Option Summary

Option: Option 1 (alias 175189)
Date: 2026-08-19

1. Summary

The route is 96.0 km in length, assigned in full to the steel-tower overhead-line asset type and traversing Dumfries and Galloway and the Scottish Borders. Total capital cost is £63,718,922 (approximately £663,739 per kilometre), with standard tower installation the largest single element at £37.2M and 58.4% of the total. The option records 11 Fundamental-class constraints, of which 8 carry No-Go significance, and 9 Major-class constraints; total linear crossings number 164. Fundamental-class No-Go interactions include direct crossings of the Langholm–Newcastleton Hills SPA, River Tweed SAC, three peatland SAC/SSSI complexes (Whitlaw and Branxholme, Threepwood Moss, Whitlaw Mosses), and two Scheduled Monuments. No items are recorded as not yet determined. Cost and constraint detail is at Appendix Tables A1–A4.

2. Cost

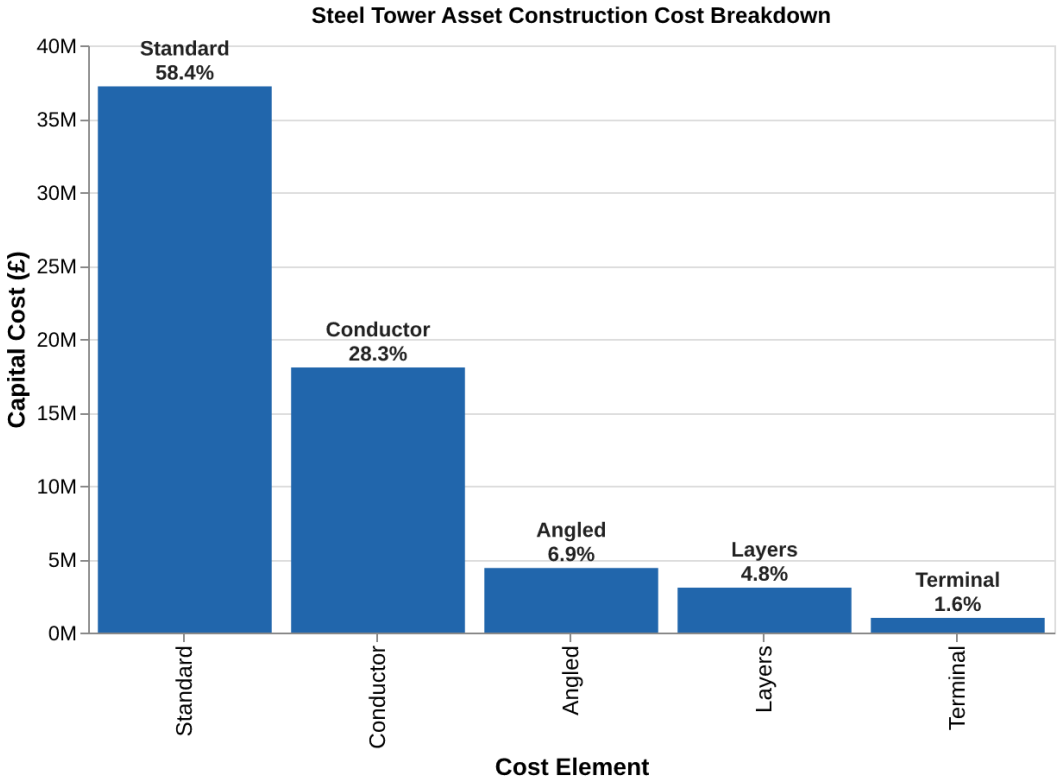
- Total capital cost £63,718,922 (~£63.7M); £663,739 per kilometre; route 96.0 km.
- Standard tower installation: £37,200,000 (58.4%) — the dominant cost driver, attributable to 186 standard towers across the full route.
- Conductor: £18,052,922 (28.3%).
- Remainder: angled towers £4,400,000 (6.9%), linear-feature crossing premiums £3,066,000 (4.8%), terminal towers £1,000,000 (1.6%).

The total capital cost for this option is **£63,718,922 (~£63.7M)**, encompassing all asset construction costs. Linear features crossings account for **£3,066,000** of that total and are included within the relevant asset construction subtotals rather than treated as a separate line item.

All construction costs are attributed to the Steel Tower asset type, broken down across five cost elements as shown below:

Cost Element	Capital Cost (£)	Share of Total
Standard	37,200,000	58.4%
Conductor	18,052,922	28.3%
Angled	4,400,000	6.9%
Layers	3,066,000	4.8%
Terminal	1,000,000	1.6%

Standard tower installation is the dominant cost driver at **£37.2M (58.4%)**, followed by conductor costs at **£18.1M (28.3%)**. Together these two elements account for over 86% of total capital expenditure. Angled tower installations contribute a further **£4.4M (6.9%)**, layers (which include the linear features crossing costs) **£3.1M (4.8%)**, and terminal structures the smallest share at **£1.0M (1.6%)**.



Full breakdown at *Appendix Table A2*.

3. Principal Constraints and Crossings

- **Langholm–Newcastleton Hills SPA/SSSI (UK9003271)**, 7,544 ha — direct crossing — Very High / No-Go; designated for breeding hen harrier (*Circus cyaneus*); Habitats Regulations Appropriate Assessment (statutory consent test for European designated sites) required.
- **River Tweed SAC/SSSI (UK0012691)**, 3,743 ha — direct crossing — Very High / No-Go; qualifying species Atlantic salmon (up to 15% of Scotland's total catch), otter, three lamprey species; trenchless method (horizontal directional drilling) required at SAC boundary if avoidance not achievable.
- **Whitlaw and Branxholme SAC (UK0013594), Threepwood Moss SAC (UK0030288), and Whitlaw Mosses SAC/SSSI** — each intersects the route directly — Very High / No-Go; European-designated peatland, transition-mire, and active raised-bog habitats (Habitats Directive — Special Areas of Conservation).
- **Eildon and Leaderfoot National Scenic Area** (38.77 km²; 4,410 m traversed) — direct crossing — Very High; statutory protected landscape (Scottish equivalent of an Area of Outstanding Natural Beauty).
- **Eweslees Watch Tower SM12750 and Faldonside–Kippielaw Linear Earthwork SM2291** — direct crossings of two nationally protected Scheduled Monuments — Very High / No-Go; Scheduled Monument Consent from Historic Environment Scotland required.
- **9 Major-class constraints** within 500 m or directly crossed — including Melrose Abbey SM90214, Oakwood Roman Fort SM1726, Whitlaw Rig SSSI (5.97 ha, direct crossing), Whitmuirhall Loch SSSI (11.86 ha, direct crossing), and Dystrophic Blanket Peat across multiple upland parcels — Very High to Moderate / Major.

Detail at *Appendix Tables A3 and A4*.

The 96 km steel-tower overhead line alignment (Option 1, alias 175189) traverses two council areas — Dumfries and Galloway in the south and Scottish Borders in the north — passing through some of the most sensitive heritage and ecological terrain in southern Scotland.

Fundamental-class constraints (direct crossings and Very High / No-Go significance)

Constraint	Designation Reference	Spatial Relation	Sensitivity / Significance
Eweslees Watch Tower	SM12750	Intersects (direct crossing)	Very High — No-Go
Faldonside–Kippielaw Linear Earthwork	SM2291	Intersects (direct crossing)	Very High — No-Go
Eildon Hill North, Fort & Roman Signal Station	SM2107	Within 500 m	Very High — No-Go (buffer)
Melrose Conservation Area	CA615	Intersects	Moderate (Construction & Operation)
Newstead Conservation Area	CA620	Intersects	Moderate (Construction & Operation)
Langholm–Newcastleton Hills SPA/SSSI	UK9003271	Intersects	Very High — No-Go; bird-collision risk
Whitlaw Mosses SAC/SSSI	UK0030288 (area)	Intersects / Within 500 m	Very High — No-Go
Whitlaw and Branxholme SAC	UK0013594	Intersects	Very High — No-Go
Threepwood Moss SAC/SSSI	UK0030288	Intersects / Within 500 m	Very High — No-Go

Constraint	Designation Reference	Spatial Relation	Sensitivity / Significance
River Tweed SAC/SSSI	UK0012691	Intersects	Very High — No-Go
Eildon and Leaderfoot National Scenic Area	—	Intersects	Very High

Eweslees Watch Tower (SM12750) is a Roman signal station of national importance in the Ewes Doors pass (Dumfries and Galloway) (Ancient Monuments UK). The alignment intersects the Scheduled Monument boundary — a direct physical crossing classified as a No-Go interaction under the heritage sensitivity framework. Its strategic siting on a rise with clear views along the Eweslees Burn valley heightens its operational sensitivity to tall infrastructure.

Faldonside–Kippielaw Linear Earthwork (SM2291) extends some 5 km along the western Eildon hill spur (Scottish Borders) and is also directly crossed by the study geometry. The monument is of national importance as a prehistoric or early-medieval territorial boundary; direct tower foundation works within its scheduled area would constitute substantial harm. Both construction and operational phases are classified No-Go.

Eildon Hill North (SM2107) (Ancient Monuments UK; Scotland Starts Here) — one of the largest hillforts in northern Britain (BBC News), capital of the Selgovae and later a Roman signal station (Roman Britain) — lies within 500 m of the alignment. Its position on a volcanic ridge rising to 422 m places it within the Eildon and Leaderfoot National Scenic Area. Construction and operational sensitivity is classified High across both assessment reports, reflecting the monument's prominence and landscape significance.

Melrose (CA615) and Newstead (CA620) Conservation Areas both intersect the study geometry. Melrose is a historic market town whose character is defined by the Abbey, the Eildon Hills setting, and 18th–19th century townscape. Newstead, associated with the Roman complex of Trimontium (Trimontium Trust), carries a Conservation Area designation dating from 1985 (Scottish Borders Council; Newstead CAA Management Plan). Significance is Moderate for construction and operation under the conservation-area sensitivity weighting.

Langholm–Newcastleton Hills SPA/SSSI (UK9003271), covering 7,544 ha (NatureScot Spatial Data) of upland moorland in the southern section of the route, is directly crossed by the alignment. The SPA (Special Protection Area — international designation for wild bird conservation) is designated for breeding hen harrier (*Circus cyaneus*), one of the UK's most persecuted birds of prey (BBC News; Scottish Land & Estates). A direct crossing of an international designation receives a No-Go classification; overhead-line bird-collision risk also persists through the operational phase, with a 5 km buffer applied specifically for collision risk assessment.

Whitlaw Mosses SAC/SSSI, **Whitlaw and Branxholme SAC (UK0013594)** and **Threepwood Moss SAC/SSSI (UK0030288)** (JNCC — Threepwood Moss SAC) form a cluster of European-designated peatland and mire sites in the central Scottish Borders. Whitlaw Mosses is a lowland raised bog with peat up to 6.5 m deep (NatureScot); Whitlaw and Branxholme is designated for transition mires and the rare slender green feather-moss (*Hamatocaulis vernicosus*), an Annex II species (JNCC — Whitlaw and Branxholme SAC). All three sites are either directly intersected or lie within the 500 m SAC buffer, attracting No-Go or Major significance for construction and operation.

River Tweed SAC/SSSI (UK0012691) spans the England–Scotland border (3,743 ha) and is directly crossed by the route (JNCC — River Tweed SAC). The SAC (Special Area of Conservation — European habitat protection designation) is selected for river habitats with Ranunculus, Atlantic salmon (representing up to 15% of Scotland's total catch), otter, and three lamprey species. A direct crossing of a European designation is classified No-Go. Appropriate Assessment under the Habitats Regulations would be required for any proposal that could not demonstrate full avoidance.

Eildon and Leaderfoot NSA, a 38.77 km² National Scenic Area (Komoot) encompassing the Eildon Hills triple summit and the Tweed valley, is directly intersected by the northern section of the route. A steel-tower overhead line within this nationally protected landscape is classified as Very High sensitivity for both construction and operation.

Major-class constraints (Very High base sensitivity, within buffer or adjacent)

Constraint	Designation Reference	Spatial Relation	Sensitivity / Significance
Melrose Abbey	SM90214	Within 500 m	Very High base / Major (construction)

Constraint	Designation Reference	Spatial Relation	Sensitivity / Significance
Huntly Burn Earthwork	SM2109	Within 500 m	Very High base / Moderate–Major
Oakwood Roman Fort and Camp	SM1726	Within 500 m	Very High base / Major
Mosspeeble Enclosure	SM4365	Within 500 m	Very High base / Major
Unthank Church & Burial Ground; Unthank Settlement	SM4768 / SM4736	Within 500 m	Very High base / Major
Whitlaw Rig SSSI; Whitmuirhall Loch SSSI	135006 / 135182	Intersects / Within 500 m	High / Very High
Selkirk Racecourse Moss SSSI	135385	Within 500 m	Moderate–Major
Gattonside Moss SSSI; Dunhog Moss SSSI	135209 / —	Within 500 m	Moderate–Major
Dystrophic Blanket Peat (NoGo peatland)	NatureScot Class 3/5	Intersects	Medium (NoGo flag set)

Melrose Abbey (SM90214), a Cistercian abbey founded in 1136 and reputedly the burial place of Robert the Bruce's heart (Lands End to John O'Groats), lies within 500 m of the alignment. Its position within the Eildon and Leaderfoot NSA and its proximity to the historic town centre means both construction vibration risk and operational visual-setting impacts are classified Major.

Huntly Burn Earthwork (SM2109) (Ancient Monuments UK) (Kirkhope, Scottish Borders) and **Oakwood Roman Fort and Camp (SM1726)** (Roman Britain) (Ettrick Valley) are Scheduled Monuments within 500 m of the route. Both attract Very High base sensitivity; the within-buffer interaction produces Major construction significance requiring detailed assessment of indirect physical and setting impacts.

Mosspeeble Enclosure (SM4365) (Ancient Monuments UK — Dumfries and Galloway) and the **Unthank** group (Ancient Monuments UK — Dumfriesshire) (**SM4768** — church and burial ground; **SM4736** — settlement) are prehistoric and medieval Scheduled Monuments in the Ewes valley (Dumfries and Galloway), each within 500 m. All attract Major construction significance under the scheduled-monument sensitivity weighting.

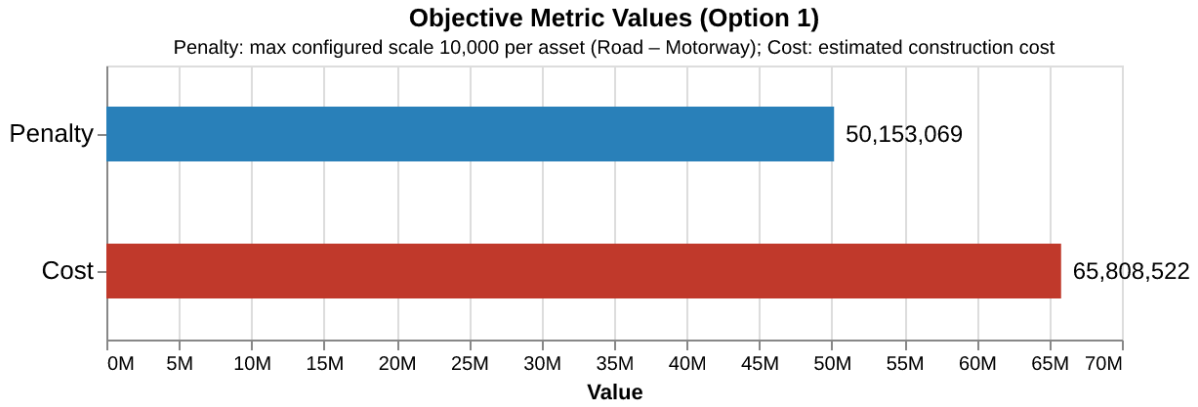
Whitlaw Rig SSSI (5.97 ha, transition mire; part of the Whitlaw and Branxholme SAC complex) is directly crossed by the route, generating Very High construction sensitivity. **Whitmuirhall Loch SSSI** (11.86 ha, biological) (NatureScot Spatial Data) is also directly intersected, producing High construction and High operational significance.

Selkirk Racecourse Moss SSSI (4.31 ha, calcareous valley fen) (Lost Naturalist) and **Gattonside Moss SSSI / Dunhog Moss SSSI** (NatureScot Spatial Data) both lie within the 500 m SSSI buffer, giving Moderate–Major construction sensitivity from potential hydrological and habitat-connectivity effects.

Dystrophic Blanket Peat (NatureScot Peatland Classes 3 and 5) (NatureScot Peatland Data) is directly intersected by the study geometry across multiple parcels in the upland sections. The NoGo flag is set in the source dataset for Class 3 features, reflecting the risk of irreversible carbon release and peat destabilisation from tower-foundation construction. Medium significance applies to the non-NoGo parcels.

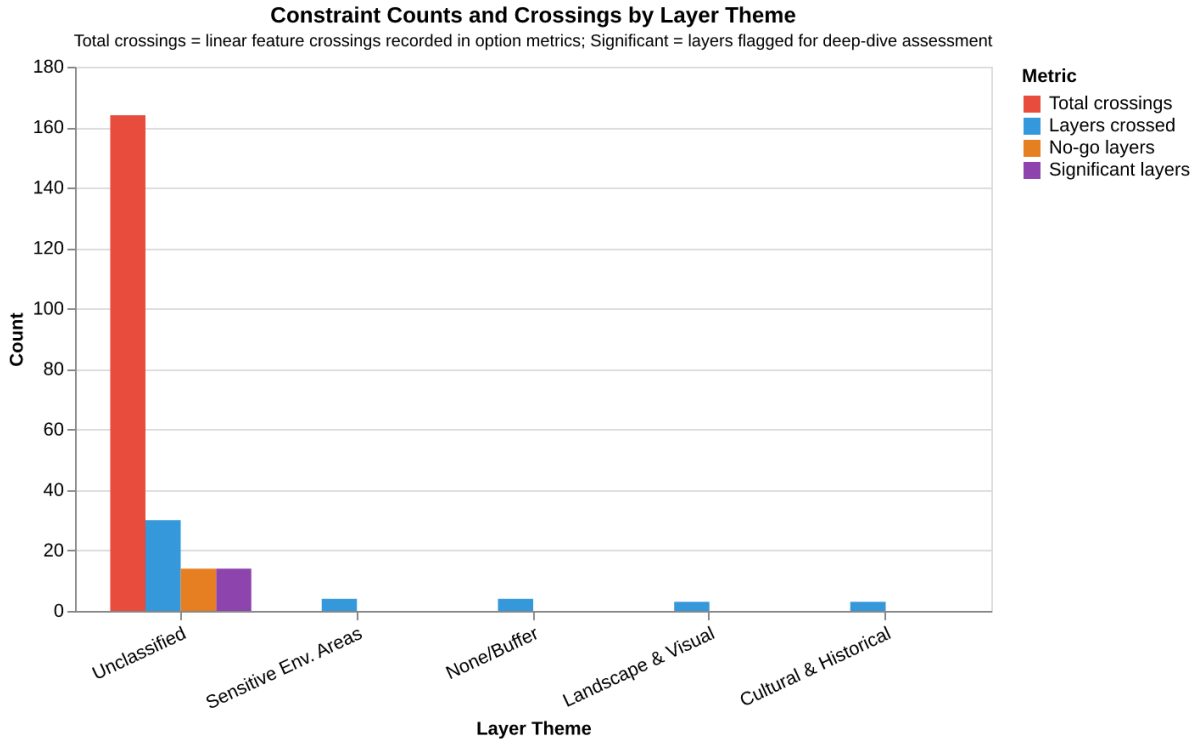
Objective Metrics

The option carries two primary objective metrics that together characterise its overall performance: **Penalty (50,153,069)**, which is the primary optimisation objective, and **Cost (65,808,522)**, the secondary objective representing estimated construction and installation expenditure.
The Penalty figure aggregates all environmental, social, and operational constraint interactions incurred along the route. The configured maximum per-asset penalty in this case is **10,000**, applied solely to Road – Motorway. Fourteen layers carry the next tier at **1,000 per asset**, and all fourteen of these are simultaneously configured as no-go layers — meaning the route cannot pass through them at all. These include Surface Water, Water bodies, Airports, Buildings All Local, several Functional Sites (Air Transport, All, Education, Medical Care), Greenspace designations (Cemeteries, Religious Grounds), Mineral extraction sites, Substation Sites, and Transmission Tower (10 m Buffer). The bulk of the accumulated penalty is driven by extensive route distance through area layers in the Unclassified theme (493,925 m) and the high-penalty landscape and peatland area layers; the largest single area-layer contributions include National Scenic Area (NSA, ~4.4 M penalty units), Grassland/heaths/bogs (~9.2 M), Agriculture (~4.1 M), SAC (500 m Buffer, ~3.9 M), and SPA (500 m Buffer, ~2.9 M).



Constraint and Crossing Counts by Layer Theme

The chart below presents four counts for each theme: **total linear crossings**, **layers crossed**, **no-go layers**, and **significant layers** (those flagged for feature-level deep-dive assessment). Themes are ordered by the highest count present, placing the Unclassified theme first.



Unclassified is the dominant theme across every count. Of its 76 layers, 30 were crossed and 14 are significant; all 14 no-go layers in the case reside here. The 164 recorded linear crossings in this theme comprise: Road – Restricted Local Access Road (30), Rivers (26), Road – Minor Road (26), Named Watercourses (19), SPD Overhead Line HV (21), Road – B Road (7), SPT Overhead Line 132kV (6), Road – Local Road (6), Road – A Road (5), Unnamed Watercourses (4), Named Rivers (3), Gas Pipeline (3), SPD Overhead Line EHV (3), and Road – Local Access Road (3). The route also passes through 493,925 m of Unclassified area layers, including 29,950 m of Grassland/heaths/bogs, 40,004 m of Agriculture, 14,791 m of Coniferous Forest, and 275 m of Surface Water (a no-go layer, penalty 1,000).

Landscape and Visual (3 layers crossed, 165,319 m through area) contains the National Scenic Area (NSA) — a statutorily designated landscape of national importance in Scotland, at penalty 1,000, with 4,410 m traversed — alongside the Wild Land (300 m Buffer) and Country Parks layers, both crossed. No significant layers were flagged in this theme.

Sensitive Environmental Areas (4 layers crossed, 28,538 m through area) includes Peatland Class 1 (1,299 m, penalty 1,000), Peatland Class 3 (4,913 m, penalty 300), SAC (500 m Buffer, 12,769 m, penalty 300), and SPA (500 m Buffer, 9,557 m, penalty 300). Multiple no-go layers in this theme — Ancient Woodland Inventory Classes 1a, 1b, 2a, Peatland Class 2, Ramsar, SSSIs — were not crossed by this option.

Cultural and Historical Sites (3 layers crossed, 1,830 m through area) includes Scheduled Monuments (25 m, penalty 1,000), Scheduled Monuments (100 m Buffer, 292 m, penalty 300), and Canmore Points (50 m Buffer, 1,513 m, penalty 100). No significant layers were flagged, though the statutory protections on Scheduled Monuments require feature-level assessment.

None/Buffer (4 layers crossed, 20,852 m through area) comprises technical buffer zones — SAC (100 m Buffer), SPA (100 m Buffer), SSSIs (Biological and Mixed 100 m Buffer), and Surface Water (50 m Buffer) — which are derived layers providing context rather than primary designations.

Themes for **Geology and Soils**, **Land Rights and Planning**, and **Energy Resources and Industrial Areas** recorded no crossed layers and contribute no direct route interactions for this option.

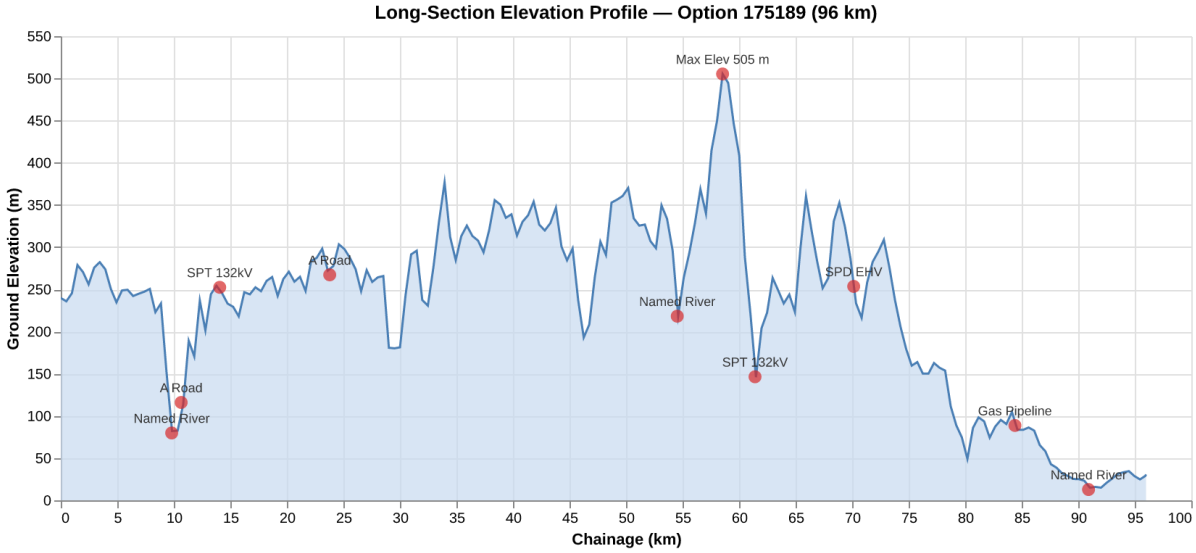
Layer Theme	Aggregate Result	Key Risks and Challenges
Unclassified	76 layers (30 crossed, 14 significant), 164 linear crossings, 493,925 m through area	14 significant layers including 1 at max penalty (10,000); 14 no-go layers; highest constraint density
Landscape and Visual	8 layers (3 crossed, 0 significant), 165,319 m through area	1 layer at penalty 1,000 (NSA); feature-level assessment required for crossed layers
Sensitive Environmental Areas	35 layers (4 crossed, 0 significant), 28,538 m through area	Highest configured penalty 1,000; multiple no-go AWI layers; feature-level assessment required
Cultural and Historical Sites	13 layers (3 crossed, 0 significant), 1,830 m through area	Highest configured penalty 1,000; feature-level assessment required
None/Buffer	7 layers (4 crossed, 0 significant), 20,852 m through area	Technical buffers; context only
Geology and Soils	3 layers (0 crossed, 0 significant)	Context only
Land Rights and Planning	6 layers (0 crossed, 0 significant)	Context only
Energy Resources and Industrial Areas	2 layers (0 crossed, 0 significant)	Context only

4. Route Summary

The route extends 96.0 km from start to finish, with terrain relief contributing an additional 1,161 m of accumulated vertical distance along the alignment. The full corridor is assigned the Steel Tower asset type, comprising 186 standard towers, 11 angled structures, and 2 terminal towers. Mean span between structures is 485 m (range: 376 m to 493 m). The maximum realised structure angle is 44.9°, with a mean of 25.1°; of the 11 angled structures, 7 fall within the negligible deflection band and 4 within the low band. No constraint breaks are recorded and no section exceeds the 800 m steel-tower elevation limit.

Terrain. Ground elevation ranges from approximately 13 m near the northern terminus to a peak of 510 m at around chainage 58–59 km, in the central-southern portion of the route. Mean ground elevation is 233 m. Maximum local slope is 30.7° (mean 5.7°); no section reaches the 40° critical-slope threshold.

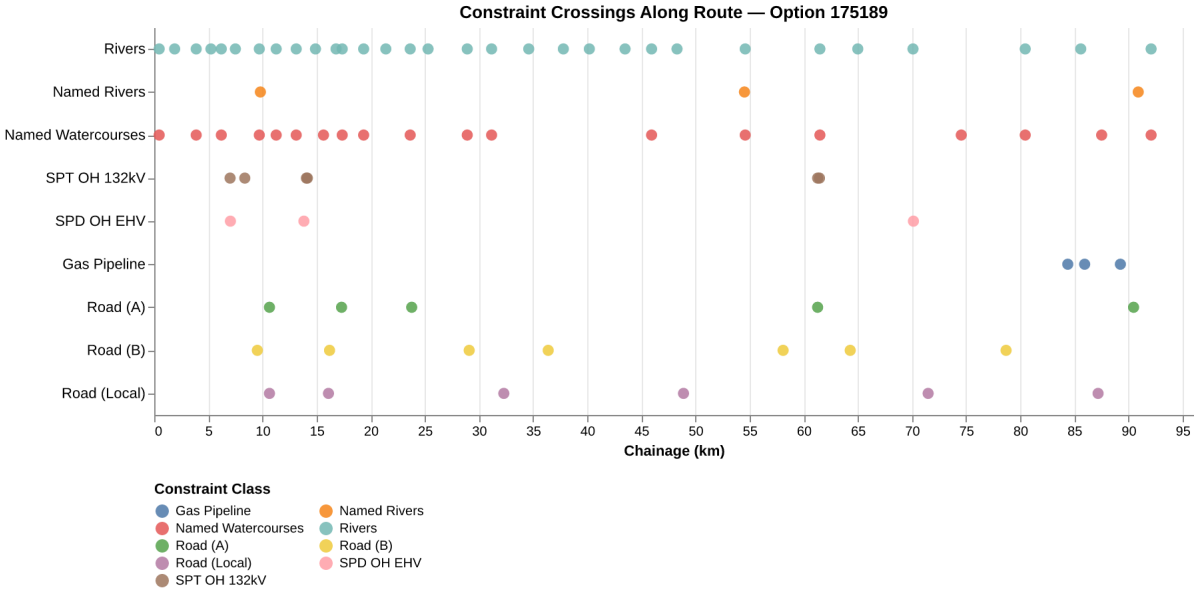
The figure below shows the full long-section elevation profile, with key constraint interaction points marked at their chainage positions.



The profile illustrates a complex undulating topography. Starting at approximately 240 m elevation, the route descends sharply to a river crossing near 9.8 km (ground level ~80 m) before climbing back through rolling moorland to the major summit plateau between roughly 33 km and 55 km, where elevations consistently exceed 280–370 m. The highest point (≈505 m) lies at approximately 58.5 km. The route then descends steeply—crossing the SPT 132kV line at ~61.4 km (ground ~146 m)—and continues a general descent toward the northern end of the corridor, finishing near 31 m elevation.

Constraint crossings. The route intersects a range of sensitive features across its length. The evidence records 26 river crossings at a mean angle of 62°, 19 named-watercourse crossings, and 3 named-river crossings. Infrastructure crossings include 6 of the SPT Overhead Line 132kV, 3 of the SPD Overhead Line EHV, and 3 of the Gas Pipeline. Road crossings total 18 events: 5 A Road, 7 B Road, and 6 Local Road. Linear constraint interaction includes 4,410 m within the National Scenic Area, 1,299 m through Peatland Class 1, 275 m over Surface Water (classified no-go), and 25 m adjacent to Scheduled Monuments.

The distribution of these crossings along the route is shown below.



River and watercourse crossings (Rivers, Named Rivers, Named Watercourses) are distributed throughout the full length of the corridor, with notable concentrations in the 5–25 km and 85–95 km bands. Electricity infrastructure crossings (SPT 132kV, SPD EHV) occur in two clusters: a group at 7–14 km and a second group near 61–70 km. All three Gas Pipeline crossings are confined to the 84–90 km section toward the northern end of the route. Road crossings of all classes are spread across the corridor but are most frequent in the first 25 km. All penalty scores for the above constraints are recorded at 1,000 against a project maximum of 10,000, indicating that none reaches the maximum penalty band.

5. Citations

- Ancient Monuments UK — Eweslees Watch Tower — Roman signal station (SM12750) at Ewes Doors pass; national scheduled monument designation record
- Ancient Monuments UK — Eildon Hill North — Scheduled Monument (SM2107) designated 30 May 1961; prehistoric hillfort and Roman signal station
- Scotland Starts Here — Eildon Hill North — Eildon Hill North; ramparts over five kilometres; Trimontium naming origin
- BBC News — Eildon Hill North — Largest hillfort in northern Britain; over 18 hectares with 530 roundhouses
- Roman Britain — Eildon Hill — Capital of the Selgovae Celtic Tribe; Roman signal tower on the summit
- Trimontium Trust — Trimontium Roman fort at Newstead; largest Roman fort north of Hadrian's Wall
- Scottish Borders Council — Conservation Areas — Newstead Conservation Area (CA620) designated 1985; Melrose Conservation Area (CA615) designation and governance
- Newstead Conservation Area Appraisal and Management Plan — CAA adopted January 2024 following public consultation
- NatureScot Spatial Data — Langholm–Newcastleton Hills SPA — SPA designation record; 7,543.81 hectares; European code UK9003271; EU Wild Birds Directive
- BBC News — Langholm–Newcastleton Hills SPA — Hen harrier designation; key stronghold for breeding hen harriers in Scotland
- Scottish Land & Estates — SPA designated for breeding hen harrier under EU Wild Birds Directive; Langholm hen harrier study
- JNCC — Threepwood Moss SAC — Special Area of Conservation (UK0030288); 53.18 ha; active bog habitat under EU Habitats Directive
- NatureScot — Whitlaw Mosses — Whitlaw Mosses lowland raised bog; SSSI and SAC designations retained
- JNCC — Whitlaw and Branxholme SAC — Special Area of Conservation (UK0013594); 41.3 ha; transition mires and slender green feather-moss (*Hamatocaulis vernicosus*)
- JNCC — River Tweed SAC — Special Area of Conservation (UK0012691); 3,742.65 ha; Atlantic salmon, otter, and three lamprey species
- Eildon and Leaderfoot NSA — Komoot — One of Scotland's 40 National Scenic Areas; Eildon Hills and River Tweed valley
- Lands End to John O'Groats — Melrose — Melrose Abbey founded 1136 by King David I for the Cistercian Order; burial place of Robert the Bruce's heart
- Ancient Monuments UK — Huntly Burn Earthwork — Scheduled Monument (SM2109) in Kirkhope, Selkirkshire; prehistoric earthwork designation record
- Roman Britain — Oakwood Roman Fort — Oakwood Roman Fort and Camp (SM1726); founded c.80/81 AD during Agricola's campaigns
- Ancient Monuments UK — Dumfries and Galloway — Mosspeeble enclosure (SM4365) scheduled monument listing in Ewes, Dumfries and Galloway
- Ancient Monuments UK — Dumfriesshire — Unthank settlement and church (SM4768/SM4736) scheduled monument listings in Ewes parish
- NatureScot Spatial Data — SSSIs — Whitmuirhall Loch SSSI (11.86 ha), Gattonside Moss SSSI, and Dunhog Moss SSSI biological designation records
- Lost Naturalist — Selkirk Racecourse Moss — Calcareous valley fen; more calcareous than comparable Scottish Borders valley fens; rich sedge swamp communities
- NatureScot Peatland Data — Peatland Class 3 and 5 spatial dataset; NoGo classifications for sensitive peatland parcels
- Historic Environment Scotland designation records — Scheduled Monument designation records for heritage assets on or near the route corridor
- NatureScot: Sites of Special Scientific Interest — National SSSI designation framework and guidance for Scotland [link not found]

Appendix

Tables only. Row caps are applied as specified.

Appendix Table A1 — Option at a Glance

Measure	Value	Note
Route length	96.0 km	Steel Tower asset type; 100% of route
Total capital cost	£63,718,922	All construction costs; linear crossing costs included
Cost per km	£663,739	Derived: total cost ÷ route length
Largest cost element	Standard towers £37,200,000 (58.4%)	186 towers across full route
Total linear crossings	164	All crossing types combined; see Table A4
Fundamental / Major constraints	11 Fundamental (8 No-Go) / 9 Major	See Table A3

Appendix Table A2 — Cost Breakdown

Cost element	Value	Share of total	Attributable feature or condition
Standard towers	£37,200,000	58.4%	186 standard towers; dominant driver across full 96.0 km route
Conductor	£18,052,922	28.3%	Conductor spans across full route length
Angled towers	£4,400,000	6.9%	11 angled structures; 7 negligible and 4 low deflection band
Layers (crossing premiums)	£3,066,000	4.8%	164 linear feature crossings included in asset total
Terminal towers	£1,000,000	1.6%	2 terminal towers at route termini

Appendix Table A3 — Constraints

Constraint (name and designation)	Interaction	Extent or count	Sensitivity	Significance	Standard mitigation
Langholm–Newcastleton Hills SPA/SSSI (UK9003271)	Crossing (direct)	7,544 ha site	Very High	No-Go	Avoidance or re-routing; Habitats Regulations Appropriate Assessment
River Tweed SAC/SSSI (UK0012691)	Crossing (direct)	3,743 ha; 26 river crossings	Very High	No-Go	Avoidance; trenchless (HDD) if unavoidable; Appropriate Assessment

Constraint (name and designation)	Interaction	Extent or count	Sensitivity	Significance	Standard mitigation
Whitlaw and Branxholme SAC (UK0013594)	Crossing (direct)	41.3 ha	Very High	No-Go	Avoidance or re-routing; Appropriate Assessment
Threepwood Moss SAC (UK0030288)	Crossing (direct)	53.18 ha	Very High	No-Go	Avoidance or re-routing; Appropriate Assessment
Whitlaw Mosses SAC/SSSI	Crossing (direct) / within 500 m	21.51 ha	Very High	No-Go	Avoidance or re-routing; Appropriate Assessment
Eweslees Watch Tower (SM12750)	Crossing (direct)	Roman signal station; 14.5 m diameter	Very High	No-Go	Avoidance; Scheduled Monument Consent (HES) required
Faldonside–Kippielaw Linear Earthwork (SM2291)	Crossing (direct)	5 km linear earthwork	Very High	No-Go	Avoidance; Scheduled Monument Consent (HES) required
Eildon and Leaderfoot National Scenic Area	Crossing (direct)	38.77 km²; 4,410 m traversed	Very High	Very High	Avoidance or re-routing; landscape and visual impact assessment

Appendix Table A4 — Crossings and Third-Party Interfaces

Crossing type	Count	Named instances	Construction implication — technique, consent, or cost
Watercourses and rivers	52	River Tweed SAC (direct crossing, No-Go)	Standard overhead span; trenchless (HDD) required at River Tweed SAC
Roads — all classes	77	—	Standard overhead span; road authority consent for A and B road crossings
SPD Overhead Line HV	21	—	Line-crossing agreement with SP Distribution; standard overhead technique
SPT Overhead Line 132kV	6	—	Crossing agreement with SP Transmission required; standard overhead technique
Gas Pipeline	3	—	Crossing agreement with gas pipeline operator; all three crossings in 84–90 km

Crossing type	Count	Named instances	Construction implication — technique, consent, or cost
			section
SPD Overhead Line EHV	3	—	Line-crossing agreement with SP Distribution; standard overhead technique