2 PROJECT DESCRIPTION

Introduction

2.1.1 This chapter provides a description of the Hunterston high-voltage cable manufacturing facility (referred to in this report as the 'Project') and forms the basis for the environmental assessment provided in this Environmental Impact Assessment (EIA) Report.

2.1.2 A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the Project design. Details of these measures are summarised in this chapter with further details provided in each topic chapter.

2.1.3 This chapter, together with the topic chapters, provide the data required to identify and assess the main and likely significant effects of the Project in accordance with Regulation 5 and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (referred to as the EIA Regulations).

2.1.4 The sections below provide a description of the site and surrounding area; the key components of the Project; an overview of the approach to construction; and the mitigation measures adopted as part of the Project.

The site and its surroundings

2.1.5 The Project site is located on part of the former Hunterston Coal Yard within the wider Hunterston Port and Resource Centre (Hunterston PARC), located on the coast of the West of Scotland, south of the settlement of Fairlie, and north of the EDF Hunterston Power Station. The project site centre point grid reference is approximately NS 20238 53343 and is approximately 50.7 hectares in size which includes the factory plot, cable export route along the jetty, access and temporary construction laydown areas. The factory plot is approx. 28.5ha.

2.1.6 Primary vehicular access to the site can be gained from the existing site access to the Hunterston Yard via Irvine Road (A78).

2.1.7 The area surrounding the project site is dominated by port infrastructure. In fact, the principal factor for selection of the site was the availability of a deep-water port with sufficient nearby road, sea and rail infrastructure, and the availability of a large workforce with similar skillsets. It is envisaged that the now closed Hunterston B nuclear power station workforce could be counted among that number. The reasons for selection of the Hunterston site are described in full at Chapter 3.

2.1.8 To the west of the site is the Hunterston Marine Construction Yard (HMCY) which most recently was the location of the former SSE National Offshore Wind Turbine Test Facility, which was decommissioned in 2018. New applications for the renovation of the HMCY are being brought forward as detailed in Appendix 4.4 – Cumulative developments database.

2.1.9 Hunterston Nuclear Power Stations A and B are located approximately 2.7km to the south west of the project site. An electrical substation and a HVDC converter station lie adjacent to the Nuclear Power Stations.

2.1.10 The nearest residential property is located approximately 157m east of the project site, on the other side of the A78 on Fairlie Moor Road.

2.1.11 In terms of ecology, the project site itself comprises a former coal storage yard in the first stages of succession with infrequent stands of vegetation. The habitats to the south are similar though slightly more vegetated, and to the north there is car parking and office facilities associated with the former coal yard site.

2.1.12 To the east a stretch of semi-mature woodland approximately 20m in height comprising a mix of sycamore (*Acer pseudoplatanus*; dominant), with stands of birch and goat willow. The woodland bund is protected by a Tree Preservation Order (TPO). To the west there is a thin strip of coastal scrub dominated by sea buckthorn with some gorse (*Ulex sp.*) and goat willow and beyond that the Firth of Clyde.

2.1.13 Southannan Sands site of Special Scientific Interest (SSSI) lies immediately to the west. Designated for its intertidal sand flats, the site has particular interest as a host for nationally scarce dwarf eelgrass *Zostera noltei*. The bay is also a shellfish fishery.

2.1.14 The Scottish Environmental Protection Agency (SEPA) Flood Map identifies that the site lies outwith any areas at risk from river or coastal flooding with only small, localised areas within it identified as being at high risk of surface water flooding.

Project description

2.1.15 The Project is an advanced manufacturing process designed to produce high-voltage electricity transmission cables on a continuous basis. The layout of buildings and equipment is therefore largely determined by the unbroken flow of cable production through the factory. Finished cable is stored on large carousels before it is loaded onto visiting cable laying vessels (CLVs).

2.1.16 The Hunterston cable manufacturing facility will produce High-Voltage (HV) submarine electricity cables for specialised applications that require very high reliability of manufacture quality given the difficulty presented by any repairs to cable faults.

2.1.17 The process takes raw materials of conductor wire, XLPE plastic pellets and steel armouring etc to produce high quality cable in a continuous process.

2.1.18 The development parameters of the Project are defined by the operational processes that are being accommodated by the factory. The 185m high extrusion tower would be a concrete structure rising out of a cluster of lower level, largely steel framed buildings between 20 and 45 m high.

2.1.19 A simplified description of the process is provided below.

Description of cable manufacturing process

Drawing Conductor Wires: Copper or aluminium conductor wire is drawn from a rod break-down machine that draws wires of the required dimensions from solid metal rods. Wires of different dimensions are drawn for both the conductor and the screen.

Conductor Stranding: Drawn conductor wires are stranded around the central conductor core.

Insulation: The conductor is drawn up to the top of the extrusion tower. From here it turns over a wheel and is transported downwards through a tube. It will first pass a pre-heater for heating the conductor to 120 degrees Celsius. Then the conductor will enter the extrusion head where the XLPE is applied around the conductor. Directly after this, the cable is heated to a temperature of 400 degrees Celsius to start the chemical reaction called cross-linking within the XLPE. This gives the cable insulation a good mechanical stability. Further down the vertical tube the cable is slowly cooled down in sections at different temperatures. The cable travels through the vertical tube in the tower at a speed of about 1 meter per second and requires 185 minutes to cure. Therefore, a tower of up to 185 meters is required.

A vertical extrusion process has the advantage over horizontal or catenary shaped lines, to result in a perfectly centred cable, producible at maximum speed.

Degassing of Subsea Cables on Turntables: Degassing is an essential process after insulation where the by-products of cross-linking (including methane) are driven-off to ensure that no voids remain in the XLPE insulation. It also serves as an intermediate storage phase between the insulation and sheathing processes.

Degassing takes place in specially constructed degassing chambers with turntables. The cable stack is heated by air flow from a perforated bottom plate of the chamber and the methane content of the recirculated air is monitored.

Lead Sheathing of Subsea Cables: A horizontal lead extruder is used to apply a lead sheath over the cable. The process starts with solid lead ingots which are fed in the heated melting pot of the machine. The pot consists of three compartments for heating regulation in two zones. After being melted, the lead is conducted to the extrusion screw which transfers lead at high pressure to the die block of the extrusion head. In the die block, lead is applied over the cable. After the lead is applied over the cable it is immediately cooled to avoid damaging of the cable insulation.

Polyethylene sheathing of Subsea Cables: The polyethylene sheath is extruded onto the lead sheathed cable in series with the lead sheathing process.

Wire Armouring: The galvanised steel wire armouring is stranded over the cable. A bitumen armour bedding layer is applied as corrosion protection and to improve adhesion of the overall serving (see below). Fibre optic elements are integrated between the armouring wires in single-core cables.

Turntables (Carousels) and Cable Tracks: Submarine cables are typically shipped in long lengths where the cable can contain one or several factory joints. Cable laying vessels take up completed cable onto their onboard turntable directly from the loading jetty.

Factory turntables are motor driven rotating platforms carrying between 300 to 12,000 tonnes of cable ready for delivery to the cable-laying vessels (CLVs).

Roller-pathway tracks are used to transport the subsea cable between processes inside the cable factory and from the factory area to the loading jetty. The roller-pathways are not powered conveyors but are simply passive rollers that aid the transport of cable pulled from one end by a winch called a 'tensioner engine'.

Testing of Subsea Cables: The subsea cable testing includes routine testing, type testing and pre-qualification testing. Factory Acceptance Tests (FAT) both of the integrity of the cable and any cable joints are carried out prior to delivery.

2.1.20 A description of the typical cable to be manufactured at XLCC Hunterston is provided at Annex A of this chapter.

Summary of parameters

2.1.21 Although current details are indicative, the Hunterston Cable Manufacturing Facility will comprise the construction and/or operation of:

- preparation of a suitable development platform and provide suitable topography for landscape and drainage purposes;
- erection of steel portal framed buildings, with a total approx. 281,500 m^2 gross external area (GEA) with the tallest being 45m AGL to eaves:
  - cable manufacturing equipment;
  - research and development laboratory;
  - control rooms, welfare facilities and heating/cooling plant, located within the main buildings;
- cable extrusion tower up to 30m x 65m x 185m AGL;
- external plant comprising of switchgear and transformers, 12 no. 50m diameter carousels and 12 no. cable carrying conveyors, stacked and feeding to 2 pairs of roller-pathways from the 50m diameter carousels to the jetty head;
- 2 pairs of tensioner towers at the jetty head connected to the roller pathways by chutes;

- access from the internal port road, internal access and circulation roads; and
- drainage infrastructure, landscape and ecological planting.

2.1.22 The current design of the Project will provide a maximum storage capacity of approx. 2000km of cable for delivery, storage and testing purposes. The factory will be capable of producing approx. 167km of cable per month.

2.1.23 It is proposed that access will be gained from the existing port access road via Irvine Road (A78) for both the construction and operational phases.

2.1.24 The Project will be designed to operate for up to 25 years, after which time ongoing operation and market conditions will be reviewed. If it is not appropriate to continue operating after that time, the Project may be decommissioned in full or in part.

Parameters plan

2.1.25 Figures 2.1a and 2.1b show the parameters plan submitted for planning permission in principle.

2.1.26 The parameters sought are:

- Redline area approx. 50.7ha
- Maximum floorspace 281,500 gross external area (GEA)
- Proposed Uses:
  - Class 4: Business
  - Class 5: General Industry
  - Class 6: Storage or Distribution
- Finished floor level of up to 6.5m AOD:
- Maximum building heights as shown on the parameters plan and listed in Table 2.1 below.

2.1.27 The key parameters for the Project are shown in Table 2.1 below:

Table 2.1 Key Project Parameters

Parameter	Key Parameter	Measure
Project wide	Footprint	50.7ha
	Maximum storage capacity	2000km of cable
	Approx. production capacity	167km of cable (per month)
	Construction period	24 months
	Operation period	25 years
Buildings	Gross Internal Area (GIA)	234,290m^2
	Gross External Area (GEA)	281,500m^2
	Max height	45m AGL**
	Finished floor level	6.5m AOD*
Cable extrusion tower	Footprint area	30m x 65m
	Max height	185m AGL
Carousels	Number	12
	Diameter	50m
Cable carrying conveyors	Number	12
Roller pathways	Number	2 pairs (4 no.)
	Max height	11.25m AGL

Tensioner towers	Number	2 pairs (4 no.)
	Max height	13m AGL

*Above Ordnance Datum (AOD).

** Above Ground Level (AGL)

Illustrative Masterplan

2.1.28 Design of the facility continues within the above parameters and an illustrative masterplan has been developed which is currently expressed in Table 2.2 below and shown on Figures 2.2a and 2.2b.

Table 2.2 Illustrative Masterplan

Design element	Dimensions GIA (sq. m)	GEA (sq. m)	max Height (m AOD) assuming a formation level of up to 6.5m AOD
Project site area	50.67 hectares		
Access Roads	2.83ha		
Factory finished floor levels	6.5m AOD		
Cable roller-pathway infrastructure along the jetty (an 8m clear span will be maintained beneath)	11.25m high by 11.33 wide		
Cable tensioner towers on the jetty head (4.no)	13m high x 7.5m deep and 6.m wide		
Building 1 PQ Testing	8268	8503	41.5
Building 2 Testing Carousel Hall 1	9565	9821	36.5
Building 3 High Voltage Testing	15171	15542	51.5
Building 4 Testing Carousel Hall 2			36.5
Building 5 Offices	2898	3153	26.5
Building 6 Security Gatehouse	27	36	26.5
Building 7 Main Factory Hall	126112	129707	51.5
Building 8 Utilities Compound	2056	2157	26.5
Building 9 Canteen/Welfare	1723	1864	26.5
Building 10 Facilities Maintenance	616	677	26.5
Building 11 Rod Breakdown	23993	24579	26.5
Building 12 Storage Carousels	35392	36099	26.5
Building 13 Cable Rewinding	2312	2564	26.5
Building 14 Reel Testing North	441	454	51.5
Building 15 Reel Testing South	441	454	51.5
Building 16 VCV (extrusion) Tower	N/A	N/A	191.5
Extrusion Tower Basement	8m below FFL		
Gross Internal Footprint total (buildings)	229,015 m^2		
Gross External Footprint total (buildings)	235,610 m^2		
Impermeable hardstanding area	2.84 hectares		
Permeable pavement, landscape and drainage area	3.61 hectares		
Fencing	2m agl		

2.1.29 Note that the total gross external area of the above buildings is 45,890 less than the parameter of 281,500 square metres applied for. This is because the table above is an example indicative layout which might vary.

Buildings

2.1.30 Many of the buildings will be constructed using a steel portal frame system clad with insulated panels, the colour pallet for which will be considered at detailed design but will reflect, and be sympathetic to, the surrounding landscape. Some of the HV testing facilities will include shielded rooms that are concrete structures. The extrusion tower will consist of a concrete core with surface treatment yet to be determined.

2.1.31 Parts of the manufacturing process have been considered in relation to the site's climatic context, meaning that more elements are covered than would be in other parts of the world. For example, finished cable storage carousels will be arranged on the west side of the site to efficiently utilise the existing jetty infrastructure and will likely be housed in a three-sided metal clad building envelope to protect the machinery from the harsh marine environment.

External Infrastructure

2.1.32 Externally the proposal will have a number of storage areas for raw materials, a scrap handling area, parking for approx. 22 lorries and employee parking (694 spaces approx.).

Cable export

2.1.33 Finished cable will be transferred from storage carousels to cable laying vessels (CLVs) via a roller-pathway system along the existing jetty comprising:

- 2 pairs of cable roller-pathways with walkway alongside elevated either above or beside the jetty road on a portal gantry or supported by single pillars encompassing a development envelope up to 11.25m high by 11.33wide. This will allow a clearance for vehicles and trains of 8m high by 8m wide at all times.
- 2 pairs of tensioner loading towers at the jetty head encompassing a development envelope up to 13m high x 7.5m deep and 6.m wide (including the access staircase).
- Chutes (4no.) connecting each roller-pathway to each tensioner tower
- Overboarding chutes (4no.) extending from near the top of the tensioner towers some 15m over the water.

2.1.34 A typical CLV will be able to accept approx. 150km of finished cable onto each of its onboard carousels. The cable is loaded at the rate of about 1km/hr which means it would take approx. 6.25 days (24/7) to load 150km cable onto the CLV. With the need to resupply the vessel, weather and tides etc, each CLV visit might be moored at Hunterston for up to 7-8 days on average.

2.1.35 The cable export system is paired allowing up to two CLVs to be loaded with two cables each simultaneously.

2.1.36 The return time of a CLV will be related to the duration of its cable laying campaign and the transit time to and from the work site. It is estimated that a CLV will be moored at Hunterston approx. 8 times per year.

Appearance and Design

2.1.37 The appearance of the buildings is a matter reserved for subsequent approval of 'matters specified in conditions' (MSC). Strategies of visual integration for the building facades will be explored to develop the appropriate approach for their setting and the approach taken on the wider Hunterston PARC.

2.1.38 The form, sizes and heights of the buildings are informed by the functional parameters of the nature of the proposed usage. Therefore, the building design will reflect a functional design aesthetic, with the design of the offices at the main entrance providing an opportunity for innovation.

2.1.39 The proposed buildings will be clad which will provide for an opportunity to add definition and variety to the elevations. The final appearance of the clad building envelopes will be developed further as design progresses. For example, to reduce the impact of the proposed buildings upon the surrounding environment, a selection of recessive and neutral colours will be selected from the standard palette of colours. The potential for the controlled use of stronger colours then becomes acceptable in order to offer contrast and relief, and to create some individuality for the buildings.

2.1.40 The factory roofs will be either a colour coated profiled steel, or standing seam rolled system.

2.1.41 Offices will use high quality materials. Curtain walling entrance features and aluminium framed glazing/window systems would enhance the pedestrian interface with the building.

2.1.42 Whilst roof forms of factory roofs will need to respond to the functional parameters required by the manufacturing process, the form and similar detailing of the main parts of the roof will help to achieve a consistent vocabulary and create a coherent language for the site.

Access, Parking, Logistics and Transport Management

2.1.43 Site access will be achieved via a single point of access from existing port access road via Irvine Road (A78) for both the construction and operational phases. Means of access is not matter reserved for subsequent approval.

2.1.44 Traffic required during normal operation will comprise deliveries of materials and movement of staff. It is envisaged that there will be approximately 900 FTE employees based at Hunterston of which, approx. 738 will be working in 4 12hr shifts with the balance being administrative and executive staff working standard daytime hours.

2.1.45 Materials required by the plant include metals (steel, aluminium (or copper), lead), XLPE pellets, bitumen, polyethylene sheath, tapes and yarns, liquid nitrogen and conductor filling compound. Different specifications of cable require different amounts of these inputs for a given length. The logistics strategy assessed in this EIAR is based on a typical cable specification that is considered most likely to be manufactured for the majority of the time at Hunterston.

2.1.46 Heavy Goods Vehicle (HGV) access will comprise

- metals delivered by road, rail or sea;
- XLPE pellets delivered by road;
- polyethylene ‘jacketing’ sheath delivered by road;
- bitumen delivered by road;
- tapes and yarns delivered by road;
- conductor filling compound delivered by road; and
- liquid nitrogen transported by road.

2.1.47 The factory will not operate on a ‘just-in-time’ re-supply model. Rather, a substantial stock of materials will be maintained to ensure that the production line will not be interrupted by logistics issues. Therefore, variability in vehicle movements can be expected in comparison to the average figures used in this EIAR.

2.1.48 Access and logistics arrangements are likely to make best use of existing rail and sea modes. However, for the purposes of environmental assessment, it has been assumed that minimal delivery of materials is achieved by rail or sea initially which would represent a reasonable worst case (for transportation by road) for the purposes of the Transport Assessment.

2.1.49 Consequently, the tonnages below and movements listed in Table 2.3 represent a reasonable worst case for the purposes of the transport assessment. However, it is the intention of XLCC that bulk deliveries by rail or sea are maximised.

2.1.50 Table 2.3 summarises the assumed logistical movements that would be required for operational consumables delivered by road (the 'high case' scenario).

Table 2.3 Number of LGV and HGV Movements (Weekday)

Vehicle Type	Operational Requirements		Tonnes/yr	Tonnes/Unit	Unit Loads	Movements per Year	Average Per Day
LGV	M&E / Factory Services*		-	-	-	10400	42
	Jetty Ship Re-supply		-	-	-	10	1***
HGV	Steel Wire**		70000	24	12	2916	12
	Lead**		60000	24	1	2500	10
	Aluminium**		20000	24	1	833	3
	XLPE**		20000	24	1	833	3
	Nitrogen tankers**		2700m3	100m^3	1	33	1***
	Waste	Scrap metal	-	-	-	25	1***
		Scrap other	-	-	-	25	1***
		Mixed Recyclables	-	-	-	52	1***
		Municipal waste	-	-	-	52	1***
	Jetty Ship Re-supply						1***
	Other		1900	50		38	1**
Total							**78**

Note. * Service deliveries are taken to be supplies of office consumables, food, personal parcels etc
Note: * Assumption that deliveries would take place on 250 days of the year
Note: *** Rounded up to 1 to establish robust daily case assumed

2.1.51 The balance of vehicle movements will comprise staff transport. Approx. 694 car parking spaces will be provided within the Project site.

Travel Plan Commitments

2.1.52 XLCC will implement a Travel Plan to promote sustainable transport. It is reasonable to assume that a modal shift for staff of at least 10% will be achieved by means of car sharing and public transport use. It is expected that a Travel Plan would be secured through a planning condition.

2.1.53 Furthermore, there is likely to be monitoring involved with the implementation of a Travel Plan. The purpose of the monitoring would be to ensure that the use of sustainable transport modes continues to be promoted, including public transport and car sharing.

2.1.54 Implementation measures could include staff induction to make employees aware of their travel choices, facilities for storage of cycles, showering facilities, preferential parking spaces for car share and public transport information boards.

Landscape

2.1.55 With approx. 65% of the factory plot taken-up with buildings, landscape treatment is concentrated on two zones, those being the Entrance Zone to the Northwest that contains the offices and associated staff and visitor car parking, and the Staff Zone to the southeast, that comprises the Staff Welfare/canteen and the Facilities Maintenance Building.

2.1.56 These zones will be designed to reflect a similar character with a focus on creating a pleasant setting to arrive to work, where the car parking is integrated with native tree planting, planted verges to footpaths and permeable surface using 'Grasscrete' or similar system to soften what could become a hard environment. The landscape scheme will be integrated with the Sustainable Urban Drainage (SuDs) strategy.

Surface Drainage

2.1.57 An outline drainage scheme has been developed for the project site that involves collecting and treating rainwater to be discharged uncontrolled to the Firth of Clyde via the existing outfall. The runoff from roof areas will discharge without any treatment.

2.1.58 The runoff from the car parking areas will be collected via a permeable surface, achieving a stage of treatment and discharge to the wider roof runoff network. The runoff from all external concrete yard areas will be collected via high capacity slot drains and discharge through a two stage treatment train. The first stage is a full retention separator, with the second achieved via the use of a proprietary device. The flows will then discharge to the wider roof runoff network and discharge uncontrolled to the Firth of Clyde.

Foul Drainage

2.1.59 The Hunterston coal yard is not currently served by an existing foul sewer (either Scottish Water sewers or private foul water drains). It is understood that Peel Ports intend to pursue a connection to the Scottish Water foul sewage network as part of delivering site-wide infrastructure to Hunterston PARC.

2.1.60 In the absence of the above permanent connection, or as a temporary measure, foul water runoff will be collected locally to each building and pumped to a single packaged treatment plant. The treated effluent will then discharge into the surface water drainage network at a location agreed with SEPA. A separate discharge consent will be required.

Trade Effluent

2.1.61 A separate network discharging to large below ground storage tanks will be provided for the collection of waste flows from the processing plant. A further network is provided for the collection and storage of lead contaminated flows. The below ground storage tanks will be emptied when full periodically and removed for treatment by tanker.

Lighting

2.1.62 A lighting impact assessment is presented at Appendix 2.3. The assessment demonstrates that external lighting can be designed to allow for night-time safety and security when required, incorporating XLCC's operational requirements whilst protecting the surrounding environment from light spillage.

2.1.63 The outline lighting scheme presented at Appendix 2.3 has followed recommendations in the Society of Light and Lighting (SLL) Lighting Handbook (Chartered Institution of Building Services Engineers (CIBSE), 2018) as recommended by the Dark Skies Campaign.

2.1.64 The outline lighting scheme for both the factory and jetty has achieved compliance with Dark Skies – CIE 150; Zone E2 – low district brightness in sparsely inhabited rural areas.

Fencing

2.1.65 The cable factory requires a medium level of security to the perimeter, and it is proposed that a 2m high paladin welded mesh fence would be appropriate. Vehicle and pedestrian gates at the cable factory site accesses would match the fencing proposed.

Operation and Maintenance

2.1.66 The operation and maintenance phase of the Project will last 25 years, following the first operation of the Project.

Hours of operation

2.1.67 The cable manufacturing facility is likely to operate 24hrs a day achieved through four teams working alternating 12hr shifts.

Employment

2.1.68 The facility is expected to employ a total of 900 FTE staff during its operation including 738 factory workers and 162 support staff.

Materials

2.1.69 The main inputs to the process will include:

- Lead
- Aluminium
- XLPE
- Steel Wire
- Polyethylene 'jacketing' sheath
- Tapes and yarns
- Liquid Nitrogen

Use of natural resources

2.1.70 The Project will require a supply of mains water for cooling.

Residues and emissions

2.1.71 The XLPE cross-linking process will give-off methane (CH4) as a by-product[1].

2.1.72 Details of residues and emissions in relation to water; noise and vibration; and soil are set out in Chapters 8: Hydrology and Flood Risk, 9: Hydrogeology, Geology and Ground Conditions and 11: Noise and Vibration of this EIA Report. Details of lighting are provided within this chapter, at Appendix 2.3 and considered within Chapters 5: Ecology and Nature Conservation and 7: Landscape and Visual Effects where relevant. As set out in Chapter 4 of this report, the Project is not likely to give rise to heat or radiation emissions during its operational phase. Potential population and health effects of the project are addressed at Appendix 2.2 Population and Health Statement.

Wastes

2.1.73 The cable manufacturing process does not generate significant sources of operational waste that is not capable of being recycled.

[1] Other by-products of the cross-linking process include alpha-methylstyrene, cumylalcohol and acetophenone

Vulnerability to Accidents and Disasters

2.1.74 The EIA Regulations require consideration of the Projects' vulnerability to major accidents and/or disasters. The development is not of a type to give rise to potential for any unusual accidents or disasters.

2.1.75 Due to its location, it is not likely the Project would be at risk of a major disaster from extreme flood or rainfall events. The drainage design for the Project takes into account an increase in rainfall as a result of climate change and therefore would be designed to accommodate higher flows. A Flood Risk Assessment has been prepared to support the application (see Chapter 8: Hydrology and Flood Risk and Appendix 8.1: Flood Risk Assessment).

2.1.76 The design and construction of the buildings would comply with Building (Scotland) Regulations, which are enforced by local building control bodies. The design would therefore take into account relevant legislation and guidance including the following (or their replacement versions at the time of construction) to reduce the risk of fire:

- Building Regulations 2004; and
- Building Standards Technical Handbook 2019: Non-domestic Buildings (Section 2: Fire) (Scottish Government, 2013).

Construction and Decommissioning

Construction Activities and Plant

2.1.77 Construction activities at the Project site will comprise:

- site setup and securing the perimeter;
- pre-construction enabling works including site clearance, demolition of coal yard base and earthworks;
- provision of temporary/permanent drainage;
- earthworks and construction of foundations;
- construction of the extrusion tower and steel portal frame buildings;
- erection and mechanical and electrical fit-out of buildings and enclosures;
- installation of pre-manufactured factory process equipment / components;
- connection of utilities;
- hard surfaces, paving, sustainable urban drainage (SuDS);
- landscape planting and habitat creation, secure fencing, restoration of temporary construction areas and ongoing habitat creation and management; and
- commissioning.

2.1.78 Typical construction plant to be used will include excavators, drilling rigs, graders and haulage vehicles, mobile and tower cranes, heavy and light goods vehicles.

2.1.79 Piling may be required for foundations of structures on the Project site. All piling is expected to comprise augured/board type with the exception of sheet piling required at the extrusion tower basement.

Special construction activities

2.1.80 The extrusion tower is to be constructed in a continuous process known as 'slip forming' which is the fastest method of construction for vertical reinforced concrete structures. Continuously moving formwork is raised vertically at a speed which allows the concrete to harden before it is free from the formwork at the bottom (but that a wetted edge is always maintained at the top). The concrete is fed from the top with a continuous supply of concrete from a nearby concrete batching plant which needs to be supplied with raw materials sufficient for the task.

2.1.81 The slip forming process requires a continuous supply of concrete from the on-site concrete batching plant that cannot be interrupted. The slip-forming operation would commence at 07:00 and run till midnight each day Monday to Saturday with cleaning of equipment and preparation occurring Saturday and Sunday in readiness for the continuation of the rise on the following Monday.

2.1.82 The approximate duration of this exceptional activity is 43 weeks

Construction Programme and Phasing

2.1.83 Subject to being granted planning permission and subsequent Final Investment Decision, the earliest date that construction could start work will be quarter 4 2022. Advance enabling works that do not require consents or licences may be required to establish the prevailing site conditions such as geo-environmental and archaeological excavations may take place beforehand.

2.1.84 The factory will be constructed in one phase lasting approximately 24 months. However, some of the buildings and 3 extrusion lines will be brought to an operational state to achieve test cable production, whilst the remainder of the construction will continue until completion.

2.1.85 The construction phase (including all works required for access and cable loading infrastructure out to the jetty) is anticipated to be organised as follows:

- **Site setup** – weeks 1-4 including securing the site, fencing, installing site cabins, temporary drainage
- **Site Preperation and Enabling Works –** weeks 1-18 including demoition of coal yard surface and earthworks. This phase will include any required remediation of contamination and removal of unsuitable material as appropriate.
- **Substructure** – weeks 4-31 including piling, laying raft foundations
- **Superstructure** – weeks 11-47 including erection of steel frames, facades, floor slabs and the tower (inlcuding its basement)
- **Fitout** – weeks 10-104 including mechanical and engineering plant and internal finishes
- **Externals** – weeks 3-104 including permanent drainage, hard and soft landscaping, fencing and gates
- **Process Equipment** – weeks 21 until completion including all factory production machinery, cable carousels and export conveyor and high voltage testing facility.

Construction Environmental Management

2.1.86 Construction of the Project will be managed through a Code of Construction Practice (CoCP) presented at Appendix 2.3 that sets out the principles of good environmental management to be followed in order to avoid or minimise environmental impacts. This includes principles for management of construction noise, dust, traffic, materials storage and wate management, drainage and ecological protection.

2.1.87 The CoCP will be supported by detailed Construction Method Statements to be produced by the lead construction contractor, which will provide method statements for construction activities detailing how the requirements for the CoCP are met.

Construction Working Hours

2.1.88 Normal construction working hours will be Monday to Friday 07:00-19:00 and Saturday 08:00-13:00. No Sunday, bank holiday or night working is proposed as described below.

2.1.89 Up to an hour before and after the normal construction working hours, the following activities may be undertaken:

- arrival and departure of the workforce at the site and movement around the project site that does not require the use of plant;
- site inspections and safety checks; and
- site housekeeping that does not require the use of plant.

2.1.90 Non-noisy activities such as fit-out within buildings may be undertaken outside of those hours where these will not cause disturbance off-site.

2.1.91 Certain construction activities cannot be interrupted including the slip-form concrete tower and continuous pouring elsewhere such as for large building foundation slabs. The operating conditions for these activities will be separately agreed with NAC to avoid causing nuisance.

Construction Working Areas and Laydown

2.1.92 The main construction working, and laydown areas will be contained adjacent to the project site within the existing curtilage of Clydeport's landholding.

Construction Workforce and Access

2.1.93 Construction traffic will use the primary access route via the port access road off the A78. Access to the project site will be required for HGVs and for construction workforce traffic.

Construction Waste

2.1.94 The Project will largely be assembled from components that have been pre-manufactured off-site, such as the steel portal frame building and carousels. Construction waste from assembling and installing these components on-site will be minimal.

2.1.95 The CoCP will include good practice measures for managing waste generated during construction. All waste generated will be disposed of by a suitably licensed waste contractor.

2.1.96 Foundation excavations at the project site are estimated to require the excavation of spoil, depending on the final site arrangement and foundation design. This is expected in part to be accommodated on site, as part of site cut/fill balance. If this cannot be accommodated on site, some material may need to be transported away from the site; if this is the case, an allowance will be made for that in the assessment of construction traffic effects.

Construction Lighting

2.1.97 Directional lighting may be required during normal construction hours in winter. Outside normal construction working hours, motion-activated directional security lighting may be used at the Project site.

2.1.98 As far as possible task lighting will be used for specific works to direct light towards the working areas during the night-time. Such task lighting will be positioned at low level on posts around the site and directed at the most frequently used areas of work. However, some floodlighting will be required for accesses and walking routes. Solid fencing will be used to limit light escaping beyond the boundaries. site offices will be lit internally, and shutters could be closed at night.

Drainage

2.1.99 The construction phase will incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable.

2.1.100 Such measures will be implemented through the CoCP and subsequent Construction Method Statements, which will require the following:

- installation of wheel washing facilities at the entrance to the construction compounds;
- use of sediment fences along existing watercourses/waterbodies when working nearby to prevent sediment being washed into them;
- covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice);
- storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds;
- concrete to be stored and handled appropriately to prevent release to drains;
- treatment of any runoff water that gathers in the trenches will be pumped via settling tanks or ponds to remove any sediment;
- obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk;
- use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage;
- storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and
- stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.

Vulnerability to Accidents and Disasters – Construction Phase

2.1.101 During construction, normal construction good practice would be followed to ensure on site safety of the workforce in accordance with the Construction (Design and Management) Regulations 2015. Independent health and safety advisors would be employed by the contractor/s during construction to report on the site's safety. It would be required that these take place monthly with the reports being provided to the Applicant.

2.1.102 Overall, the Project is not of a type to give rise to potential for any unusual accidents or disasters during its construction phase. Therefore, construction legislation and good practice would be sufficient to control risks to an acceptable level.

2.1.103 Measures have been proposed as part of the Project to control dust emissions during construction and to ensure that runoff from the site is controlled. These measures are set out in Appendix 2.1 and Chapter 8 of this EIA Report.

Decommissioning

2.1.104 The Project has an initial design lifetime of 25 years. Extension of its operation beyond this timescale will be dependent on prevailing market conditions at the time. The assets, if in continuing use, will most likely be upgraded and follow any necessary approvals process in place at that time.

2.1.105 Should the facility be decommissioned, all above ground structures will be removed from the Project site, with the maximum value being recovered from materials and equipment via re-use or recycling at the time. The decision on how much of the below ground infrastructure (including foundations and concrete pads) will be retained will be agreed with the landowner and any other interested parties, accounting for decommissioning methods and timescales at the time.

2.1.106 Decommissioning activities are therefore expected to give rise to types of potential impact that are similar to construction and which will be no greater in terms of magnitude or duration.

References

Chartered Institution of Building Services Engineers (CIBSE) (2018) Society of Light and Lighting (SLL) Lighting Handbook.

Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites

Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide

Scottish Government (2013) Building Standards Technical Handbook 2019: Non-domestic Buildings (Section 2: Fire)

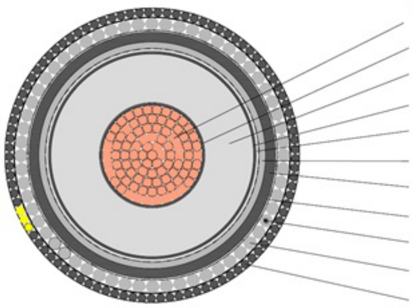
Society of Light and Lighting (SLL) Lighting Handbook (Chartered Institution of Building Services Engineers (CIBSE), 2018)

Annex A - Description of a typical HVDC submarine cable

A typical construction of 1-core submarine HVDC cable comprises the following elements laid-down in concentric layers as follows:

- Stranded round compacted copper conductor (longitudinally water blocked).
- Semi-conducting conductor screen.
- cross linked polyethylene (XLPE) insulation.
- Semi-conducting insulation screen.
- Longitudinal water penetration barrier.
- Lead alloy sheath.
- Polyethylene (PE) sheath.
- Armor bedding.
- Optical fiber element
- Galvanized steel wire armouring.
- Overall serving (yarn sleave).

A cross section of these layers is shown in the inset below:



The cable components are described in sequence as follows:

Conductor: The conductors are of compacted circular design, constructed of annealed copper or aluminium wires and longitudinally water sealed to reduce the water migration within the conductor in case of cable damage. Water blocking is made with strand filling thermoplastic compound.

Conductor screen: Extruded semi-conductive layer.

Insulation: Extruded XLPE insulation suitable for DC-cables.

Insulation screen: Extruded bonded semi-conductive layer.

Longitudinal water barrier: Between the insulation screen and the metallic sheath a longitudinal water barrier composed of semi-conductive water swelling tape is applied. This barrier is limiting water penetration along the cable core in case of cable damage. The tape is applied longitudinally over the cable core.

Lead sheathing: Extruded lead alloy sheath is applied over the water swelling tape. The lead sheathing creates radial water barrier for the cable. Letter E type alloys are recommended.

Polyethylene sheath: Extruded polyethylene compound is applied over the lead sheath. This layer prevents direct contact between the metallic sheath and water, thus prevents corrosion of lead and dissolution of lead contaminates into the water. One layer of insulating compound is used.

Armour bedding: A layer of PP strings or textile tapes is applied over assembled core as bedding for the armour wires.

Armouring: One or two layers of galvanized steel wires are applied over the bedding. Bitumen is provided over each armouring layer as corrosion protection and to improve adhesion of the overall serving layer. Fibre optic elements are integrated between the armouring wires.

Serving: Serving is a layer of fibrous materials to provide a woven sheath over the armouring. One or two layers of polypropylene strings are applied over armour as cable serving to provide abrasion protection and to reduce cable skid friction during laying of cable to the seabed. The polypropylene serving is of double colour pattern in order to give better visibility of the cable.

Fibre Optic Element: The fibre optic element is typically assembled at the armouring line. The fibres are protected by a longitudinally welded steel tube.