POST & WIRE BIRD DETERRENT SYSTEM
Royal Exchange Theatre, Manchester
Project: Royal Exchange Theatre
Address: St Ann's Square, Manchester, M2 7DH
Building: Royal Exchange
Heritage Status: Grade II Listed Building
Historic England List Entry: 1200826
Target Species: Pigeons and Gulls
Access: Existing Construction Site Scaffold
Proposed Fixing: Eco Environmental 25 mm Nylon Masonry Rivet – PW209/PW210
System Manufacturer: Eco Environmental
Document Status: Technical / Tender Installation Proposal
Revision: JT01
Preliminary Wire Allowance: 3,000–3,500 lm
Tender Working Quantity: 3,250 lm

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1. PROJECT DESCRIPTION

The works comprise the supply and installation of a discreet Eco Environmental Post & Wire bird deterrent system to selected external ledges, parapets, cornices, sills, architectural projections and other suitable bird-landing surfaces at the Royal Exchange Theatre in Manchester.

The system is intended to deter pigeons and gulls from landing and roosting on vulnerable areas of the building.

The works are to be undertaken from the existing construction-site scaffold.

The Royal Exchange is a **Grade II listed building, Historic England List Entry 1200826**. The listing covers the former Royal Exchange and associated addresses including St Ann's Square, Cross Street, Market Street, Exchange Street and Royal Exchange Arcade. Historic England describes the building as a very large island-site building with an east-west arcade, central atrium, Darley stone elevations, three glazed domes, giant Corinthian order, massive entablature, modillioned cornice, balustraded parapet and a Baroque turret.

The Royal Exchange Theatre itself confirms that it occupies the Grade II listed Royal Exchange building in Manchester.

Because of the listed status and architectural significance of the building, the installation shall be undertaken as a minimum-intervention, discreet and reversible bird-control installation wherever practicable.

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2. DESIGN INTENT

The design intent is to provide effective bird deterrence while:

- Minimising physical intervention into the listed fabric.
- Avoiding unnecessary drilling.
- Protecting significant stonework and architectural details.
- Keeping the system visually discreet from ground level.
- Protecting the complete usable bird-landing surface rather than merely its outer edge.
- Using appropriate pigeon and gull components.
- Allowing future removal for building maintenance.
- Avoiding interference with drainage and other building services.
- Maintaining safe access for future maintenance.

Post & Wire system is as a discreet, low-impact solution suitable for high-profile buildings where appearance is important, including ledges, parapets, roof ridges, signs and handrails.

3. HERITAGE REQUIREMENTS

The Royal Exchange is protected under the Planning (Listed Buildings and Conservation Areas) Act 1990. Historic England records the building as Grade II listed, List Entry 1200826.
Before installation, the Contractor shall confirm that all necessary heritage approvals and consents are in place.

No permanent fixing shall be installed until the proposed fixing locations have been reviewed and accepted under the project's heritage approval process.

3.1 Heritage principles

The installation shall:

1. Use existing suitable fixing locations where available.
2. Use the smallest practical fixing.
3. Prefer mortar joints for new masonry fixings where structurally and technically appropriate.
4. Avoid drilling directly into significant stonework wherever practicable.
5. Avoid carved stone, mouldings, architectural sculpture and decorative features.
6. Avoid fixing through leadwork, roof coverings or glazed elements.
7. Avoid damage to cornices, parapets and balustrades.
8. Avoid blocking or penetrating rainwater drainage routes.
9. Maintain reversibility as far as reasonably practicable.
10. Keep the system visually subordinate to the architecture.

The use of a nylon/plastic masonry rivet is proposed to minimise the size and permanence of the fixing, but the use of a plastic rivet does not remove the requirement for heritage approval.

4. BUILDING ELEVATIONS

For the purpose of the bird-control survey and installation, the building shall be divided into the following provisional elevation zones:

Reference	Elevation / Area	Preliminary Allowance
E01	St Ann's Square	650 lm
E02	Cross Street	550 lm
E03	Exchange Street	650 lm
E04	Old Bank Street	450 lm
E05	St Mary’s Gate / Market Street side	450 lm
E06	Internal arcade / atrium areas	300 lm
E07	Turret / specialist architectural features	200 lm
	TOTAL	3,250 lm

These are provisional tender allowances, not measured quantities.
The final quantity shall be established from the scaffold-level survey.

Historic England confirms that the listed building encompasses multiple elevations and addresses around the island site, including Old Bank Street, Royal Exchange Arcade, St Ann's Square, Cross Street, Market Street and Exchange Street.

5. ELEVATION PHOTOGRAPHIC SURVEY

A full photographic survey shall be undertaken from the construction scaffold before final setting out.

Each elevation shall be photographed in overlapping sections.

The photographic survey shall identify:

- Ledge locations.
- Cornice profiles.
- Parapets.
- Sills.
- Horizontal projections.
- Existing bird activity.
- Existing nests.
- Existing fixings.
- Masonry condition.
- Mortar condition.
- Drainage outlets.
- Architectural details.
- Proposed post locations.
- Proposed wire routes.

Photo schedule

E01 – St Ann's Square
Photographs shall cover the complete principal elevation, including the main entrance, upper storeys, cornices, parapets and horizontal architectural projections.

E02 – Cross Street
Photographs shall cover the complete elevation and all accessible ledges and horizontal surfaces.

E03 – Exchange Street
Photographs shall cover the full elevation and associated returns.

E04 – Old Bank Street
Photographs shall cover the full elevation and accessible architectural ledges.

E05 – St Mary's Gate / Market Street
Photographs shall cover the relevant elevations and returns.

E06 – Internal Arcade / Atrium
Separate photographs shall be taken of internal ledges and horizontal surfaces where bird activity is identified.

E07 – Turret / Specialist Features

Detailed photographs shall be taken of the Baroque turret and other particularly significant architectural features. Internet photographs and archive photographs shall be treated as reference information only. Final post locations shall be determined from current scaffold-level photographs and measurements.

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6. PROPOSED SYSTEM

The installation shall use the Eco Environmental Post & Wire system.

Eco Environmental' s system consists of thin stainless-steel wires tensioned by springs and supported on stainless-steel posts. The pigeon and gull systems use different wire, posts and springs because gulls require heavier components.

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7. PIGEON SYSTEM

The proposed pigeon system shall comprise:

- 0.45 mm diameter stainless-steel wire with protective plastic/nylon coating.

- 304 stainless-steel posts.
- Standard Eco Environmental springs.
- Nickel-plated crimps.
- Eco Environmental 25 mm masonry rivets.
- Appropriate end anchors/counter-tension arrangements.

Eco Environmental specifies:

- Front/leading wire height: approximately 90 mm.
- Subsequent row wire height: approximately 110 mm.
- Maximum post spacing: 1.5 m.
- Minimum one spring per 1.5 m run.
- Maximum parallel row spacing: approximately 65 mm for complete ledge protection.

For masonry installations, Eco Environmental identifies the 25 mm masonry rivet PW209/PW210 as the post anchorage method.

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8. GULL SYSTEM

The proposed gull system shall comprise:
- 0.96 mm diameter stainless-steel wire.
- 304 stainless-steel gull posts.
- Eco Environmental micro springs.
- 1 mm copper crimps.
- Eco Environmental 25 mm masonry rivets.
- Appropriate end anchors/counter-tension arrangements.

Eco Environmental specifies:
- Leading-edge wire height: approximately 160 mm for masonry.
- Subsequent wire height: approximately 160 mm.
- Maximum post spacing: 3 m.
- Minimum one spring per 3 m run.
- Maximum parallel row spacing: approximately 100 mm for the referenced system.

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9. COMPLETE LEDGE PROTECTION

A critical installation requirement is that the complete usable bird-landing surface is protected.
The system shall not simply be installed around the outside perimeter of a deep ledge.
Eco Environmental's installation information states that the complete ledge or feature should be protected rather than just the outer perimeter. For pigeons, a second-third-fourth parallel row is positioned approximately 35 mm behind the front row, with subsequent rows no more than 65 mm apart. For gulls, parallel rows are limited to approximately 100 mm apart.

This requirement is particularly relevant to the Royal Exchange because of its extensive architectural ledges, parapets, cornices and horizontal projections.

The final number of wire runs shall therefore be determined from the actual depth and profile of each ledge.

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10. PROPOSED MASONRY FIXING

The proposed masonry fixing is:
Eco Environmental 25 mm Nylon Masonry Rivet
PW209 / PW210
Eco Environmental specifies installation of the masonry rivet into a 6.5 mm diameter hole approximately 25 mm deep, with approximately 20 mm of the post contained within the rivet.
Heritage installation procedure

1. Mark approved fixing position.

2. Confirm the location is within an approved mortar joint or other approved substrate.
3. Confirm masonry is sound.
4. Confirm the location is clear of significant architectural detailing.
5. Drill the specified hole carefully.
6. Control dust and debris.
7. Insert the nylon masonry rivet.
8. Install the stainless-steel post.
9. Confirm the post is secure.
10. Photograph the completed fixing.

No fixing shall be installed into defective or friable mortar without further assessment.

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11. POST SPACING

The maximum Eco Environmental spacings shall be treated as design limits rather than targets.

Pigeons
Maximum:
1.5 m centres
Posts may be installed closer where required by:

- Ledge geometry.
- Corners.
- Returns.
- High bird pressure.
- Changes in level.
- Heritage constraints.
- Wire tension requirements.

Gulls
Maximum:
3.0 m centres
Posts may be installed closer where required.
Eco Environmental specifically requires a spring at each post/run section rather than simply passing the wire continuously through the post eyelets. This distributes the load and helps prevent sagging.

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12. POST ARRANGEMENT

For pigeon protection of deeper ledges, Eco Environmental specifies multiple rows.
Typical arrangement:
Front row → 35 mm → second row → subsequent rows at maximum 65 mm centres.
Posts on neighbouring parallel rows should be staggered so that birds cannot straddle aligned posts.
For gulls, parallel rows shall be arranged at a maximum approximately 100 mm apart in accordance with the selected system.
The final arrangement shall be adjusted to suit the actual ledge width.

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13. WIRE INSTALLATION
The Eco Environmental installation procedure shall be followed.
For each wire section:
1. Install the post.
2. Attach the spring to the post.
3. Measure the required wire length.
4. Cut the wire with sufficient allowance for termination.
5. Attach the first end to the designated post.
6. Pass the wire through the spring at the next post.
7. Apply light, controlled tension.
8. Crimp the wire securely.
9. Continue from post to post.

10. Install the final end anchor.
11. Confirm the wire is straight and correctly tensioned.
12. Remove excess wire.
13. Ensure there are no sharp exposed ends.

Eco Environmental's installation guide specifically recommends individual spring-tensioned sections and warns against simply threading wire continuously through post eyelets.

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14. CORNERS AND RETURNS

At corners:

- Posts shall follow the architectural geometry.
- Wire shall not be forced around sharp corners.
- Individual wire runs shall be used where necessary.
- Additional posts shall be installed where required.
- Springs shall be used to maintain controlled tension.
- Excessive tension shall not be applied to historic masonry.

Corners shall be individually inspected before the installation continues.

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15. TURRRET AND SIGNIFICANT ARCHITECTURAL FEATURES

The Baroque turret and other prominent architectural features shall be treated as specialist areas.
Historic England specifically identifies the Baroque turret at the north-west corner and the building's giant Corinthian order, entablature, modillioned cornice, balustraded parapet and domes as significant architectural elements.
No standard drilling detail shall automatically be applied to these features.
A separate fixing proposal shall be prepared where necessary.

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16. GLAZED DOMES AND ROOF FEATURES

The listed building includes three glazed domes.
The bird-control installation shall not:

- Drill through glazing.
- Drill into leadwork without approval.
- Penetrate roof coverings.
- Interfere with roof drainage.
- Fix directly to significant roof fabric without a specific approved detail.

Any bird-control requirement around the domes shall be separately assessed.

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17. SCAFFOLD ACCESS

All works shall be carried out from the existing construction scaffold.
The scaffold shall:

- Have been formally handed over.
- Have current inspection records.
- Provide safe access.
- Have suitable guardrails and toe boards.
- Provide adequate working platforms.
- Provide adequate working space.
- Be suitable for the anticipated loading.

Bird-control operatives shall not alter the scaffold.
Any requirement for modification or additional access shall be referred to the scaffold contractor.
Tools and small components shall be secured against falling.

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18. HEALTH AND SAFETY

The works shall be undertaken in accordance with the approved project RAMS and applicable UK legislation.
Principal hazards include:

- Work at height.
- Falling persons.
- Falling tools/materials.

- Scaffold access.
- Drilling.
- Dust.
- Noise.
- Hand tools.
- Bird fouling.
- Biological contamination.
- Adverse weather.
- Existing services.
- Historic masonry damage.

Operatives shall be competent and appropriately trained.

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19. BIRD AND WILDLIFE CHECK

Before installation:

- Inspect for active nests.
- Inspect for chicks/eggs.
- Inspect for roosting birds.
- Check for bats and other protected species.
- Record existing bird activity.
- Identify the target species.

If active nesting or protected wildlife is found:
STOP WORK IN THE AFFECTED AREA.
Notify the Site Manager and obtain appropriate ecological advice before continuing.

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20. PRELIMINARY WIRE QUANTITY

For tender and budget purposes, the project shall allow:
3,000–3,500 LINEAR METRES
of post-and-wire bird deterrent wire.
The recommended working/tender quantity is:
3,250 LINEAR METRES

This increased allowance recognises that the Royal Exchange is not a simple perimeter installation.

The building has:

- Multiple elevations.
- Deep architectural ledges.
- Cornices.
- Parapets.
- Returns.
- Recesses.
- Horizontal architectural projections.
- Multiple storeys.
- Internal arcade areas.
- Central atrium areas.
- Areas potentially requiring multiple parallel wire rows.

Eco Environmental specifically states that the complete ledge/feature should be protected, rather than merely the outer perimeter.

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21. PROVISIONAL SPECIES SPLIT

For tender purposes:

System	Allowance
Pigeon Post & Wire	2,000 lm
Gull Post & Wire	1,250 lm
TOTAL	3,250 lm

The final split shall be adjusted following the scaffold survey and assessment of actual bird activity.

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22. ELEVATION ALLOCATION

The provisional 3,250 lm shall be allocated as follows for tender purposes:

Elevation	Allowance
E01 – St Ann's Square	650 lm
E02 – Cross Street	550 lm
E03 – Exchange Street	650 lm
E04 – Old Bank Street	450 lm
E05 – St Mary's Gate / Market Street	450 lm
E06 – Internal Arcade / Atrium	300 lm
E07 – Turret / Specialist Features	200 lm
TOTAL	3,250 lm

These quantities shall be regarded as provisional.

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23. POST QUANTITY

Post quantities should not be calculated simply from the total wire quantity because the Royal Exchange will contain multiple parallel runs.
For tender purposes, an initial allowance may be adopted as follows:
Pigeon posts
Allow approximately:
1,350–1,500 nr
This allowance assumes multiple parallel runs and a maximum nominal spacing of 1.5 m.
Gull posts
Allow approximately:
425–475 nr
This allowance assumes multiple gull runs and a maximum nominal spacing of 3 m.
Total provisional posts
Approximately 1,775–1,975 nr
Final post quantities shall be measured from the actual wire-run layout.

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24. MASONRY RIVETS

Allow approximately:
2,000 nr Eco Environmental 25 mm masonry rivets
This is a provisional tender allowance only.
Final quantity shall be calculated from the number of posts actually required.
Eco Environmental identifies PW209/PW210 masonry rivets for both pigeon and seagull masonry installations.

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25. SPRINGS

The spring requirement shall correspond to the actual number of wire sections and post locations.
Eco Environmental requires:
Pigeon
Minimum one spring per 1.5 m run.

Gull
Minimum one spring per 3 m run.
The final spring quantity shall therefore be calculated from the measured wire-run schedule rather than simply from total linear metres.

26. PRELIMINARY MATERIAL SCHEDULE

Item	Preliminary Allowance
Pigeon wire	2,000 lm
Gull wire	1,250 lm
Total wire	3,250 lm
Pigeon posts	1,350–1,500 nr
Gull posts	425–475 nr
Total posts	1,775–1,975 nr
Masonry rivets	2,000 nr provisional
Pigeon springs	TBC from final runs
Gull springs	TBC from final runs
Pigeon crimps	TBC
Gull crimps	TBC
End anchors / screw pins	TBC

27. TENDER BOQ DESCRIPTION

The following description shall be used for tender purposes:
Supply and installation of Eco Environmental Post & Wire bird deterrent system to the Royal Exchange Theatre, Manchester, including pigeon and gull systems, stainless-steel posts, appropriate stainless-steel bird wire, springs, crimps, Eco Environmental 25 mm masonry rivets, end fixings, setting out, drilling, installation, tensioning, cutting, termination and completion inspection, all from the existing construction scaffold. Allow a provisional total of 3,250 linear metres, with an overall quantity range of 3,000–3,500 linear metres. Installation to be carried out in accordance with the manufacturer's technical requirements and approved heritage/conservation details.

28. HERITAGE-SENSITIVE WORKING METHOD

The Contractor shall establish a sample installation area before proceeding with the complete works.
The sample shall demonstrate:

- Fixing method.
- Drill size/depth.
- Masonry rivet.
- Post installation.
- Wire height.
- Spring arrangement.
- Wire tension.
- Visual appearance.
- Distance from architectural features.

The sample shall be inspected and approved before the installation proceeds across the remaining elevations.

29. PROTECTION OF HISTORIC FABRIC

During installation:

- Protect stone surfaces from drilling debris.
- Use controlled drilling.
- Avoid unnecessary impact.
- Do not enlarge holes.
- Do not drill cracked masonry.

- Do not drill deteriorated mortar without approval.
- Do not use unapproved adhesives.
- Do not use aggressive cleaning methods.
- Remove all drilling debris.
- Remove all wire offcuts.
- Prevent dropped objects.
- Do not modify historic architectural features.

Any accidental damage shall be reported immediately.

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30. DRAINAGE AND SERVICES

The completed system shall not obstruct:

- Rainwater outlets.
- Gutters.
- Downpipes.
- Scuppers.
- Overflow outlets.
- Ventilation openings.
- Existing services.
- Maintenance access.

Where a proposed wire route conflicts with drainage, the wire shall be locally diverted.

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31. MAINTENANCE

The completed system shall be inspected periodically.
Inspection shall include:

- Loose posts.
- Broken wire.
- Loss of tension.
- Damaged springs.
- Damaged crimps.
- Damaged rivets.
- Corrosion.
- Bird nesting.
- Accumulated debris.
- Damage caused by other contractors.
- Damage to surrounding masonry.

Eco Environmental identifies the system as capable of being removed and reinstalled for building maintenance, which is particularly beneficial for a heritage building.

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32. COMPLETION INSPECTION

The completed installation shall be inspected elevation by elevation.
The inspection shall verify:

- Correct system.
- Correct wire.
- Correct post type.
- Correct post spacing.
- Correct wire height.
- Correct spring arrangement.
- Correct tension.
- Secure crimps.

- Secure rivets.
- No sharp wire ends.
- No damage to masonry.
- No obstruction to drainage.
- Acceptable appearance.

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33. PHOTOGRAPHIC RECORD

The following photographs shall form part of the completion documentation.
Elevation photographs

- E01-01 to E01-XX – St Ann's Square.
- E02-01 to E02-XX – Cross Street.
- E03-01 to E03-XX – Exchange Street.
- E04-01 to E04-XX – Old Bank Street.
- E05-01 to E05-XX – St Mary's Gate / Market Street.
- E06-01 to E06-XX – Internal arcade / atrium.
- E07-01 to E07-XX – Turret / specialist features.

Detail photographs

- D01 – Typical pigeon fixing.
- D02 – Typical gull fixing.
- D03 – Masonry rivet.
- D04 – Typical post.
- D05 – Spring connection.
- D06 – Wire termination.
- D07 – Typical corner.
- D08 – Multiple parallel wire rows.
- D09 – Heritage-sensitive installation.
- D10 – Completed elevation.

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34. AS-INSTALLED ELEVATION DRAWINGS

The final project record shall include elevation drawings/photographic elevations showing:

- Pigeon wire – Blue.
- Gull wire – Red.
- Post locations – Dot / symbol.
- Masonry fixing points – Small circle.
- End termination – Triangle.
- Areas excluded from installation – Hatched.
- Heritage-sensitive areas – Amber.

Each elevation shall include its measured wire quantity.

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35. FINAL MEASUREMENT SCHEDULE

The following shall replace the provisional schedule once the scaffold survey is complete:

Elevation	Pigeon lm	Gull lm	Total lm	Pigeon posts	Gull posts
E01 – St Ann's Square	TBC	TBC	TBC	TBC	TBC
E02 – Cross Street	TBC	TBC	TBC	TBC	TBC
E03 – Exchange Street	TBC	TBC	TBC	TBC	TBC
E04 – Old Bank Street	TBC	TBC	TBC	TBC	TBC
E05 – St Mary's Gate / Market Street	TBC	TBC	TBC	TBC	TBC
E06 – Internal Arcade / Atrium	TBC	TBC	TBC	TBC	TBC

E07 – Turret / Specialist	TBC	TBC	TBC	TBC	TBC
TOTAL	TBC	TBC	TBC	TBC	TBC

36. KEY INSTALLATION REQUIREMENTS

The following requirements are mandatory:

1. Royal Exchange Theatre is a Grade II listed building.
2. All permanent fixing locations require the appropriate project/heritage approval.
3. Use Eco Environmental Post & Wire system or approved equivalent.
4. Use the appropriate pigeon system for pigeon areas.
5. Use the heavier gull system for gull areas.
6. Use Eco Environmental 25 mm masonry rivets for approved masonry fixing.
7. Prefer mortar joints where practicable.
8. Do not drill significant architectural stonework without approval.
9. Protect the complete bird-landing surface rather than only the outer edge.
10. Pigeon post spacing: maximum 1.5 m.
11. Gull post spacing: maximum 3 m.
12. Pigeon parallel rows: maximum approximately 65 mm.
13. Gull parallel rows: maximum approximately 100 mm.
14. Spring-tension each wire section.
15. Stagger posts on parallel runs.
16. Maintain drainage routes.
17. Protect historic fabric.
18. Undertake all works from approved scaffold access.
19. Complete a photographic elevation survey.
20. Provide as-installed elevation drawings and quantities.

37. FINAL PROVISIONAL QUANTITY

For the current tender/technical proposal:
TOTAL POST & WIRE ALLOWANCE: 3,250 LM
with an acceptable preliminary range of:
3,000–3,500 LM
Provisional split:
Pigeon: 2,000 lm
Gull: 1,250 lm
The quantity is deliberately based on the anticipated requirement to protect multiple parallel rows and the complete depth of suitable ledges, rather than simply the external perimeter of the building.
The final quantity shall be confirmed by detailed scaffold-level measurement.

Materials:















