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| Committees | Dated: |
| Hampstead Heath Consultative Committee Hampstead Heath, Highgate Wood & Queen's Park | 09/03/2015 23/03/2015 |
| Subject: Hill Garden Pergola | Public |
| Report of: The City Surveyor (CS 044/15) | For Information |

Summary

The Hill Garden Pergola is regarded as a hidden gem of Hampstead Heath and is much loved by visitors as well as now being used increasingly for weddings and civil ceremonies as well as filming events.

This report sets out the issues affecting the condition of the Pergola and the works that are currently planned to address safety. Further reports will be prepared to obtain financing for the extensive major works required to deal with the long term deterioration which is mainly due to damp penetration.

Recommendation

Members are asked to note the report.

Main Report

Background

1. The Superintendent of Hampstead Heath presented a previous report on Maintenance Works and Future Proposals at the Hill Garden & Pergola to the Hampstead Heath Consultative Committee on 12 November 2013.
2. This report has been prepared following questions raised at the Consultative Committee meeting on 7 April 2014 when a report of what works were planned for the Pergola was requested.
3. The City Surveyor has commissioned historical research and condition reports from consultants including The Morton Partnership and Alan Baxter Associates over recent years. The report summarises the historic background and sets out an overview of the current condition of the Pergola with priorities for future remedial works.
4. The City Surveyor has undertaken remedial works to the Pergola which have been primarily driven by the need to address health & safety concerns. These include making safe to timber superstructure and repaving. The report identifies the further works required at the Pergola.

Current Position

Historical background to the Hill Garden Pergola

5. The Hill Garden Pergola, located on West Heath, was constructed between 1905 and 1925. The main building, known as The Hill or Hill House, was acquired by William Hesketh Lever, Lord Leverhulme in 1904. He began redevelopment work which continued up to his death in 1925, including enlargement of the house and its gardens.
6. Three phases of the works to the gardens and Pergola were carried out by Thomas H. Mawson, a renowned landscape architect whose importance had been recognised by being appointed President of the Royal Town Planning Institute in 1923 and, in 1929, the first President of the Institute of Landscape Architects. Mawson's association with the Hampstead Heath Pergola is integral to its historic significance.
7. The site was unaltered whilst in the subsequent ownership of Lord Inverforth although the house was renamed as Inverforth House. After Lord Inverforth's death in 1955 the house and surrounding gardens were given to Manor House Hospital. Inverforth House was home to the Orthopaedic Society Hospital from the 1950s to the 1980s.
8. Following an unsuccessful attempt by the hospital to develop the site, the western section of the Pergola was offered to the London County Council who purchased it in 1959. Restoration was carried out and this section of the garden and Pergola were opened to the public in 1963. The eastern section had been left to deteriorate. In 1971 the hospital also handed over responsibility for this section to the Greater London Council who took over all responsibilities relating to maintaining the upper parts and planting in return for allowing public access to this section as well.
9. The Pergola was listed as Grade II* in 1978. The listing describes it as a "colonnaded pergola constructed of paired and single Doric columns of Portland stone carrying a timber pergola superstructure imitating a Doric entablature" with a "solid brick screen wall on north side" and "tiled pavement; approached by balustrade steps at north-west end from the northern garden and with steps on the south side." It adds a historic note that "the terraces were constructed using spoil from the Hampstead Tube excavations" and has "views south across Hampstead Heath woodland and at western end into northern garden."
10. In 1985 the Greater London Council purchased the remainder of the structure, that they had previously not owned, and 1.5 acres of the surrounding land separating the ownership of the structure and gardens from Inverforth House. 1986 saw the abolition of the Greater London Council and ownership of the Pergola was eventually transferred to the City Corporation in 1989.
11. The acquisition came at an unfortunate time as The Great Storm of 1987 had left much of the Pergola in a badly damaged state. The City Corporation began a programme of restoration costing £1.4m. The western section (known as section

2 in this report) was left untouched as it was considered to be in a much better condition having been better maintained whilst in local authority ownership since 1960 and also less damaged by the storm. Extensive restoration works were undertaken to the eastern section (known as section 1) and the Pergola in its entirety was opened to the public in 1995.

12. The Pergola became a licenced venue for weddings and civil ceremonies in 2013. Four ceremonies took place in 2014 and there are 15 bookings for 2015.

Description and layout of the Pergola

13. The Pergola comprises a high level walkway approximately 250m long lined by stone columns and containing several staircases. A number of varied small structures and features are contained within the Pergola creating a complex and challenging building to maintain and manage. The largest and most visually significant areas are the Belvedere structure which includes the Belvedere viewing terrace; oak domed and tent-shape structures supported on stone columns; the paved walkways with integral planters; a bridge built over the public footpath and a copper roofed cupola. At ground level a large internal walkway has a brickwork façade containing arches, a rotunda, a steel spiral staircase and store rooms.

14. The eastern section of the Pergola immediately adjacent to Inverforth House is referred to as section 1. The western section, from the bridge to the belvedere structure, is referred to as section 2. Please see Appendix 1 for a plan of the Pergola showing its relationship to Inverforth House and the Hill Garden.

15. The land owned by the City Corporation extends by one metre into the grounds belonging to Inverforth House to allow access for maintenance from this side to section 1 of the Pergola. The north boundary of section 2 abuts the rear of private residential properties in Inverforth Close.

Condition report

16. The condition report is set out in the following sequence. It starts with section 1 (the eastern section next to Inverforth House) with issues reported sequentially from higher level downwards. Items common throughout the Pergola are generally reported in section 1. Photographs to illustrate the condition report are included in Appendix 2.

17. Section 1: Pergola timber superstructure

The Pergola timber superstructure comprises decorative oak horizontal beams and cross beams with raised domes and tent type features, specifically The Temple and The Summer Pavilion. These were rebuilt as part of the 1995 reconstruction works.

The individual oak members of the timber superstructure have undergone quite extensive movement such as shrinking, bowing and twisting which is typical of unseasoned timber. Some timber features, such as the balls and finials, have

rotted. A series of repairs were carried out in 2012 including replacing rotten parts, checking and tightening all open joints, and fitting steel straps across weak joints.

The condition of the pergola timber superstructure will be regularly monitored. The entire superstructure is planned to be refurbished or replaced in about 10 years' time although its condition will be monitored to try to maximise its life whilst it is in a safe condition.

18. Section 1: Stone columns

Stone columns are located throughout the Pergola. These are a mixture of original columns made from Portland stone and replacement columns made from reconstituted stone. The columns are located on the upper walkways of the Pergola and form a fixing platform for pergola timberwork superstructure. The timberwork and the stonework are fixed together with a centrally located dowel in the head of columns. A lead capping has been fitted to separate the oak timber section from the Portland stone to form a barrier to alleviate the acid attack that is evident in section 2.

The general condition throughout section 1 is good with only small isolated repairs currently required. The additional lead capping detail has proved successful and there are no further works deemed necessary, except for general minor repairs, as and when they are required.

19. Sections 1 & 2: Stone balustrades

Stone balustrades are also located throughout and, along with the metal railings, provide edge protection to the raised garden structure. The original balusters were made from Portland stone but all replacements have been made from reconstituted stone.

The stonework has been fixed using a centrally located ferrous dowel. A number of the balustrades are showing signs of decay such as spalling and cracking; this is probably due to the corrosion and expansion of the ferrous metal dowels.

English Heritage suggested, in a report dated 1989, that all the balustrades should be dismantled and the dowels replaced with a non-ferrous metal type and the reconstituted stone replaced with Portland stone. It is not considered that the defect is so serious that this work is warranted although the City Corporation monitors safety with regular inspections and will carry out spot repairs as and when they are required.

20. Section 1: High walkway paving and planting beds

The paving slabs sit on sleeper walls suspended over a void above a structural slab. The void space contains planting beds for the ornamental plants and climbers growing through the Pergola. The growing medium (earth) is not held in containers and, together with plant root systems, has spread. There is no effective waterproofing membrane between the voids and the structure of the Pergola. There is an irrigation system which has, together with rainfall, resulted in

extensive water penetration into the structure.

The condition of the planting beds and walkway surfaces are satisfactory but the absence of effective waterproofing is causing deterioration of the structure below particularly to the brickwork and steel beams.

A tanking system should be introduced within the planters to contain the root systems and water from the irrigation systems, together with an effective method of draining excess water from the void area. The existing planting will need to be removed to enable these works. These works should be undertaken in advance of any full scale renovation projects.

21. Sections 1 & 2: Metal railings & gates

Metal railings and gates provide edge protection and a physical boundary barrier to the neighbouring private grounds of Inverforth House and where the walkway is raised above higher ground. The condition is generally fair but a small number of base fixings into stonework are showing signs of corrosion.

The City Corporation monitors safety with regular inspections and will carry out repairs when required. The railings will be redecorated through the cyclical maintenance programme and at the same time check and carry out any repairs to fixings that are required.

22. Sections 1 & 2: Brickwork

The lower level walkway of section 1 has an arcaded brick wall adjoining the lower garden area with arches supporting the upper level walkway. In section 2 brickwork wall support the walkway where this rises above ground level. The bridge is also faced with brickwork. Large areas of brickwork are heavily weathered and have been affected by efflorescence. The most significant areas of damage are the brick arches, circular windows in section 1. Some of the previous repairs are of poor quality, e.g. the use of hard cement mortar and facing where the surface of the bricks has laminated. The brickwork generally needs repointing.

The defects present are generally associated with water ingress from the upper walkways, the age of the brickwork and the exposed location of the Pergola. A consequential result of this damage could eventually lead to structural defects. The water ingress should be remedied. Damaged areas of brickwork should be rebuilt, particularly features that have structural properties such as the arches and circular windows.

23. Section 1: False windows

The original window openings in the brickwork walls were lost when structural remedial works were carried out in 1995 as the rooms and spaces in the lower walkway were filled with mass concrete. The windows have been replicated in the form of false windows comprising brickwork details and a recessed rendered panel decorated in a *trompe l'oeil* effect.

Several of the false windows were re-rendered and repainted in April 2013 and are in good condition. The remainder are now in need of similar treatment.

24. Section 1: Lower walkway and the retaining wall to Inverforth House grounds

The rear wall of the lower walkway is a structural retaining wall holding back the higher level grounds to Inverforth House. This retaining wall was rebuilt as part of the 1995 renovation work project and at the same time the ground level was reduced by forming a dry moat type feature. Water will build up on the reverse side of the retaining wall and this should be allowed to drain away somehow but it is unclear how this was designed.

There is minor cracking in the inner face of the retaining wall and water pressure has formed seepage routes which are unsightly but are not of cause for concern in respect of the structural stability of the wall. There are no simple solutions to alleviate the water seepage problem and as this is of relatively minor concern to visitors it is not intended to undertake any remedial works however the situation will be monitored.

25. Section 1: Rotunda

The rotunda is the brick drum shaped structure that is located at the change of direction in the south length of the Pergola. The rotunda has suffered structural damage evident as cracking at high level and movement away from the main walls. An attempt to remedy this is also evident in the form of a steel beam.

Recent structural investigations conclude that the movement is likely to be the result of thermal expansion and contraction over the length of the Pergola but it is not regarded as significant and the cracks have actually introduced expansion joints. They have recommended that any attempt to tie the rotunda back should be avoided. The cracks and movement will be monitored. The openings will be filled with non-structural weatherproofing jointing material.

26. Section 1: Lower walkway steel beams

Steel beams have been fitted to the underside of the upper walkway structural slab. These steel beams are suffering from corrosion and adjacent concrete is spalling. This is probably as a consequence of the non-effective waterproofing system to the voids containing planting beds and an irrigation system.

The waterproofing system beneath the upper level walkway should be made effective and incorporate drainage to discharge incident water. The steel surfaces should be adequately prepared to receive a new durable protective coating and the spalling concrete should be repaired. The steel beams should be regularly monitored.

27. Section 2: The bridge

The bridge spans over the footpath leading from Inverforth Close to the West Heath area. It is formed by a brick masonry arch faced in stonework bonded back to the arch. Minor repairs, such as repairs to cracked stonework keystones,

brickwork replacement and repointing to open joints, were carried out in 2011. At this time it was found that water ingress had caused corrosion in the steel dowels in the key stones.

The structural condition of the bridge is monitored regularly, it is considered to be stable, however some of the conditions affecting other parts of the Pergola, such as water ingress from the walkway, the condition of brickwork and balustrades also affect the bridge.

28. Section 2: Pergola timber superstructure

The pergola timber superstructure comprises oak horizontal beams and cross beams. This is the original timberwork, now almost 100 years old. It is of a more elegant, less decorative, design than the replacement timberwork in section 1. The timbers are very decayed with some of the original timber details lost with age. Many of the beams are now missing. The remaining beams have been secured with plastic straps as a temporary measure. The timberwork forms an integral part of the structure of the colonnade; connecting the tops of the columns. The weakness in the timberwork therefore has an adverse effect of the structural integrity of the colonnade.

Although the timberwork is regularly monitored the colonnade area is closed to visitors during high wind conditions because of concerns with the safety (as noted in the Superintendent's 2013 report). Overall the timberwork is overdue for replacement with new oak timber to match the original design. The timberwork should be replaced conjunction with repairs to the columns as part of any restoration project.

29. Section 2: Stone columns

Portland stone columns form a colonnade walkway supporting a timber superstructure. The structural integrity of the stone columns has been affected by the decay of the timber superstructure which should fix into the columns to provide lateral support. The stonework itself is in generally reasonable condition but has been affected by acid attack to the capitols and fixing dowels due to lack of separation with the oak timbers.

The timberwork should be replaced as noted already in this report. At that time the decay to the stonework due to acid attack should be addressed. It is likely that this will require replacement sections of stone with new non-ferrous dowels. The lead separating detail, used in section 1, should be replicated when this work is undertaken in section 2.

30. Section 2: Raised level paving and planting beds and staircases

Where the Pergola colonnade approaches the Belvedere viewing terrace, at the western end of section 2, the Pergola rises above natural ground level and forms a two-storey structure with a viewing terrace and shelter above with store rooms below. There are paving slabs and planting beds situated over the lower level accommodation. It is suspected that the waterproofing in the structure is not effective and this is causing dampness in to the structure.

At this location there are also a number of staircases. The main staircase descends along the line of the viewing axis towards the Hill Garden whilst minor staircases lead back to ground level on either side of the Pergola and the Belvedere structure. Some of these minor staircases lead to locked doors or to areas that are out of bounds to visitors. Some of the redundant store rooms, which have open mesh windows, are sometimes inhabited by bats. There are also minor staircases either side of the Pergola in section 1 near the bridge.

The condition of the planting beds and walkway surfaces are satisfactory but the absence of effective waterproofing is causing deterioration of the structure below. The staircases are in a poor condition. The stonework has been affected by damp and vegetation growth with cracked risers and treads and poor quality previous repairs. There are also signs of structural movement. Some of the timber doors are decayed.

Waterproofing works were carried out in March 2014 to an area forming part of the staircase up to the Belvedere Structure. The structural slab and severely corroded reinforcement was replaced with waterproof tanking. Remedial works to the main staircase between the Belvedere and the Hill Garden are planned for later this year (2015/16) as part of the cyclical maintenance programme. The entrance to the Belvedere structure store room requires re-rendering once the dampness problem has been resolved and allowed to dry out.

Waterproofing works such as tanking should also be carried out to the raised structural slabs above the store rooms and other accommodation on the lower level. This should incorporate a means of containing the planting beds and draining away of surplus irrigation water. The existing planting will need to be removed to enable these works. These works should be undertaken in advance of renovation works to lower levels. This work can be followed with remedial works to rendered surfaces and redecorations in the lower level store rooms.

Remedial works to the staircases including replacement of stonework or realignment of treads and risers, together with replacement of decayed timber doors would enable these to be put back in to use and reopened to visitors.

31. Section 2: Paving to colonnade

The colonnade walkway is an attractive design of brick paviours and stone slabs. The central part of the walkway, mainly consisting of brick paviours, had suffered settlement probably due to root damage over the years resulting in ponding and, in winter, icy conditions that made the Pergola unsafe for visitors. The brick paviours were re-laid in 2013 as part of the cyclical maintenance programme.

The condition of the paved surfaces will be monitored and local repairs undertaken as necessary. The stone slabs will be taken up and re-laid to alleviate possible future damage due to root growth as part of the overall restoration of the section 2 Pergola.

32. Section 2: Party wall to properties in Inverforth Close

The wall between the rear of the colonnade and the residential properties in Inverforth Close has a top coping course formed of brickwork and tiles. (A coping course is an impervious layer that will shed rainwater thus preventing dampness entering the structure.) Some of the residential properties have greenhouses abutting this wall on their side. The brickwork and tiles forming the coping course have become loose with age. These have been removed along the length of this wall to avoid falling on visitors or into neighbouring gardens.

The top of the wall needs to be repaired or rebuilt as necessary and to incorporate an adequate coping course. This work will need to be carried out in consultation with the adjoining owners of the residential properties in Inverforth Close. Works such as this are undertaken under the provisions of the Party Wall Act 1996. These works should be carried out as part of the restoration project.

Recent, current and planned maintenance and repair works

33. Repairs and associated works carried out to the Pergola, since 2011, include: repairs to the keystones and repointing to brickwork to the bridge; repairs to the oak timber superstructure to section 1; replacement rainwater pipes; rendering and decoration to false windows; repaving works; and making safe the coping stones. These works cost a total of approximately £135,000.

34. Monitoring works are on-going as noted in the condition report. This includes the following elements of the Pergola: stone balustrades, metal railings, retaining wall, rotunda, steel beams, timber superstructures, the bridge, and to the paved walkways. The monitoring is undertaken by staff and consultants. Any issues of concern are addressed or reported for remedial works as appropriate.

35. Estimates for works at the Pergola are included in the City Corporation's forward maintenance plan. The estimates, set out below, for 2014/15 and 2015/16 have been approved and are part of the Additional Work Programme. The estimates for future years (in italics) are not approved and are subject to review. Capital funding in future years will be significantly constrained and a suitable business case will need to be made to secure financing.

| Description | 2014/15 | 2015/16 | 2016/17 | 2017-2022 |
|------------------------------------|----------------|----------------|----------------|------------------|
| Repairs to Belvedere staircase | £150,000 | | | |
| Redecorations to stores & shelters | | £10,000 | | £5,000 |
| Investigative surveys | | £10,000 | | |
| Monitoring | | £2,000 | | £6,000 |
| Major repairs | | £100,000 | £100,000 | |
| Refurbishment section 2 | | | £20,000 | £750,000 |
| Repairs to cracks | | | £4,000 | |
| Major repairs | | | | £1,800,000 |
| Totals | £150,000 | £122,000 | £124,000 | £2,561,000 |

36. Remedial works to the staircase and waterproof tanking to the slabs in the Belvedere structure are being planned to be carried out later this year (2015/16), as noted previously, from the £150,000 provision in the 2014/2015 Additional Work Programme budget provision.
37. The provisions totalling £200,000, in years 2015/16 & 2016/17, for major repairs have been assigned for the renewal of the timber superstructure and stone columns in section 2. This will address the current safety concerns and the need to have to close parts of the Pergola at times.
38. The large sums, totalling £2,550,000, in the forward maintenance plan for years 2017 to 2022, will be subject to the City Corporation's Operational Property Review and the Project Gateway approval process. This will be for the works identified in the condition report that are needed to address the major repairs required stop the long term deterioration of the Pergola and are summarised below:
- Waterproofing works to sections 1 and 2
 - Remedial works to staircase and store rooms to section 2
 - Remedial works to columns in section 2
 - Brickwork repairs to section 1
 - Steel beams to section 1
 - Copings to party wall works to section 2
 - Stone paving relaying to section 2
39. Further reports will be developed as the major works proposals are developed in more detail. These will include cost estimates, programming and the implications on access to the Pergola during construction periods.

Conclusion

40. The condition report identifies essential remedial works on both sections of the Pergola. Some work is being undertaken through the Additional Works Programme but major works are required that will need to be funded through the capital programme including major problem which is the rectification of damp penetration through the walkways and planters into the structure of the Pergola.

Appendices

- Appendix 1 – plan of the Pergola
- Appendix 2 – photographs

Background Papers

- Report of Maintenance and future proposals at the Hill Garden & Pergola, report of the Superintendent of Hampstead Heath to the Hampstead Heath Consultative Committee on 12 November 2013.

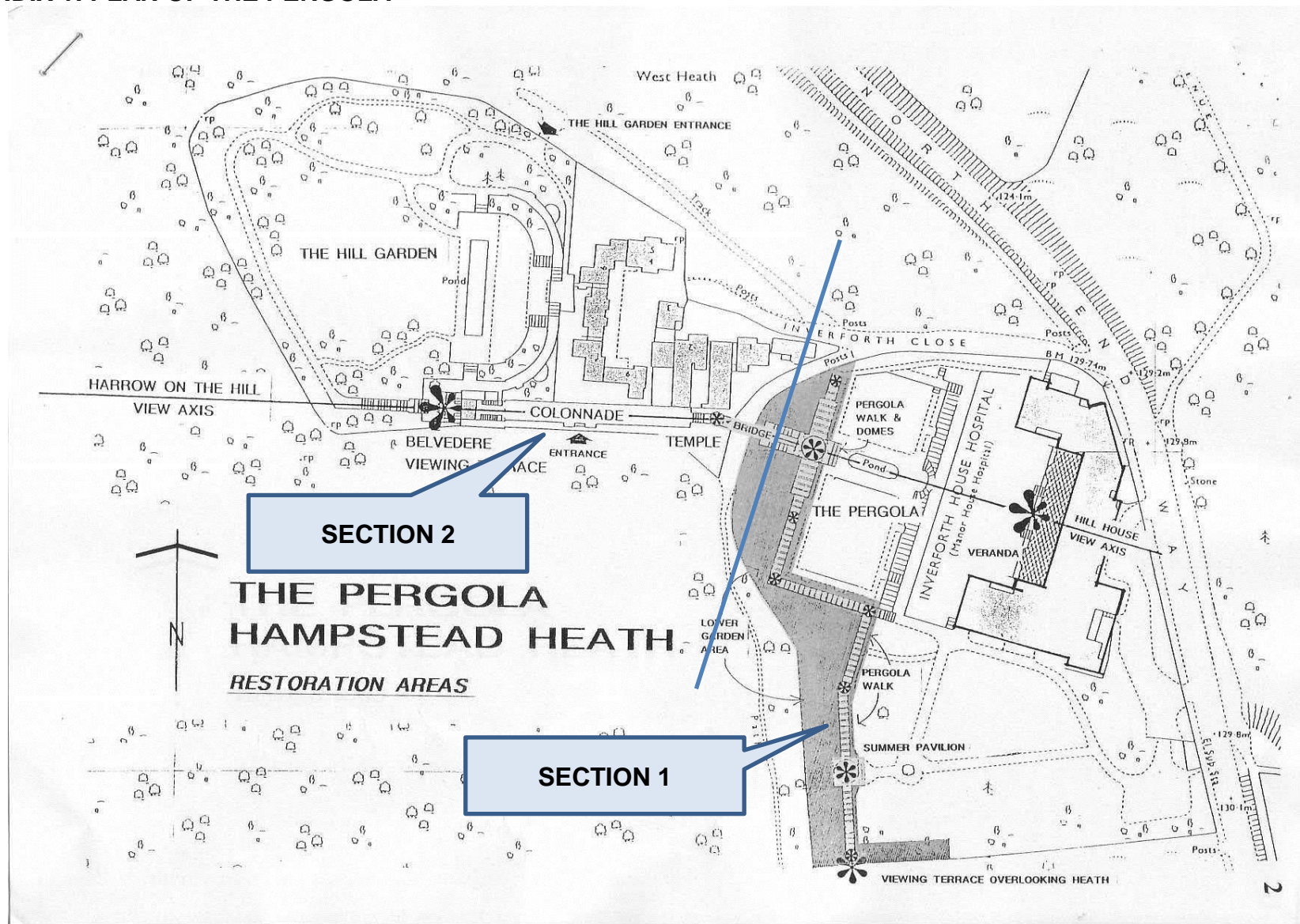
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APPENDIX 1: PLAN OF THE PERGOLA



APPENDIX 2: PHOTOGRAPHS



Section 1: dome shaped timber superstructure



Section 1: showing opening of joints in the timber superstructure



Section 1: showing upper level walkway with stone balusters and columns and planting beds which extend into the void between the paved surface and the structural slab.



Section 1: Brickwork arcade to lower level walkway showing deterioration due to dampness.



Section 1: brickwork deterioration around a circular window feature and efflorescence below the level of the structural slab to the walkway.



Section 1: The rotunda feature showing unsightly efflorescence.



Section 2: The false windows after renovation in 2013.



Section 2: water seepage through the retaining wall.



Section 2: showing timber superstructure with decayed and missing sections.



Section 2: showing decayed timbers and acid attack to Portland stone column from oak timbers.



Section 2: showing renewed brick pavements and planting beds set into the structure.



Section 2: general view showing renewed brick pavements.



Section 2: cracked staircase at the Belvedere structure which will be repaired as part of the 2015/16 cyclical maintenance programme.



Section 2: one of the minor staircases showing cracked treads.



Section 2: repairs to Belvedere stair platform undertaken in 2014.



Section 2: The Bridge