

Balliemeanoch Pumped Storage Hydro

Environmental Impact Assessment
Report

Volume 5: Appendices
Appendix 17.1: Climate Change Risk
Register

ILI (Borders PSH) Ltd

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Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	July 2024	Submission	DL	David Lee	Technical Director

Distribution List

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2. Risk framework

Source: EU Technical guidance on the climate proofing

			CONSEQUENCE					
Asset damage / Engineering / Operational			Impact can be absorbed through normal activity	An adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity actions	Disaster with the potential to lead to shut down or collapse or loss of the asset / network	
Safety and Health			First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury or disability	Single or multiple fatalities	
Environment			No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect. Recovery in one year	Significant harm with local effect. Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery	
Social			No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups (1). National, long-term social impacts	Loss of social licence to operate. Community protests	
Financial (for single extreme event or annual average impact) (**)			x % IRR (***) < 2 % of turnover	x % IRR 2-10 % of turnover	x % IRR 10-25 % of turnover	x % IRR 25-50 % of turnover	x % IRR > 50 % of turnover	
Reputation			Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short-term impact on public opinion; negative national media coverage	National, long-term impact with potential to affect the stability of the government	
Cultural Heritage and cultural premises			Insignificant impact	Short term impact. Possible recovery or repair.	Serious damage with wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society	
In-combination			The climate change parameter in-combination with the effect of the Proposed Development does not impact the significance of the impact of the Proposed Development on the resource/ receptor, as defined by the topic.	The climate change parameter in-combination with the effect of the Proposed Development causes the significance of the impact of the Proposed Development on the resource/ receptor, as defined by the topic, to increase to minor.	The climate change parameter in-combination with the effect of the Proposed Development causes the significance of the impact of the Proposed Development on the resource/ receptor, as defined by the topic, to increase from minor to moderate.	The climate change parameter in-combination with the effect of the Proposed Development causes the significance of the impact of the Proposed Development on the resource/ receptor, as defined by the topic, to increase from moderate to major.	The climate change parameter in-combination with the effect of the Proposed Development causes the significance of the impact of the Proposed Development on the resource/ receptor, as defined by the topic, to increase from major to catastrophic.	
		Qualitative	Quantitative	Insignificant	Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Highly unlikely to occur	5%	Rare	Low	Low	Medium	High	Extreme
	Unlikely to occur	20%	Unlikely	Low	Low	Medium	High	Extreme
	As likely to occur as not	50%	Moderate	Low	Medium	High	Extreme	Extreme
	Likely to occur	80%	Likely	Medium	High	High	Extreme	Extreme
	Very likely to occur	95%	Almost certain	High	High	Extreme	Extreme	Extreme

3. Climate change risk assessment

Risk Identification			Risk Assessment			Adaptation Measures								
Risk ID	Climate variable	Risk statement	Direct or Indirect, In-Construction	Components impacted	Impact type	Planned Controls	Initial risk rating RCP8.5 (2020-2049)	Initial risk rating RCP6.5 (2040-2069)	Initial risk rating RCP2.5 (2070-2099)	Justification	Adaptation Measures	Responsibility	Residual risk rating RCP6.5 (2040-2069)	Residual risk rating RCP2.5 (2070-2099)
Description of impacts	Respond	Enhancement	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use	Re-use
PRE CONSTRUCTION & CONSTRUCTION														
1	Extreme Heat	Extreme heat days results in ambient temperature rising above optimal design temperatures of construction equipment, resulting in delay, repairs and additional project costs.	Direct		Asset damage, Financial, Health & Safety	The Contractor will monitor weather forecasts, and plan works accordingly, protecting construction equipment and materials from any extreme heat weather conditions.	Unlikely	Insignificant	Low	Occurrence of extreme heat events unlikely to change considerably during construction phase	No further adaptation measures required	Contractor	Unlikely	Low
2	Extreme Heat	Extreme heat events causes health and safety to the construction force, which could lead to an injury or fatality, or in a worst-case scenario death.	Direct		Health and Safety	The Contractor will monitor weather forecasts, and plan works accordingly, protecting workers from any extreme heat weather conditions.	Unlikely	Insignificant	Low	Occurrence of extreme heat events unlikely to change considerably during construction phase	No further adaptation measures required	Contractor	Unlikely	Low
3	Changes in precipitation (Extreme rainfall)	Extreme rainfall event results in damage to construction equipment and/or unsafe working conditions resulting in a delay to construction	Direct		Health & Safety	Contractors will monitor weather forecasts and receive weather alerts from the Environmental Protection Agency (SEPA) flood alerts and plan works accordingly with external methodologies to manage workers and resources in extreme weather conditions such as storms, flooding. Health and safety plans to be in place.	Moderate	Minor	Medium	Precipitation changes are expected to increase slightly during winter months	No further adaptation measures required	Contractor	Moderate	Medium
4	Changes in precipitation (Extreme rainfall)	Extreme rainfall events can cause surface water flooding at the construction site, which can cause disruption and damage to the site.	Direct		Health & Safety, financial, asset damage	A surface water drainage system on site will be designed to accommodate the 1:30 year plus 35% climate change rainfall event without any surface water flooding.	Moderate	Minor	Medium	While unlikely, damage to building foundations during construction can cause significant damage.	No further adaptation measures required	Contractor	Moderate	Medium
5	Changes in precipitation (Extreme rainfall)	Extreme rainfall event causes surface water flooding of the construction site and local roads. This affects the viability of and access to the site, causing potential delays to construction work, disruption to supply chains damage to equipment.	Indirect		Financial, health & safety, asset damage	A surface water drainage system on site will be designed to accommodate the 1:30 year plus 35% climate change rainfall event without any surface water flooding.	Moderate	Minor	Medium	According to UKCP18 projections increased winter rainfall may result in more extreme rainfall periods and flood events.	Critical construction equipment to be stored at higher ground levels. Wetland areas to be assigned to higher ground levels.	Contractor	Moderate	Medium
6	Wildfire Event	Increased heatwaves and dry periods increase the potential for wildfires, which could result in considerable damage to construction equipment and the construction site itself.	Direct		Financial, health & safety, asset damage	Weather forecasts should be monitored to expected extreme temperatures are prepared for in advance, and contingency measures can be put in place to minimise disruption to the construction.	Rare	Insignificant	Low	While unlikely, wildfires can have significant impacts on construction sites and building work	No further adaptation measures required	Contractor	Rare	Low
7	Wildfire Event	Increased heatwaves and dry periods increase the potential for wildfires, which could result in injury or fatality to personal.	Direct		Health and Safety	Weather forecasts should be monitored to expected extreme temperatures are prepared for in advance, and contingency measures can be put in place to minimise disruption to the construction.	Rare	Insignificant	Low	While unlikely, wildfires can have significant impacts on construction sites and building work	No further adaptation measures required	Contractor	Rare	Low
8	Temperature-related (Extreme cold)	Construction workers are at risk of hypothermia due to low temperatures. As a worst case scenario this could lead to death.	Direct		Health and Safety	The contractor will monitor weather forecasts, and plan works accordingly, managing workers during periods of extreme cold weather.	Unlikely	Minor	Low	UKCP 18 temperature projections indicate that during winter periods temperatures are likely to drop below 0°C, thus resulting in freezing conditions.	No further adaptation measures required	Contractor	Unlikely	Low
9	Temperature-related (Extreme cold)	Low temperatures can lead to ground stress becoming frozen. This can lead to delays and disruption to construction activities, as the areas will need to be de-iced.	Direct		Asset damage and Financial	The contractor will monitor weather forecasts, and plan works accordingly, managing workers during periods of extreme cold weather.	Unlikely	Minor	Low	UKCP 18 temperature projections indicate that during winter periods temperatures are likely to drop below 0°C, thus resulting in freezing conditions.	No further adaptation measures required	Contractor	Unlikely	Low
10	Storm Events	Storm events create an unsafe environment for construction workers. Workers in outdoor or unstable environments face increased physical risks during storms, including injuries from falling debris, flooding, or high winds.	Direct		Health and Safety	The contractor will monitor weather forecasts and plan works accordingly, managing workers during storm events.	Moderate	Minor	Medium	The Met Office has projected an increase in near surface wind speeds over the UK for the winter season when more significant impacts of wind are experienced. However, the increase in wind speeds is modest compared to natural variability from month to month and season to season, so confidence is low.	No further adaptation measures required	Contractor	Moderate	Medium
11	Storm Events	Storms and severe weather can disrupt construction of the Scheme. Impacts include delays, damage to construction materials, and machinery. Flooding and blocked roads can also affect material delivery and personnel movement.	Direct		Asset damage and Financial	The contractor will monitor weather forecasts and plan works accordingly, managing workers during storm events.	Moderate	Minor	Medium	The Met Office has projected an increase in near surface wind speeds over the UK for the winter season when more significant impacts of wind are experienced. However, the increase in wind speeds is modest compared to natural variability from month to month and season to season, so confidence is low.	No further adaptation measures required	Contractor	Moderate	Medium
OPERATION														
12	Extreme temperatures (heat)	Heatwaves result in heat stress for building occupants and outdoor workers, causing health and safety incidents. e.g. Sunstroke & dehydration	Direct		Health and Safety	The Operator will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Minor	Low	UKCP18 temperature projections indicate that increased temperatures are likely to occur during the operational phase. Heatwaves are more likely to occur especially during the summer period.	Elevate the responsibility for proper enforcement of the heat stress guidelines. Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. Cease outdoor and no essential work if working conditions are too dangerous, and could result in injury to workers and damage to equipment.	Operator	Unlikely	Low
13	Extreme temperatures (heat)	Prolonged periods of extreme heat and heatwaves can lead to an increase in demand for HVAC and cooling equipment for indoor areas.	Direct		Asset damage/ Engineering/ Operational	The Operator will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Minor	Low	UKCP18 temperature projections indicate that increased temperatures are likely to occur during the operational phase. Heatwaves are more likely to occur especially during the summer period.	Consider inspection of vulnerable operational assets after a hot day	Operator	Unlikely	Low
14	Changes in Precipitation (Flooding)	Extreme rainfall events could result in physical damage to the infrastructure (dams, reservoirs, turbines and electrical equipment) of the Scheme, which could all be susceptible to damage from flood waters. This could lead to costly repairs and Scheme downtime	Direct		Asset damage/ Engineering/ Operational	A flood risk assessment will be included with the EIA report, this will be supported by a detailed Flood Risk Assessment (FRA) and will be conducted in line with SEPA guidance.	Moderate	Minor	Medium	According to UKCP18 projections increased winter rainfall may result in more extreme rainfall periods and flood events.	No further mitigation measures required	Operator	Moderate	Medium
15	Changes in Precipitation (Flooding)	Extreme rainfall events could cause physical damage to the infrastructure (dams, reservoirs, turbines and electrical equipment) of the Scheme, which could all be susceptible to damage from flood waters. This could lead to costly repairs and Scheme downtime	Direct		Asset damage/ Engineering/ Operational	A flood risk assessment will be included with the EIA report, this will be supported by a detailed Flood Risk Assessment (FRA) and will be conducted in line with SEPA guidance.	Moderate	Minor	Medium	According to UKCP18 projections increased winter rainfall may result in more extreme rainfall periods and flood events.	No further mitigation measures required	Operator	Moderate	Medium
16	Changes in precipitation (Droughts)	Periods of reduced precipitation (Droughts) could change the streamflow trends, which could disrupt the water supply to both the lower and upper reservoir (headpond), thus reducing the electricity generation capacity of the Scheme and resulting in downtime for the Scheme.	Direct		Asset damage/ Engineering/ Operational	A Water Management Plan describing the mitigation measures to protect the surface water environment will be produced as part of the planning application.	Unlikely	Minor	Low	UKCP 18 data for precipitation for the area suggests increased winter rainfall that has the potential to result in an increase of flood events.	No further mitigation measures required	Operator	Unlikely	Low
17	Wildfire Event	Increased heatwaves and dry periods increase the potential for wildfires, which could result in considerable damage to plant infrastructure and operational machinery. This could result in asset damage, plant downtime and machinery repair/replacement. In addition, this could be exacerbated by any combustible materials at the site. E.g. generator fuel.	Direct		Asset damage/ Engineering/ Operational	The vegetation and woodland near the development mean a risk of wildfires within the Scheme's Red Line Boundary. Any fires on site are more likely to be human-caused as a result of negligence or process failure rather than as a result of climate change.	Unlikely	Minor	Low	As stated by Think hazard, there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that poses some risk to the operation of the Scheme.	Project planning decisions, project design, construction methods and emergency response planning should take into account the level of wildfire hazard.	Operator	Unlikely	Low
18	Wildfire Event	Wildfire reaches the plant causing considerable damage to site infrastructure and operational machinery. This could result in injury or fatality for workers and people within the vicinity.	Direct		Asset damage/ Engineering/ Operational	The vegetation and woodland near the development mean a risk of wildfires within the Scheme's Red Line Boundary. Any fires on site are more likely to be human-caused as a result of negligence or process failure rather than as a result of climate change.	Unlikely	Minor	Low	As stated by Think hazard, there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that poses some risk to plant and facilities.	Project planning decisions, project design, construction methods and emergency response planning should take into account the level of wildfire hazard.	Operator	Unlikely	Low
19	Temperature-related (Extreme cold)	Low temperatures can lead to ground stress becoming frozen. This can lead to delays and disruption to operations as the areas will need to be de-iced.	Direct		Asset damage/ Engineering/ Operational	The Operator will monitor weather forecasts and plan works accordingly, protecting workers and resources from cold weather events.	Unlikely	Minor	Low	UKCP 18 temperature projections indicate that during winter periods temperatures are likely to drop below 0°C, thus resulting in freezing conditions.	No further mitigation measures required	Operator	Unlikely	Low
20	Storm Events	Storm events create an unsafe environment for on-site operational workers and contractors. Workers in outdoor or unstable environments face increased physical risks during storms, including injuries from falling debris, flooding, or high winds.	Direct		Health and Safety	The Operator will monitor weather forecasts and plan work accordingly, managing workers during storm events.	Unlikely	Minor	Low	The Met Office has projected an increase in near surface wind speeds over the UK for the winter season when more significant impacts of wind are experienced. However, the increase in wind speeds is modest compared to natural variability from month to month and season to season, so confidence is low.	No further mitigation measures required	Operator	Unlikely	Low
21	Storm Events	Storms and severe weather can disrupt the operation of the Scheme. Potential impacts can include damage to infrastructure and machinery. Flooding and blocked roads can also affect site access for operational workers and contractors, thus impacting operations.	Direct		Asset damage and Financial	The Operator will monitor weather forecasts and plan works accordingly, managing workers during storm events.	Unlikely	Minor	Low	The Met Office has projected an increase in near surface wind speeds over the UK for the winter season when more significant impacts of wind are experienced. However, the increase in wind speeds is modest compared to natural variability from month to month and season to season, so confidence is low.	No further mitigation measures required	Operator	Unlikely	Low

