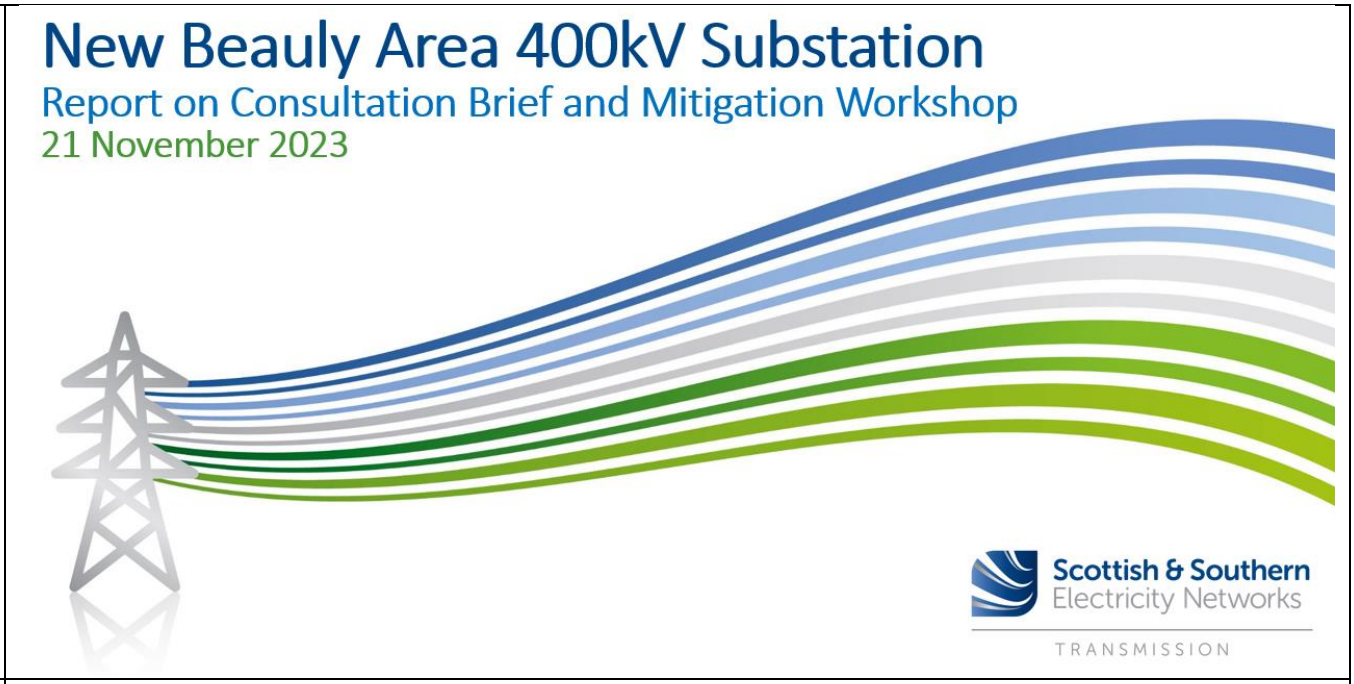
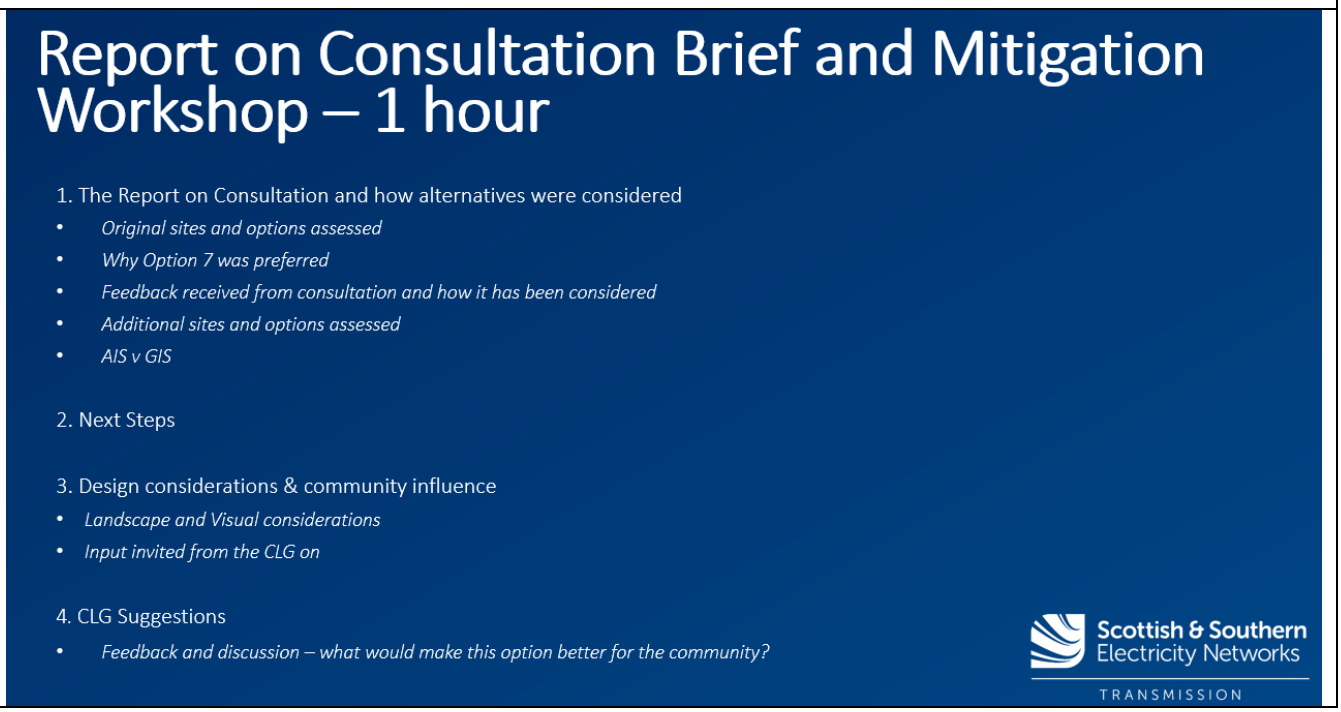
	 New Beauly Area 400kV Substation Report on Consultation Brief and Mitigation Workshop 21 November 2023 Scottish & Southern Electricity Networks TRANSMISSION
1.0	
1.2	 Report on Consultation Brief and Mitigation Workshop – 1 hour 1. The Report on Consultation and how alternatives were considered • Original sites and options assessed • Why Option 7 was preferred • Feedback received from consultation and how it has been considered • Additional sites and options assessed • AIS v GIS 2. Next Steps 3. Design considerations & community influence • Landscape and Visual considerations • Input invited from the CLG on 4. CLG Suggestions • Feedback and discussion – what would make this option better for the community? Scottish & Southern Electricity Networks TRANSMISSION

2.0

1. The Report on Consultation

The Report on Consultation (RoC) is anticipated to be finalised and published late November/ early December
We are sharing information that will be outlined within the RoC with the CLG to provide transparency, advance notice for Community Councillors and to aid discussion during the workshop.

What site is being taken forward?

Site Option 7 (combined): Fanellan

Why?

Site 7 was proposed as the preferred site for consultation following initial assessment.

Feedback from the consultation recommended we consider alternative sites, which were then assessed using the same site selection process;
however, none of these outperformed Site 7 on balance.

What alternatives were considered?

- 16 sites investigated originally

- 4 options shortlisted and taken forward to consultation

- **6** additional options identified and assessed following consultation feedback

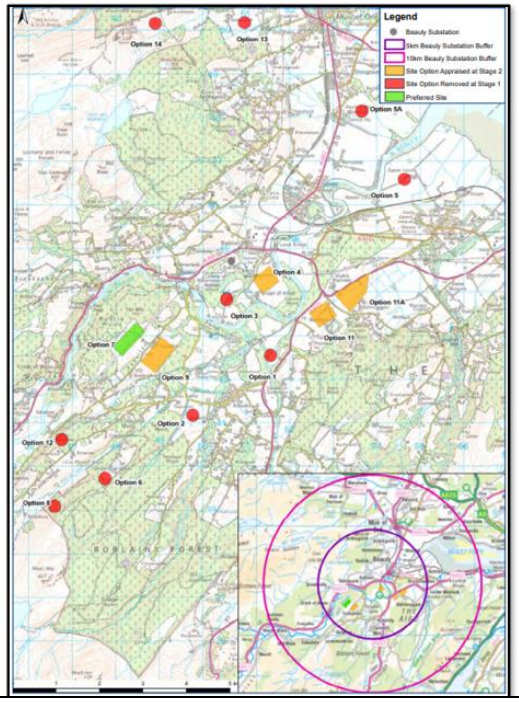
Why aren't you workshopping the site options with the CLG?

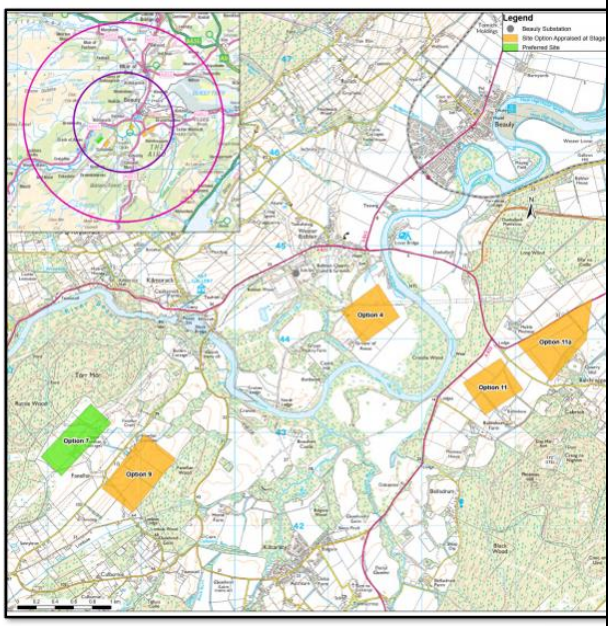
It is vital that CLG engagements are meaningful and influence project decision making. As the alternative options suggested had been investigated and scored poorer than Site 7, we considered the site location as not something the CLG could meaningfully influence at this stage and the workshop should focus on mitigating impacts

2.1 SSEN T stressed to the CLG we want to make Site 7 the best it can be and understand that this is difficult for those in the Kiltarlity area to hear that this the site that is being taken forward. We very much want to work collaboratively with the CLG to mitigate the impacts.

3.0

Original Sites and Options Assessed





3.1

Why was Option 7 preferred

- Large site that can accommodate both the substation and HVDC converter station. Limits new UGC, overall footprint/ earthworks and concentrates development in one new area.
- Relatively unconstrained site in three directions, allowing the new 400kv OHLs to connect into the substation.
- Site 7 rated best regarding environment, cultural heritage, planning policy and economics.
- Located next to the existing Beauly- Denny 400kv OHL, which the new substation will need to tie into because the new substation needs to connect back to the existing Beauly substation. This limits new OHL/ UGC in the Beauly area and the associated environmental impacts.
- Ruttall wood provides natural screening in some directions.
- Undulating topography of the site will limit the amount of import material required (reducing construction traffic) and provides an opportunity to construct landscape bunds.
- There is adjacent land available for ancillary infrastructure such as construction compounds, SuDS and landscaping.
- Community – immediate area is sparsely populated in comparison to other sites, 'recreation' scored equally across all sites assessed. Site is located away from existing Beauly substation, reducing risk of adding to existing noise levels.

SSEN T explained that the AC (alternating current) part of the new substation is not as high as the Direct Cable (DC) building element of the HVDC which will be the most prominent feature, therefore the plan is to lower it into the hillside, use hard and soft landscaping, screening around the DC section and make it a colour agreeable to the community. This design development phase is ongoing and SSEN T seek the community`s input.

SSEN T explained that with this site being the node for several connections it is being developed holistically. The CLG said they want to see the whole picture of what is going in and out of the new substation and to get a sense of the scale. SSEN T explained that it is too early in the development phase to produce these visuals though they will be available at the events to be held early 2024 – there will be photomontages, 3D modelling which can be viewed from different locations and aspects factoring in a 5km distance. SSEN T explained that they are reviewing the structural integrity of Black bridge and are looking to create a temporary access road on the Kiltarlity side which will be subject to discussions at the pre-application consultation events in the New Year.

4.

Why was Option 7 preferred

Issues with shortlisted sites (not all applicable to each site):

- Split site option would lead to a larger land footprint overall, greater earthworks, a new UGC and the new electrical infrastructure would be spread over a larger area.
- The river crossing for UGC between the converter station and substation would be wide, technically challenging, create additional environmental impacts and be costly.
- Located in an area that has medium- high risk of fluvial flooding
- Limited adjacent land, which is required for temporary construction compounds, SuDS & landscape bunds.
- Existing OHLs cross the site, so additional work and outages required to divert these.
- Larger diversion of the existing Beauly –Denny 400kv OHL.
- Sites are mostly flat/ gentle slope, offering little opportunity to win material to build the platform, meaning a lot of imported material would be required, creating additional construction traffic
- Proximity to and potential impact on setting of, cultural heritage assets
- Potential planning policy conflicts relate to flooding and agriculture
- Located on high-quality agricultural land.

Feedback from consultation and how it has been considere

From the community

Common themes:

- Project need, technology choice, environmental impacts, socio-economic impacts, consultation process

Project Specific feedback:

- Site selection process- methodology, weightings, timescales
- Additional sites requested to be assessed: West of Broallan, Quarry and split site option (Quarry A and Site 7)
- Landscape & Visual concerns- including on tourist routes, suggestions for mitigation
- Noise
- Health and Wellbeing
- Impacts on recreation (walking and cycling)
- Information on the connecting new 400KV OHLs
- Subsea v onshore
- Future expansion plans
- Environmental impacts- wildlife, protected species, cultural heritage
- Construction phase- construction methodology and impacts, including roads, drainage
- Operational phase- Light pollution, security risk, property values, tourism, community benefit

Full responses to these themes are provide Report on Consultation, which will be publi imminently

5.0

Feedback from consultation and how it has been considered

From The Highland Council:

- THC is generally supportive of transmission projects and understand the benefits of the project however they have concerns about: size of development, landscape & visual, noise, lack of potential suitable sites which are well screened at a lower level to accommodate the height & scale of buildings, extent of OHL proposed, limited separation from residential receptors, environmental impacts/ enhancement, technology choice, impacts on local road network and maximising socio-economic impacts.
- THC requested us to review the split site option (Quarry A and Site 7) in more detail.
- If site 7 combined is progressed then we must try and reduce land take, lower development into landscape, engage a landscape architect to design the development to suit the landform.

From NatureScot:

- Beauly substation is not expected to result in significant effects on landscapes of national importance
- Cromarty Firth and Inner Moray Firth SPA- Osprey- high potential for disturbance during construction. Survey data required to determine effects and mitigation plans
- No direct or indirect impacts on non-breeding birds
- No direct or indirect impacts on SSSI/ RAMSAR sites
- Applicant to explore & identify opportunities for biodiversity enhancement

From SEPA:

- SEPA agree with our choice of site 7, least likely to negatively impact on flood risk, private water supplies and watercourse.
- Flood risk assessment and Drainage impact assessment required.

From Historic Environment Scotland:

- Site 7 is least likely to have impact on setting of nearby scheduled monuments or raise issues of national interest. None of the other options assessed provide a betterment. Note this needs confirmed by a full assessment, including cumulative assessment with OHLs is required.
- Recognised site 7 is located west of Beaufort castle inventory garden and designed landscape. It may be visible, however perimeter of estate is enclosed by mature woodland that would limit visibility. Impacts are unlikely to raise issues of national interest.
- Agree with our decision to discount West of Broallan and Quarry C sites due to proximity to scheduled monuments
- Concerned with Quarry A site- brings the development close to the scheduled area- Kiltarlity Parish Church. If option was progressed, the tree shelterbelt would need to be retained. If it couldn't be retained then the HVDC buildings may have a significant impact on the setting, may raise issues of national importance.

Feedback from consultation and how it has been considere

What we initially did in response

We investigated **6** additional site options in response to feedback.

We also further considered whether GIS could be a viable option in comparison to GIS.

What we're still considering

We're currently considering how we can best mitigate all potential impacts associated with the site and improve our consultation process and hope to work with the CLG regarding reducing landscape and visual impacts at this stage.

What we didn't consider

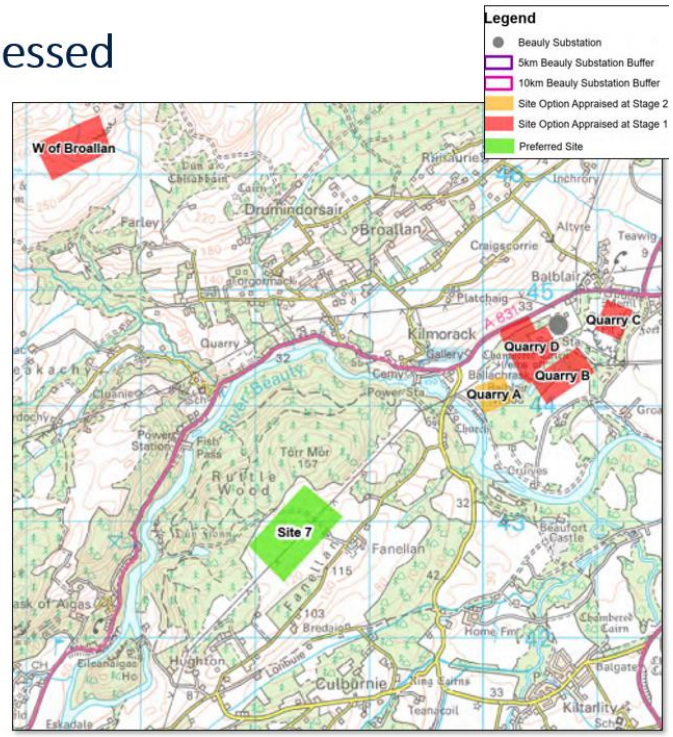
We didn't re-consider the other short sites presented at consultation, as selection already indicated Site 7/ Far as preferable in comparison and we c receive a consensus that another site preferable from the communitie perspective.

6.0

Additional Sites & Options Assessed

West of Broallan (Not taken to Stage 2)

- Approx 3km from the existing Beauly-Denny 400kv OHL, this would require a significant diversion, because the new substation needs to tie-into this OHL, to connect back to existing Beauly substation.
- Elevation of site would constrain choice of technology
- An unnamed watercourse route through the site
- Scheduled Monument, Dun Garbhaich fort (SM2422), located approx 50m north.
- Presence of infrastructure to an area where there's currently none, likely compromise sense of remoteness.
- Technically challenging to create a new access route to site due to the remote location.
- Steep slopes / topography of site would make constructability challenging.

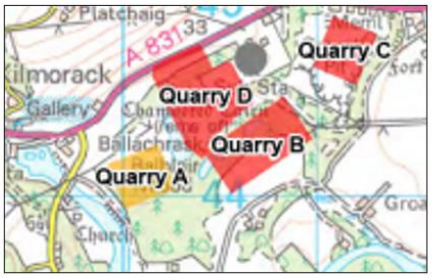


6.1

Additional Sites & Options Assessed

Quarry A (Taken to Stage 2)

- Contains AWI (2b LEPO), majority of woodland removed from site due to quarry. Generally free from other environmental constraints that would preclude development of this option
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, quarry will close in Dec '25 but quarry restoration may be affected.
- The position of the site on land impacted by the quarry works results in unique hazards, unfavourable topography, and risk of contaminated land.
- Noise- Close to residential properties , risk of adding to the current levels from the existing Beauly substation.
- Connectivity to the new Beauly to Loch Buidhe 400kv OHL would be challenging.
- Limited space would restrict technology choice for the substation to GIS arrangement. This would also prevent future expansion if required. This determined this site only suitable for the HVDC Converter station



Quarry B (Not taken to Stage 2)

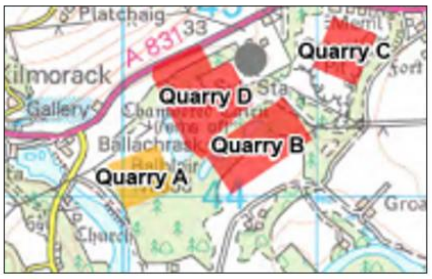
- Noise- close to residential properties- risk of adding to the current levels from the existing substation.
- AWI (2b LEPO) covers margins of the site, this woodland has potential to support recreational activities.
- 3 unnamed water features through the site, low- medium risk of fluvial flooding.
- Sits across a former meander of the River Beauly and would require removal of a large area of mixed woodland with oxbow ponds
- Contains Class 3.1 agricultural land (high-quality) current land use is for agricultural purposes.
- Potential planning policy conflicts relate to landscape character, flooding, agricultural land and ancient/native woodland.
- Connectivity to new 400kv OHL (Beauly to Loch Buidhe 400kv OHL) would be challenging
- Diversion of an existing OHL required and outages required to enable this.
- Limited space available for ancillary infrastructure, such as temporary construction compounds, SuDs and landscape

7.0

Additional Sites & Options Assessed

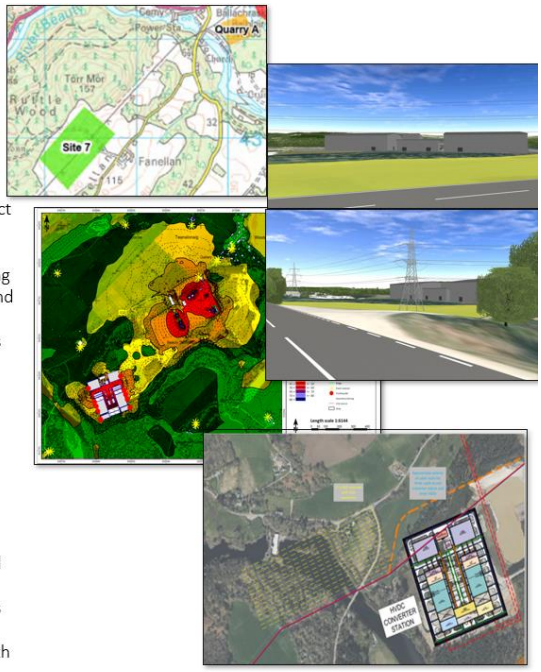
Quarry C (Not taken to Stage 2)

- Noise- Close to residential properties , risk of adding to existing levels from existing Beauly substation.
- Scheduled Monument, Corff House fort, located approx. 30m east.
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, quarry will close in Dec '25 but quarry restoration may be affected.
- Land in use for quarry activities and industrial components, therefore ground conditions are unknown and contaminated land is likely.
- Limited space available would prevent future expansion if required.
- Unique engineering hazards as a result of proximity to quarry.
- Option was noted as a potential site for the Western Isles convertor station only, due to impact of connecting Beauly/Denny OHL and impact to existing and future connections.

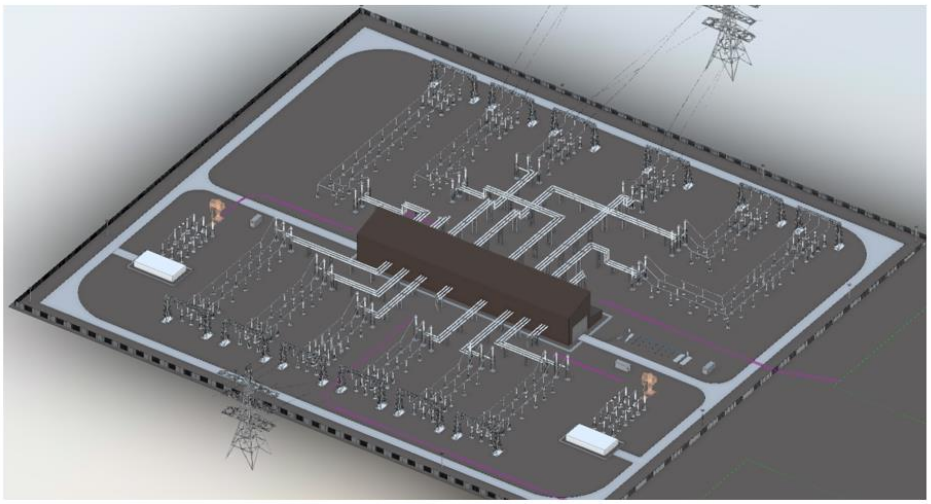


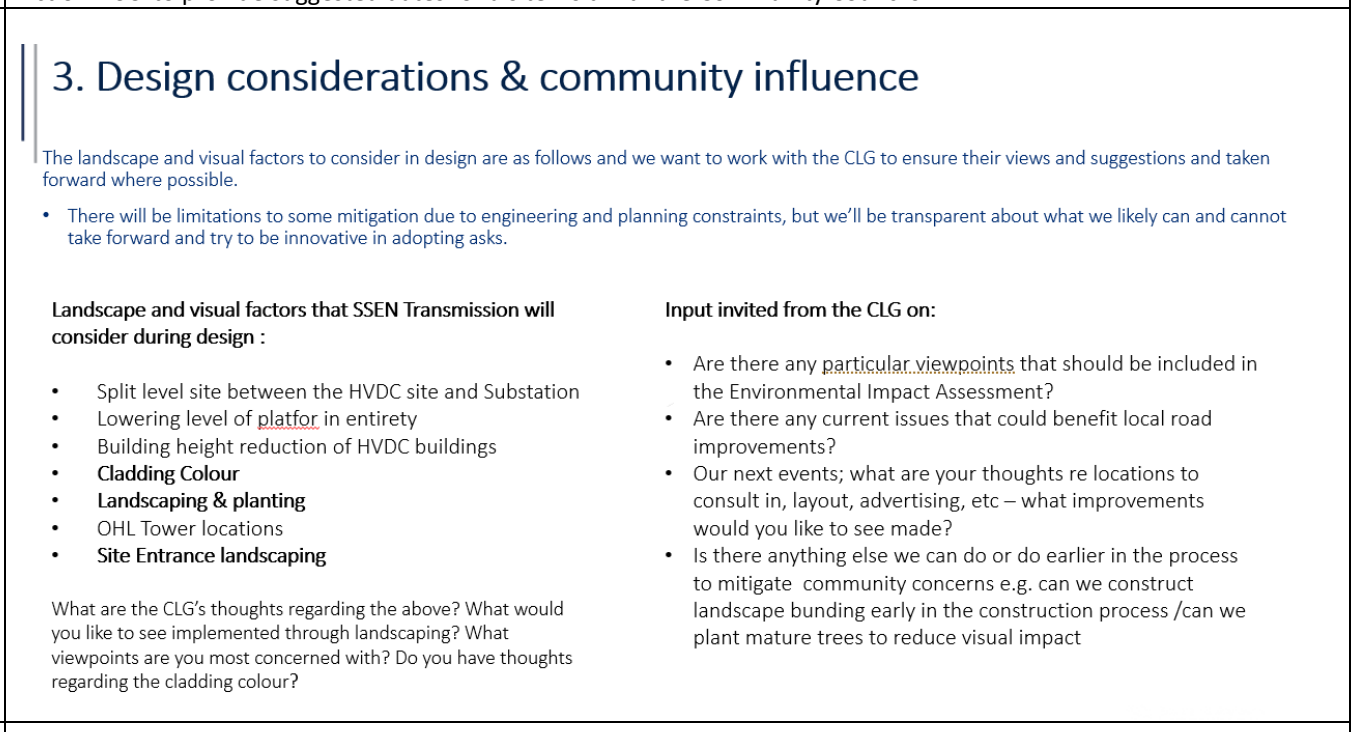
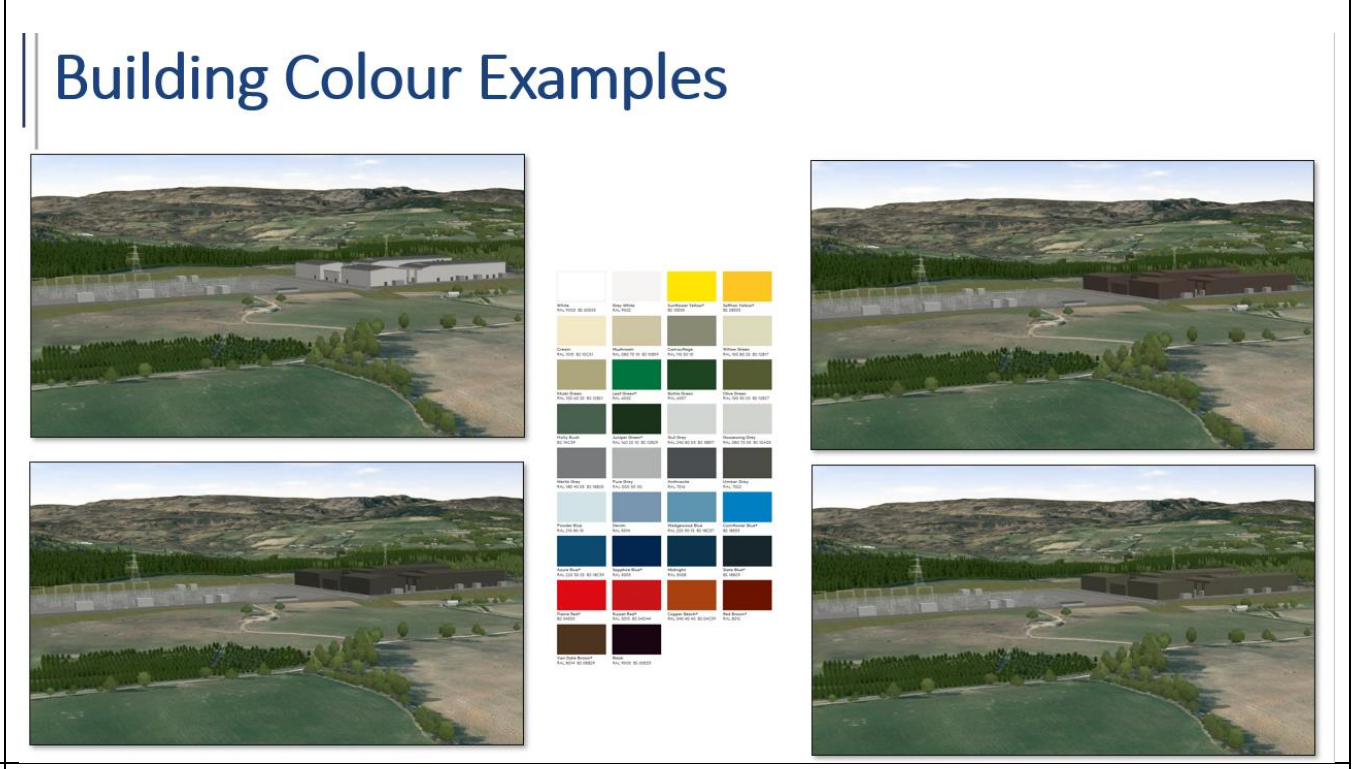
Quarry D (Not taken to Stage 2)

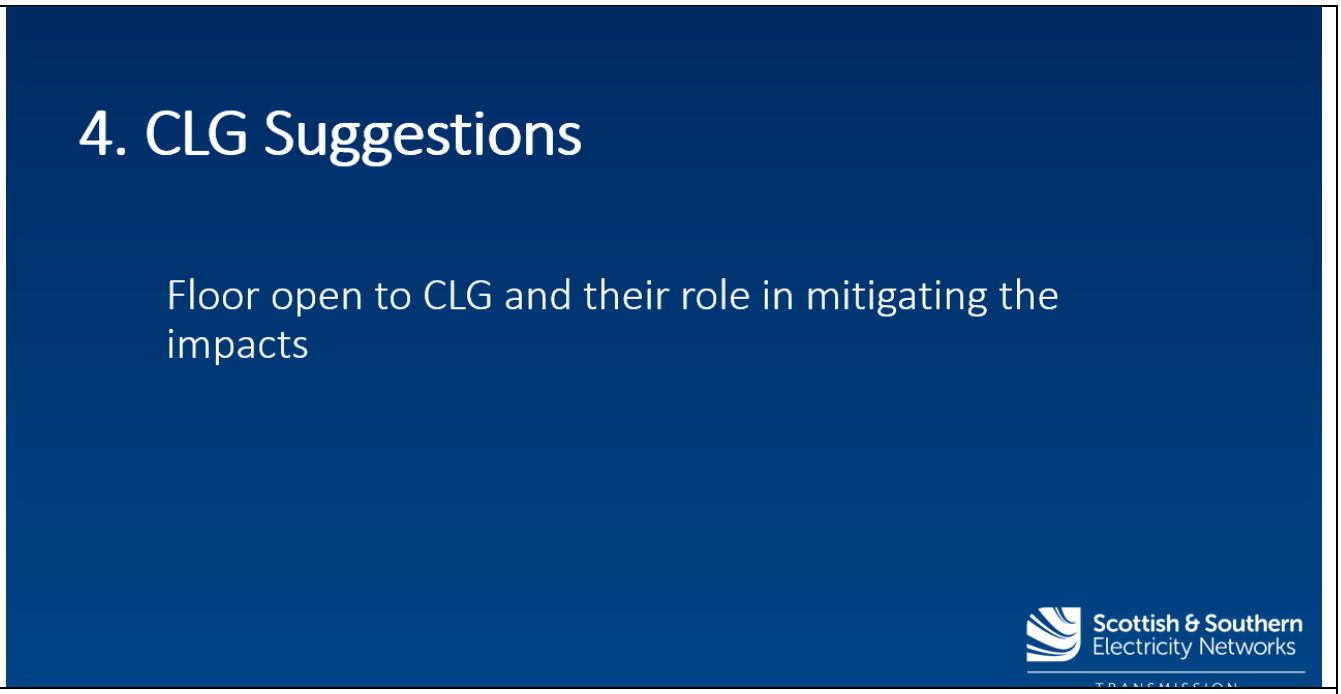
- The site is an extension to the existing Beauly Substation.
- Close to residential properties, risk of adding to current levels from existing Beauly substation.
- Unnamed water features route through the site and 3 unnamed water features are located 20m, 35m and 65m north west.
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, quarry will close in Dec '25 but quarry restoration may be affected
- Limited space available would limit technology choice, to GIS. It would also prevent future expansion if required and result in a non-standardised design of substation.
- Significant earthworks needed to build up to existing platform level
- Complex and prolonged outages required to facilitate construction
- Connectivity to the new Beauly - Loch Buidhe 400kv OHL would be challenging.
- The position of the site on land impacted by the quarry works results in unique hazards, unfavourable topography, and risk of contaminated land.

7.1	
	## Additional Sites & Options Assessed
	Split site option (HVDC Converter at Quarry A and Substation at Site 7)
	• **Ground conditions** - highly disturbed and may vary across site as material is excavated, stockpiled and backfilled. Risk of ground contamination and import requirements likely.
	• **Space availability** - limited for screening bunds and/or SUDS, increasing visual impact and potential for surface water challenges during operational phase
	• **Flooding**
	  • level of quarry extraction is below the flood level for River Beauly. The building platform would need to be raised in height meaning greater visual impacts and need to import materials.
	  • There is an acquifer below the site and ground water sits around 8 -11meters AOD. This poses challenges with the converter station, as it requires a basement.
	• **OHL diversion** - Beauly-Denny OHL required to be diverted provide safe clearance zones. This would require removal of tree belt north of the quarry.
	• **Connectivity** - Significant 400kv AC cabling back to the new substation at site 7 would be required. 15 no. HDDs would be required to cross the river Beauly. The increased cabling reduces efficiency of using the HVDC and has technical and economic challenges. Physical constrained by dam.
	• **Visual impact**- the diversion of the OHL and removal of the tree belt to the north, would increase the visibility of the site from the A831. The need to import material to raise the quarry platform level and remove the flooding risk would also increase the visual impact. There is also limited space around the site to provide mitigations e.g. bunds.
	• **Noise**- locating the converter station on the quarry site, and diverting the OHL north resulting in tree loss would have negative effect on existing noise levels.

7.2	SSEN T explained that for Site 7 (Fanellan) and the Quarry A option, to make a connection to the HVDC is very challenging as many cables would be required to be installed via horizontal directional drilling underneath the River Beauly , taking up a significant amount of space which makes this unfeasible. -For efficiency the HVDC converter and the AC equipment are better to be situated close together and are required to be connected. The further they are apart, the more infrastructure would be required to connect them. -The CLG were informed that 525kV of DC will be converted to 400kV AC and explained that DC is more efficient for bulk transfer of energy which is transmitted directly from point to point over long uninterupted distances,without any infrastructure between. AC is better for transporting electricity around a network where there are intermediate connection points, including to local networks. The Western Isles cable connection is DC and our overhead lines are all AC, which provides more network flexibility. From the Western Isles, energy will be transmitted onland by DC cable which will be converted to AC at the Converter station at Fanellan, to then be transmitted via OHL to centres of demand. -The CLG asked whether DC can be used on the Beauly-Blackhillock-New Deer-Peterhead project (BBNP) . Transmission explained that this is not possible because of the other connections along the route, that is other infrastructure such as substations etc. so it is not an uninterrupted point to point connection. Transmission also explained that the size / number of trenches and overall land take for underground AC cables at 400kV is far larger than that for DC cables – though with DC you have the requirement for converter stations at either end.
8.0	## Additional Sites & Options Assessed **AIS vs GIS (Air Insulated Switchgear vs Gas Insulated Switchgear)** As many will be aware, we have two key technologies available for the main switchgear i.e. **AIS and GIS**. The use of gas as an insulating medium in GIS allows for smaller footprints for the main busbar and key components such as circuit breakers. However, the decision on whether to use AIS or GIS requires consideration of many factors beyond footprint. **Key Points On GIS Technology** • There is a fundamental difference in the GIS technology used at 132kV (such as that being built for the Beauly 132kV project) and higher voltages, such as 400kV. • At 132kV, all three phases are housed inside a single tube, whereas at 400kV all three phases require separate tubes, which increases the size. • Further, it is relatively simple to connect high voltage cables directly to 132kV GIS, but this is more complex with 400kV GIS, which typically necessitates the use of lengths of Gas Insulated Busbar (GIB). Thus increasing the size of the footprint. • 400kV non-SF6 switchgear is a relatively new development, we currently don't believe anyone in the world has any 400kV non-SF6 GIS operational yet • In terms of project delivery, we have more options available to us working with AIS, compared with GIS **Our consideration of GIS** Given it requires a larger footprint, initial options assessment for Pathway to 2030 substation sites were based on AIS as 'worst case'. Any site capable of housing AIS, could reasonably be expected to house a GIS design as well. Once several potential site locations had been identified, each was evaluated against a scorecard of factors associated with AIS versus GIS. Across Pathway to 2030 projects, GIS was generally only progressed at sites where environmental requirements (such as coastal location) dictated an indoor solution was required. In those cases, the downsides associated with a 400kV AIS substation indoors made GIS more favourable For Beauly, the number of circuit connections allied with the need to minimise GIB (instead using 400kV cable or AIS busbars) resulted in significant electrical infrastructure outside the main GIS building. This translated to **a site size approximately 2/3** of the size of the equivalent AIS layout. With no technical driver (e.g. indoor requirement), and a relatively limited footprint reduction we did not pursue the GIS option. Our approach to AIS vs GIS across the whole ASTI portfolio in general and at each site in particular (including Beauly) has been presented to OFGEM over recent months; OFGEM agreed with our approach.

9.0	## Additional Sites & Options Assessed
9.1	 GIS Arrangement Model developed as part of optioneering, to allow AIS vs GIS comparison.
9.2	SSEN T informed that the diffence in size between a 132kV GIS substation compared to that of a 400kV GIS substation is significant. GIS and GIB (Gas Insulated Busbar) comes in tubes and for higher voltages at 275kV and 400kV, separate tubes are required, as more gas is needed to achieve insulation. Further, that connecting cable to a 400kV GIS instalaltion is more technically difficult than connecting cable to 132kV GIS. Therefore, the design for a 400kV GIS substation is different (more complex) than a 132kV GIS substation, because a different balance of equipment is required to achieve an efficient design. SSEN T also noted that non-SF6 technologies are newer at higher voltages; whilst Transmission are installing non-SF6 GIS at Beauly, currently we don't believe there is a fully non-SF6 400kV GIS substation operational anywhere. In general, AIS offers greater flexiblility and reliability, compared with GIS. GIS is typically used in coastal locations, as the potential implications of salt corrosion of equipment lead towards an indoor substation design. For a 400kV AIS substation with it's larger electrical clearances, a building to house the equipment would be huge and technically complex to design e.g. locations of intermediate supporting structures. For the Accelerated Strategy of Transmission Infrastructure (ASTI) projects, AIS was the base solution for all sites, a strategy which has been reviewed and agreed by Ofgem. Only a couple of sites demonstrated overall justification for changign from AIS to GIS e.g. Peterhead with its coastal location. Transmission explained that they are keen to work with the Community, to mitigate the landscaping and visual impacts.
10	## 2. Next Steps • Report on Consultation published (uploaded to webpage, webinar, Summary Reports, briefings) • Design development • Site visit with CLG members if considered beneficial • Ongoing invitation for meeting with SSEN Transmission System Planning/Senior Managers in Inverness or Perth • EIA Screening & Scoping • Provide CLG with preview of Design Q1 2024 ahead of PAC event • Next Consultation event (March 2024 tbc) 

10.1	Transmission informed that the Reports on Consultation will be published week of 27th November, this will be followed-up with engagment events. Action – SC to provide suggested dates for a site visit with the Community Councils
11	
11	
11.1	SSEN T informed that the community can input into the choice of colour for buildings, these can be greens, greys, browns, blues or different colours for different buildings and to ensure that the chosen colour/colours work with the existing background and proposed landscape mitigation.

12	
12.1	SSEN T shared the maps and these will be shared with the CLG. They explained that the System Planning process is very complex so producing these in a simpler format is very challenging. SSEN T offered a Teams meeting should the CLG wish these to be explained and to contact Sally to arrange if this is the case.