



SCOTTISHPOWER
SP Transmission Ltd

Beaully-Denny Overhead Transmission Line Project

Stirling Visual Impact Mitigation Scheme
Consultation Leaflet

Connecting Scotland's Sustainable Future



Background

As the amount of renewable energy generation in Scotland increases, prompted by Scottish and UK government targets aimed at tackling climate change, changes in the electrical infrastructure are needed to allow the energy produced by these developments to reach areas where the power is required.

As owners of Scotland's high voltage electricity transmission network, SP Transmission Ltd (SPT) and Scottish Hydro Electric Transmission Ltd (SHETL) are required to make sure the electricity transmission network is capable of safely connecting and transmitting the energy produced by generators.

Having considered many options, in 2005, in order that SPT could meet this obligation, SPT and SHETL proposed the replacement of the Beauly-Denny line as a solution which would balance cost effectiveness with social, environmental and economic impacts.

The Scottish Government approved the essential upgrade to the overhead transmission line between Beauly, near Inverness and Denny, near Falkirk in January 2010.

The approval followed consideration of all aspects of the development during an extensive Public Inquiry process and is subject to a detailed and comprehensive range of conditions. These conditions include a requirement for SPT to prepare proposals to mitigate the visual impact of the overhead transmission line in the Stirling area.

SPT has commissioned engineering and environmental studies by experts who specialise in transmission infrastructure and the routing of overhead lines through the landscape. These studies have considered how best to conform to the visual mitigation condition in the consent.

Purpose of Leaflet

This leaflet contains a summary of the studies SPT has undertaken to conform to the visual mitigation condition in the consent. It sets out a brief background of the proposals to date and the visual mitigation condition. The leaflet sets out the mitigation proposals considered appropriate to address the visual impact of the overhead line whilst allowing the Company to comply with its statutory duties.

SPT will consult with local community and stakeholders on the Company's visual mitigation proposals for the upgrade to the Beauly to Denny transmission line. This voluntary consultation period is in addition to the formal consultation required by the condition placed on the overhead line consent.

SPT recognises that by undertaking this voluntary consultation, it will allow the Company to gather and consider these views on the proposals, prior to the formal submission of the visual mitigation scheme to the Scottish Government.

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Further information on the Stirling Visual Impact Mitigation Scheme can be found in the Consultation Report. Details of how to view or obtain copies of the report can be found on the back cover of this brochure.

What is the Beaully Denny Visual Mitigation Scheme?

In January 2010, the Scottish Ministers granted consent for the proposed Beaully Denny 400kV overhead transmission line. This followed a lengthy consultation and planning process relating to this project, dating back to 2004, and which included a Public Inquiry held during 2007. A number of conditions were attached to the consent and these require to be discharged in order for the development to progress. One such condition (19) relates to the Stirling Visual Impact Mitigation Scheme

Condition 19 - Stirling Visual Mitigation Scheme

19.(1) Neither the overhead transmission line or the towers carrying that line shall be installed or constructed in the area of Stirling Council until –

(a) the applicant has submitted to Scottish Ministers for approval a scheme prepared in accordance with this condition setting out proposals to mitigate the visual impact of the 400kV line in the Stirling area (*“the Stirling Visual Impact Mitigation Scheme”*); and
(b) the Scottish Ministers have, after consultation with Stirling Council, approved the Stirling Visual Impact Mitigation Scheme.

(2) The Stirling Visual Impact Mitigation Scheme is to include proposals for:

(a) the mitigation of the visual and landscape impact of the line between the top scarp of the Ochil Hills at Cocksburn Wood (TD199) and Airthrey Castle (TD203),

(b) the mitigation of visual and landscape impact of the line between Logie (TD203) and Glenside (TD244E),

(3) The Development shall be carried out in accordance with the approved Stirling Visual Impact Mitigation Scheme unless otherwise agreed in writing by the Scottish Ministers.

What does this condition require?

The condition requires SPT to prepare a scheme of measures which will assist in reducing the visual impact of the overhead line. Although the condition refers to the submission of a scheme to mitigate visual impact, the requirement has been interpreted more widely, as including both landscape and visual mitigation.

Does the condition state what these measures should be?

No. The condition only requires the preparation of 'a scheme'. No detail of what these measures should include is provided in the condition. Subsequent to the issuing of the decision, the Scottish Ministers issued a Briefing Note setting out the Scottish Government's intentions with regard to the Stirling Visual Impact Mitigation Scheme. The Briefing Note describes the purpose of the Scheme as mitigating the visual impact of the proposed line in the Stirling area, possibly by re-routing, re-sizing of towers, screen planting or undergrounding. This has been read as also mitigating landscape impact.

Does the Condition apply to the entire route within the Stirling area?

No. The condition requires measures to mitigate the landscape and visual impact of the line in the Stirling area but along two specific sections: between the top scarp of the Ochils at Cocksburn Wood (TD 199) and Airthrey Castle (TD 203) and the section south of the tower at Logie Villa (TD203) to Glenside (TD244E), near Plean.

What measures has SPT undertaken to meet the terms of the visual mitigation condition?

SPT has commissioned engineering and environmental studies by experts who specialise in transmission infrastructure and the routing of overhead lines through the landscape. These studies considered the requirements of condition 19 and the Briefing Note and have informed the mitigation measures which SPT is consulting upon.

What factors have influenced the mitigation measures being consulted upon?

The findings of the landscape and visual impact assessment undertaken in 2006 of the proposed route, as reported in the Beaully Denny Environmental Statement and Addendum for the Stirling area, and the mitigation measures identified at that stage.

Commitments (including landscape and visual mitigation measures) made following the presentation of evidence to the Stirling local session of the Beaully Denny Public Inquiry.

Findings and recommendations to the Scottish Ministers from the Public Inquiry Reporters.

Conditions imposed by the Scottish Ministers for mitigation of visual impacts in the Stirling area; and accompanying Briefing Note.

Consideration of the undergrounding reports presented at the Public Inquiry.

Independent Technical and Landscape Review commissioned by SPT to address the specific requirements of the Stirling Visual Impact Mitigation condition 19.

Statutory and licence obligations. SPT requires to demonstrate that all expenditure is necessary, economic and efficient. To this end, SPT requires to balance environmental factors with costs and technical considerations.

Has SPT considered the briefing note issued by the Scottish Ministers?

Yes, SPT has undertaken a comprehensive review of the measure suitable to contribute to a visual mitigation scheme. As well as the measures identified by the Scottish Minister, SPT has identified further measures it considers appropriate for consideration.

Scottish Ministers Briefing Note:

- Undergrounding
- Re-routeing
- Re-sizing of towers
- Screen planting

Further Measures Identified by SPT:

- Undergrounding existing 132kV lines
- Undergrounding existing low voltage lines
- Tower painting
- Re-conductoring (replacement of existing wires)
- Landscaping - Replace/reinforce landscape features

Do the visual mitigation proposals include the undergrounding of all or any of the sections of the proposed 400kV overhead line?

No. Having examined the terms of condition 19 and the Briefing Note, SPT has reviewed its position on undergrounding. It has considered issues raised in representations concerning new technology, examples in other countries and the cost associated with underground cable technology. SPT is still of the opinion that undergrounding of the 400kV overhead line does not allow it to meet its statutory and licence obligations. Although there would be a reduction in certain landscape and visual impacts as compared with the overhead line, SPT do not consider that the benefits identified can be justified when taking account of the very significant additional costs of undergrounding, therefore undergrounding is not considered to be an efficient and economic development of the transmission system. In their report to the Scottish Ministers, the Reporters' concluded that, for the Stirling section of the route, undergrounding (and/or alternative routeing) is not justified on the grounds of cost, technical difficulties and the limited environmental benefits. Scottish Ministers endorsed the Reporters' conclusions.

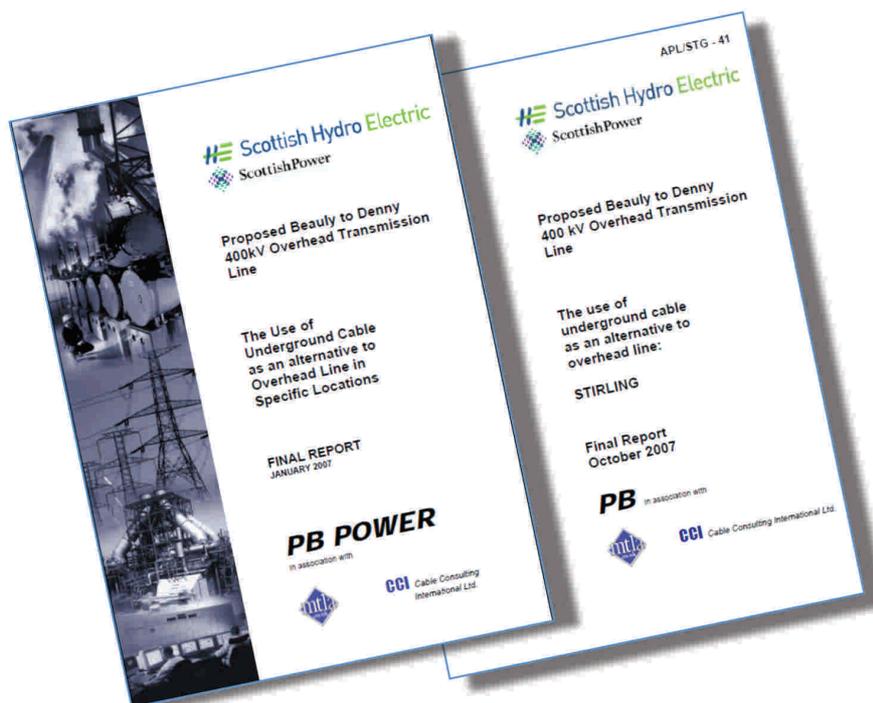
Based upon the terms of the study commissioned by SPT, the Company considers that, in the period since the Public Inquiry, the position has not changed.

Was undergrounding of the 400kV overhead line considered during the Public Inquiry?

Yes. The possibilities of undergrounding the proposed 400kV line were comprehensively considered during the extensive Public Inquiry. Undergrounding was a key issue examined by the Inquiry Reporters. As part of the Inquiry process, SPT commissioned investigations of various options for undergrounding proposals in the Stirling area put forward by Stirling Council, SNH, University of Stirling ("UoS") and Stirling Before Pylons. The report considered 4 route options, one to the east of Stirling and three to the west of Stirling.

Route Options Considered at Public Inquiry

Scottish Natural Heritage Route 1 - Milour Moor to Denny Substation	24km [plus 6.5km overhead line]
Scottish Natural Heritage Route 2 - Milour Moor to Gartur	13.8km [plus 16.7km overhead line]
Stirling Before Pylons Route - Braco Substation to Denny Substation	33.4km
University of Stirling Route - Cocksburn Wood to Manor Powis [Tunnelling Option]	3.9km [plus 1 km overhead line]



What is the cost of these undergrounding alternatives in relation to the cost of the overhead line?

As part of SPT's review of undergrounding, the costs for these route options have been updated to current day prices and are detailed below. This review has been undertaken by independent commercial companies and the costs informed by those considered competent to supply Extra High Voltage (EHV) cable systems in Europe.

Route	Undergrounding Cost £million	Overhead Cost £million	The number of times Undergrounding is more expensive than Overhead Line
Scottish Natural Heritage Route 1	352.8 (327.3)	27.5 (28.5)	12.8 (11.5)
Scottish Natural Heritage Route 2	217 (202.5)	27.5 (28.5)	7.9 (7.1)
Stirling Before Pylons Route	480.2 (444.7)	27.5 (28.5)	17.5 (15.6)
University of Stirling Route	114.5 (94)	5.2 (6.6)	21.9 (14.2)

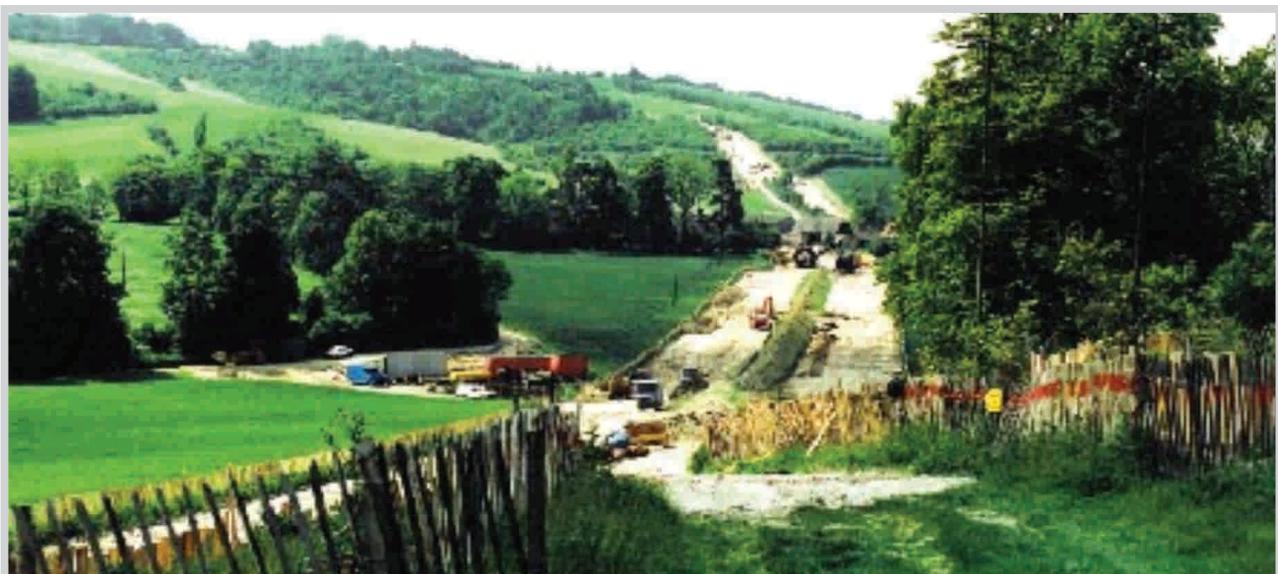
Figures in brackets represent the cost and ratio estimated at Public Inquiry

Has SPT considered any further undergrounding routes in addition to those considered at the Public Inquiry?

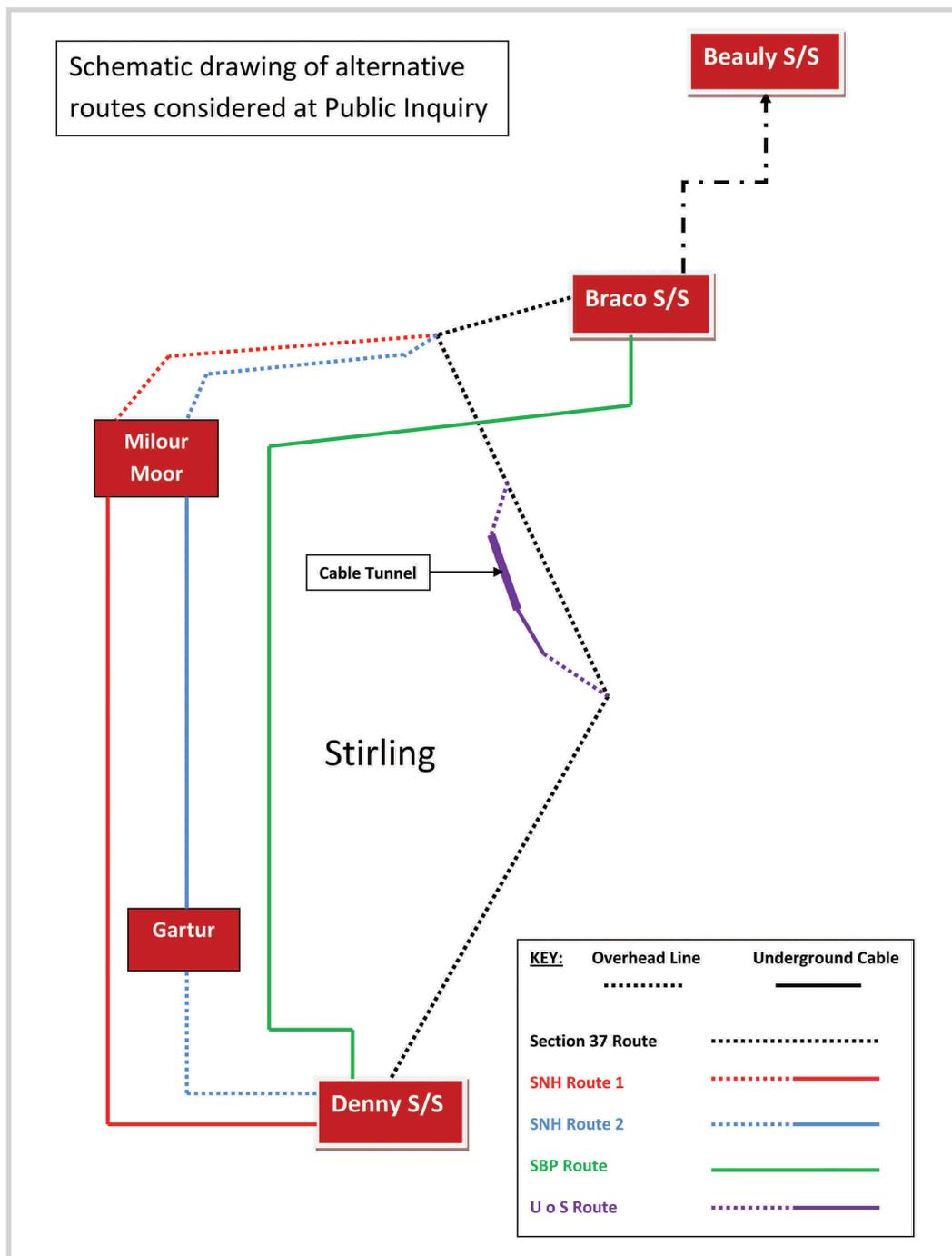
Whilst it was broadly accepted during the Public Inquiry that the least preferable route for undergrounding was UGC-4 -UoS (to the east of Stirling down the Ochil escarpment), in response to condition 19 and the Briefing Note, SPT have in addition to revising the Public Inquiry costs, developed options for a further 3 underground sections. These relate to the route of the overhead line covering the 14 km sections of the overhead line to which condition 19 applies. The cabling costs and equivalent overhead line costs and cost ratios are summarised below:

Route	Cost £million	Overhead Cost £million	The number of times Undergrounding is more expensive than Overhead Line
TD 199 – TD 203A - 1.5km	60.3	1.46	41.4
TD 199 – TD 244 -16km	229.1	15.7	14.6
TD 203A – TD 244 - 14.5km	178.8	13.2	13.6

A total of seven cable route alternatives to the overhead line route have now been studied. As can be seen from the table above, the cost ratio between undergrounding and overhead lines for these alternatives can range from 7.9 times to 41.4 times depending on the route specific circumstances.



Typical 400kV underground cable construction.



What has been the impact of advances in cable technology since the Public Inquiry?

SPT have commissioned a review of cable technology in order to determine if there have been any advances which may contribute to a reduction in undergrounding costs. Whilst there have been advances in the field of alternating current Extra High Voltage [EHV] cable systems, there have been no major technological breakthroughs since the Beauly Denny Public Inquiry in 2007 that would influence the use of underground cables over overhead lines.

Have you compared the cost of undergrounding this project to other undergrounding projects in the UK and around the world?

Yes. There has been evaluation of projects in other areas of the world including Denmark, Madrid and Japan where less expensive underground cable connections are installed. The assessment of the power transfer requirements and the constraints on underground cable construction techniques of these projects, highlighted significant fundamental differences from those of the underground options proposed at Stirling. In simple terms, the power transfer requirements differ, the ground conditions differ, the labour rates differ and engineering solutions are applied which are not suitable for the Beauly Denny Connection.

A review has also been conducted on the Hinkley Point C connection alternatives being considered by National Grid in Somerset. In summary, National Grid considers the cost of undergrounding to be some 12 to 17 times more costly than overhead lines. The cost ratios provided to SPT set out on the previous page are broadly consistent with National Grid's figures.

What measures to reduce the visual impact have been undertaken to date?

Before considering what additional landscape and visual mitigation measure may be appropriate, it is important to recognise the work done to date. It is widely accepted that the main effect of an overhead line through the landscape is its potential to affect the visual amenity of an area. The following measures have been undertaken over a number of years to develop the proposed route to find a line route that best *“achieves a technically feasible and economically viable route but one which also causes the least disturbance to the environment and those living in it, working in it, visiting it or using it for recreational purposes”*.

The recognised principles for overhead line routeing in the UK are 'The Holford Rules'. These Rules (which were extensively referenced during the Beaully Denny Public Inquiry) recognise that the major impact of an overhead line is visual, and that the most effective way of reducing visual effects is through the careful routeing of the overhead line transmission towers.

A Guidance Document outlining the SHETL/SPT approach to the routeing of high voltage steel lattice tower transmission lines set out the approach that was followed during overhead line routeing, and that was applied to the routeing of the line between Beaully and Denny.

The Key Stages of Route Development were:

- **A Routeing Study** - Initial consideration of route corridors from a range of options.
- **Development of indicative route options.**
- **Consultation** - A range of alternative route options were developed in the Stirling area in order to try and address the concerns that had been raised during the consultation process.
- **Development of the proposed route.**
- **An independent route review** of the Beaully Denny proposed route. in advance of its final selection.
- **Tower micro-siting** to achieve best fit of tower height and the distance between towers.

At all times during the routeing process, the environment of the area and the people living, working, travelling through or taking recreation within it, were the main focus of the studies and the assessments undertaken to support the routeing process. In some locations, a balance was required to be struck between different adverse effects on the different aspects of the environment, as it was not always possible to find a solution that removed all adverse effects in any one area.

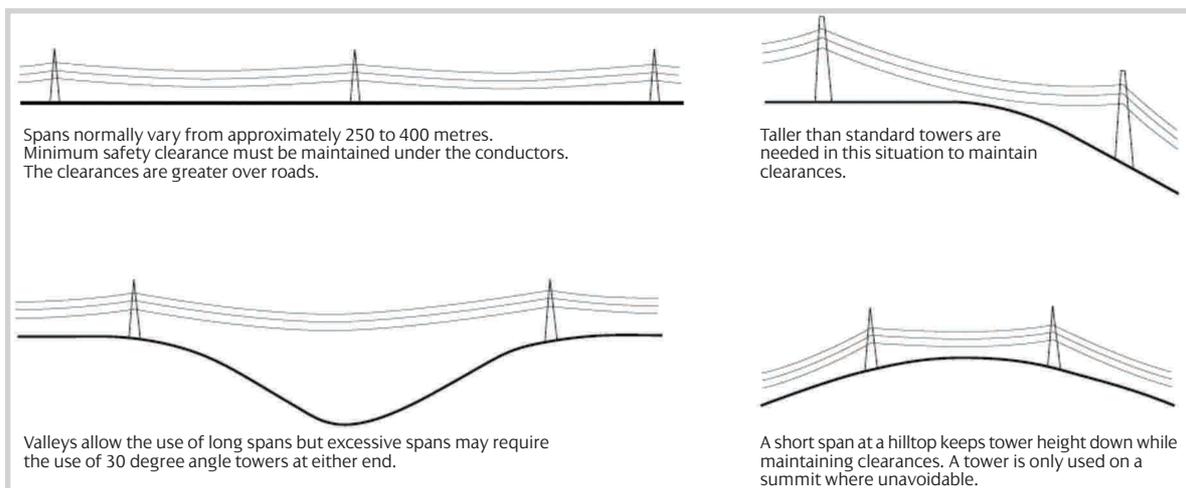
Consideration should also be given, that as a result of this upgrade approximately 17.5Km of the existing overhead line will be removed at the end of the project.

What was the Inquiry Reporters findings on the proposed route?

In their report to the Scottish Ministers, the Reporters concluded that the route for the proposed 400kV overhead line *“was logical and justified”* and that *“none of the strategic alternatives considered would offer the same balance of advantages as the Beaully Denny proposal”*. Scottish Ministers granted consent for the overhead line within the Stirling area on the route proposed by SPT.

What height will the towers be?

The towers require to be different heights to accommodate the necessary statutory clearance from the ground to the lowest wires on the tower. The towers will range in height from 42.3 up to 61.5 metres.



If undergrounding of the 400kV line is not an option, what landscape and visual mitigation measures have SPT considered?

SPT has reviewed a number of possible measures which could assist in reducing the landscape and visual impact of the overhead line. The measures were suggested by an independent landscape architect who, in addition has also evaluated the options for mitigation and formed a view as to how these could contribute to the reduction in the landscape and visual impact. Descriptions of the various measures considered by the landscape architect are set out below:

Scottish Ministers Briefing Note – Brief description of measures suggested for consideration:

Re-routeing –

The possibility of new route for the overhead line, either locally or in the wider Stirling area, with the specific aim of reducing the effects on visual amenity, without increasing the effects on other aspects of the natural and built environment.

Re-sizing of towers –

This can be achieved by using a different tower design (low height towers) or reducing the heights of the approved towers.

Low height towers are typically about 10m lower than the proposed conventional lattice steel towers, with a very much wider lower crossarm (about 60% wider than usual). This in effect removes the top cross arm of a conventional tower and places the conductors from the top cross arms onto the middle crossarm.

Screen planting –

Can provide some mitigation against the adverse landscape and visual impacts of the proposed 400kV line, though the benefits are greatest when the planting is located close to the viewer. Screen planting requires the agreement of the relevant landowner.

Further Measures Identified by SPT - Brief description of measures:

Undergrounding existing 132kV Overhead Lines –

Condition 18 of the overhead line consent requires SPT to underground elements of the existing 132kV double circuit steel tower overhead line east of Fallin. There is opportunity to extend this undergrounding of the existing 132kV double circuit line from Fallin to Glenberrie, although this section of the existing line does not lie along the route of the proposed 400kV line.

Undergrounding existing low voltage lines –

SPT has examined a number of locations where there could be potential benefit from the removal of low voltage overhead lines (on wood poles). There are instances where this is appropriate. One example is in locations where the proposed 400kV overhead line would be routed over low voltage overhead lines which would require to be temporarily undergrounded.

Temporary undergrounding could be made permanent to remove the wirescape effect of converging electricity infrastructure.

In some cases there is opportunity to extend the undergrounding of such lines beyond that required for construction to further improve visual mitigation. In other locations there are opportunities to underground low voltage lines which are not directly below the proposed 400kV overhead line but are in the vicinity and as such their removal would contribute to a reduction in the electricity infrastructure in the surrounding area.

Tower painting -

Whilst the standard grey colour of new or repainted towers provides the best compromise of colour to reduce the visibility of towers, painting of the towers in order to reduce their potential landscape and visual impact against a backdrop location provides an opportunity for visual mitigation.

Re-conductoring -

There are opportunities for achieving a reduction in effects on visual amenity from the presence of overhead lines within the Stirling area, in particular in respect of the visual dominance of the two existing 275kV overhead lines that cross over the M9 and A9 in the area west and south of Plean.

These existing lines carry conductors in bundles of four (quads), which increase the visibility of the wires due to their square formation within the bundle, which has the effect of adding to the perceived visual weight. In addition, the 'X' shaped separators can increase the visual prominence of this type of transmission line. These lines could be re-conductored to reduce the numbers of conductors from four (quad) to two (twin). This would be of benefit in halving the number of conductors crossing through the area on the existing lattice steel towers, and thereby reducing to some degree the prominence of these lines in the landscape, and their visual impact over the section of the route between Powdrake Farm and Denny.

Landscaping – Replace/reinforce landscape features –

Landscaping can provide some mitigation against the adverse landscape and visual impacts of the proposed 400kV line, though the benefits of this are greatest when the planting is located close to the viewer. The replacement and/or reinforcement of landscape features can also provide opportunity to screen the overhead line or compensate for its presence. In some areas the construction activities associated with the proposed 400kV overhead line will result in disturbance to the ground conditions and the provision of laydown areas and construction compounds will similarly require areas to be reinstated on completion of the works. There would be scope, in these areas, to provide additional enhancement of these areas as part of this reinstatement. Landscape works would require the agreement of the landowner.



L12 'Low Height' towers near Thirsk, North Yorkshire considered as an alternative.



L12 towers near Humbie, East Lothian. L12 towers similar to those proposed on the Beaully-Denny route.

Source: SHETL Overhead Transmission Tower Study, 2004

Scottish Ministers Briefing note – SPT evaluation of measures:

Re-routing –

Following a further review by SPT, it was concluded that no alteration to the line would result in a reduction of impacts overall and would not reduce the potential for adverse impacts on the visual amenity of the Stirling area. The Scottish Ministers endorsed the Reporters conclusions that the route selection process was logical and justified. Therefore re-routing of the proposed 400kV overhead line is not an option that SPT propose to pursue.

Re-sizing of towers –

SPT has revisited the use of both low-height towers and the reduction in height of the proposed towers (L12). A reduction in the height of the towers could reduce the potential for adverse visual impacts, in some locations but may give rise to the introduction of adverse effects in other locations. This applies to both L12 towers, where the reduction in tower height will result in the increase in the number of towers required, and in the case of low-height towers where the reduced height has to be compensated by an increase in the tower bulk. As such it is considered that there would be no benefit to the landscape or visual amenity of the area from the re-sizing of towers.

Screen planting –

Screen planting can provide some mitigation against the adverse landscape and visual impacts of the proposed 400kV line, though the benefits of this are greatest when the planting is located close to the viewer. This may not always be appropriate, however, as such planting may also result in other / wider views being blocked. Screen planting requires the agreement of the relevant landowners. SPT considers screen planting to be an appropriate visual mitigation measure to assist in screening or softening views of the overhead line, provided the agreement of the landowner can be sought.

Further Measures Identified by SPT - Evaluation of measures:

Undergrounding existing 132kV Overhead Lines –

There would be substantial visual benefits to be gained from undergrounding of the existing 132kV double circuit line from Fallin to Glenberrie, although these do not lie along the route of the proposed 400kV line. Whilst SPT recognise the benefits resulting from the undergrounding, these would not justify the additional significant costs (£12.9 million) when assessed, against SPT's statutory and licence duties. The measure is not considered to represent an efficient and economic development of the transmission system within the regulatory framework within which SPT is obliged to operate. Therefore SPT has not included the measure within the proposed Visual Impact Mitigation Scheme.

Undergrounding existing low voltage (LV) lines –

SPT has examined a number of locations where there could be potential benefit from the removal of Low Voltage overhead lines on wood poles. There are two cases where this is appropriate. In locations where the proposed overhead lines would be route over the LV overhead lines the lines require to temporarily be undergrounded. As mitigation these temporary measures would be made permanent to remove the wirescape effect of converging electricity infrastructure. In some cases there is opportunity to extend the undergrounding of such lines beyond that required for constructions to further improve visual mitigation. Due to the relatively low cost of underground LV lines compared to High Voltage (HV) and the benefits obtained for such costs, SPT considers the undergrounding of Low Voltage lines to be an appropriate measure to include in the Visual mitigation Scheme.

Tower painting –

There was considered to be limited scope to paint the towers on the proposed line due to the limited number of locations where the towers would be viewed with a back drop to match the colour of the background locations. However, SPT considers tower painting to be an appropriate visual mitigation measure for the three towers on the Ochil escarpment. Condition 19 specifically refers to these towers in terms of additional landscape and visual mitigation. A further location where tower painting will be of benefit to local visual amenity is where the proposed Beauldy Denny line would run parallel to the two existing 275kV transmission lines (scheduled to be painted in 2012), from the Carbrook Mains / A9 area westwards. It is proposed to paint the new line to match the colour of the re-painted 275kV towers. This would enable all three lines running in parallel to have a consistency of appearance, reducing the scope for the new line to exacerbate the cumulative visual impact from the presence of overhead transmission lines in this area. The visual impact of the proposed overhead line in this area would remain significant, however. However, there would be no benefit to the landscape or visual amenity from the painting the entire route of towers in the Stirling area.

Re conductoring –

Whilst there are opportunities for achieving a reduction in effects on visual amenity in respect of the visual dominance of the two existing 275kV overhead lines that cross over the M9 and A9 in the area west and south of Plean by reducing the numbers of conductors from four (quad) to two (twin). The benefits resulting from the re-conductorng would not justify the additional significant costs (£2.4 million) when assessed against SPT's statutory and licence duties. The measure is not considered to represent an efficient and economic development of the transmission system within the regulatory framework within which SPT is obliged to operate. Therefore SPT has not included the measure within the proposed Visual Mitigation Scheme.

Landscaping – Replace/reinforce landscape features –

Landscaping can provide some mitigation against the adverse landscape and visual impacts of the proposed 400kV line, though the benefits of this are greatest when the planting is located close to the viewer. This may not always be appropriate, however, as such planting may also result in other / wider views being blocked. The introduction and or replacement of landscape features requires the agreement of the relevant landowners. SPT considers landscape planting/reinforcement to be an appropriate visual mitigation measure to assist in screening or softening views of the overhead line, provided the agreement of the landowner can be sought.

Following the evaluation of options, what are the visual impact mitigation measures being proposed under the Stirling Visual Impact Mitigation condition ?

Proposed Visual Impact Mitigation Measures:

- Screen Planting
- Landscaping - Replace/reinforce landscape features
- Undergrounding Low Voltage Lines
- Tower Painting

Where are the current proposed locations for additional screen and landscape planting?

Within the streamside / south-western boundary of the open space area to the **south-west of Fallin, near South Cockspow** additional tree planting in the area would assist in screening views of towers passing to the west and south-west of Fallin. This would partially mitigate the adverse visual impacts of the proposed overhead line in this area, depending on the extent of planting undertaken in this area.

On the southern side of the **A905 to the east of Fallin / west of Throsk**, which is very open at present roadside field boundary hedging and hedgerow trees would enhance the local landscape character and would assist in screening views towards the proposed overhead line as it passes to the south of this area. This would partially mitigate the adverse visual impacts of the proposed overhead line in this area.

On both sides of the **minor road (Kerse Road) between the A905 and Cowie**, where space permits and where this would not obstruct sightlines for motorists roadside field boundary hedging and hedgerow trees would enhance the local landscape character and would assist in screening views of the proposed overhead line as it crosses this road from west to east. In combination with the proposed undergrounding of the LV line in this area, this could assist in reducing the section of road within which significant impacts would be experienced to the section of road closest to the proposed 400kV overhead line.

On both sides of the **National Cycle Route 76** where it runs south-east from Cowie and south towards Whitehill and Plean Tower field boundary hedging and hedgerow trees would enhance the local landscape character and would assist in screening views of the proposed overhead line in this area. In areas where the boundary with the track comprises stone walls, tree planting (as groups of trees) would be proposed. This would partially mitigate adverse visual impacts of the proposed line, though these would remain significant in this area.

Roadside tree planting adjacent to the minor road **south of Dales Wood** and west of the proposed substation site would assist in screening views of the existing (and proposed) towers present in this area, though the wirescape effect would remain. This proposal is however outwith the limits of Condition 19.

If considered appropriate, detailed proposals would be developed for these areas. In addition SPT will consider further areas identified from the consultation process.

Will there be other opportunities where planting could be undertaken with the objective of assisting in screening or softening views of the proposed overhead line ?

Yes. As noted above, screen planting can provide some mitigation against the adverse landscape and visual impacts of the proposed 400kV line, although the benefits of this are greatest when the planting is located close to the viewer. But this may not always be appropriate as such planting may also result in other / wider views being blocked.

Additional planting or other landscape mitigation measures can continue to be developed as opportunities arise as part of the ongoing progression of the Beaully Denny project.

Opportunities associated with construction activities - In some areas the construction activities associated with the proposed 400kV overhead line will result in disturbance to the ground conditions and the provision of laydown areas and construction compounds will similarly require areas to be reinstated on completion of the works. There would be scope to provide additional enhancement of these areas as part of this reinstatement.

One area where such measures could be provided is in the area of TD198 and TD199, west of Dumyat. There would be construction disturbance to this area. As part of the reinstatement of this area, there would be scope to improve the parking arrangements and the appearance of the landscape in this area. This could include reinstatement of stone boundary walls, provision of stiles, additional tree planting and surfaced parking areas (using grass reinforced geogrid, or similar), to ensure that the rural character of the area is maintained and enhanced.

In addition, it could be possible, subject to the agreement of the landowner, to provide a gravel or stone surfaced footpath link from the parking area in Cocksburn Wood, to the access points onto the footpath network, to avoid the need for people to walk on the road, through this area. The implementation of such measures would not reduce the impact of the proposed overhead line, but would considerably enhance the landscape character and visual amenity of the area.



How much of the overhead line will be painted?

The Ochils scarp has been identified as a location where tower painting is considered appropriate. The sensitivity of this location has been recognised in evidence to the Public Inquiry and in the Reporters Report to the Scottish Ministers. The three towers positioned at the base of, and on this scarp slope have the potential to be prominent, visually, from views located within the floor of the carse, at the foot of the slope, or in elevated positions such as in views from the Wallace Monument or Stirling Castle. Painting all or part (i.e. the base) of the towers a darker grey colour would assist in reducing their prominence within such views. The implementation of this measure would be of benefit in reducing the landscape and visual impacts of the line in this area. A further location where tower painting may be of benefit to local visual amenity is where the proposed Beaully Denny line would run parallel to the two existing 275kV transmission lines, from the Carbrook Mains / A9 area westwards. The towers on these existing lines are scheduled to be painted in 2012 and there would be a distinct difference, visually, between these painted towers and the proposed towers (which would be of a much shinier steel), as a result. In order to reduce the prominence of the new section of overhead line, it is proposed to paint the towers within the section between the 'double shuffle' (TD239 / TD240) and TD243/1, west of Glen Road, to match the colour of the re-painted 275kV towers. This would enable all three lines running in parallel to have a consistency of appearance, reducing the scope for the new line to exacerbate the cumulative visual impact from the presence of overhead transmission lines in this area. The visual impact of the proposed overhead line in this area would remain significant, however.

Where are the locations that Low Voltage (LV) Overhead lines are proposed to be undergrounded?

Undergrounding of certain low voltage lines is necessary to address the construction requirements of the proposed 400kV line and the dismantling of the existing 132kV. Where appropriate, these works will be extended in order to enhance the visual amenity and landscape character of the local area. Other areas where undergrounding of low voltage lines will benefit the landscape and visual amenity have also been identified and these are set out below:

Logie Kirk area -

Although there is no requirement on safety grounds for undergrounding in this area it is considered that it would be beneficial to the setting of the church therefore it has been recommended that the existing distribution wires be undergrounded in this area. The landscape and visual assessment identified a moderate adverse impact on the landscape character and visual amenity of this area. The removal of these overhead line wires would assist in mitigating the impacts and removing the existing 'wirescape' from the entrance area.



Witches Craig Caravan Park -

There will be a requirement to underground the existing LV wires in the Logie Villa and A91 / B998 roundabout area. It is proposed that this is extended westwards away from the roundabout and eastwards to include the section of line entering the caravan park from the A91. This would benefit the visual amenity of road users in this area as well as for people staying in the caravan park.

Powis House-

An existing 11kV line passes beneath the existing 132kV (and proposed 400kV) line to the north side of the access road into the Powis House area and is required to be placed permanently underground, for construction safety reasons. There would be increased benefit to the visual amenity of the occupants of the properties in this location, to the continued / better establishment of the avenue of trees, and to the working of the field, if this undergrounding were to be continued to both the north and south, by 100m, extending to the southern side of the access track.

Manorneuk -

In the area west of Manorneuk, an existing LV line runs on the northern side of the truncated road and will require to be undergrounded in the section beneath the proposed Beaully Denny line. It is proposed that this undergrounding is extended east as far as the public road (to the west of the stream) as this will assist with the landscape planting mitigation proposed in this area. There would be some benefit to the visual amenity of the property, though the main outlook is to the west. Some further undergrounding of a double circuit LV wood pole line crossing the Alloa railway line to the south of this property is also proposed and this will be of greater landscape and visual benefit, as this will remove up to 14 poles from this area, which forms part of the principal view from this property.

Bolfornought -

LV undergrounding is required in the Bolfornought area where this passes beneath the existing 132kV CN route. It is proposed to extend this westwards as far as the north side of the access track in this area (west of the cottage) in order to enhance the visual amenity of the residents in this area, though this would not reduce the adverse impact of the proposed 400kV line in the area further to the east.

Burnbank – Burnhead Area -

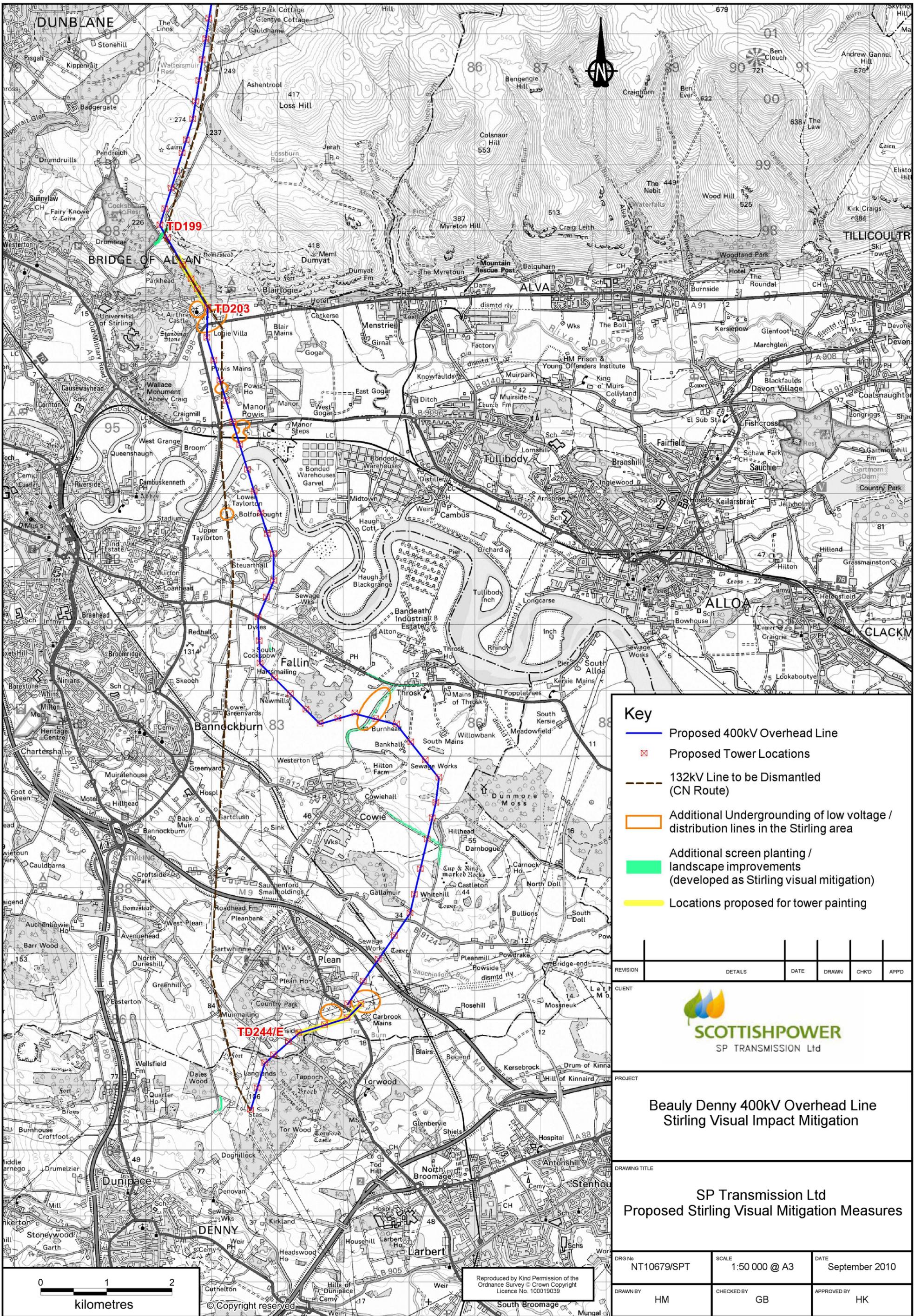
An existing LV line requires to be undergrounded on a permanent basis in the area between Burnhead Farm and Burnhead Cottage. It is proposed that this undergrounding be extended northwards, including the section into Burnbank, in order to enhance the visual amenity of the local area generally, as well as for road users and the occupants of the three properties in this area. The landscape and visual impact assessment identified adverse impacts on visual amenity for road users and residents in this area. The proposed undergrounding would assist in partially mitigating these impacts.

Carbrook Mains Area -

In the area north of Carbrook Mains and south of Plean, there are a number of wood pole distribution lines crossing the fields in the vicinity of the existing 275kV lines (and the proposed Beaully Denny line). It is proposed that the circuits that are carried by wood poles should be placed underground. Although this would not remove the impacts associated with the proposed 400kV line, the reduction in wirescape within this area, in combination with the provision of additional roadside planting would assist in mitigating the adverse effects of the proposed overhead line.

Plean Industrial Estate Area -

South of the Plean industrial estate, some of the existing LV lines are required to be placed underground. The existing wood (H) poles are sited on a localised ridge and are therefore relatively prominent in views from within the industrial estate. It is proposed to extend this undergrounding so that the retained wood poles are off the ridge line and less prominent, in order to benefit the local visual amenity.



- Key**
- Proposed 400kV Overhead Line
 - ⊠ Proposed Tower Locations
 - 132kV Line to be Dismantled (CN Route)
 - Additional Undergrounding of low voltage / distribution lines in the Stirling area
 - █ Additional screen planting / landscape improvements (developed as Stirling visual mitigation)
 - █ Locations proposed for tower painting

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

CLIENT



SCOTTISHPOWER
SP TRANSMISSION Ltd

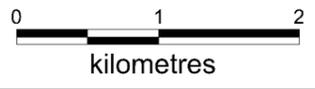
PROJECT

**Beauldy Denny 400kV Overhead Line
Stirling Visual Impact Mitigation**

DRAWING TITLE

**SP Transmission Ltd
Proposed Stirling Visual Mitigation Measures**

DRG No	SCALE	DATE
NT10679/SPT	1:50 000 @ A3	September 2010
DRAWN BY	CHECKED BY	APPROVED BY
HM	GB	HK



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In addition to those measures under the Stirling Visual Impact Condition, what other measures, either from the Public Inquiry or other conditions, will mitigate the landscape and visual impact of the proposed 400kV line

A range of mitigation measures have also been proposed to assist in reducing the potential effect of the proposed 400kV overhead line, through a reduction in the number of other (lower voltage) transmission and distribution lines, within the Stirling area. These include the requirement (to be implemented through Condition 18 of the Beaully Denny consent) for undergrounding to reduce the wirescape effect in the area east of Stirling and west of Fallin. Prior to and during the Public Inquiry a number of landscape proposals were developed to assist in reducing the visual and landscape impact of the proposed overhead line.

When all the visual impact mitigation measures are combined, how do they reduce the visual impact of the new line?

Although taken individually the proposed mitigation measures may not be sufficient to reduce the level of impact of the proposed 400kV overhead line, when taken as a whole, it is considered that there would be a considerable reduction in the level of adverse impacts on landscape character and visual amenity. This can be seen in the following locations:

In the Cocksburn Wood / Cocksburn Reservoir area west of Dumyat, where significant adverse effects have been identified from the presence of taller towers, including an angle tower, mitigation measures are proposed in the form of woodland planting within the clearance corridor of the existing 132kV line, at Cocksburn Wood, and enhancement in the form of improved parking, repairs to stone walls, new gates or stiles and additional tree planting, in the area of tower TD199. A footpath link from the Cocksburn Wood parking area to the start of the Dumyat path network would also enhance the environment for users of this area.

On the Ochils scarp slope, a Forestry Design Concept plan will ensure that replacement tree and scrub planting is provided, in order to address the clearance required for construction of the 400kV line in this area. This would include 'feature' planting as a visual distraction from the overhead line towers. Tower painting in this area would also reduce potential visual impacts.

At the foot of the Ochils scarp slope, removal of low voltage wires and the provision of areas of planting will assist in mitigating against the presence of the proposed overhead line. The painting of the tower located here will also reduce potential visual impacts.

New roadside hedgerow and hedgerow tree planting proposed **on the eastern side of the A91 between the roundabout with the B998 and the entrance to Powis House**, in addition to the undergrounding of low voltage lines and enhancement of the tree'd avenue to this area, will enhance the local landscape character and reduce the prominence of the proposed overhead line in views from the road.

Removal of the existing lattice steel towers from **the areas to the north, north-west and west of Fallin** will reduce the potential for a wirescape effect in this area. Additional planting **to the south-west of Fallin** will also assist in screening views of towers from this area.

Removal of the existing lattice steel towers **crossing the Forth to the east of Cambuskenneth** will benefit the visual amenity of properties in this and **the Lower Taylorton area**.

Areas of tree and shrub planting, and hedging, together with the removal of lower voltage overhead lines **in the Manorneuk area** will assist in reducing the impact of the proposed 400kV line in this area.

Implementation of new roadside hedgerow and tree planting **to the south side of the A905 between Fallin and Throsk** will assist in enhancing local landscape character and reducing the visual impacts of the proposed line.

There will be beneficial effects from the removal of low voltage wires alongside **the minor road between Throsk and Cowie**, for the users of this road and properties in this area. If roadside hedgerows and hedgerow trees can also be provided in this area, that would add to the enhancement of the landscape character, in addition to assisting in screening views of the proposed line.

Field boundary hedging and tree planting alongside the minor roads / tracks (forming **part of National Cycle Route 76) to the east and south-east of Cowie** will be of benefit to the local landscape character and will assist in screening views of the proposed line.

Roadside planting **adjacent to the A9 in the Carbrook Mains area**, together with undergrounding of lower voltage lines will be of benefit to the visual amenity of residential areas / properties and road users in this general area, **south of Plean**.

Pages 16 to 22 show some typical examples of mitigation measures that are proposed.



Dumyat, one of the access points to the hillside footpath network, showing possible improvements such as reinstatement of stone walling, provision of timber stile crossing point, tree planting and reinforced-grass surfacing for car parking.

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CLIENT		DRG No NT10679/Fig C-1	SCALE NTS	DATE September 2010
PROJECT	Stirling Visual Mitigation	DRAWN BY SKM	CHECKED BY GB	APPROVED BY HK
DRAWING TITLE	Appendix C Figure C-1 Dumyat	 your earth our world		

Existing



Proposed



Logie Kirk, parking area south of the church

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CLIENT 	DRG No NT10679/Fig B-1	SCALE NTS	DATE September 2010
PROJECT Stirling Visual Mitigation	DRAWN BY SKM	CHECKED BY GB	APPROVED BY HK
DRAWING TITLE Appendix B Figure B-1 Logie Kirk, parking area		 your earth our world	

Existing



Proposed



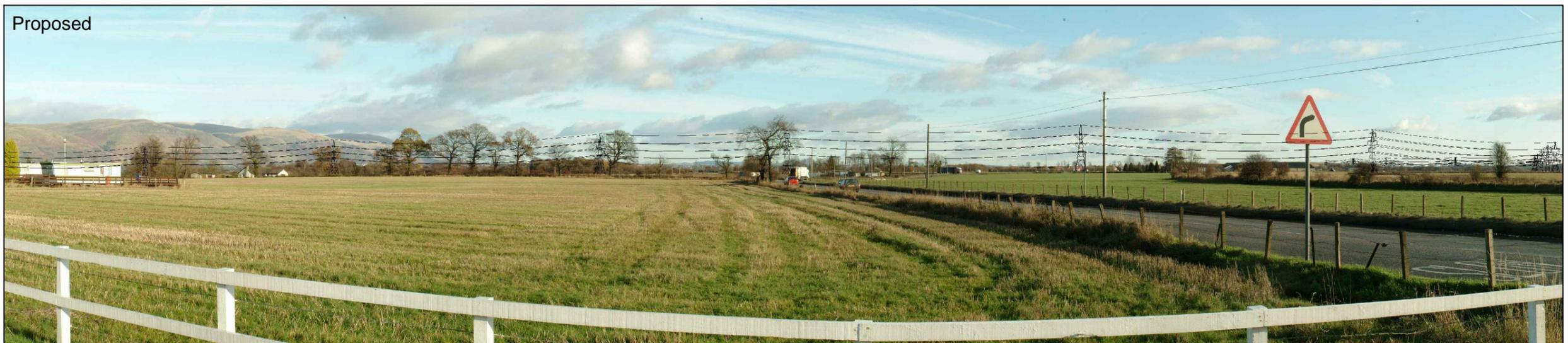
View south-east from the A91, looking towards Powis House and the 'avenue' of trees lining the existing access track

Note: Towers and conductors as proposed are represented by a graphic model and are not true visual images

Existing



Proposed



A905, edge of Stirling (ES Viewpoint 99 Figure 24.1-099)

Note: Towers and conductors as proposed are represented by a graphic model and are not true visual images

Existing



Proposed



View south from the Manor Neuk area towards the River Forth

Note: Towers and conductors as proposed are represented by a graphic model and are not true visual images

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PROJECT Stirling Visual Mitigation	DRAWN BY SKM	CHECKED BY GB	APPROVED BY HK
DRAWING TITLE Appendix B Figure B-5 View south from Manor Neuk	 your earth our world		

Summary Conclusions

In January 2010 following a lengthy public inquiry, Scottish Ministers granted consent for the proposed Beauldy Denny 400kV overhead transmission line.

Scottish Ministers accepted that the route for the proposed 400kV overhead line *“was logical and justified”* and that *“none of the strategic alternatives considered would offer the same balance of advantages as the Beauldy Denny proposal”*.

Although approving the overhead line, Scottish Ministers attached a condition (19) to the consent requiring SPT to develop measures for further mitigation of the landscape and visual impact of the towers and overhead line in two sections, namely between the top scarp of the Ochill Hills and Airthey Castle and between Logie Villa and Glenside. The measures are to be in the form of a Mitigation Scheme, and are to be submitted for the approval of Scottish Ministers.

Following the grant of consent, the Scottish Government issued a Briefing Note detailing the Government's intentions with regard to the Scheme. The note describes the purpose of the Scheme as mitigating the visual impact of the proposed line in the Stirling area, possibly by re-routeing, re-sizing of towers, screen planting or undergrounding.

SPT has commissioned engineering and environmental studies to consider the requirements of condition 19, the Briefing Note and to consider further possible measures. These studies have informed the mitigation measures which are the subject of this consultation.

SPT is required to comply with certain statutory and licence obligations. Possible mitigation measures such as undergrounding of the 400 kV overhead line have been rejected by SPT. Given the very significant costs involved, undergrounding is not considered to represent an efficient and economic development of the transmission system.

This consultation document presents the findings of the studies and provides an opportunity for interested parties to comment on the proposals which SPT considers should be included within the Mitigation Scheme to be submitted to Scottish Ministers.

The Proposed Mitigation Measures

Screen planting/Landscaping

Subject to landowner agreement, additional areas of tree and hedgerow planting are proposed, to enhance the local landscape character and to reduce the potentially significant visual effects of the 400kV overhead line at a number of locations including:-

- Additional tree planting within the streamside/south western boundary of the open space south west of Fallin, near South Cockspow;
- Field boundary hedging and hedgerow trees on the southern side of the A905 to the east of Fallin/west of Throsk;
- Field boundary hedging and hedgerow trees on both sides of the National Cycle Route 76 where it runs south-east of Cowie towards Whitehill and Plean tower;
- Field boundary hedging and hedgerow trees on both sides of the Kerse Road between the A905 and Cowie;
- Roadside planting adjacent to the minor road south of Dales Wood; and
- Improved parking, repairs to stone walls, new gates or stiles and additional tree planting, in the area of tower TD199 and a footpath link from the Cocksburn Wood parking area to the start of the Dumyat path network.

Detailed proposals would be developed where landowner agreement can be achieved.

Tower Painting

It is proposed to paint the four towers on the Ochil's escarpment. The sensitivity of this location has been recognised in evidence to the Public Inquiry and terms of condition 19. The three towers positioned at the base of, and on this scarp slope have the potential to be prominent, visually, for receptors located on the carse and in views from the Wallace Monument and Stirling Castle. Painting all or part (i.e. the base) of the towers a darker grey colour would assist in reducing their prominence within such views. The implementation of this measure would be of benefit in reducing the landscape and visual impact.

Undergrounding of Lower Voltage Lines

It is proposed to remove a large number of spans of lower voltage distribution lines within eight locations. Undergrounding of certain low voltage lines is necessary to address the construction requirements of the proposed 400kV line and the dismantling of the existing 132kV. Where appropriate, these works will be extended in order to enhance the visual amenity and landscape character of the local area. Other areas where undergrounding of low voltage lines will benefit the landscape and visual amenity have also been identified and these are set out below:

- Logie Kirk area
- Witches Craig Caravan Park
- Powis House
- Manorneuk
- Bolfornought
- Burnbank – Burnhead Area
- Carbrook Mains Area
- Plean Industrial Estate Area

The measures above in relation to lower voltage lines do not suffer from the technical difficulties associated with undergrounding of the transmission lines at 132 or 400kV. The costs of the various options are significantly less per km. These measures are therefore more attractive from a regulatory perspective than undergrounding of the proposed 400kV or the 132kV overhead lines. In addition, the environmental impacts will be less.

Options ruled out

Undergrounding of the 400kV overhead line

Undergrounding of the 400kV overhead line does not form part of the mitigation proposals. Undergrounding was comprehensively considered during the public inquiry in 2007. Scottish Ministers endorsed the views of the Reporters that it could not be justified on the grounds of cost, technical difficulties and limited environmental benefits. Having explored the issue again, with the input of expert advice, SPT considers that there has been no change in circumstances which would allow the decision not to underground to be revisited.

Undergrounding of the 132 kV overhead line

The substantial visual benefits to be gained from undergrounding of the existing 132kV double circuit line from Fallin to Glenbervie, do not justify the additional significant costs (£12.9 million) when assessed, against SPT's statutory and licence duties.

Re-routing

No changes to the route of the overhead line are proposed as it would not result in a reduction of impacts overall and would not reduce the potential for adverse impacts on the visual amenity of the Stirling area.

Re-sizing of Towers

A reduction in the height of the towers could reduce the potential for adverse visual impacts in some locations but can give rise to adverse impacts in other areas through, for example the need for additional towers. There would be no benefit to the landscape or visual amenity of the area from the re-sizing of tower

Re-conductoring

Reducing the numbers of conductors on the two existing 275kV overhead lines that cross over the M9 and A9 in the area west and south of Plean from four to two would improve visual amenity.

However, the benefits would not justify the additional significant costs (£2.4 million) when assessed against SPT's statutory and licence duties.

Next Steps

SPT has set out the additional mitigation measures it considers appropriate to address the landscape and visual impact of the sections of the overhead line in the sections identified within condition 19. These measures have been identified following a balancing of environmental, technical and cost considerations. The measures proposed are considered to represent an efficient and economic development of the transmission system and take account of SPT's statutory and licence obligations.

SPT is now consulting local community stakeholders on the proposed landscape and visual mitigation measures.

This voluntary consultation exercise is in addition to the formal consultation which will be undertaken by the Scottish Government Energy Consents and Deployment Unit on the terms of the Stirling Visual Impact Mitigation Scheme ("the Scheme") when it is submitted for approval. SPT recognises that undertaking this voluntary consultation will allow the company to gather and consider views on the proposals, prior to finalisation of the Scheme. Details of how to make representations to SPT can be found below.

Upon receipt of the Scheme, the Scottish Government Energy Consent and Deployment Unit will consult Stirling Council for a period of 30 days. The Energy Consents and Deployment Unit will then submit its recommendation on the Scheme to Scottish Ministers for their decision.