CONSTANT ENERGY LIMITED

TIRAWLEY WIND FARM

CO. MAYO

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

MANAGEMENT PLAN 4

PEAT AND SPOIL MANAGEMENT PLAN

SEPTEMBER 2025

Constant Energy Limited,
6th Floor Riverpoint,
Lower Mallow Street,
Co. Limerick,
Ireland,
V94 WC6A.

Jennings O'Donovan & Partners Limited,
Consulting Engineers,
Finisklin Business Park,
Sligo.
Tel.: 071 9161416
Fax: 071 9161080
email: info@jodireland.com

JENNINGS O'DONOVAN & PARTNERS LIMITED
Project, Civil and Structural Consulting Engineers,
FINISKLIN BUSINESS PARK,
SLIGO,
IRELAND.
Telephone (071) 9161416
Fax (071) 9161080
Email info@jodireland.com
Web Site www.jodireland.com

DOCUMENT APPROVAL

PROJECT	Tirawley Wind Farm	
CLIENT / JOB NO	Constant Energy Limited	6289
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP) Peat and Spoil Management Plan	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Padraig O'Dowd Aileen Byrne	Name David Kiely
Date 16/09/2025	Signature Padraig O' Dowd Aileen Byrne	Signature David Kiely

CONSTANT ENERGY LIMITED

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SPOIL MANAGEMENT PLAN

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1 INTRODUCTION

1.1 General

The plan provides an assessment of the issue of handling surplus excavated material at the the Site of the proposed Tirawley Wind Farm (Proposed Development), Co. Mayo. The measures outlined in the plan will be monitored onsite by the appointed Ecological Clerk of Works and will be discussed with the Contractor before works commence onsite. This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP) and Management Plans.

1.2 Site Investigations

Whiteford Geoservices Ltd. has been commissioned by Jennings O'Donovan & Partners on behalf of Constant Energy Limited (the Developer/s) to assess the geological site characteristics in relation to the planning application for Tirawley Wind Farm (the Proposed Development), Co. Mayo. The Site Investigations Report (**Appendix 8.1, App F Report 2165-22B Site Investigation Works for Proposed Borrow Pit Site, Lacken Hill, 6km east of Ballycastle** of the **EIAR**) outlines the ground conditions in terms of peat and slope stability risk, subsoil and geological characterisation and classification.

Bedrock and sub-soils outcrop logging and characterisation at proposed turbine locations.

- 21 no. hand augured holes at proposed turbine locations to a maximum depth of 2.00 m below existing ground level.
- Peat depth probing, at turbine positions and across the Site development boundary until a significant change in resistance was registered within the sub-soils. The depth of this increase in resistance was measured and recorded.
- Shear strength of peat measured using a handheld shear vane.
- Von Post classification method was employed to determine the range of peat characteristics across the Proposed Development Site.
- The purpose of these investigations methods was to assess the impact of external factors (such as local hydrology, vegetation etc) on the tensional forces binding the peat and hence its tendency towards failure, by shear, during construction works.
- Recording if Irish Transverse Mercator (ITM) coordinates for all investigation locations.
- The proposed Spoil Deposition Area is located in an abandoned quarry at Lackan Hill within the Wind Farm Site. A Site Investigation Works (**Report 2165-22A, Appendix 8.1-App F**, of the EIAR) for the proposed Spoil Deposition area was carried out by Whitefords Geoservices Ltd on the 27th of March 2023 (During excavation works, peat will be deposited in the proposed Spoil Deposition Area located in an abandoned quarry at Lackan Hill).

1.3 General Aims and Principals of the Peat and Spoil Management Plan

The purpose of this Peat and Spoil Management Plan is:

- Safety in relation to potential peat slippage risk;
- Reduction in bare soil exposure and release of sediment;
- To make sure that the landscape is not adversely effected as a result of the Proposed Development; and
- To make sure that good site management practices are carried out.

Any reinstatement and reprofiling proposals will consider and mitigate against all identified significant risks to environmental receptors.

Topsoil and surface vegetation excavated during the construction of the Wind Farm infrastructure will be used to finish reinstated surfaces around Turbine Foundations and Turbine Hardstands. Reinstatement and reprofiling of, and around, infrastructure will be carried out during the construction phase.

Landscaping will allow for sympathetic restoration of the ground surface and ground profile to reduce the visual impact of new infrastructure, facilitate vegetation regrowth and reduce scour and erosion of bare surfaces prior to vegetation establishment. Reinstatement will be undertaken as work progresses. This work will be completed only by experienced personnel under guidance from the appointed Ecological Clerk of Works, and they will conduct regular inspections of the work to ensure it is completed in an appropriate manner.

All areas subjected to reinstatement will be fenced with stock-proof fencing to prevent livestock disturbance until vegetation has become established.

Excavated material is used in several ways:

- Excavated sub-soil material will be used as fill material where suitable (e.g., back filling around and on top of Turbine Foundations) with any other sub-soil material to form berms adjacent to Site Access Tracks, apron spreading around Turbine Hardstands edges.
- Excavated topsoil will be used to vegetate edges of Turbine Hardstands and Turbine Foundations.
- All surplus material will deposit in designated peat storage deposition areas.

1.4 Management of Excavated Material

The estimated total volume of excavated peat material onsite is 103,810 m^3. The estimated total volume of excavated till material onsite is 65,355 m^3. The estimated potential total volume of excavated material is 169,165 m^3. Approximately 169,165 m^3, of the excavated material will be permanently stored in the 19 no. designated disposal areas on-site. Materials required for landscaping works will be stored in an environmentally safe manner, ensuring no risk of water pollution, until they are needed for reuse.

Excavated material along the Grid Connection Route (GCR) (10,854m^3) will be re-used off-site after treatment at a suitable facility.

A buffer of 50m from watercourses will be implemented for storage areas of excavated materials to be re-used for reinstatement works.

Excavated material will not be stored adjacent to slopes (>15 degrees gradient). This will be subject to evaluation and approval by the Civil Contractors' geotechnical engineer and will accommodate the Site stockpiling requirements based on earthwork calculations.

The locations chosen for the permanent spoil storage areas are based on geotechnical data and ground stability assessment, habitat type, and the adequacy of the ground to support the surcharge material. The Civil Contractor will be responsible for ensuring that the removal and storage of excavated material is done in accordance with the requirements of this management plan. The temporary storage areas and the vegetative material will be inspected regularly from an ecological perspective.

1.5 Reinstatement

Reinstatement works will commence at an early stage of the construction works. Such reinstatement will occur following the completion of individual sections of work such as the completion of, say, a Turbine Foundation or Turbine Hardstand. Reinstatement will include grading of any slopes left by the construction works, followed by the careful placement of topsoil which had been previously excavated from this area and temporarily stored on-site.

2 ESTIMATED EXCAVATION QUANTITIES

The Wind Farm Site has an area of approximately 119.12 ha. The Wind Farm Site is comprised of peat bog, coniferous forestry, transitional woodland scrub and agricultural pastures. Much of the lands are in private, third-party ownership, while a portion of the site is shared land (commonage). Land cover at the Wind Farm Site is mapped by Corine (2018) as inland wetland peat bogs, with some smaller areas of coniferous forestry, semi natural areas and agricultural pastures (www.epa.ie). Analysis of the shallow exploratory hole investigations indicates that topsoil or peat is underlain by a natural sequence of glacial soils. Weathered rock was not encountered during the intrusive investigations at proposed Turbine positions but shale was encountered during investigations at peat repository at Lacken Hill. Groundwater was generally not encountered within these shallow exploratory holes in any significant volumes. the majority of the peat covering the Redline Boundary area of the main site lies in the range of 0.00 – 0.50 m in thickness. Only 13.6 % of the Wind Farm Site recorded peat thickness in excess of 0.50 m. The median peat depth recorded was 0.10 m, with a mean depth over the main site of 0.22 m.

The Wind Farm Sites terrain is slopping with gradients generally between 0 – 10 degrees to the horizontal and ground surface elevations ranging from 62m to 158m above sea level (Malin Head OD).

Geotechnical drawings prepared by Whiteford Geoservices Ltd (WGS) were used in conjunction with the peat depth probes and geotechnical trial pit logs to calculate the spoil volumes generated for the Proposed Development. The excavation volumes associated with the Proposed Development are outlined in **Table 2.1**.

Table 2.1: Breakdown of Peat and Spoil Volume Quantities for the Various Infrastructure for the Proposed Tirawley Wind Farm

Item	Topsoil / Peat (m^3)	Till / Bedrock (m^3)	Total Spoil Volume (m^3)
Turbine Foundations	4,590	30,858	**35,448**
Turbine Hardstands	29,453	10,130	**39,583**
Blade Laydown	28,810	0	**28,810**
Turbine Transformers	187	54	**241**
Site Access Tracks	28,290	11,316	**39,606**
Substation, BESS and Building	5,376	4,156	**9,532**
Substation Transformer Base	138	28	**166**
Met Mast	138	83	**221**
Relay Mast	77	101	**178**
Temporary Compounds	1,350	810	**2,160**
Internal Cabling	1,413	1,131	**2,544**
110 kV Cable Trench	4,065	6,789	**10,854**
Totals	**103,810**	**65,355**	**169,165**

2.1 Grid Connection

This preferred GCR consists of a permanent grid connection between the Onsite Substation via underground 110 kV cable to the existing Tawnaghmore 110 kV Substation. The route of this underground GCR is provided in **Figure 2.1**. The overall length of preferred GCR is 13.55 km, of which 12.43 km is located along the public road corridor and 1.12 km is located within the Killala Business Park grounds.

Figure 2.1: Tirawley Wind Farm Grid Connection Route

The Grid Connection will be constructed to the requirements and specifications of EirGrid. The electricity will be transmitted as a three-phase power supply meaning there will be three individual conductors in each cable circuit. The three conductors will be laid in separate ducts which will be laid in accordance with EirGrid functional specifications (CDS-GFS-00-001-R1[1]) for 110 kV underground cables. The width of a 110 kV cable trench with a trefoil formation will be 600 mm. The depth of the trench for 110 kV cables is 1.335 m. A separate duct will be provided within the trench for fibre-optic communications, refer to **Figure 2.21 Standard 110 kV Roadway Trench Terfoil Design (160 mm Duct)** of the **EIAR**.

Precast concrete cable joint bays (junction boxes) will be installed along the cable trench at typically 0.5 km centres. Each joint bay typically will be 6 m long x 2.5 m wide x 2.5 m deep. A reinforced concreted slab will be constructed on top of the bay. The joint bay locations have been dictated by suitable terrain and access to facilitate the operation of cable pulling equipment at any phase of the development and future operation of the installation in accordance with the ESB Networks Limited specifications. Communication chambers, which are pre-cast concrete structures with an access cover at finished surface level, will be installed at every joint bay location to facilitate connection of fibre-optic communication cables between on the Onsite Substation and existing Tawnaghmore 110 kV Substation. The communication chambers will be approximately 1.30 m x 1.03 m and have a depth of 1.29 m, **Planning Drawing: 6289-PL-GR-1310** of the **EIAR**. In addition, **Table 2.2** provides a breakdown of the estimated total excavation volume for the estimated excavation from the GCR.

All extracted material along the GCR will be re-used off-site after treatment at a suitable facility as per the Waste Management Plan (**CEMP**, **Management Plan 5**).

[1] https://www.eirgridgroup.com/site-files/library/EirGrid/110kV-Underground-Cable-Functional-Specification-General-Requirements.pdf

Table 2.2: Estimated Excavation from Grid Connection

Description	Length (m)	Area (m^2)	Volume of Peat Extraction (m^3)	Volume of Subsoil Extraction (m^3)
110 kV Cable Trench	13,550	8,130	**4065**	**6788.55**
		Total	**10,853**	

2.2 Total Estimated Excavation Volume Summary

The total estimated excavation volume from the Wind Farm Site is 169,165 m³, of which 103,810 m^3 is peat and 65,355 m³ is subsoil. The total estimated volume of peat and subsoil material from the GCR is 10,854 m^3. The volume of the bituminous material is estimated to be c. 813 m^3. These quantities are detailed in **Table 2.1** and **2.2** above.

3 RE-USE OF EXCAVATED MATERIAL

Spoil will be re-used, where possible, as landscaping, backfill and remediation at Site Access Tracks, Turbine Foundations, Turbine Hardstands, at the Onsite Substation and around the edges of the Temporary Construction Compound.

5,700 m^3, of the excavated mineral soil will be suitable for reuse as ballast on top of turbine foundations, the remaining 163,465 m^3 of spoil (103,810 m^3 of peat and 59,655 m^3 of subsoil will be permanently stored on-site in nineteen designated disposal areas (**Table 3.1**).

3.1 Permanent Spoil Repository Areas

There are nineteen number designated permanent spoil repository areas within the Wind Farm Site (**Figure 3.1**). The nineteen repository areas have a combined storage capacity of 15,980m^3. 163,465 m^3 of excavated spoil will be permanently stored in these areas.

Table 3.1: Spoil Repository Areas – Storage Capacity

ID	PEAT (M^3)	TILL (M^3)	MIX (PEAT:TILL)	AREA (M^2)	HEIGHT (M)	MAX VOLUME (M^3)	VOLUME -10% (CONSERVATIVE) (M^3)	MATERIAL	OVERSPILL (M^3)	REMAINING VOL (M^3)
SD01	36,013	0	100%:0%	16,421	2.5	41,052.5	36,947	Peat Only	-	934
SD02	12,860	0	100%:0%	6,185	2.5	15,462.5	13,916	Peat Only	-	1,056
SD03	9,911	0	100%:0%	4,470	2.5	11,175	10,058	Peat Only	-	147
SD04	10,549	0	100%:0%	8,863	1.5	13,294.5	11,965	Peat Only	-	1,416
SD05	0	4,912	0%:100%	3,646	1.5	5,469	4,922	Till Only	-	10
SD06	750	4,000	16%:84%	3,930	1.5	5,895	5,306	Mixed	-	556
SD07	450	3,000	13%:87%	3,415	1.5	5,122.5	4,610	Mixed	-	1,160
SD08	0	7,815	0%:100%	5,789	1.5	8,683.5	7,815	Till Only	-	-
SD09	0	6,685	0%:100%	7,792	1.5	11,688	10,519	Till Only	-	3,834
SD10	8,515	0	100%:0%	7,385	1.5	11,077.5	9,970	Peat Only	-	1,455
SD11	4,952	0	100%:0%	3,970	1.5	5,955	5,360	Peat Only	-	408
SD12	6,560	0	100%:0%	5,156	1.5	7,734	6,961	Peat Only	-	401
SD13	0	6,591	0%:100%	4,882	1.5	7,323	6,591	Till Only	-	-
SD14	0	12,275	0%:100%	9,641	1.5	14,461.5	13,015	Till Only	-	740
SD15	7,739	0	100%:0%	6,473	1.5	9,709.5	8,739	Peat Only	-	1,000
SD16	0	6,330	0%:100%	4,937	1.5	7,405.5	6,665	Till Only	-	335
SD17	5,511	0	100%:0%	4,298	1.5	6,447	5,802	Peat Only	-	291
SD18	0	6,000	0%:100%	5,407	1.5	8,110.5	7,299	Till Only	-	1,299
SD19	0	7,470	0%:100%	5,739	1.5	8,608.5	7,748	Till Only	-	1

There will be 15,043 m^3 surplus capacity at these sites.

3.2 Access Track Construction

Where suitable rock is found on-site it will for road construction and construction fill where applicable.

3.3 Turbine Met Mast and Relay Mast Foundation Excavations

Excavated subsoil will be backfilled and serve as ballast for the Turbine Foundations.

3.4 Storage Areas to the perimeter of Hardstands

Topsoil and subsoil will be used in landscaping around turbines and hardstands. The balance of soil excavated for the hardstands will be placed with the 19-no. permanent onsite spoil storage areas.

3.5 Grid Connection

The total volumes to be excavated for the GCR is estimated at 10,854 m^3. All material will be re-used off-site after treatment at a suitable facility, according to **Management Plan 5: Waste Management Plan** due to the presence of bituminous material and hydrocarbons.

Figure 3.1: Permanent Spoil Repository Areas

4 SUMMARY

Based on the available information, Jennings O'Donovan make the following recommendations:

- The estimated potential total volume of excavated material is 169,165 m³.
- The estimated potential total volume of excavated peat is 103,810 m³.
- Approximately 5,700 m^3 of the excavated mineral spoil and rock will be reused as ballast on top of turbine foundations
- Approximately 163,465 m^3 will be permanently stored onsite in 19 no. designated spoil areas.
- The designated onsite permanent spoil areas have a total capacity of 184,208 m^3 and 15,043 m^3 surplus capacity.
- Excavated material along the Grid Connection Route (10,854 m^3) will be re-used off-site after treatment at a suitable facility