

# RUSSELL HIGH SCHOOL PIETERMARITZBURG



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# RUSSELL HIGH SCHOOL PIETERMRITZBURG

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# RUSSELL HIGH SCHOOL, PIETERMARITZBURG

## PART 1

### 1. Introduction

The firm Robert J W Brusse Architect was commissioned in 2015 to undertake a survey of the existing buildings and prepare proposals to resolve some functional problems arising from the school's successful educational programme. The firm was also asked to investigate certain physical problems arising from the age of the historic main building.

In 2017 the firm was asked to inspect the roofs of the historic main building after a particularly severe storm, with a view to preparing a critical assessment of the structural integrity and efficacy of the existing fabric. This investigation was extended to a preliminary assessment of the condition of the principal elements of the main rooms of the same building.

On 4<sup>th</sup> December 2019, the firm was contracted by Nexor 312, trading as VNA Consulting to act as the Heritage Architect / Heritage Practitioner to provide professional services as set out in the contract between the two parties. As a first stage of that project the HA was requested to carry out an 'in depth assessment' of the historic main building to help the Project Managers establish an Order of Magnitude estimate of the costs to :

- repair existing storm damage to the historic main building,
- review and make necessary alterations and additions to the storm water management in and around the historic main building,
- restore and renovate the historic main building.

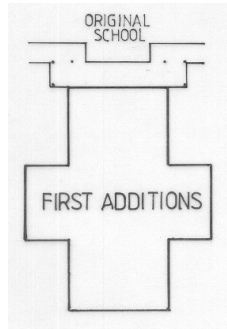
The above is intended to establish a scope of works and a preliminary budget based on these reports and the Order of Magnitude estimates.

This report outlines the results of the data collected in previous inspections, all updated and, where necessary, amplified in the most recent inspections. It does not purport to provide specifications or details of specific works that will be necessary to achieve the end objectives. A copy of these data sheets is attached hereto as Appendix A.

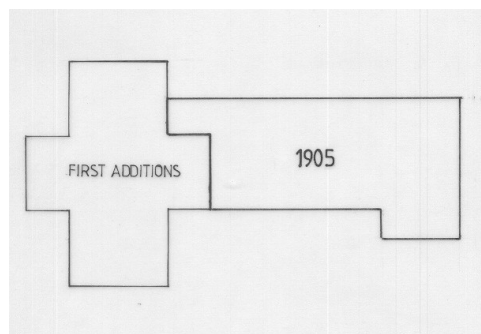
This report contains reduced copies of measured drawings prepared for the identification of existing room uses and proposed uses as agreed upon with the school authorities in previous investigations and reports. Copies of these drawings are attached hereto a Appendix B.

## 2. Background to the evolution of the historic main building

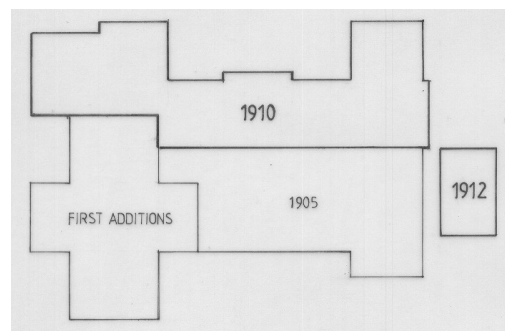
Russell High School was established in 1878 as the Girls Model School, in Berg Street. The earliest extant plans show proposals for the addition of three classrooms over new ablution facilities, to an existing building – presumably the first school building. These classrooms were converted into the current library sometime in the 1950's ; the ablutions were converted into teaching facilities shortly after the new ablution block was completed in 1913. These spaces have, most recently served as the Hospitality Services department. This building is a soundly constructed Victorian building.



In 1905 new classrooms and an assembly hall were added as a new three storied building to the south-west of the current library. This Edwardian building was designed in the best traditions of the Arts and Crafts tradition, then fashionable both in Britain and her colonies.



Five years later a new block was added to the complex, facing onto Hoosen Hafejee Street. This extension consisted of a new main entrance, the Principal's office and a series of classrooms on two levels with staircases on either end of the building. The contract drawings show that these proposals were approved by the Department of Public Work's Chief Engineer, J. F. F. Barnes in February 1910, and the contract signed on 4<sup>th</sup> April that same year.



It is very probable that the original school building, of which there are no detailed records were demolished before the commencement of this building contract.

These various additions to previously constructed buildings were not without potential problems : each addition had its own rook that was erected with little regard to the efficacy of storm water control other than via internal valley gutters; where a valley gutter couldn't resolve the junction, a false head wall was introduced; where pre-existing gutters and down pipes happened to be in the way of an addition they were incorporated into the extension, within the new rooms and boxed in.

Two years later, in 1912 a separate three storied building was constructed adjacent to the south western end of the school dedicated to ablution facilities for all scholars and staff.

During World War II (1941) the school was renamed in honour of Robert Russell, former superintendent of Education in the Colony of Natal, who had shepherded the school during its first 22 years of existence.

Several other smaller buildings were constructed throughout the grounds of the school, most of which have been demolished. However, two small buildings remain that are sufficiently old to be affected by heritage legislation and those are the 'Square Space' and part of a Staff accommodation that has been incorporated into the Maintenance Workshop. These two buildings do not form part of this report. They have been surveyed by VNA Consultant's in-house architectural team.

### **3. Summary of Significance**

As a Provincial Heritage Landmark the building is statutorily recognised and protected as being of historic and architectural significance. The three principle phases of construction of the main building – the oldest remaining portion, the 1905 additions and the 1910 additions – are all very good examples of the best architectural traditions of the day : Victoria, Edwardian Arts and Crafts, and Edwardian Neoclassical.

Situated at the corner of two city streets the building contributes significantly to the urban landscape of Pietermaritzburg.

The school has served the inner city residents of Pietermaritzburg for over 140 years, adapting itself and its scholastic environment to changing times, without losing its desire for excellence. The historic building reflects much of this ethos : a well proportioned building, appropriately designed for its teaching functions at the time, and constructed in a sound manner, that has generally stood the test of times.

A number of significant South African's received their early childhood development at this school, amongst them Dr Alan Paton, the author of "Cry the Beloved Country" and Dr Edgar Brookes, politician and respected academic. The name 'Russell' commemorates an important pioneer in the Education Department.

The building is undoubtedly of historic, architectural, urban and social importance. It deserves to be protected and maintained for the benefit of present and future generations.

## RUSSELL HIGH SCHOOL, PIETERMARITZBURG

### PART 2

#### **4. Assessment of the Internal fabric.**

##### **4.1 Introduction : Methodology**

The Building has, on three occasions, been inspected to ascertain the condition of either specific rooms, or all rooms/. In this process the architects have followed a rigorous template made up of :

- the primary elements Ceiling, Walls and Floor,
- secondary elements Cornices, Picture rails, Hat/Coat rails, Dados and Skirtings,
- the tertiary elements were the windows and doors,
- Services – Electrical, Sanitation and Plumbing etc.,
- Other – fittings or fixtures deserving of note:

The inspections of the Primary and Secondary elements were firstly carried out visually and only if there was reason to believe that there was a physical problem were the elements physically tested.

Every tertiary element – window or door – was physically tested to ascertain the degree of functional acceptability. Every window was tested to see if it could be opened, whether the sash cords were functioning and whether doors could lock.

All electrical fittings were tested as far as whether they worked or not, and all power points (plugs) were tested with an ELCB/Polarity Tester, and the findings noted. However, it remains the responsibility of the Electrical Consultant to make the final recommendation of whether the units comply with current legislation and norms.

All plumbing fittings were similarly tested and appropriate comments made.

It should be noted that the different inspections were carried out in 2015, 2017 and 2019, while the building was occupied and used by some 500 scholars and teachers. There were constant breakages and repairs, even changes of usage of rooms and one has to accept that there can be no finite record of the condition of the building – only a generalised indication of the magnitude of the need for restoration and renovation.

##### **4.2 Primary Elements :**

###### **4.2.1 Ceilings,**

There are basically three types of ceilings in the building :

- i. T & G boarding, generally restricted to the oldest portion of the building – including in the roof space over the current library. There is localised borer and termite damage in these ceilings, noted by the entomologist, which will have to be treated and significantly damaged

material will have to be replaced with matching material.

- ii. Plaster and paint applied to a ferrous scrim mesh, nailed to supporting battens, fixed to either timber cleats forming part of the floor construction, or to cleats fixed to the underside of boarding under the roof timbers. Together with similarly covered 'boxing' of steel joists it forms the principle ceiling type throughout the 1905 and 1910 additions. Generally the condition of these ceilings is sound, but where poor maintenance has allowed box gutters to fail, the ferrous scrim mesh has rusted within the plasterwork, ceased to reinforce and support the plaster and localised areas of ceiling have collapsed.  
These areas will have to be carefully stripped of plaster around the failure, back to sound scrim mesh, new scrim mesh carefully secured to sound existing material and the plaster re-applied to match the existing, before redecorating.
- iii. Plaster and paint to the underside of concrete floor slabs, which is to be found in the 1910 additions of the new ablutions under the lower and upper ground floor slabs. Generally these areas are sound, with only localised deterioration of the paint layer, possibly due to water ingress as a result of the failure of the waterproofing screed on the slab over. Such areas are to be scraped of all loose paint, wire brushed to remove all traces of moisture bourn salts, and prepared for redecorating.

Finally there is a rather unfortunate 'suspended ' ceiling over the current library which was apparently inserted to cover up some very shoddy storm water pipes, which will be removed as part of the restoration program to expose the original T & G ceiling.

#### **4.2.2 Walls,**

The internal walls of the historic building have been constructed of three to five skins of brickwork, finished with a steel trowelled two coat cement plaster. These walls have multiple layers of accumulated paint.

The walls in the ablution facilities are similarly constructed and plastered. In addition to the multiple layers of accumulated paint, there are tiled splash backs. Oil based paints have been applied over weaker water based paints, which has resulted in paint cracking and peeling back.

Throughout the building all painted surfaces should be redecorated onto properly prepared sub-bases in compliance with the architect's specifications. Tiled splash backs must be re-evaluated, where the Heritage architect considers the original tiles are appropriate, they will remain, where there has been patching with later tiles, all tiling is to be removed and

approved new tiles supplied and fixed.

#### 4.2.3 Floors,

- i, The oldest part of the building has two different floor constructions : a central portion that appears to have a 'concrete' slab construction, and two end sections that have a wholly timber construction with T & G boarding over. The South eastern portion of the timber floor construction is over a vented sub-floor void; the north western portion of this floor was over the Hospitality classroom and pantry. The latter section could be inspected from the Lower Ground Floor Hospitality classroom and pantry and appears to be sound. There are indications that the timber boarding in the south east part of the library has been compromised by termites.

Both floor constructions are currently covered with carpeting.

- ii. The balance of the main building appears to have a typically turn-of-the-century 'concrete' construction consisting of one, or more, principal ferrous metal floor joists bedded into the masonry walls, onto which are laid a series of ferrous I beams which form the support for the ends of arched corrugated iron permanent shuttering, onto which the concrete has been poured to form the 'slab'. The timber supports for the various ceiling types have been fitted to the underside of the shuttering system.

Throughout the main buildings built in 1905 and 1906 this 'concrete' construction has been finished with a herring-bone patten light oak parquet flooring. The timber appears to have been stripped within the last two decades and new dirt has accumulated along the edges of the floor and in corners. Throughout the rooms, particularly on the Upper Floor there are parquet blocks that have come loose. In one room there is evidence that regular rain water leaks have brought about a degree of rot.

It is recommended that :

- areas of loose block work must be carefully lifted, the base thoroughly cleaned and the original block relaid in a bed of hot bitumen, all by a specialist firm.
- areas of rot should have the affected blocks carefully removed, the hollows thoroughly cleaned of all dirt and fungal material, new matching parquet blocks manufactured to match the originals and relaid in a bed of hot bitumen,
- all the floors are thoroughly cleaned, given a light surface sanding, sealed and finished with three coats of a wax / paraffin mixture well worked onto the wood.



- iii. The verandah balconies have all been screeded with a composite screed made of cement, chips and a bitumastic additive. The bitumastic has partly evaporated over the past 115 years and now needs to be re-done. This is part of the historic fabric of the building and needs to be carefully taken up and reworked with additives before being relaid on each of the balconies and in the ablution facilities. Further research needs to be undertaken in this regard.
- iv. The Lower Ground Floor ablutions have a granolithic screeded floor which requires re-grinding to provide a perfectly smooth and uniform floor finish. There is one panel that appears to be a later replacement in which it appears that the grano chips have been omitted. This panel may have to be taken up and re-cast properly to match the original finish.

### **4.3 Secondary Elements :**

#### **4.3.1 Cornices,**

There are basically three different types of cornices in this building :

- i. Cement plaster moulded cornices, these vary from relatively humble proportioned copies of the more prolific PoP cornices, through to the very large cornices used in the Assembly Hall. Generally three cornices, being of a cement plaster have been little affected by the ingress of rainwater, other than the painted coating being damaged. Carefully remove all old paint sand paper smooth and redecorate to specification.
- ii. Fibre reinforced Plaster of Paris moulded cornices occur in most of the rooms in this historic building. Where these have been exposed to regular rainwater ingress the PoP has deteriorated and needs to be locally removed and replaced with new profiled lengths. It is unlikely that matching profiles can be bought off the shelf. The Heritage Architect will demonstrate how to form new profiled lengths on site. The existing lengths of PoP cornice have all been painted numerous times. The surfaces are to be thoroughly washed, carefully sanded to sound surface and redecorated according to specification.
- iii. Profiled timber cornices occur in selected areas, primarily in the oldest portion of the building. It was not possible to determine the extent of any insect infestation, but it is highly likely that this is so. Carefully remove insect infested cornices and replace with new timber profiled cornices to match. These will have to be purpose made. Remaining lengths to be carefully stripped of damaged paint and redecorated to specification.

#### **4.3.2 Picture Rails,**

Originally all rooms, other than ablutions and stairwells, would have had a picture rail all round the room. Over the years some of these have been removed, others have been crudely cut to make way for electric conduits, water pipes etc.

Where the picture rail is missing in a classroom, or a passage, office or the Library , new timber profiled picture rails, to match existing, should be supplied and fitted. In certain cases only the return section of the picture rail is missing or a relatively short length has been affected by rainwater ingress, and new portions must be supplied and fitted.

All profiled timber picture rails have been painted countless times and the profiles to ensure that all salvaged fittings be inspected by the heritage architect and approved units be reinstalled on the original windows have been partly obliterated. All sound, existing timber picture rails are to be carefully stripped with a hot air stripping gun, very carefully sanded and redecorated in accordance with the specifications.

#### **4.3.3 Hat / Coat Rails,**

Originally every Classroom would have had a timber rail on either a side wall of the back wall on which a number of simple coat & hat hooks were fixed to take pupils coats scarves and hats. This remains an important heritage element reflecting the social conditions of former times, and must remain in position. It is not necessary to re-create new ones where they are missing.

These rails with their coat and hat hooks have been painted countless times and it is recommended that the hooks are carefully taken off each rail and cleaned before being sealed in an identified plastic packet for later re-fixing. The hooks and screws can be cleaned by soaking in an approved solution of caustic soda; the timber rails should be stripped off old paint as for the Picture Rails above. Rails and hooks should be separately redecorated in terms of the specification and then re assembled as they were.

Any timber rails that are found to have deteriorated due to water ingress or insect infestation must be replaced – either locally or completely – with matching timber.

#### **4.3.4 Dado Rails,**

There are two principle types of Dado Rail – a profiled 'rail' that is formed into the plastered wall surface and a protruding rail that resembles the traditional timber dado rail, but formed in plaster or concrete. There is reason to believe that there are also some timber profiled dado rails but they are so heavily covered in layers of paint that it impossible to

determine accurately whether they are really timber.

By their very nature dado rails are intended to take impacts of different sorts and will therefore get damaged to some degree or other. The existing dado rails are to have the layer of paint removed from them and all blemishes repaired in either plaster or timber (to match the original material) to suit, before redecorating in terms of the specifications.

Particular note should be taken of the ends of plastered dado rails adjacent to door ways, which appear to have sustained the greatest degree of damage.

#### **4.3.5 Skirtings,**

There are three types of skirting in this building, an original profiled timber skirting approximately 300mm high, an original profiled plaster skirting the same profile and size and some contemporary hardwood skirtings.

By the very nature of skirtings they are intended to protect the wall from impact and consequently all the original skirtings have varying degrees of damage. All the original skirting boards have been repainted at various times with the result that the definition of the profiles has been significantly reduced and the loss of paint has seldom been adequately addressed. The surface finish in most cases is very poor.

It is recommended that all skirtings should be stripped off all existing layers of paint, repaired and redecorated in terms of the specifications.

### **4.4 Tertiary Elements :**

#### **4.3.4. Windows**

The vast majority of windows are of timber construction, purpose made for this building and typical of the windows to be found in buildings of the years 1890, 1905, 1910 and 1912. The windows consist of vertically sliding sash windows, side hung, bottom hung and top hung casements. Many of the windows have fanlights over them; in some cases there are double fanlights over sliding sash windows.

A number of classrooms in both the 1905 and the 1910 buildings have additional windows opening into the corridors to facilitate cross ventilation.

As with all other timber elements in the building, the windows have been repeatedly repainted without the previous layers of paint being reduced, or removed. Consequently, the build-up of paint layers has made the operation of many windows not only problematic, but in several cases impossible. The extraordinary size of some of the sliding sash

windows makes them difficult to lift and has necessitated the installation of a rather unique system of pulleys. In the current security climate one of the major problems is securing sash windows when they are shut, or installing an appropriate contact alarm system for detection.

The windows on the North West elevation of the 1905 building are in a much better condition than on the South East elevation, due to the protective nature of the verandahs on each floor. A number of windows on the South East elevation of the building – those facing the early morning sunshine are in a particularly poor and weathered condition, but none are beyond repair. The windows on the three exposed sides of the ablution block are all in need of attention due to lack of maintenance and exposure to inclement weather.

It is recommended that every casement and sash window be systematically removed from its frame, selectively sorted into those that require only the stripping of existing paint, from those that require disassembly, stripping and re-gluing, before being serviced and repainted. It is estimated that at least  $\frac{1}{4}$  of the windows will require the latter restoration process.

Great care must be exercised :

- to remove existing glass before any stripping of paint ensuring, a minimum of breakage as the glass must be considered part of the heritage fabric,
- to carefully remove all existing brass-ware and fittings (including all screws) from each window to be sealed in individual clear plastic bags, each clearly identified to the particular window number before any work is commenced on site. These sealed bags are to be kept under strictly monitored, 24 hour security by the Main Contractor.
- to ensure that all salvaged fittings be inspected by the heritage architect, and approved units be reinstalled on the original windows.

#### **4.4.2. Doors,**

An interesting feature of the doors in this school is that almost every door between a passage and a room has been designed to include a glazed portion to facilitate the safe passage from room to corridor, and allow for supervision of the room without entry. The majority of internal doors have a fanlight.

There are doors that are set flush with the inner face of the classroom, which have been fitted with standard profiled timber architraves. Generally these doorways have also been fitted with door-linings. The doors that open onto the balconies are set in the middle of the

brickwork, and have no architraves. In General all internal doors have been painted – only the Main Entrance Door has ben stripped down to natural timber and varnished.

The historic building contains a remarkably large number of its original brass-ware : finger plates, key hole escutcheons, some brass door handles, but very few original locks. Several doors have been 'fixed' in a totally inappropriate manner and will require additional attention.

There are number of solid framed, ledged, braced and batten doors, generally restricted to entry doors and 'service' rooms on the Lower Ground Floor. Some retain vestiges of the original ironmongery, all of which must be carefully restored and maintained.

There are a number of four panel partition doors in the ablutions which originally had historic indicator bolts, but many have been removed. It is recommended that the remaining historic indicator bolts are concentrated in one area, and that contemporary indicator bolts are supplied to the other two toilets.

It is recommended that every door is systematically removed from its frame, selectively sorted into those that require only the stripping of existing paint only, from those that require disassembly, stripping and re-gluing, before being serviced and repainted. It is estimated that at least  $\frac{1}{4}$  of the doors will require the latter restoration process.

Great care must be exercised :

- to remove existing glass before any stripping of paint ensuring, a minimum of breakage as the glass must be considered part of the heritage fabric,
- to carefully remove all existing brass-ware and fittings (including all screws) from each door to be sealed in individual clear plastic bags, each clearly identified to the particular door number before any work is commenced on site. These sealed bags are to be kept under strictly monitored, 24 hour security by the Main Contractor.
- to ensure that all salvaged fittings be inspected by the heritage architect, and approved units be reinstalled on the original doors.

## **4.5 Services.**

### **4.5.1 Electrical Services,**

It is highly improbable that electric services were incorporated in the original construction of the school. Inspection of the roof spaces has shown only a single incidence of cotton wound wire and that was over the present library. Either subsequent electricians have been

super efficient in removing all old wiring, or there was never any extensive electrification in the years before 1920. When electricity was introduced into the building it was clearly an after thought with almost all the wiring being done down surface mounted conduits. In later years a variety of round and square plastic conduits have been added as and when the need arose.

Each Classroom has been provided with fluorescent ceiling lighting (generally 3 of four double units), two plug points, two ceiling fans, an overhead digital projector and a heater-fan. Almost every Classroom has a computer station which is powered via a series of extension cables and a multiplug – quite clearly the latest attempt to update an inadequate system. We have been advised that the mini Distribution boards in each classroom are a direct consequence of the over loading when the heater fans were used – we have also been advised that the heater fans are no longer required.

The roof paces are littered with I T, intercom and security alarm cabling laid out in an alarmingly unprofessional manner. Many of these services have subsequently been drilled through the cornices and glued to any stable surface that is convenient. In a word the electrical reticulation is not acceptable and inappropriate for this building

Arising from discussions held with the nominated electrical consultant it is recommended that :

- all existing light fittings are replaced, providing a uniform energy efficient type of fitting for the classrooms and appropriate lighting to office and circulation spaces.
- All Classrooms are provided with a plug point at both the front and the back of each classroom as well as a plug point near the position that the teachers now occupy with their computers – generally below the window closest to the front of the classroom.
- In specialised classrooms where more power points are required investigate the use of power-skirtings located behind timber skirting board, or plain 'dado rails' – always disguised but accessible.
- Each classroom will retain at least two ceiling fans and its over head digital projector.
- The intercom must be re-designed to provide adequate communication throughout the building,
- electronic security surveillance needs to be re-viewed, whether it be through motion detection or contact breakers,
- smoke detection needs to be integrated into the school to comply with current

- legislation,
- all surface conduiting should be removed and efficient conduiting cut into the walls and plastered over. Conduiting through the roof space must be installed in an equally professional manner through appropriate conduits and laid close to new access walkways to be installed in the roof space.
- The number and positioning of Distribution Boards must be rationalised.

#### **4.5.2 Sanitation Services,**

The Principal has a private toilet adjacent to her office; the staff have a dedicated toilet opposite the Main Entrance; and the scholars have access to toilets and basins on three levels in the 1912 Ablution Block – there are also some staff toilets designated in this block.

The Principal's and the main Staff Ablutions are fitted out with relatively contemporary ceramic toilets and basin, all in a satisfactory condition.

The scholars Ablutions vary between banks of original wash hand basins that are in generally satisfactory condition to a series of contemporary toilets with low level cisterns that scholars have seriously abused – it would appear that a substantially more robust toilet pan may be required served by a flushing system that does not rely on individual cisterns.

The ancillary facilities – indicator bolts, toilet paper dispensers, sanitary pad bins etc – all require further investigation to identify more robust units appropriate for the current crop of scholars.

There are two shower cubicles that appear to have been decommissioned and these spaces should be allocated to more useful purposes – eg. storage of toiletries, buckets and brooms etc.

#### **4.5.3 Plumbing,**

Other than the plumbing to the Ablution Block, there appears to be very little historic plumbing left. The introduction of new plumbing and drainage for the Principal's, Staff Ablutions, the Tuck Shop sink and other relatively recent interventions have all been carried out in white PVC pipes which contrast critically with the colour of the brickwork, drawing unwanted attention to these service components. Going forward all plastic pipes must be painted with an appropriate colour to blend into the brickwork background.

It can be taken for granted that all the original supply pipes were made of galvanised ferrous

metal. These are well over a hundred years old and one must accept that the bore of these pipes has been significantly reduced with rust and scale, whilst threaded junctions will also have been compromised as a result of rusting. Most of the piping is surface mounted on the exterior of the building.

It is recommended that a very careful inspection of the galvanised iron pipes and fittings is undertaken and a final detail evaluation made as to the scale of replacement.

Most of the drainage pipes are made of cast iron which has a slower rate of rusting than the supply pipes due to the nature of the material, and the considerably thicker wall thickness. However, there is evidence that the inspection covers to inspection eyes have rusted around the edges and may no longer be totally water tight.

It is recommended that the cast iron soil waste stacks and vent pipes be carefully opened at all Inspection eyes and :

- the pipes carefully roded to remove scale build up,
- the scale and rust ground off the inspection eye covers
- badly corroded inspection eyes replaced with newly cast covers,
- all inspection covers be re-seated with a rubber gasket.

GREAT CARE must be taken to retain the original screws as these would be Imperial threaded as opposed to the modern threading which will not fit. Sourcing replacements of the original screws will be extremely difficult.

All holder bats to the cast iron pipework must be individually checked for efficaciousness and defective bats are to be serviced – NOT REPLACED.

A certain amount of contemporary copper pipes have been used to replace older pipes. All of this was surface mounted and has therefore become the target of thieves. Much of the stolen pipework has subsequently been replaced with PVC pipes, with all its disadvantages.

It is strongly recommended that cisterns are done away with in the scholar's ablutions and that a concealed flush mechanism be introduced, thereby reducing potential vandalism. Further more it is recommended that all supply pipework be replaced with appropriately gauged copper piping, fully recessed into the masonry walls and plastered over.



## **RUSSELL HIGH SCHOOL, PIETERMARITZBURG**

### **PART 3**

## **5. Assessment of the External fabric.**

### **5.1 Introduction : Methodology**

The Building has, as mentioned before, been inspected on three occasions to ascertain the condition of its external envelope. Again the architects have followed a rigorous template made up of :

- the primary elements : Roofs and Walls,
- secondary elements : Ventilators, barge boards / fascias, eaves, gutters, rainwater down pipes and floor ventilators.
- the tertiary elements : doors and windows
- Services – Electrical, Sanitation and Plumbing etc.,
- Other – fittings or fixtures deserving of note:

The inspections have been carried out visually. It is important that this be understood as further examination when scaffolding is available WILL expose further errant material. That will have to be addressed.

Services have been dealt with individually, again based on a visual inspection.

Each facade of the building being recorded setting out all the above information.

All plumbing fittings were similarly tested and appropriate comments made.

As mentioned before different inspections were carried out in 2015, 2017 and 2019, while the building was occupied and used by some 500 scholars and teachers. There were constant breakages and repairs. One has to accept that there can be no finite record of the condition of the envelope of the building – only a generalised indication of the magnitude of the need for restoration and renovation.

## **5.2 Primary Elements :**

### **5.2.1 Roofs,**

The roofs to all parts of the building were formed as a consequence of the sequential nature of the evolution of the building. Hence one has separate roofs over :

- the library,
- the 1905 building,
- the 1910 extensions and
- the 1912 extensions (ablutions)
- various ad hoc car park awnings.

Common to all the roofs is the round nosed brozely tile covering, set on substantial, beautifully crafted timber trusses with the appropriate rafter and battens over. As a consequence of ageing, poor maintenance, and a degree of hazardous climatic conditions these roofs have been damaged to varying degrees.

- i the Library, being the oldest building has clear evidence of previous termite infestation and a degree of borer damage to roof members . An entomologist has been shown the relevant damage and has undertaken his inspection for his report.

At least two principal trusses will have to have their rafter elements replaced, together with identified cross beams and struts. All this work will have to be carried out on site, retaining sound historic material and integrating the new members with matching historic junctions. To effect this the roof tiles, the battens and various support beams will have to be carefully removed before adequate access can be gained to work on the truss members.

While the roof covering is removed for the above, scaffolding can be erected to access the historic roof ventilator to execute urgent restoration work to this important element.

- ii. The 1905 extensions has a brozely tiled roof over the whole of that development on similar beautifully crafted trusses and support structure. There is also a lean too roof over the west facing balconies, also covered with round nosed brozely tiles. The area that have been inspected are all in apparently good condition, other than hail damage to the tiling.

The damage that does exist is along the two valley gutters abutting later extensions of the building,- these are described under gutters below.

- iii. The 1910 extensions consist of a hipped roof over the main portion of the new building built adjacent to the 1905 development, with a double hipped roof extension over the administration wing. The consequence of this construction is that there are two major valley gutters incorporated into this development each with specific problems – see gutters. There is relative little loss of tiles and damage associated with these roofs. However, where incompetent workmen have taken up tiles either side of the valley gutter between the 1905 and 1910 buildings these have been relaid with no concern for the consequent leaking. A 1 M strip of roof tiles either side of this gutter will have to be taken up and relaid professionally.

The tiling either side of the other valley gutter over the administration wing will have to be taken up to gain proper access to work on that valley gutter.

- iv. The roof over the 1912 Ablution facilities consists of a simple hipped roof covered in round nosed brozely tiles. There is considerable loss of tiles due to hail damage over the whole of this roof. In addition vandals have damaged tiles on the roof facing the end of the main building.

### **5.2.2 Walls :**

Throughout the buildings, irrespective of the date of construction, typical salmon pink 'Maritzburg clay bricks have been used. Where these have not been subjected to recurrent and continuous damp, the bricks have survived very well.

Where rain water down pipes or gutters have failed and there has been a regular, or continuous source of damp, these relatively under-vitrified bricks have exfoliated. This process can also be brought about by rising damp in the walls and excessive salts in the clay. This deterioration is progressive and cannot be reversed.

Various futile remedies have been attempted : sealing of the bricks with proprietary chemicals, covering the damage with a cementitious plaster. Neither of these 'solutions ' will work. The source of water / damp must be eliminated and the damaged brick replaced.

## **5.3 Secondary Elements :**

### **5.3.1 Roof Ventilators :**

Roof Ventilators are a typical feature of late Victorian public buildings, originally integrated into the roof to provide a natural method of ventilating the building below. A ventilator also allowed the designer a chance to exercise his aesthetic skills.

There are two large ventilators, one over the Assembly Hall and one over the Library, both are still linked to the original system of gms pipes that drew heated air from the individual rooms up into the vent. Further investigation must be undertaken to ascertain whether there could be any benefit in re-activating these ventilators.

The actual ventilators have been constructed of ferrous or zinc sheeting on timber boarding with timber structure and framed openings. The whole would originally have been painted – only vague residues of the protective paint remains and both timber and cladding are showing clear signs of weathering.

Each ventilator needs to be totally restored. Their location on the brozely tiled roofs makes it very difficult to restore in situ without without causing extensive damage to the roof tiles. The restoration of the Ventilator over the Library can best be undertaken whilst the tiles are off that roof and the rafters are being restored. The restoration of the Ventilator over the Assembly Hall can best be affected if the whole ventilator is lifted off the building and brought down to ground level.

### 5.3.2 Barge Boards / Fascia Boards :

The timber used for Barge Boards and, or Fascias Boards generally arrived here from overseas, in long lengths as pre-profiled planks. Later a cheaper version was available without a profile along the lower edge. Both types are to be found in this building.

These boards were often doubled up as barge boards on the gables for aesthetic purposes – though there are also cases of single boarded barges on this building as well. The use of these boards for fascias was almost exclusively as a single board.

Barge boards and fascia boards were always painted.

The barge boards and fascias on this building generally appear to be sound, but there are cases of timber deterioration where the boards have been subjected to excessive and constant moisture, and where there has been inadequate ventilation to ensure drying out.

Once scaffolding has been erected for to commence work to the roofs, it will be possible to inspect all fascias and barge boards, particularly behind gutters. The present report records assumed conditions as viewed from the ground. Where unsound timbers are identified partial or complete replacement may be necessary. In all cases the grade of timber and its chemical treatment shall be specified by the architect, before any orders are placed.

### 5.3.3 Eaves closures :

There are four different methods of closing the eaves employed on this building :

- i, 3 or more simple square pattens with ventilation gaps in between,
- ii. T & G boarding closing the eaves off completely
- iii, T & G boarding laid on sprockets,
- iv. plaster or other composite boarding - presumably a modern intervention.

Each of these eaves closures was painted, generally white.

Seen from Ground level the timber eaves closures appear to be reasonably sound, but, as with the barge boards and fascias a further inspection needs to undertaken once scaffolding is in place and appropriate quality control applied.

Due to the historic nature of the building all unsound material will have to be replaced to match existing both in design and material. Allowance must be made for the re-fixing of the different eaves boards where original brads have rusted, and this must be carried out with new brads of an appropriate dimension.

### 5.3.4 Gutters :

There two distinct gutter types on this building : remnants of the original cast iron gutters, and contemporary extruded aluminium Ogee pattern gutters. Beside the standard gutters around the periphery of the roofs, there are also several internal box gutters.

The original cast iron gutters have a cross sectional pattern that, in the eye of the modern builder, is fairly similar to the aluminium Ogee pattern gutters. Regrettably much of the original guttering has been removed and it would be impractical to replace the aluminium with newly cast iron gutters. Where the original exists it must be carefully maintained and protected. Being very brittle on impact, great care must be taken when handling length of this gutter to avoid any impact.

Where cast iron gutters remain, it is necessary to undertake a very careful inspection of the fixings of these gutters – which are probably all dangerously rusted. Now would be the right time to take every length of gutter down, carefully de-scale it, and re fix it AFTER the associated fascia has been completely restored, ensuring that every joint is properly caulked in bitumen. It should not be necessary to repaint these gutters as the cast iron tends to rust very slowly over time.

Where extruded aluminium gutters have been fitted all joints , and particularly the corner junctions need to be cleaned and re-sealed – this is the greatest disadvantage of these gutters, there is no effective long lasting method of sealing any junction in this guttering – and there are many places where they are leaking!

Critical in this process will be a review of all outlets in extruded aluminium gutters for two reasons :

- i, the standard puncturing of the base of an extruded gutter and then bending the flanges into the down pipe is very seldom done to satisfaction, leading to leakage at this point.
- ii. aluminium and ferrous metals undergo an electrolytic reaction when moisture creates a contact, which leads to a deterioration of the one or other element. Almost every aluminium gutter discharges into a cast iron rain water down pipe. This restoration is an opportunity to ensure that all potential contact between aluminium and cast iron is appropriately insulated with a rubber barrier.
- iii. There are several internal box gutters between adjacent roofs all of which have been 'fiddled ' with by persons not familiar with the technology of lead and the consequences of electrolytic reaction. Every box gutter that we have had access to shows

that at some time in the last 30 years the lead lining was covered with gms sheeting. This has now deteriorated to the extent that water passes through the gutters and into the building – it is the cause of ALL the major damage to ceilings on the Upper Floor. This has also led to the deterioration of the beautifully crafted timber box gutter supports.

It will be necessary to :

- a, very carefully remove the brozely tiles adjacent to each of the box gutters to at least 1 200mm either side of the gutter – this will provide working space for remedial work as well as providing light into the roof space to executed the repairs to the box gutters support lining and any other water damage to rafters etc.
- b, remove all the gms linings from the box gutter and very thoroughly inspect the original lead linings for defective material. All blemishes and damage must be made good by means of soldering over or soldering on new lead sheeting to match existing
- c, before the remedial work in 'b' above is commenced, but after the gms lining has been removed, the timber support lining to the box gutter must be inspected and the elements of rotten timber must be replaced with material and workmanship to match the existing – the existing carpentry forms an important part of the historic fabric and must be respected.  
Take up the tiling battens over the opened area on both sides of the gutter, fit a 3 ply sheet of timber onto the upper face of the rafters, lay a continuous sheet of three ply malthoid sheeting onto this board, fix 13 mm treated counter battens vertically down the board directly over the rafters, followed by new 22 x 22 mm treated tiling battens at appropriate spacings and closely relay the brozely tiles , ensuring that the lowest course of tiles has a double layer on completion.
- d, consideration should be given, where possible, to form a mild steel walk way over the gutter and adjacent tiles to provide for future safe and convenient access for regular cleaning of the gutters.

### **5.3.5 Rainwater Down Pipes :**

Each portion of the building was provided with gutters and rainwater down pipes to suit the envelope that had been completed. Where later developments were abutted onto existing fabric, and r.w.d.p's were 'in the way' they were either replaced with a large box gutter with a down pipe at the end of that gutter, or the existing down pipes were retained - to drain new box gutters – and simply boxed all round within the new rooms.

Where r.w.d.p. Occur on the external envelop of the building they are relatively easy to

monitor and maintain and almost all of these are in remarkably good condition. The internal cast iron r.w.d.p. that have been boxed in, cannot be observed without entering a service tunnel under the building, and it appears that there is evidence of moisture flowing down the exterior of some of these pipes. It is possible that this moisture is associated with the malfunctioning collectors in the roof space above, but it could also be possible that there are leaks in the c.i. pipes between the collectors and the basement. While the school was occupied for teaching purposes it was not possible to demolish the decorative boxing and inspect the condition of the pipes. That will have to happen once a contract has been awarded.

This contract should allow for localised dismantling of portions of the pipes to attend to minor rusted area. In one instance on the SW wall of the Library alcove there is particularly crude and ineffective repair job which fails to contain any water, and will have to be attended to. There are also two exceedingly crude 're-arrangements' of c.i. r.w.d.p.s at the SW of the 1910 building intended to fill JoJo tanks that will have to be redesigned.

A few of the c.i. holder bats have broken and have to be re-welded by a specialist welders  
All the r.w.d.p.s were originally painted and need to be prepped and re-decorated.

### **5.3.6 Under Floor Ventilators :**

There are a substantial number of cast iron under floor ventilators, all of the louvred kind spread around the external brickwork walls of every block. These were intended to provide ventilation between the ceilings and the underside of the floor construction. They appear to have been generally very effective as there are no known floor failures other than in the Library – and that is suspected to be due to ground moisture.

Approximately four have been identified as either being broken or missing all together. Application shall be made to the Provincial Heritage Resource Agency to obtain replacements from their store rooms. All sub-floor ventilators were originally painted, and must be repainted again after suitable prepping.