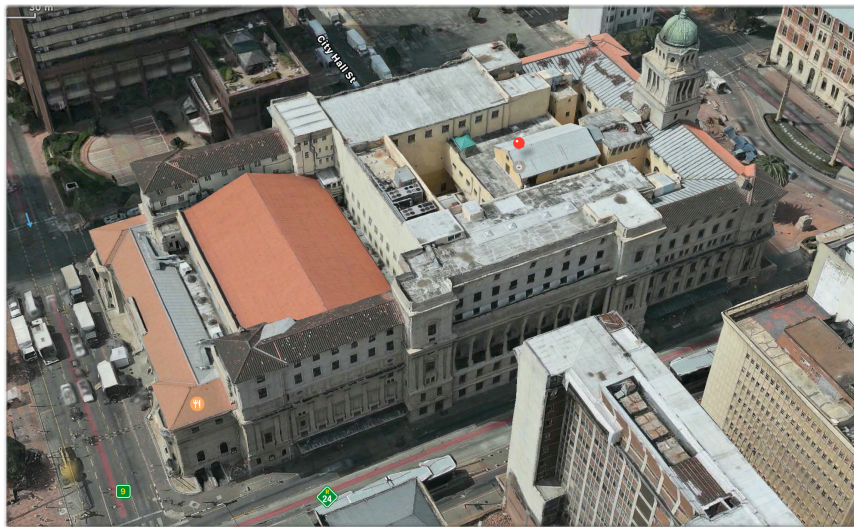




# **GAUTENG PROVINCIAL LEGISLATURE CONCRETE & SHEETED ROOF WATERPROOFING REPAIRS**

**TECHNICAL SPECIFICATION**

OCTOBER 2018



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## 1. EXECUTIVE SUMMARY

Gauteng Provincial Legislature appointed Masande TVNA Consulting Engineers to investigate the condition of the roof waterproofing, and to develop a solution to address the present leaking and damage to internal finishes.

The site is located between Albertina Sisulu, Harrison, Helen Joseph and Rissik streets in Johannesburg CBD.

The building is classified as a heritage site, and is subjected to the restrictions, controls and approvals of the Provincial Heritage Resources Authority - Gauteng (PHRA-G). An application was lodged with PHRA-G for the proposed work, and is subject to their approvals and conditions.

The work comprises of three workgroups, namely:

- a) Concrete flat roofs to be waterproofed, with waterproofing of stone cladding joints,
- b) Pitched corrugated metal roofs to be waterproofed, and gutters replaced.

All necessary safety measures as required by the OHSA are to be included and provided.

## 2. GENERAL INFORMATION

### 2.1. Client's Details

Gauteng Provincial Legislature Address:	Corner Albertina Sisulu & Rissik Private Bag X52 Johannesburg 2000
Telephone:	011-4985902
Email:	nkamungoma@gpl.gov.za

### 2.2. Consulting Engineer's Details

MasandeTVNA Consulting Engineer Reg. No. CK/2000/026749/23	
Address:	173 St Georges Road, Observatory Johannesburg 2198
Telephone:	011-4873467
Fax:	0866831358
Email:	theo@masandetvna.co.za
Responsible Person:	T.E. van Niekerk
Registration Number:	950627

## 3. TERMS OF REFERENCE

Gauteng Provincial Legislature appointed Masande TVNA Consulting Engineers to investigate the condition of the roof waterproofing, and to develop a solution to address the present leaking and damage to internal finishes.

The building is classified as a heritage site, and is subjected to the restrictions, controls and approvals of the Provincial Heritage Resources Authority - Gauteng (PHRA-G). An application was lodged with PHRA-G for the proposed work, and is subject to their approvals.

### 3.1. SITE INFORMATION

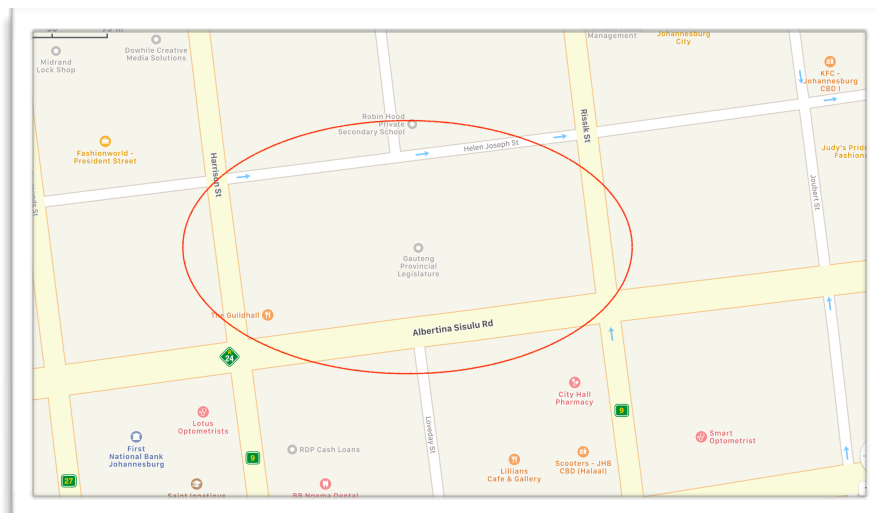
#### 3.1.1. SITE DESCRIPTION

The site comprises one building with a collection of roofs in terms of heights, finishes and construction. The roofs are grouped into three, namely flat concrete roofs, clay tiled pitched roofs, and sheet metal pitched roofs. Refer to the schematic below for the grouping clarification.



### 3.1.2. LOCALITY MAP

The site is located between Albertina Sisulu, Harrison, Helen Joseph and Rissik streets.



### **3.2. SCOPE OF WORKS**

The project comprise the following three main work groups:

- Temporary access scaffolding and safety structures,
- Treatment of the concrete flat roofs and related elements,
- Treatment of the metal pitched roofs and related elements.

The groups are detailed further as follows:

#### **3.2.1. Concrete roofs**

The scope of work for this work group comprise the following:

- a) Erect safety measures as required,
- b) Strip existing torched-on waterproofing and dispose,
- c) Demolish screeds where falls are insufficient,
- d) Apply new screeds to improved falls,
- e) Clear all fullbore drains, and of blocked, inspect by camera for repairs,
- f) Apply new spray-on waterproofing coating with adequate side laps,
- g) Strip existing joint seals and grout from parapet copings and stone cladding, and reseal with correct waterproof grout
- h) Remove redundant brackets and fixings from walls and roofslab, and seal the holes,
- i) Scratch open plaster cracks, clean and seal cracks, apply waterproofing membrane and repaint walls,
- j) Seal around all roof skylights.
- k) Maintain the lightning conductor on all parapets, test and certify upon completion by specialist subcontractor.

#### **3.2.2. Sheet Metal Roofs**

The scope of work for this work group comprise the following:

- a) Erect safety measures as required, including all approvals from local council if using pedestrian walkway space,
- b) Strip existing waterproofing seals and coatings, and dispose,
- c) Remove and dispose all gutters and downpipes,
- d) Clean, inspect, repaint and seal existing metal sheeting,
- e) Replace all loose screws and fixings,

- f) Seal all valleys, hips and ridges,
- g) Install new profile rolled aluminium gutters and downpipes,
- h) Reinstate lightning conductors in place where applicable.

## 4. TECHNICAL SPECIFICATIONS

### 4.1. Flat slab roof

The plant room area where the rooftop chillers and other mechanical equipment is positioned is considered confined, with difficult accessible sections. Therefore an elastic spray-on product is required to ensure proper coverage throughout around the chiller areas.

For the remainder of the flat slabs, where the existing torched-on is still reasonable, an ew multi-layer torched-on solution is required.

#### **FOR PLANT ROOM AREA:**

- Strip and dispose of existing waterproofing material.
- Remove all oils, grease or other contaminants by scrubbing, rinsing and cleaning to produce a water break-free surface. Abrade surfaces where necessary by etching, blasting or grinding.
- Inspect roof falls for proper drainage, and identify areas where screeds must be modified.
- Apply new screed to minimum 1% falls to outlets, with crystalline add-mixture to supplier's application. Internal corners should be coved to 50mm and external corners radiused to 25mm. All exposed brickwork, where the waterproofing is to be terminated, must be plastered to a smooth and true finish
- Apply a polyurea-polyurethane spray-on application waterproofing membrane, Stoncor Stonechem 441 or Bitumproof Inopaz H2O or similar approved. (If any alternative is offered, comprehensive comparative specifications must be provided to demonstrate matching properties). Specifications attached in **Annexure B & C**

#### **FOR REMAINDER OF FLAT ROOFS:**

- Existing torch-on membrane must be washed and scrubbed well, as to remove all contaminants from the surfaces.
- A full and thorough inspection of existing membrane must be done. Any areas of existing membranes deemed to have delaminated from the surface, or that has become brittle from UV exposure and the elements, are to be removed completely. If these areas exceed 20% or more of existing areas, then it is recommended to remove all existing membranes in a specific area.
- Replace and patch all areas where existing membrane has been removed with a single (or double) layer of Prostruct 1001 x 4mm plain, after priming with Prostruct 201.

- All overlaps, penetrations and outlets on existing waterproofing are to be checked and resealed to ensure a watertight seal, should there be any visible signs of delaminating.
- All previously coated aluminum coatings are to be removed by heating up the surface, and mechanically removal thereof means before placing new waterproofing membranes.
- Internal corners should be coved to 50mm and external corners radiused to 25mm. All exposed brickwork, where the waterproofing membrane is to be terminated, must be plastered to a smooth and true finish. A minimum surface tensile strength of the substrate of at least 1.5 MPa and a minimum moisture content of 5% is required.

• **TEMPERATURE:**

- Apply all waterproofing products only in fair weather when air and surface temperature are above +5°C.

• **PRIMING:**

- Prime all prepared surfaces to be waterproofed with Pro-Struct 201 Bituminous Primer, including all verges, and around outlets and protrusions at a coverage rate of 3 to 5m<sup>2</sup>/litre. Allow the primer to dry until tack free, ensuring all solvents have evaporated. Extremely porous surfaces should be re-primed.
- Prime only the area which will be covered with membrane in the same working day.
- Areas not covered with membrane in 24 hours must be re-primed.

• **MEMBRANE APPLICATION:**

- Apply a 300mm wide gusset strip of Pro-Struct 1001 4mm Plain, centrally at all floor screed and wall junctions.
- Dress all full-bore outlets with a single layer of Pro-Struct 1001 4mm Plain.
- Seal the entire full-bore outlet with Pro-Struct 203 Rubberised Bitumen Emulsion Reinforced with Pro-Struct 599 reinforcing membrane (as per the Technical Data Sheet for Pro-Struct 203).
- Apply a the First layer of Pro-Struct 1001 4mm Plain, dual reinforced with a non-woven polyester membrane and a woven glass mesh composite.
- Fully bond the membrane, by heat fusion, onto the primed area.
- Side laps of 75mm shall be carefully sealed by heat fusion, allowing a small bead of molten bitumen to become visible at the exposed edge of the sheet.
- Seal these edges with a roller while the bitumen is still wet in a molten state.
- Do not seal these laps with a heated trowel or other tool, it does more harm than good.
- Apply a the Second layer of Pro-Struct 1001 4mm Plain, dual reinforced with a non-woven polyester membrane and a woven glass mesh composite.
- Fully bond the membrane, by heat fusion, onto the primed area.



- Side laps of 75mm shall be carefully sealed by heat fusion, allowing a small bead of molten bitumen to become visible at the exposed edge of the sheet.
  - Seal these edges with a roller while the bitumen is still wet in a molten state.
  - Do not seal these laps with a heated trowel or other tool, it does more harm than good.
  - For end laps, the underlying membrane must be heated to form a 100mm wide strip of molten bitumen. The underside of the upper sheet is also heated, laid into the molten bitumen and sealed with a roller. Do not use a heated trowel to seal these end laps.
  - Extend and fully bond the Pro-Struct 1001 4mm Plain 200mm up all vertical surfaces.
- **VERTICAL TERMINATION:**
- Counter-flash all vertical terminations with a 200mm wide strip of Pro-Struct 203 Rubberised Bitumen Flashing Liquid reinforced with Pro-Struct 599 membrane (as per the Technical Data Sheet of Pro-Struct 203). It is recommended that the top leading edge of the counter-flashing be terminated in either a reglet of the substrate (Minimum of 6x6mm joint), or a brickwork joint.
- **ALUMINIUM COATING:**
- Apply two coats of Pro-Struct 202 Bituminous Aluminium Coating to the waterproofed areas at a coverage rate of 6m<sup>2</sup>/litre/coat.
  - **Lap all sides** to suppliers' directions along all balustrades, upstands and plinths.
  - **Counter flash** all vertical terminations with a 100mm wide strip of Pro-Struct 680 Acrylic Flashing Liquid reinforced with Pro-Struct 599 membrane (as per the Technical Data Sheet of Pro-Struct 680). The top leading edge of the counter-flashing will be terminated in either a reglet of the substrate (Minimum of 6 x 6mm joint), or a brickwork joint.
  - **Flood Test and Thermal Camera inspection:** On completion of the waterproofing installation, the waterproofing contractor is to seal all outlets and flood test the area. , whereafter a thermal camera inspection must be done to verify the waterproofing. A certificate or letter is to be obtained from the main contractor establishing that the waterproofing treatment was handed over in a watertight and workmanlike manner.

#### 4.2. Sheet metal roof

This section covers all corrugate metal roofs and sheeting, other than the sheeting under the clay tiles.

- Remove the existing waterproofing strips and membranes.
- Clean the metal substrate thoroughly ensuring all dust, loose debris and other contaminants are removed
- Inspect the roof for loose or missing screws, and replace and repair as necessary.
- Seal all joints, fixings and other potential areas of water ingress of Pro-Struct 203, reinforcing it with Pro-Struct 200 Membrane, alternatively Bitumproof BP-3000 & Paz-poly membrane.

- Apply primer to suppliers specifications.
- Apply Stoncor Alumanation 301 or Bitumproof Acrylpaz Super over ENTIRE surface.
- Refit new gutters and downpipes.
- Replace the metal roof sheeting over Zone 14 with minimum 0.5mm Chromadek corrugated sheeting to match surrounding colours.
- Specifications attached in **Annexure B & C**

#### **4.3. Balustrade cladding & copings**

- Strip all existing membranes and seals from joints.
- Clean stone cladding by grit blasting to remove traces of old waterproofing and paint.
- Scratch out old grout between joints.
- Seal joints with *TREMCO PU515 low modulus polyurethane elastomeric sealant* to suppliers' directions.
- Specifications attached in **Annexure B**.
- Upon completion, appoint a specialist subcontractor to inspect, repair where necessary, test and certify the roof earthing system. All down conductors, connectors and mountings to be serviceable upon completion.

#### **4.4. Exterior walls**

- Scrape loose paint and remove.
- All cracks wider than 0.3mm are to be raked out to a width of no less than 6mm and patched with Pro-Struct 684/1.
- Clean the prepared substrate thoroughly, ensuring all loose debris, dust, existing coatings and contaminants are removed.
- Apply Pro-Struct 506 to all prepared surfaces, in strict accordance with the attached product data sheet.
- Repaint the walls to original colours.

### **5. DRAWINGS**

No formal drawings are available on the project.

The contractor must submit sketches of their proposed access and safety system for approval by the Engineer and Client prior to commencing work.

## 6. SCHEDULE OF QUANTITIES

### PREAMBLE TO THE SCHEDULE OF QUANTITIES AND RATES

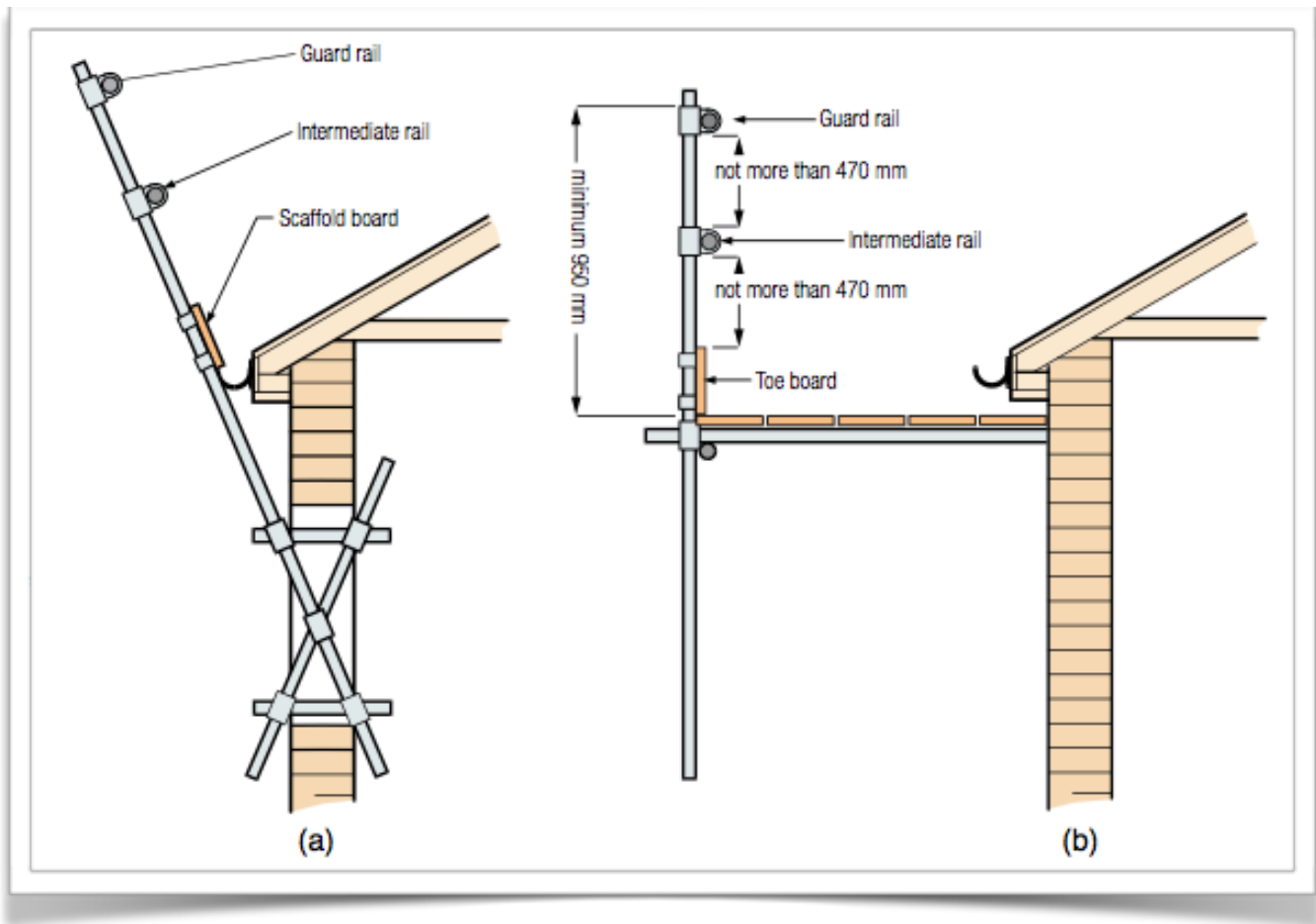
- a) The Standard Commercial Terms and Conditions, The Special Commercial Terms and Conditions, the Specifications (including the Project Specification), and any Drawings are to be read in conjunction with the Schedule of Quantities and Rates.
- b) The Schedule comprises items covering the Service Provider's profit and costs of general liabilities and of the design, manufacture, supply, installation and commissioning of temporary and permanent Works. The Proposer is at liberty to insert a rate of his own choosing for each item in the Schedule and any item against which no quantity (where applicable) or rate is entered will be considered to be covered by other items in the Schedule.
- c) The quantities and rates inserted in the Schedule are to be inclusive prices to the Employer for the work described under the several items. Such prices shall cover all costs and expenses that may be required in and for the Works, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the Tender is based. All rates and amount shall be nett, exclusive of Value Added Tax (VAT) and shall be carried to the summary page in their nett form. VAT will then be calculated on the total of the nett amounts.
- d) All quantities and rates as set forth and inserted in the Schedule and extended to the totals for each portion of the Schedule, shall be considered as being totally inclusive for the whole of the Works as stipulated, or as can reasonably be inferred from these Documents.
- e) All product guarantees are deemed to be included in the rates, and installation and application rates will include all necessary inspections and approvals to maintain guarantees.
- f) "Complete" as it is used in the Schedule means the complete system or unit as specified in the particular documents.
- g) Each item in the Schedule which is priced, shall be filled in black ink.
- h) All quantities shall be considered as final and sufficient for the work described. The Proposer shall satisfy himself as to the sufficiency of quantities but may not change quantities. Quantities shall be re-measured and payment shall be made according to the adjusted total only.
- i) In case of arithmetical errors in the multiplication of rates and quantities in the Proposal, the amount shall not be changed. In case of incorrect summation of amounts in the Proposal, the Lump Sum total shall remain fixed.

## 7. HEALTH AND SAFETY

Safety during construction is paramount, and the Contractor must adhere to the statutory construction regulations and other regulatory requirements.

The following serves as a guideline to the access and safety scaffolding:

- One point of entry will be allowed from street level. No access is allowed from inside the building.
- All roof structures must be inspected prior to erection of working platforms or scaffolding onto roof structures. Any discrepancies must be reported to the Engineer for assessment.
- Stacking of materials may only be done on roof sections able to withstand the load safely, and must be restricted to limit concentrated loads on the structure.
- **A secure means of entry and exit is essential.** A general access scaffold or tower scaffold (preferably of the stairway design) will be required to provide suitable access. A properly secured ladder is the minimum requirement for short term access.
- **Permanent security** guards or lockable gates will be required at the access point. Access to the site must be controlled and limited at all times.
- **Edge Protection Barriers:** All exposed roof edges to be enclosed with an edge protection barrier. Edge protection should include or be equivalent to:
  - a main guard rail at least 950 mm above the edge;
  - a toe board and brick guard where there is risk of objects being kicked off the edge of the platform; and
  - a suitable number of intermediate guard rails or suitable alternatives positioned so that there is no gap more than 470 mm.
- Roof parapets may provide equivalent protection but if it does not, extra protection will be required as described above.
- **Crawl boards and Roof ladders:** On sloping roofs, roof workers should not work directly on tiles, as they do not provide a safe footing, particularly when they are wet. Use roof ladders and proprietary staging to enable safe passage across a roof. It must be designed for the purpose, of good construction, properly supported, and, if used on a sloping roof, securely fixed by means of a ridge hook placed over the ridge, bearing on the opposite roof or other support. It should be used in addition to eaves-level edge protection. *Gutters should not be used to support any ladder.*
- **Work platforms:** Adequate and secure work platforms from which to carry out the work are required where necessary.
- **Fall mitigation:** Providing adequate platforms and edge protection may not always be possible or reasonably practicable. If so, safety nets, soft landing systems, or other measures may be necessary to minimise the consequences of any potential injury. If nets are used it must be properly installed by competent riggers as close under the work surface as possible to minimise the distance fallen.



- **Personal fall arrest systems:** Devices such as harnesses with a sufficiently strong anchorage points are necessary throughout, the contractor must determine where the anchorage points should be, and clearly indicate it on site. The contractor will be responsible to monitor user discipline and active monitoring for compliance.
- **Falling material:** A tidy site must be maintained to prevent material which could fall from accumulating. Material may never be thrown from a roof or scaffold, and enclosed rubbish chutes are to be used if lowering material to the ground in containers is not possible. Rubbish chutes must discharge into skips to dispose of spoil material to spoil level.
- **Public safety** must be maintained throughout, and all scaffolding and pedestrian walkways must be barricaded to prevent accidental or unauthorised access. Where necessary, the contractor must obtain permission from council to barricade sidewalks.

## 8. HERITAGE REQUIREMENTS

The Contractor will be required to comply with, and adhere to, the requirements imposed by the **Provincial Heritage Resources Authority - Gauteng (PHRA-G)**, which are, but not limited to, the following:

### 8.1. PHRA-G Conditions

- A permit will be issued prior to commencement of any work, to be read in conjunction with the PHRA-G approved plans,
- A copy of the permit must be kept on site at all times,
- The permit is subject to a general appeal period of 14 days. The permit will be suspended should an appeal be received by PHRA-G within 14 days from the date of issuing of the permit.
- No work may be done during the appeal period, until the Appeals Committee heard the case and made a decision.
- An A3 copy of the approved permit must be displayed on the main street façade for the 14 days appeal period.
- The permit is valid for two years and not transferable.
- The issuing of the permit does not exempt the contractor from other statutory applications to local authorities.
- PHRA-G must be notified when the work is completed.

### 8.2. General

- Additional caution needs to be taken when working with heritage buildings as damage can often not be repaired and items cannot be replaced.
- Movable or removable items that may be damaged or stolen during the construction process should be put into safe keeping and securely locked away. These should only be reinstalled after the completion of the project.
- No item is to be disposed of without approval of the professional team and heritage consultant.
- Any items found on site, regardless of their perceived value, should be put to one side to be assessed by the architect and heritage consultant prior to disposal.
- The site and building should be kept secure at all times.
- The buildings should be kept weather proof to prevent water damage.
- Vertical access to the roof (be it done internally or externally) should allow for the protection of existing surfaces and fittings from damage.

### 8.3. Demolition

- No demolition is to take place without prior confirmation of its extents with the Engineer.

- Any fittings recovered during demolition are to be retained and are not to be disposed of without permission from the professional team and heritage consultant.
- Chasing/chopping of existing surfaces should be limited where ever possible. Where this needs to occur it should be away from any existing fittings and decorative wall finishes (such as tiles). The extents of all chasing / chopping must be confirmed with the professional team and heritage consultant prior to the start of work.

#### **8.4. Woodwork and Timber**

- Woodwork should be protected from damage during construction.
- The balustrade of the staircase, should they be used for access, should be covered with soft board or similar covering to protect it from damage.

### **9. EVALUATION CRITERIA**

The tenders will be evaluated on the following criteria:

- a) Standard commercial compliance as per GPL Procurement Policy (submission of required statutory documentation, etc).
- b) Schedule of Quantities:
  - All line items to be priced,
  - No alterations to quantities,
  - Arithmetic correctness,
  - Comparison of individual rates to check for unusual outliers,
  - Check for omissions.
- c) Technical experience and competency of tenderer.
- d) Products proposed if deviating from specification. NOTE: The tenderer must submit a comprehensive comparison with specified materials to demonstrate compliance and equivalent performance. The Engineer will not search through spec-sheets to find justification for alternative products.

### **ANNEXURES:**

- Annexure A: Site Plans
- Annexure B: Material Specifications and Specsheets - STONCOR
- Annexure C: Material Specifications and Specsheets - BITUM-PROOF
- Annexure D: Heritage Mitigating Conditions

# **ANNEXURE A**

## **SITE LAYOUT DRAWINGS**



# **ANNEXURE B**

## **MATERIAL SPECIFICATIONS**

### **STONCOR**

**ANNEXURE C**

**MATERIAL SPECIFICATIONS**

**BITUM PROOF**

# **ANNEXURE D**

# **HERITAGE MITIGATING CONDITIONS**

## Mitigation Measures recommended in the Heritage Impact Assessment

### GENERAL MITIGATION MEASURES

- **PROTECTION** – Sufficient care needs to be taken when working on the building knowing its historic and cultural significance. Allowance needs to be made for the protection of areas from damage and theft while working including areas used for the stockpiling of material and construction waste. This is particularly true for surfaces which are exposed (the stone façade), important details and copper elements.
- **CONTRACTOR** – the demonstration of relevant experience working on historic buildings and working with the specified roof tile need to be required by the contractor as part of the tender documentation.

### SHEETING ROOFS

- Should sheeting be replaced the new sheeting should match the profile and colour of the original.
- Sheetting that is repainted should be repainted in a red oxide colour as per the original colour scheme

### FLAT ROOFS

No specific mitigation measures required

### GUTTERS

- The profile of the new gutters should match that of the original
- The gutters should be repainted in a colour to match the original

### DOWNPIPES

- Internal courtyard or roof top level downpipes should be replaced to match the original.
- External façade downpipes should only be replaced where necessary. The relining of the downpipes is preferable over replacement
- The profile of the new downpipes should match that of the original
- The gutters should be repainted in a colour to match the original

### HERITAGE WATCH LIST FOR TENDER DOCUMENTS

#### General

- Additional caution needs to be taken when working with heritage buildings as damage can often not be repaired and items cannot be replaced.
- Movable or removable items that may be damaged or stolen during the construction process should be put into safe keeping and securely locked away. These should only be reinstalled after the completion of the project.
- No item is to be disposed of without approval of the professional team and heritage consultant.

- Any items found on site, regardless of their perceived value, should be put to one side to be assessed by the architect and heritage consultant prior to disposal.
- The site and building should be kept secure at all times.
- The buildings should be kept weather proof to prevent water damage.
- Vertical access to the roof (be it done internally or externally) should allow for the protection of existing surfaces and fittings from damage.

#### Demolition

- No demolition is to take place without prior confirmation of its extents with the architect.
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#### Woodwork and Timber

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