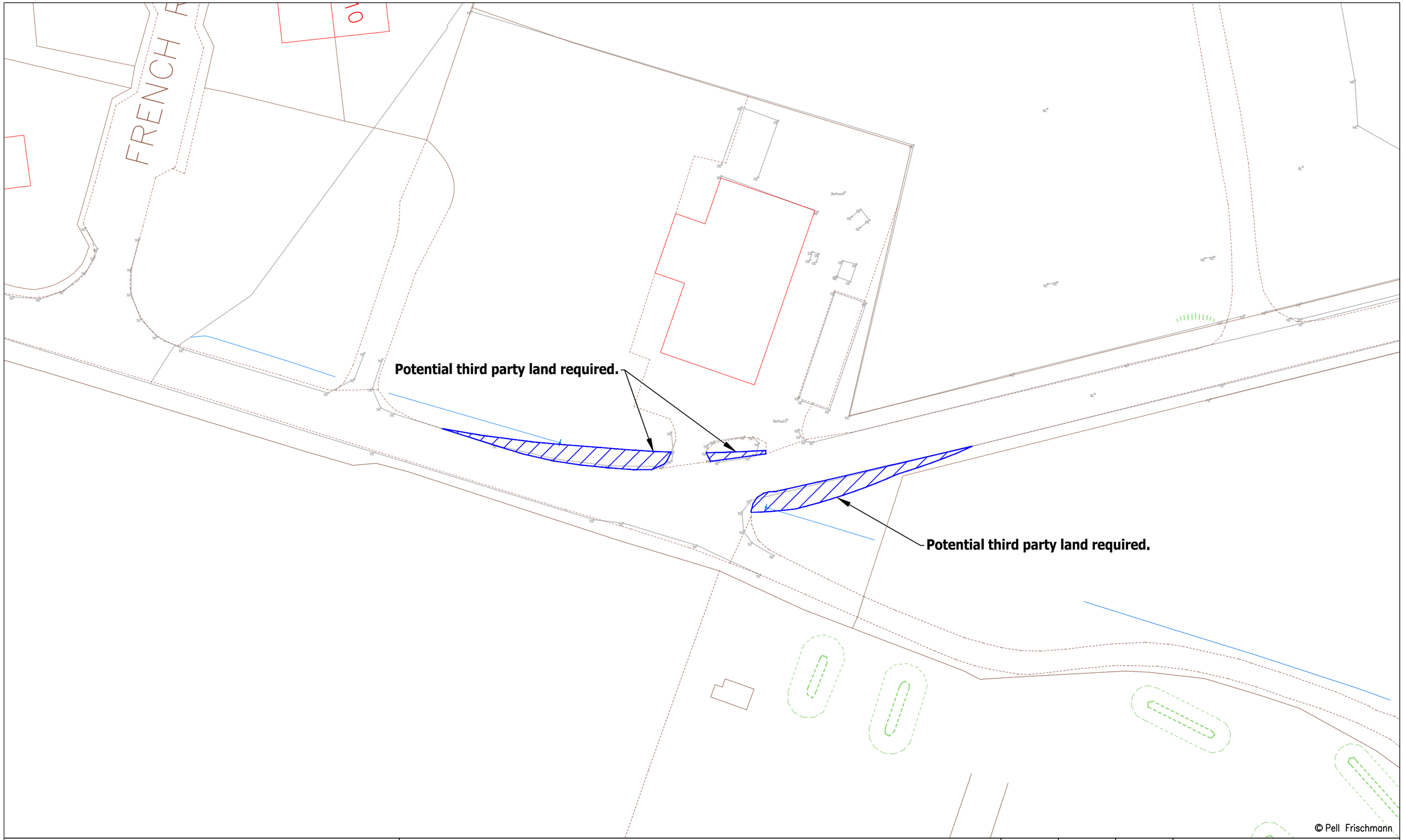
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK03

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 Right Bend

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		5

Scale: 1:500 @ A3

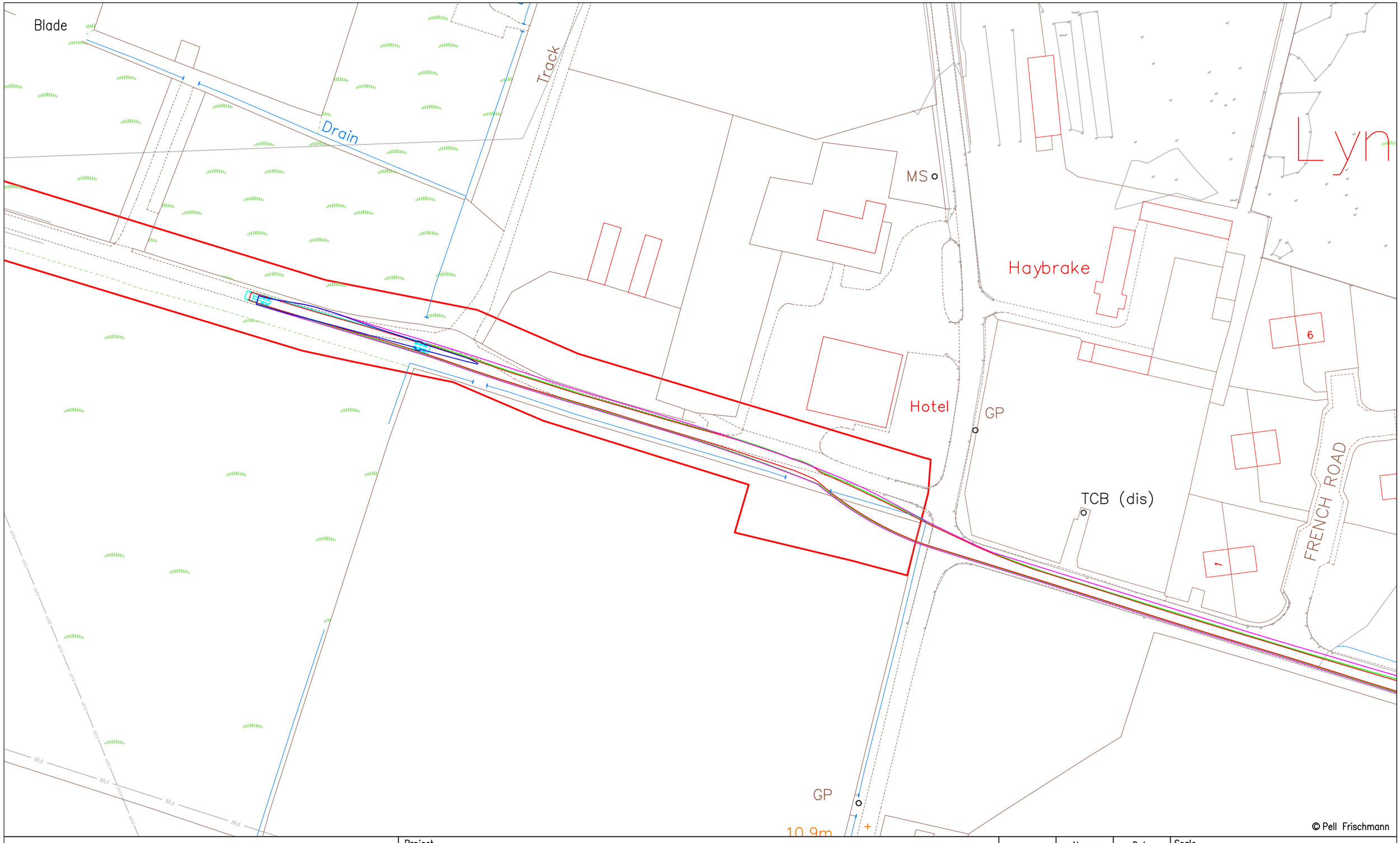
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK03A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 / B9047 Junction

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		6; 7

Scale: 1:1000 @ A3

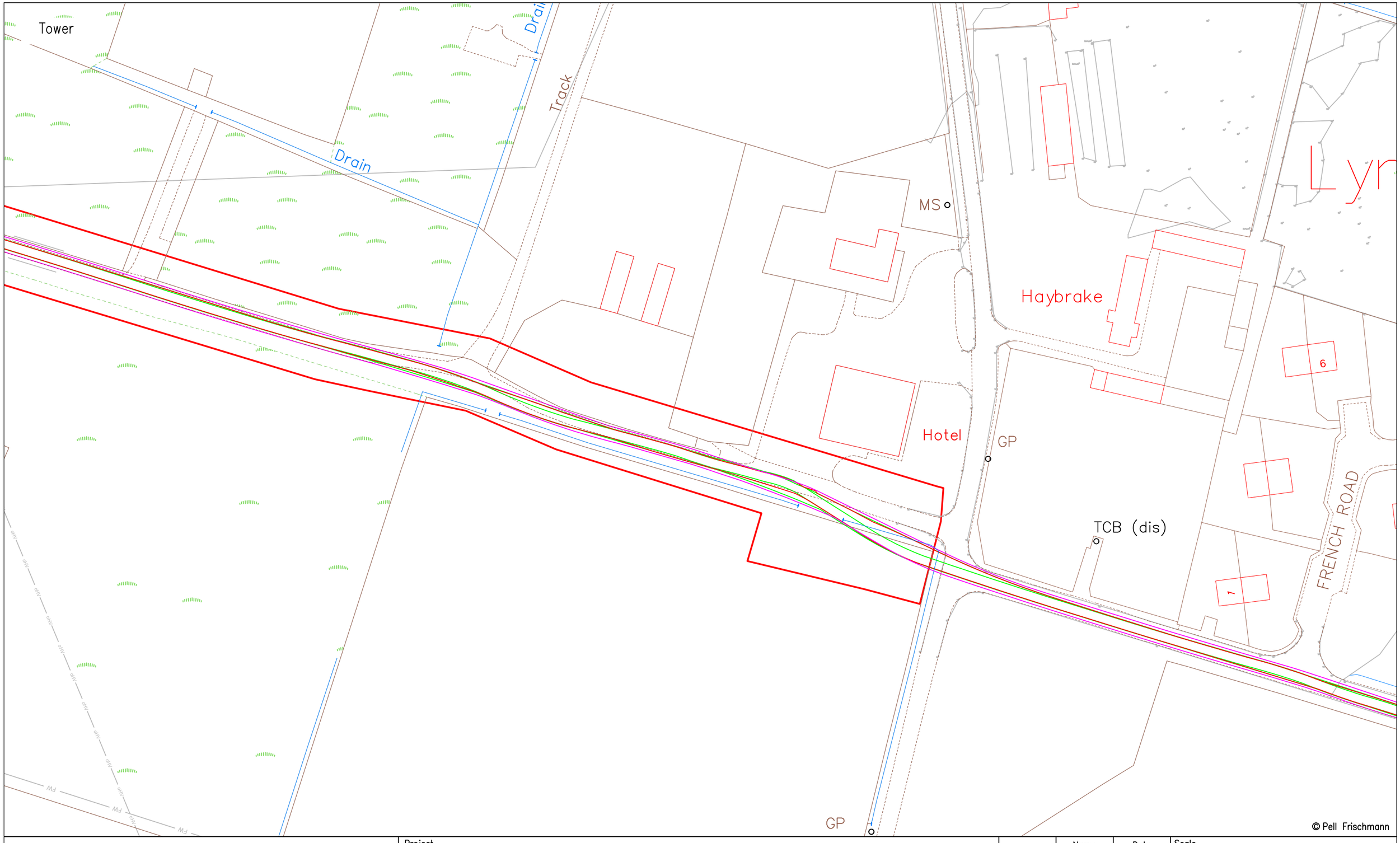
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK04

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 / B9047 Junction

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		6; 7

Scale: 1:1000 @ A3

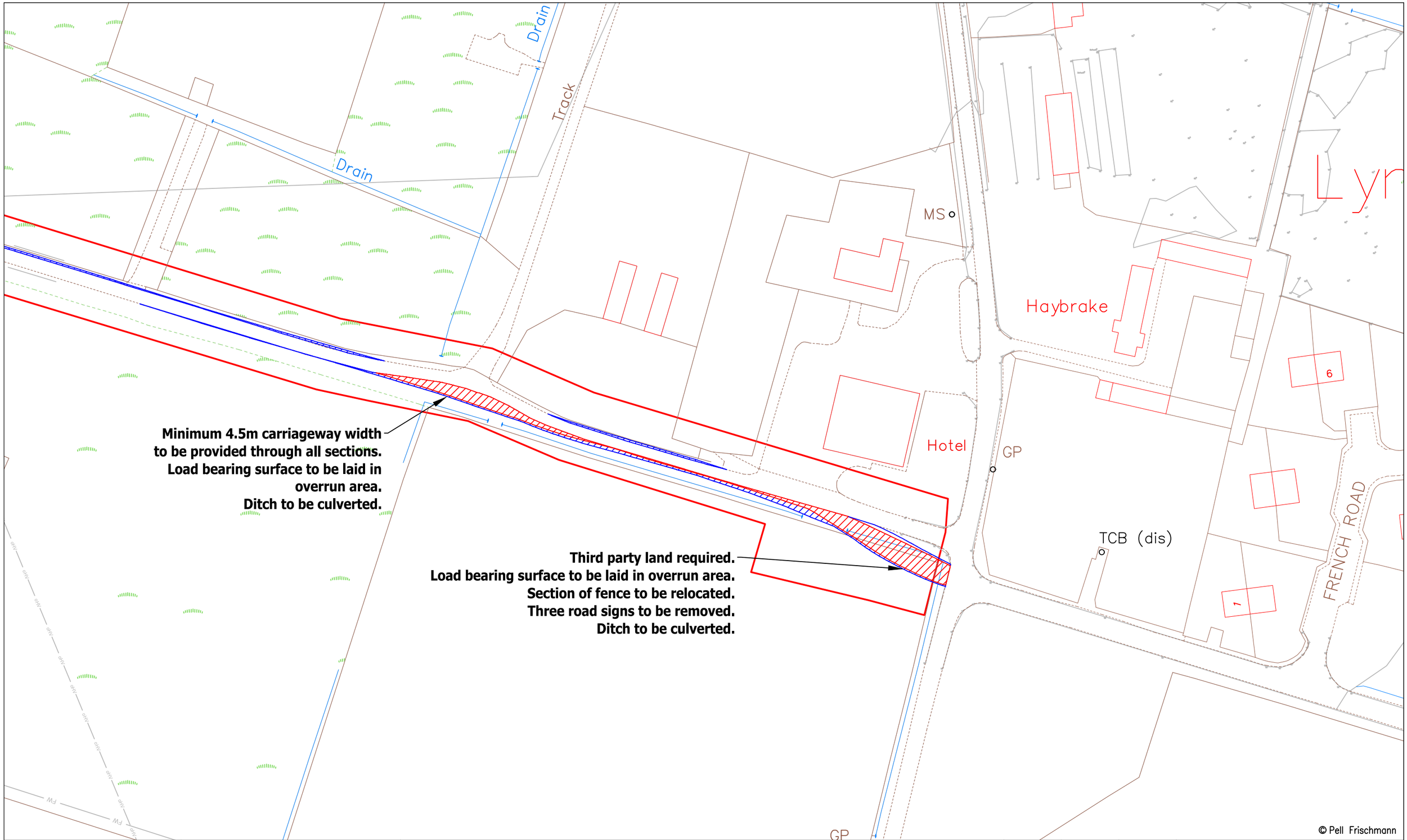
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK04A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: B9048 / B9047 Junction

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		6; 7

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

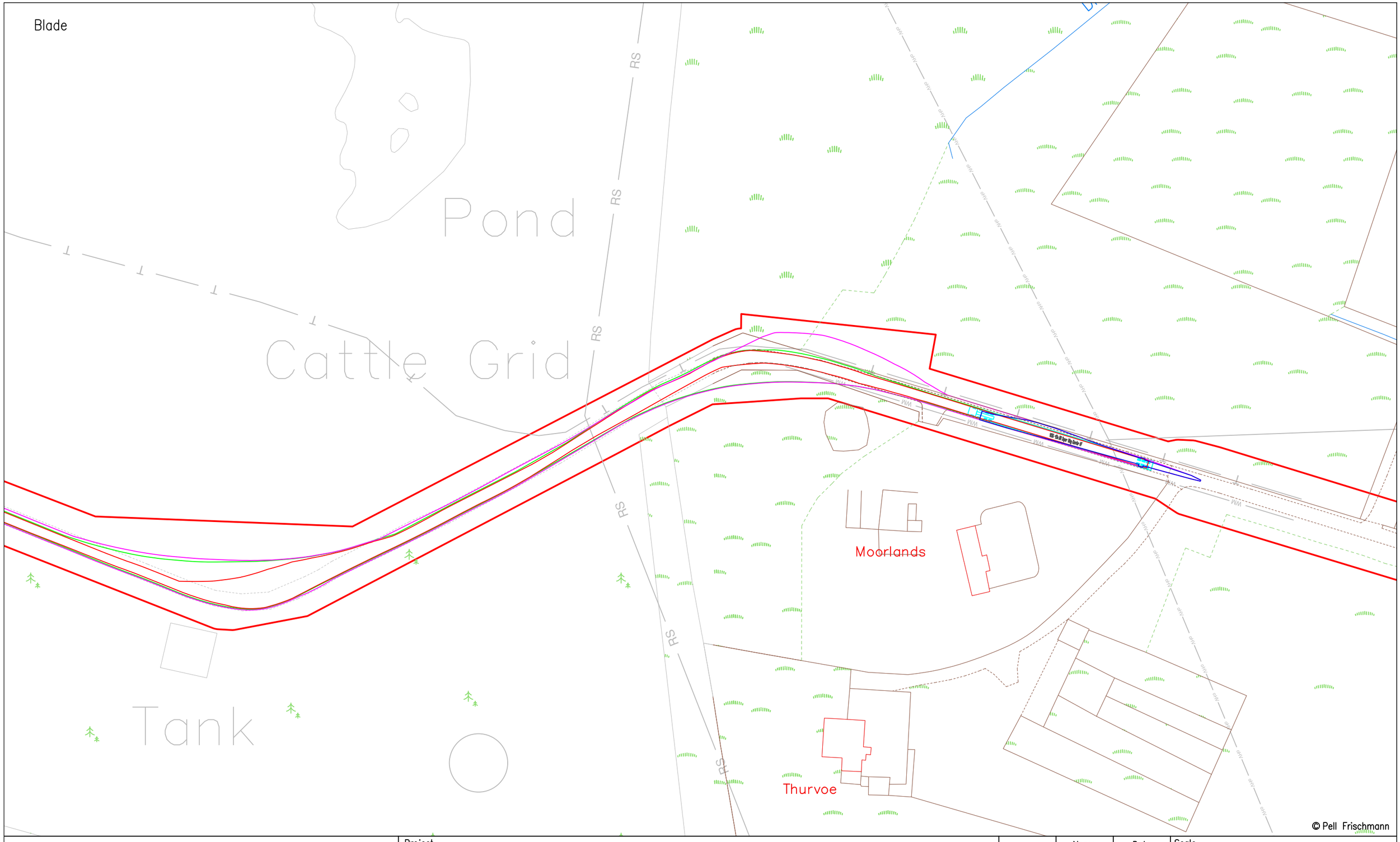
Drawing Status: Draft

Drawing No.: SK04B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1

Blade



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Client: ITPEnergised

Key: Wheel SPA; Body SPA; Load SPA; Indicative; Over-run; Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: Double bend west of Lyness

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		8; 9; 10

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK05

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1

Tower

Pond

Cattle Grid

Tank

Moorlands

Thurvoe

RS

WM

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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: Double bend west of Lyness

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		8; 9; 10

Scale: 1:1000 @ A3

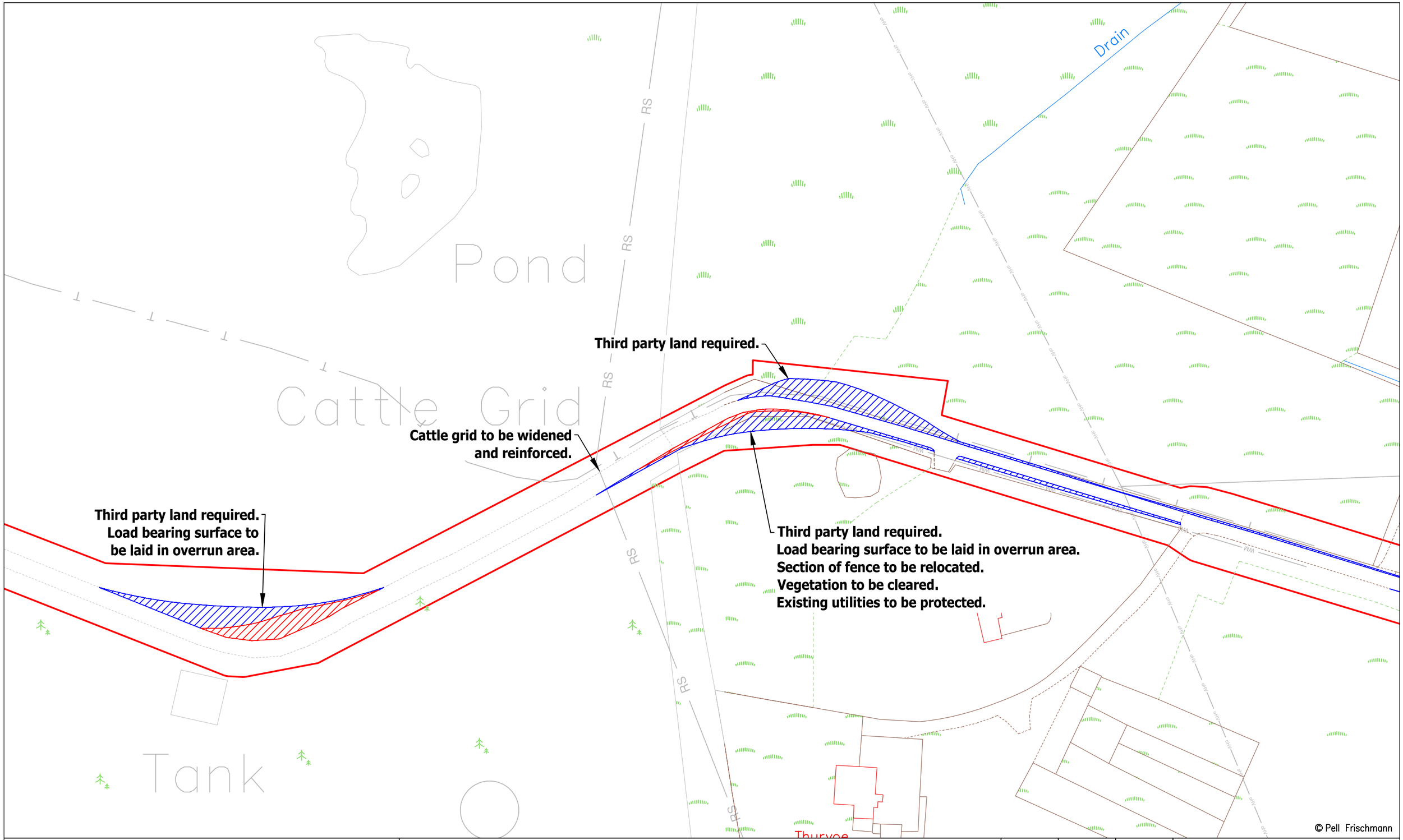
File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK05A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1



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Client: ITPEnergised

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Over-run | Over-sail

Project: Hoy Wind Farm

Drawing Title: V136 Blade and Tower

SPA Location: Double bend west of Lyness

	Name	Date
Drawn	JS	10/01/2020
Designed	JS	09/01/2020
Checked	GB	17/01/2020
Point of Interest		8; 9; 10

Scale: 1:1000 @ A3

File No.: 200102 Hoy SPA.dwg

Drawing Status: Draft

Drawing No.: SK05B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 1

Appendix C
ESDAL Responses

No responses received as at 24th August 2020