Request IR-17:

(a) Please provide a comprehensive cost estimate for the trenched underground land cable option and a copy of NS Power's Economic Analysis Model (EAM) comparing it with the subsea cable option. Any costs incurred to date that are specifically related to the subsea cable option should be excluded from the cost estimate (and related EAM) for the trenched underground land cable option.

(b) Please describe the preliminary route for the trenched underground land cable option, including:

- **(i) Mapping;**
- **(ii) Starting and ending points;**
- **(iii) Length of the cable; and**
- **(iv) Burial depth of the cable.**

(c) Please describe the trenching technologies that would be used for the underground land cable.

(d) Please compare the technical specifications of the subsea cable and the land cable.

Response IR-17:

(a) Please refer to Attachment 1 for a detailed estimate of trenched underground cable alternative. An economic analysis model has not been prepared to compare these two alternatives as there are no differences in costs beyond the capital investment required.

The comparison therefore only considers capital costs, and the trenched cable option is $665,605 more expensive than the subsea cable option, as shown in the table below.

Distribution Power Supply Routing Options	Capital Cost	Delta ($)
Subsea Cable Replacement	$4,388,679	$665,605
Trenched Underground Land Cable	$5,054,284	

(b) NS Power's preliminary route for the trenched underground land cable, which would be subject to change, would extend from the termination point of the existing distribution line at approximately Civic 2179 Big Island Road and connect to the existing Big Island overhead distribution system at approximately Civic 1020 Big Island Road.

(c) The underground trench alignment would be anticipated to extend for approximately 5 km, either within the roadway or along the northern boundary of the roadway right-of-way, generally parallel to the existing underground communications duct bank. This would minimize potential impacts to adjacent wetlands and areas of significant species and habitat located along either side of the causeway. The proposed depth of burial for the underground cable infrastructure would be approximately 1,000 mm to the top of the cable conduit.

NS Power would propose to utilize excavators and backhoes to construct underground trenched land cables in accordance with a conventional open-trench methodology, incorporating the installation of a concrete duct bank encasement.

(d) Please refer to the table below comparing the technical specifications of the subsea cable and the land cable.

	Subsea Cable	Land Cable
Voltage	28kV	15kV
Conductor	2/0 AWG – Copper	3/0 AWG - Aluminium
Conductor Shield	Semi-conducting non-metallic thermosetting material	Semi-conducting non-metallic thermosetting material

	Subsea Cable	**Land Cable**
Insulation	Tree Retardant Crosslinked Polyethylene (TRXLPE)	Tree Retardant Crosslinked Polyethylene (TRXLPE)
Insulation Shield	Semiconducting non-metallic thermosetting material	Semi-conducting non-metallic thermosetting material
Concentric Neutral /Metallic Shield	Copper Wires 14 x 10AWG	Copper Wires 25 x 14
Cable Jacket	Linear Low-Density Polyethylene (LLDPE)	Linear Low-Density Polyethylene (LLDPE)
Armouring	Yes - electro-zinc coated steel wires	No
Water blocking	Yes	Yes
Outer Covering	Textile material such as Poly Propylene Yarns	No

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Capital Project Detailed Estimate

Location: Distribution
CI# : C0080101
Title: 539N-201 Big Island Subsea Cable Replacement - Trenched Underground Land Cable Option
Execution Year: 2026/2027

Description	Unit	Quantity	Unit Estimate	Total Estimate	Cost Support Reference	Completed Similar Projects (FP#'s)
Regular Labour						
Engineering	LOT	1	$ 143,881	$ 143,881		
Cable Installation (NSP underground crew)	LOT	1	$ 309,286	$ 309,286		
Site Supervision	dat	27	$ 1,200	$ 32,400		
			Sub-Total	$ 485,567		
Materials						
Underground Power Cable	m	5500	$ 32	$ 176,000		
Cable Joint/Sealing Materials	LOT	1	$ 30,000	$ 30,000		
Transportation Reel Deposits	LOT	1	$ 17,048	$ 17,048		
Single phase recloser with Controls	LOT	1	$ 11,722	$ 11,722		
Misc. Hardware (poles, connectors, etc.)	LOT	1	$ 24,056	$ 24,056		
			Sub-Total	$ 258,826		
Contracts						
Geo-Technincal Survey	LOT	1	$ 105,510	$ 105,510		
Survey / Detailed Design Engineering Services	LOT	1	$ 79,900	$ 79,900		
Civil contract (Includes TCP, trench, DB, PP, backfill)	LOT	1	$ 2,500,000	$ 2,500,000		
Vegetation Management	LOT	1	$ 8,400	$ 8,400		
Access road construction	LOT	1	$ 6,000	$ 6,000		
Traffic Control	LOT	1	$ 36,728	$ 36,728		
Scrap & Waste Disposal	LOT	1	$ 3,000	$ 3,000		
Cable Unloading	LOT	1	$ 3,000	$ 3,000		
				$ -		
			Sub-Total	$ 2,742,538		
Consulting						
Archaeological Resource Impact Assessment	LOT	1	$ 25,000	$ 25,000		
Wetlands, Watercourses and Species of Conservation Interest	LOT	1	$ 25,000	$ 25,000		
			Sub-Total	$ 50,000		
Freight Postage Delivery						
Material Transportation	LOT	1	$ 50,000	$ 50,000		
				$ -		
			Sub-Total	$ 50,000		
Easements and Appraisals						
Appraisals, Purchases, & Easements	LOT	1	$ 10,000	$ 10,000		
Land Agent Services	LOT	1	$ 95,640	$ 95,640		
Crown Land Easement	LOT	1	$ 6,000	$ 6,000		
			Sub-Total	$ 111,640		
Other Goods & Services						
Contingency	%	15%	$ 3,698,571	$ 554,786		
				$ -		
			Sub-Total	$ 554,786		
Vehicle Overhead						
Vehicle Labour AO		1	$ 156,287	$ 156,287		
			Sub-Total	$ 156,287		
Interest Capitalized						
AFUDC		1	$ 95,838	$ 95,838		
				$ -		
			Sub-Total	$ 95,838		
Administrative Overhead						
Labour AO		1	$ 262,125	$ 262,125		
Contractor AO		1	$ 286,677	$ 286,677		
			Sub-Total	$ 548,802		
			SUB-TOTAL (no AO, AFUDC)	$ 4,253,357		
			TOTAL (AO, AFUDC included)	$ 5,054,284		
Original Cost				$ -		

Note 1: The labour figures noted above are an average of salaries across a variety of jobs within similar classifications including fringe, and are used solely for budgeting purposes.
Note 2: Small differences in totals are attributable to rounding.

Request IR-18:

In response to IR-10 (d) (i), NS Power provided a comparison table for all three options based on seven criteria.

(a) For the criterion "Reliability and Service Continuity" the Subsea Cable option is rated as "High", defined as:

> **High– Low frequency of weather-related outages once installed; ice risk is localized and design-mitigable, however, faults typically require specialized marine investigation and repair, which may result in longer outage durations.**
> **[N-2, IR-10, p.4]**

The Underground Cable Causeway option is rated as "Moderate", defined as:

> **Moderate– Buried system reduces routine exposure; however, faults may be difficult to locate and repairs may require excavation and trench restoration potentially resulting in extended outage durations, particularly following severe weather events.**
> **[N-2, IR-10, p.4]**

(i) Please explain whether the issues noted in the evaluation of the Underground Cable Causeway option such as "faults may be difficult to locate and repairs", "potentially resulting in extended outage durations," are also applicable to the subsea cable option; and

(ii) Please explain why the subsea cable option received a rating of "High" for this criterion, whereas the Underground Cable Causeway option received a rating of only "Moderate".

(b) For the criterion "Maintenance and Repair", NS Power only noted the repair requirements.

(i) Please describe the expected routine maintenance requirements for both options.

(ii) Please explain whether NS Power conducts regular condition assessments of subsea or underground cables, particularly following major windstorms.

(iii) Based on the decisions to replace the 1977 cable and 1990s cable following major damages, and NS Power's responses to IR-4 (d) (i) and IR-5 (b) (i), please describe NS Power's standard practice for subsea cable repair.

(iv) Please describe whether the proposed new subsea cable would have better repairability compared to the 1977 cable and 1990s cable.

(v) Please describe NS Power's standard practice for underground cable repair.

Response IR-18:

(a)

(i) NS Power confirms that the issues identified for the Underground Cable Causeway option, specifically relating "faults may be difficult to locate and repair", "potentially resulting in extended outage durations," are also applicable to subsea cable installations. While both options are subject to fault location and repair challenges, the overall risk profile differs, and these differences underpin the relative ratings assigned in the evaluation.

(ii) The subsea cable option received a "High" rating for reliability and service continuity primarily because it is expected to have a lower frequency of outages, owing to it being installed and protected within Merigomish harbour providing a

stable operating environment which limits exposure to third party damage which is mitigated through design.

In contrast, the Underground Cable Causeway option, while also buried, is exposed to a more variable environment (i.e., weather events, third party or local infrastructure disturbance, ground erosion), resulting in a higher likelihood of faults over time.

Both options may experience extended outages due to the difficulty of detecting and repairing faults; however, this is a common factor and not the primary distinction. The rating difference instead stems from the subsea option's better overall performance in reducing the likelihood of outages.

(b)

(i) The expected routine maintenance requirements for both the Subsea Cable and the Underground Cable Causeway options are relatively low compared to overhead distribution infrastructure, as both are buried systems designed for long service life with limited ongoing intervention. Routine maintenance for both options is primarily monitoring and inspection rather than activities involving direct physical intervention.

The Underground Cable Causeway option, however, benefits from greater physical accessibility, enabling more frequent and direct inspections of associated infrastructure.

Maintenance activities arising from inspection programs for both options would generally be limited to the inspection and upkeep of terminations (i.e. Overhead to Underground transition points) and targeted remediation of any identified deficiencies, such as restoration of cable protection where required.

(ii) NS Power does not conduct routine post weather-event condition assessments of the subsea (marine) portion of the cable route. Following a fault or outage on a distribution feeder, inspection activities are focused on overhead infrastructure. Specifically, NS Power inspectors would assess the overhead portion of the circuit up to the transition (riser) pole to identify any visible damage or contributing factors in cases of a fault.

For underground cable installations, including the Underground Cable Causeway option, inspection activities would include visual assessment of the surface conditions above the duct bank (e.g., roadway or grade) to identify signs of erosion or potential cable exposure that could affect cable integrity and customer safety. However, such inspections would not typically be conducted on a routine basis and would instead be undertaken in response to a fault, outage, or identified issue on the associated distribution system.

(iii) In standard practice, subsea cable repairs typically involve mobilizing specialized marine resources, including securing a suitable marine platform equipped with subsea cable handling equipment for repairs and engaging experienced internal and/or external cable specialists. Fault location is carried out using established diagnostic testing methods, followed by marine-based investigation to pinpoint the fault. Once identified, the damaged section of cable is isolated, removed, and replaced by splicing in a new section of cable from available spares inventory using proven jointing techniques.

Historically, repairs to subsea cables have been relatively infrequent, reflecting the generally strong in-service performance of these assets once installed. As noted in prior responses, the decision to repair or replace is made based on site conditions, extent of damage, and overall feasibility, including seasonal and logistical constraints. In certain cases, replacement may be determined to be the more reliable and practicable option.

(iv) Yes. As part of the project, NS Power plans to procure additional spare cable and associated accessories to support timely response in the event of a cable failure and to improve repair lead times. Furthermore, the new cable installation will continue to incorporate established risk mitigation practices, including appropriate routing, burial depth, and protective measures, consistent with industry good practices.

(v) If a cable is damaged, it is first isolated and tested to help pinpoint the fault location. Once the location and nature of the fault are identified and confirmed to be repairable, the cable is fixed using an approved splicing kit. After completing the repair, the cable undergoes Very Low Frequency (VLF) testing or DC hipot testing to confirm the integrity of the splice.