



Design & Heritage Significance Statement

for

Drum Castle, Proposed installation of Starlink satellite receiver and associated cabling

April 2024

Contents

Background Information	3
Site Information	3
Heritage Significance	4
Design Philosophy	7
Design Solutions	8
Heritage Impact	20
Conclusions	21
References	22

Background Information

The National Trust for Scotland (NTS) wish to upgrade internet solutions at a number of its properties across the north east, and in particular at Drum Castle. Internet coverage and service is slow and unreliable at Drum and is inhibiting not only staff operations within the properties but also customer services and visitor experience; for example the lack wireless capability outside for functions and events, retail and café operations and holiday accommodation.

Extensive testing took place at all north east sites in the Spring and Summer of 2023. Options including fibre broadband installation, radio and satellite options. Due to the rural locations of some of its properties, the installation of broadband internet through the conventional ground route is not a viable option, which is the case at Drum Castle. There are no plans via BT Openreach to provide fibre broadband as part of the Scottish Government R100 programme, therefore the NTS has been looking at alternative solutions.

It is proposed to install Starlink satellite internet at Drum Castle. This will involve the installation of a satellite receiver (details attached) as well as cabling from the receiver into the buildings, where an internet hub in the form of a cabinet would also be installed.

Suitable locations for the receiver require a clear line of sight to the southern sky, which can be achieved at Drum Tower. A test has been carried out confirming that the preferred location at Drum Castle, on the roof of the Drum Tower, is suitable to pick up the satellite signal.

The NTS is fully aware of the sensitivities of introducing new equipment onto the both the interior and exterior of historic buildings. Therefore the proposed location has been selected to meet operational need as well as to minimise visual impact upon setting and physical impact upon historic material of the Category A listed Drum Castle.

A pre-application enquiry was made to Aberdeenshire Council in August 2023 seeking guidance on the principle of the proposed installation (ENQ/2023/1141).

Site Information

Drum Castle is situated 12 miles to the west of Aberdeen between the settlements of Drumoak and Peterculter. The castle, garden and estate are the last remnant of the once extensive estate of the Irvines of Drum. The site is situated on a ridge above open countryside and extends to 164 hectares.

The castle is Category A listed and sits within the wider Drum Castle Garden and Designed Landscape. The Castle, a composite structure, is set around a courtyard and comprises a 13th century Tower with later additions, a Jacobean mansion and Victorian additions, remnants of parkland, a walled garden with later ornamental planting, an arboretum and lawns.

The tower comprises a 53' x 40' x 70' high rubble built mass masonry external walls with rounded corners and corbelled crenelated battlements. The courtyard buildings date to the 15th century with the large south wing constructed in the 17th century. Access to the top of the tower is by an internal stair via a set of steps and doorway on the southern elevation of the tower. Originally the

doorway would have been accessed using a removable timber ladder, but the stone steps were installed in the early 19th century.

The Tower is not currently accessed by visitors as part of their visit. This may change in the future.

In 2023 the NTS undertook a programme of repairs to the top section of the tower to address rainwater management issues, including the cloaking in lead of the cap house roof, crenelations and parapet walkway; listed building consent reference APP/2023/0187.

Heritage Significance

The NTS Statement of Significance (submitted with this application) identifies the key physical components of the estate as being the Tower and the Old Wood of Drum, which are bound together in their medieval origins as a royal deer forest, one of the hunting seats of Robert the Bruce. The most significant component of the property is the Tower; it is one of the three oldest towers in Scotland and of these, the most intact. Its early date (probably pre-1286), lack of alterations and associations with Robert the Bruce make it of outstanding national importance.

The Jacobean mansion extension of 1619 reflects a development in Scottish architecture from vertical to horizontal building. The mansion has been extensively altered and represents an amalgam of architectural styles. Alterations were undertaken in 1876 by David and John Bryce which included the creation of the library in the tower on the first floor of the main house linking through into the tower.

The author of the New Statistical Accounts for Scotland 1845 for the Parish of Drumoak describes the tower as a *“large and venerable building, The date of its erection cannot be ascertained as it existed when the estate was conveyed to the family in 1323..it is of oblong form being 50 feet 6 inches by 39 feet at the base, and 70 feet 6 inches in height to the top of the battlement”*. It describes the access from the tower to the parapet walkway as follows: *“In the east end [of the 3rd floor] of its vaulted roof is a small door, which leads out to the battlement, access to which was obtained from the apartment below by means of a moveable ladder. This ancient edifice is kept in complete repair, and its wall are apparently as entire as when newly erected”*. (p888)

Of particular interest are the curved angles of the corners of the tower and the continuous corbelled stringcourse, above which the parapet is also rounded and heightened at the angles. According to MacGibbon and Ross (1887) *“such rounded angles are by no means uncommon in castles of the fourteenth century; but there are few such perfect examples of the parapet carried round the corners as at Drum”* (p155).

The cap house roof has also changed over time from an alcove roof that was much taller than the current roof and may have had an attic floor in this space. The chimney stack is for the first-floor fireplace in the library dating to the Bryce alterations. The NTS installed a permanent timber stair to the east end of the third-floor hall to allow visitor access to the parapet walkway, although currently this is not open to visitors.

The historic and architectural significance of the castle is reflected in its Category A listing by Historic Environment Scotland.



Fig.1 James Skene of Rubislaw sketch c1828, NTS archives.



Fig. 2 Sketch by MacGibbon & Ross, taken from the Castellated and Domestic Architecture of Scotland, 1887



Fig. 3 CAD cross section showing the construction of the Drum Tower, with the Library inserted into the first floor in the 19th century, copyright NTS

Design Philosophy

In preparing this application cognisance has been made to the following guidance:

- National Trust for Scotland Conservation Principles
- Historic Environment Scotland; managing change in the historic environment
- Aberdeenshire Local Development Plan 2023, in particular:
 - Policy P1 Layout, Siting and Design
 - Policy P5 Digital Infrastructure
 - Policy HE1 Protecting Listed Buildings, Scheduled Monuments and Archaeological Sites
 - Policy HE2 Protecting Historic, Cultural and Conservation Areas
- National Planning Framework 4:
 - Policy 24 Digital Infrastructure
 - Policy 7 Historic Assets and Places

A pre-application enquiry was submitted to Aberdeenshire Council in August 2023 (ENQ/2023/1141). The response from the Council stated that the Planning Services concludes that the proposed development would likely accord with the Aberdeenshire Local Development Plan 2023 and National Planning Framework 4 and is likely to be supported.

Historic Environment Scotland (HES) were consulted on the pre-app due to Drum Castle being Category A listed. Their feedback stated that *"telecommunications devices and satellite dishes can have an adverse impact upon the appearance of a building. These should be positioned so as not to alter the historic profiles or skyline of where impact is minimal"*.

The NTS adopts the approach of minimal intervention and emphasises the potential reversibility of the addition of the satellite receiver as technology advances in the future or technology requirements changed.

The proposed route has been chosen to minimise visual impact upon the building, the historic roof profile and impact upon historic fabric, whilst balancing this with the operational requirements of an uninterrupted line of sight to the southern sky to ensure communication with the Starlink satellite. Care has been taken to route cables to make use of existing cabling, downpipes and gutters, and where existing inventions have already been made into the building, that these are reused wherever possible.

A small section of trenching will be required adjacent to the east elevation of the castle at ground to enable the cable to be largely hidden from view.

Design Solutions

The main piece of equipment to attach is the receiver dish. The receiver will be located on the east side of the existing chimney breast at the top of the Old Tower, facing south. The receiver does not have the ability to move to point towards the satellite, but this will generally be to the south.

The receiver will be placed into a pipe adapter, which in turn will be mounted on a pole, attached to a bespoke designed bracket which will be connected to two fabricated metal straps around the chimney breast on the cap house roof.

The straps will be made to carefully sit around the chimney breast and will not be fixed into the chimney, rather clamped in place to ensure minimal physical alteration to the top section of chimney breast, which is a later addition to the cap house roof.

When installation takes place, there will be some movement required to align the receiver, adapted and straps. The images below show what is currently anticipated, but the exact position of the straps on the chimney will depend on final alignment of the receiver.



Fig.4 Photomontage (not to scale) of chimney with Starlink receiver on east side of chimney facing south



Fig.5 Photomontage (not to scale) of chimney with Starlink receiver on east side of chimney facing north

STARLINK

Antenna	Electronic Phased Array
Orientation	Motorized Self Orienting
Environmental Rating	IP56
Snow Melt Capability	Up to 75mm / hour (3in / hour)
Operating Temperature	-30°C to 50°C (-22°F to 122°F)
Field of View	140°
Average Power Usage	110-150W

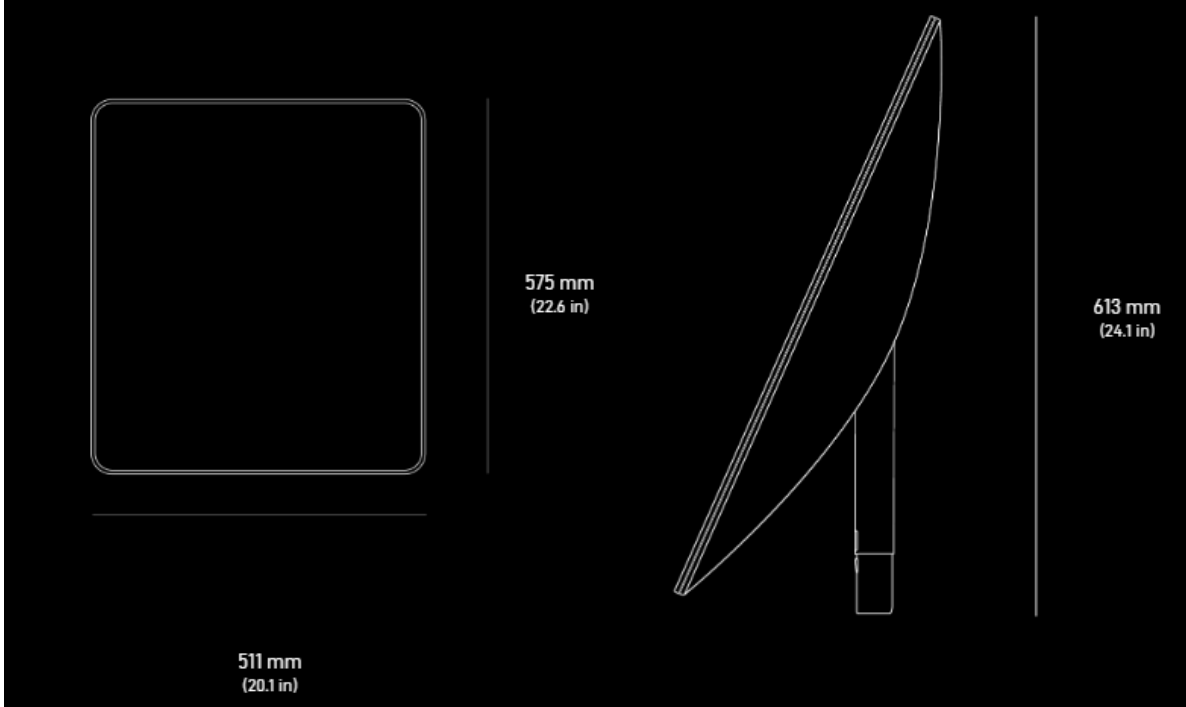


Fig. 6 Starlink High Performance antenna specification

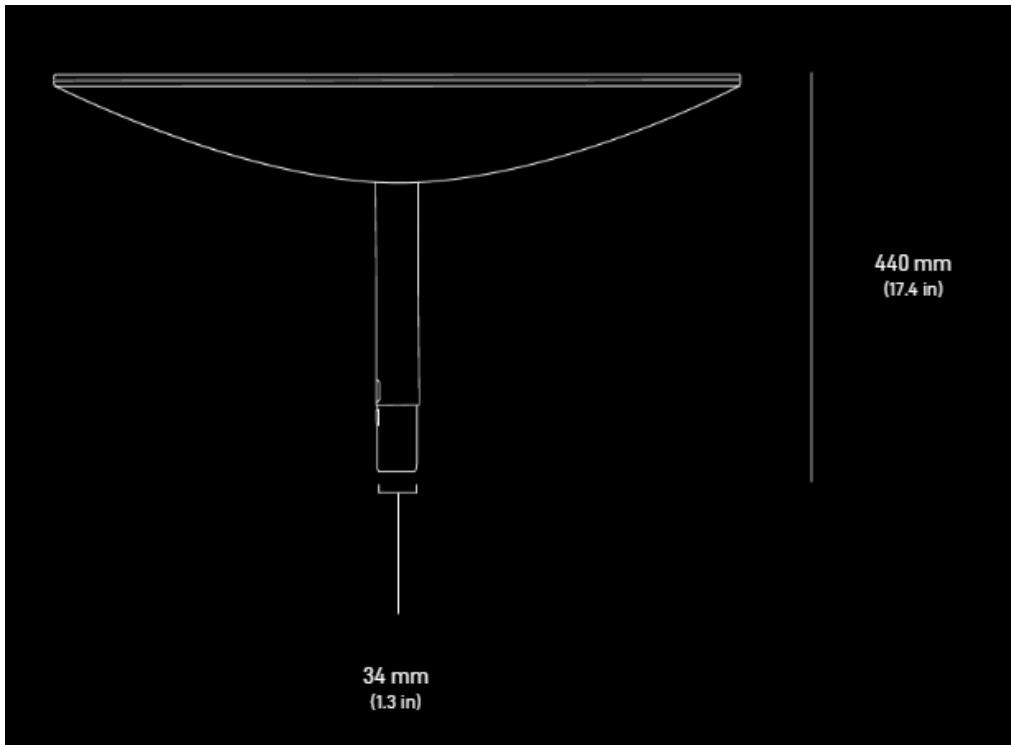


Fig. 7 Starlink High Performance antenna specification

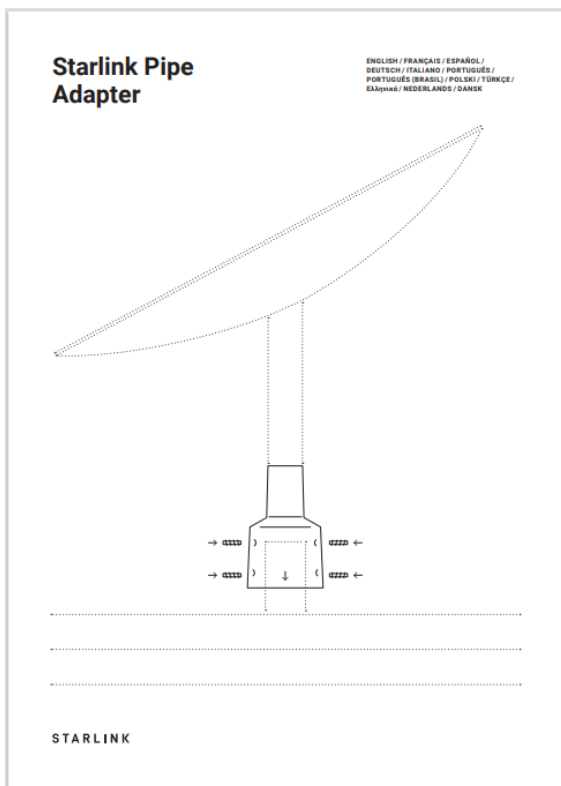


Fig.8 Starlink pipe adapter specification

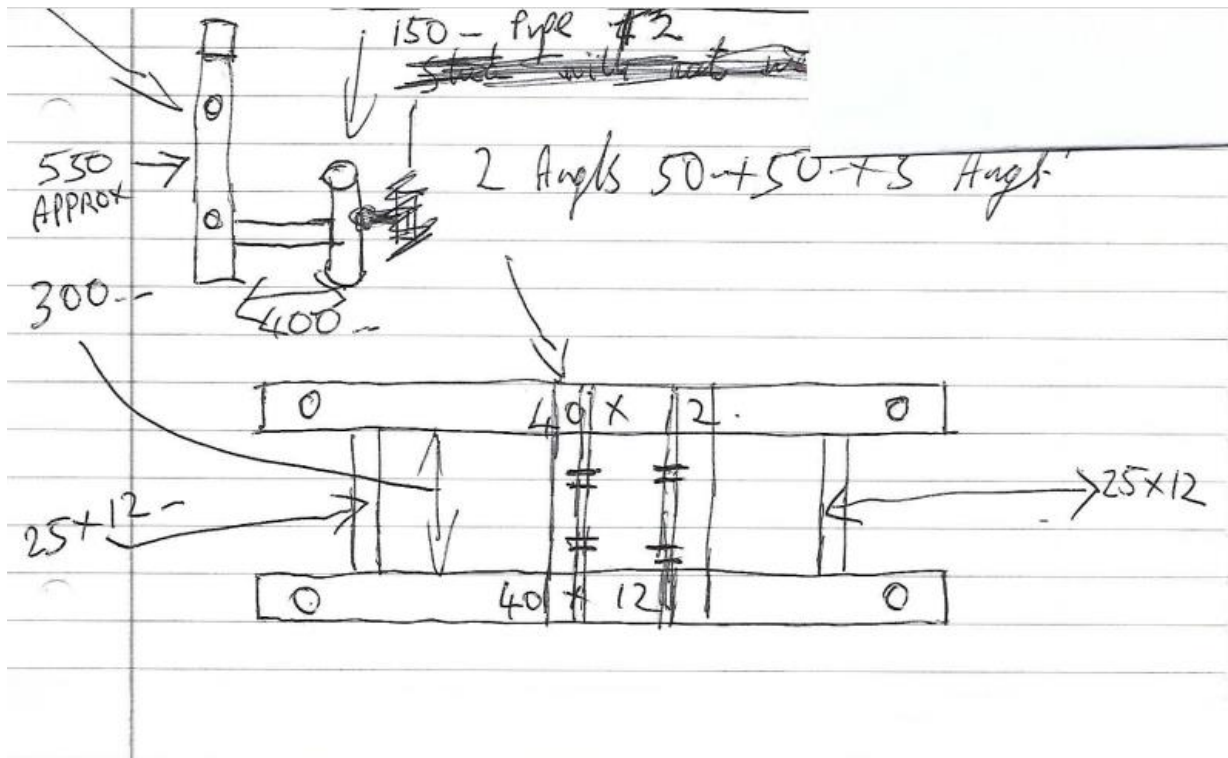


Fig.9 Sketch of bespoke designed bracket and straps, provided by B Beattie Blacksmiths

Cabling Route

Three cable runs are required: a cable from the receiver to the main Starlink hub, a cable from the receiver to the north side of the castle to the holiday accommodation and courtyard area and a cable from the receiver to the south side of the castle to the main NTS office. The main receiver cable is grey in colour and the other two cables will be black once installed but for the purposes of illustration they have been coloured on the plans and photos.

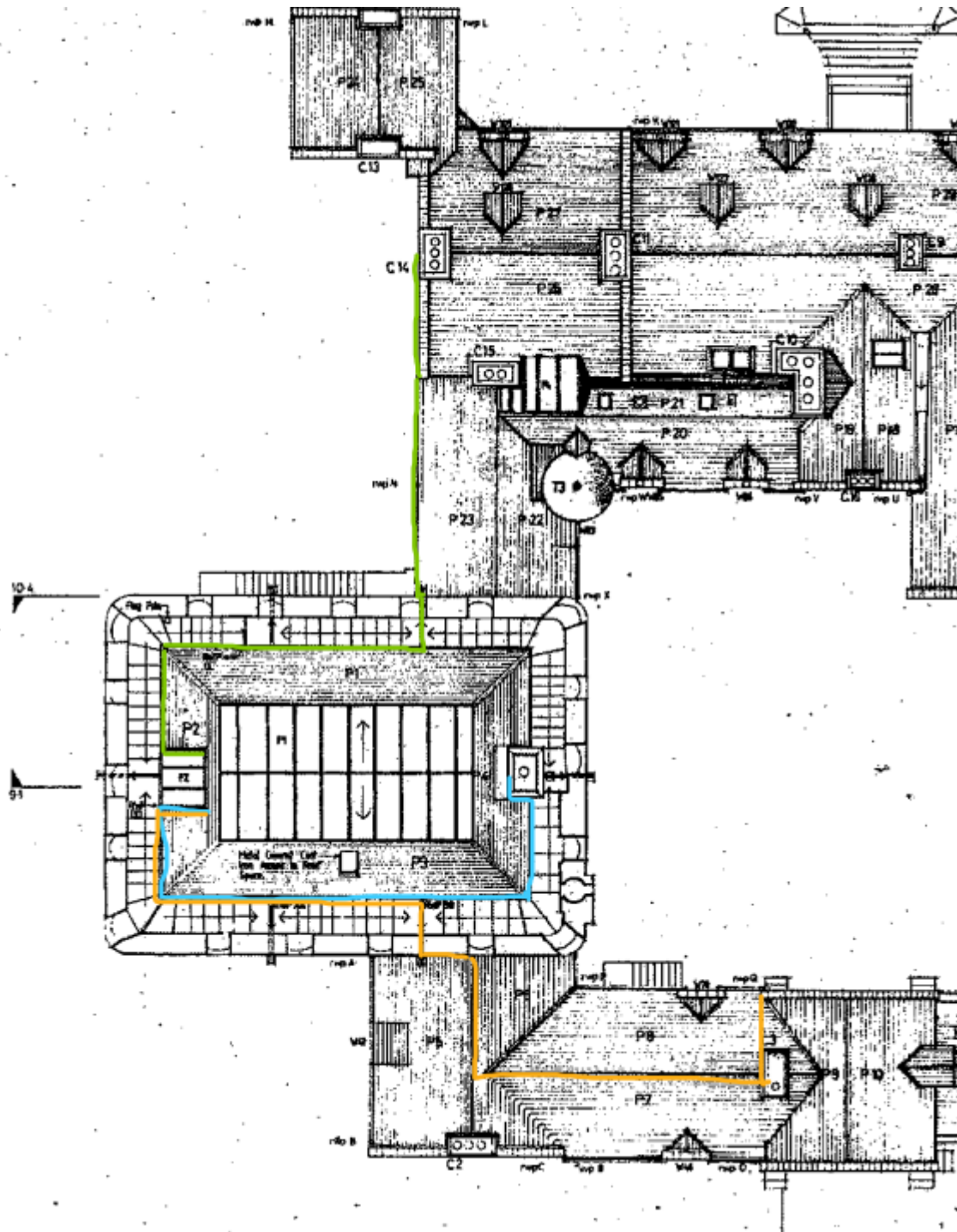


Fig. 10 Roof plan extract (not to scale) with cabling routes shown.

Cable 1 (blue)

The first is the cable run from the receiver into the main Starlink hub cabinet, which will be located underneath the timber stair inside the tower. This cable is the main Starlink signal cable. The cable will be run tucked underneath the guttering along the north side of the cap house roof to the cap house door on the east elevation.

The cable will be run through a new hold in the door frame and run straight down the side of the internal stone steps and around the side of the timber staircase into a new equipment cabinet. The cabinet will be free standing on a base, tucked underneath the stair and not attached to any fabric on the stair.



Fig. 11 Cap House doorway



Fig. 12 Existing power cable attached to staircase



Fig. 13 Area under stair for locating equipment cabinet

Cable 2 (green)

The second cable will run from the equipment cabinet back under the timber stair up through the doorway and run underneath the cap house gutter on the south sides of the tower, across the walkway and through the drainage channel and clipped in place behind the downpipe. This then tracks along underneath the gutter on the east side of the Jacobean Mansion section of the castle, down a further downpipe and along the ground into the Drum Castle office.

The exact method of attaching the cables to the gutters and downpipes is likely to be by a discreet cable ties and clips but this will only be confirmed once the cabling company are able to carry out the install. Care and attention will be taken not to overload the existing gutters and downpipes and to keep attachments to the minimum necessary.



Fig.14 Proposed cabling along cap house gutter and across walkway to downpipe



Fig.15 Proposed cabling from downpipe, behind guttering and downpipe to ground level



Fig. 16 Reopen existing filled in hole through wall under window into NTS office



Fig.17 Internal office area adjacent to window for equipment cabinet.



Fig. 18 Dotted section of proposed trenching route to avoid doorstep and drain cover

Currently this will involve the reopening of a small hole below the window cill, from where it is anticipated that it will be connected into an IT cabinet in this room. However, until the existing fill is removed, we are unable to ascertain whether there is already an existing hole that runs through the thickness of the wall. If this proves not to be the case, the cable will need to be routed through the window frame instead. After discussion it was considered the more appropriate option would be to try and use an existing hole, but due to the thickness of the walls and the unknown depth of the hole (assumption is it does go all the way through), it may not be possible to reopen and drill through, in which case the window frame presents the next best option.

Cable 3 (orange)

The third cable will run from the equipment cabinet back under the timber stair up through the doorway and run underneath the cap house gutter on the north sides of the tower, across the walkway and through the drainage channel and clipped in place behind the downpipe on the north elevation to where it meets the Brewhouse roof in the Courtyard building complex, where it will follow the line of an existing cable along the ridge across the holiday flat roof and into the Tower Store above the courtyard pend.



Fig.19 Cable route shown in orange. From cap house gutter across walkway to downpipe



Fig.20 Cabling route from downpipe across bewhouse roof, holiday flat roof and into Tower Store above pend.



Fig. 21 Line of proposed cabling down from hopper, along ridgeline into Tower Store.

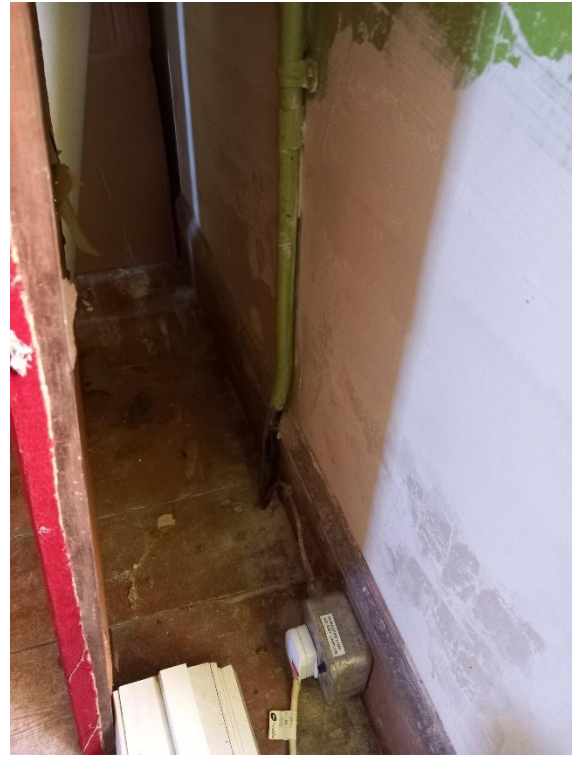


Fig. 22 Location of cable into the Tower Store, where new equipment cabinet will be sited.

Three new lead clips will be made on each side of the cap house walkway to hold the cables in place to avoid a trip hazard and to present a neat solution holding the cable in the corner of the step to minimise visual impact, as is already the case for the lightning conductor cables on either side of the tower.



Fig. 23 Example of existing lead clip holding cable in place across lead covered walkway

Trenching & Archaeology

The small section of cabling required to be trenched has been discussed and agreed by the NTS Archaeologist in full consultation. The cable will be laid 300mm under the ground. A Written Scheme of Investigation (WSI) has been prepared and is submitted along with this application, and a watching brief will be undertaken during the works by a suitably qualified archaeologist (Cameron Archaeology).

The area of ground to be dug is adjacent to the east elevation of the castle for a distance of approximately 7 metres projecting away from the wall to travel around the stone doorway and drain. However the exact trenching route may vary depending on anything found underground during the works and will be adjusted accordingly with the advice of the archaeologist.

Protected Species

Bats and jackdaws are known to be present in the area of the Old Tower. The NTS Rangers closely monitor this activity. The Tower has a known hibernation roost. There are known areas of activity on other areas of the Castle. None of the cabling is going through any roof spaces. There will be a new hold drilled on the roof access doorway and all cabling as part of this project is external to the castle running over the roof spaces until point of entry. The main Starlink equipment cabinet will be located on the timber stair of the main hall.

The cabling contractor will be made aware of the presence of potential bats in the Tower and a toolbox talk will be delivered to ensure the correct procedures are followed, in consultation with NTS Rangers and if necessary, a licenced bat worker.

Heritage Impact

The proposals have been designed to have a minimal impact upon both the historic fabric of the castle, the setting of the Tower, and the overall historic significance of the Category A listed building.

The receiver dish will largely not be visible or noticeable from ground level due to it being set back behind the crenulations of the tower and also from certain angles, set behind the chimney stack. The most visible elevation will be on the west side, and what will be most visible is the metal bands holding the receiver in place. These will be powder coated in a colour to match the chimney render as closely as possible to minimise the visual impact. The west side of the chimney can be seen from the approach to the castle from the visitor car park into the courtyard, but not from any other approach, therefore it is important that the metal bands blend in with the chimney stack.

There will be no interference to the historic skyline of views through and across the crenulations of the tower from ground level.

Currently there is no open access to the tower, although the layout internally enables this to be a possibility at some point in the future. The proposed cabling would not interfere with achieving this and would not pose a health and safety risk. Whilst the receiver would be clearly visible from the parapet walkway, it would not be accessible due to its height above the roof. Views between the crenulations across the Drum estate would not be interrupted by the receiver due to it being set back from the walkway.

All cables will be grey and black in colour and will be largely hidden from view behind downpipes and gutters. Care will be taken to attach the cables in a way that does not damage rainwater goods. For the purposes of illustration the cables have been given three different colours on the plans.

The proposals aim to balance the need to improve digital infrastructure, operational connectivity and impact upon historic fabric and the heritage significance of Drum Castle.

The requirement for the receiver to face south, limited location options. Consideration was given to a finding a discreet location on the southern elevation of the Jacobean wing, but the visual impact of the receiver on this elevation was considered to be detrimental to the character of the building at this location. Other locations lower down on the south side of the building meant the line of sight to the Starlink satellite would be obscured by trees around the south lawn.

Whilst the Tower is the most significant part of the castle in terms of built heritage, it is also the highest point. The significance of the tower lies in its construction, its historic association and that it has been largely unaltered over time. None of these important elements would be impacted upon by the proposal, although it is accepted that from the parapet walkway, there is a visual impact. However, the crenellations enable the cap house roof and chimney to be screened from ground level to the north, east and southern elevations and from the west (visitor car park approach) the receiver would not be seen, but it may be possible to identify the metal bands around the chimney stack.

The work is completely reversible and would leave little if any trace if removed in the future as technology develops.

Conclusions

The IT project undertaken by the NTS to upgrade the internet infrastructure at its properties is a challenging one; one that aims to balance the operational requirements of the site, which generate valued income to the Trust, with impact upon important historic fabric and historic settings, protected by heritage designations. Drum Castle is located in an area that will not benefit from the Scottish Government's R100 Programme for fibre broadband connection, which has meant other solutions being explored. Starlink internet offers a good solution for Drum. This does require the installation of the satellite receiver to be located at the highest part of the Castle, with a clear view of the southern sky.

The visual impact upon the setting of the Tower will be minimal due to the siting of the receiver behind the chimney. Whilst the supporting metal straps may be visible from some angles, this is balanced against the benefits of the receiver not being physically fixed into the chimney structure, which will cause no damage to the fabric. Views of the chimney are limited to the western approach.

The physical impact upon the building is also minimal, making use of existing downpipes, gutters and ridgelines, following sight lines that already exist around the building. Where a small number of interventions are required to route cables through the doorframe of the Cap House and potentially the office window, care will be taken to only make holes that are the smallest necessary. There are some locations where there is no alternative route.

The proposed installation will not lessen the significance of the Castle or Old Tower, nor would it detract from the characteristics and historic association that gives the Old Tower its significance.

References

The Castellated and Domestic Architecture of Scotland from the Twelfth to the Eighteenth Century, David MacGibbon and Thomas Ross, Edinburgh 1887

[Statistical Accounts of Scotland \(edina.ac.uk\)](https://edina.ac.uk) [accessed 1/4/24]

Historic Environment Scotland listing description [DRUM CASTLE \(LB3113\) \(historicenvironment.scot\)](https://historicenvironment.scot) [accessed 1/4/24]

Historic Environment Scotland Inventory of Gardens and Designed Landscapes [DRUM CASTLE \(GDL00141\) \(historicenvironment.scot\)](https://historicenvironment.scot) [accessed 1/4/24]