

The image shows the exterior of a single-story building with a white facade and yellow decorative moldings. There are three arched windows and a central arched doorway, all with dark frames. A small plaque is visible on the wall to the left of the doorway. In the foreground, there is a concrete wall on the left and a garden bed with green plants and orange flowers on the right. The sky is blue with some clouds.

# **Report on the Condition of the Building Fabric with Recommendations**

**February 2023**

**The Robe Institute,  
Smillie Street, Robe**



**ARCÛATE**  
ARCHITECTURE

DESIGN | HERITAGE | SUSTAINABILITY



Above: Photo of the Robe Institute. C.1880. Image B 18999. Credit to State Library of SA.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## Contents

- 1.0 Introduction
- 2.0 Executive Summary
- 3.0 Current Condition of the External Fabric
- 4.0 Current Condition of the Internal Fabric
- 5.0 Current Condition of the External Grounds
- 6.0 Recommendations for repairs to the External Fabric
- 7.0 Recommendations for repairs to the Internal Fabric
- 8.0 Recommendations for upgrades to the External Grounds
- 9.0 Initial suggestions for making the property more energy efficient
- 10.0 Conclusions
- 11.0 Appendices



Left: Satellite image of the Institute. North is to the top of the image.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

#### 1.0 Introduction

##### 1.1 Location & Description



Above: Photo of the Robe Institute. C.1913. Image B 12088. Credit to State Library of SA.

The Institute building that we see today, located on Smillie Street in Robe, was built in a number of stages. The original building dating from 1868 '*consisted of a Hall, with retiring room and porch, the Library, and the "West Room", which was rented by the Manchester Unity of Oddfellows Lodge once a fortnight for 44 years. Within two years the library contained approximately 2,000 books and was open six nights a week to the public. In addition, lectures and readings were held regularly*'. (extract from the **Robe Historical Interpretation Study 1983**).

The Institute building consequently became the "cultural centre of Robe" from the late 1860's onwards.

It is understood that the modern Library and toilets to the east side of the original building were constructed in 1944. The extension containing the Kitchen, Projector Room and WC along the west elevation was built around 1983.

The Institute was entered into the State Heritage Register on 24 March 1983. Details are as follows:

State Heritage Place No. ID #10365.  
Heritage Number #16412.

##### 1.2 Site Surveys

The condition of the fabric, as it is recorded in this report, has been assessed on several occasions, but primarily during a site visit by Arcuate on 21 August 2022 at which time the weather was cool, cloudy and dry.

##### 1.3 Caveats

Observations documented in this report on the condition of the fabric of the Institute building are based upon non-disruptive surveys where there was no opportunity to open up the existing fabric to understand the underlying conditions.

It was not the remit of this report to assess in detail the condition of the structure, fabric, finishes and services throughout the building, unless their condition has been directly and patently affected by the condition of the external fabric, for example through water ingress.

Nor is this a detailed investigation report, but rather it is a review following general inspections of both the inside and outside of the property where the building fabric was visible and readily accessible.

No attempt was made to identify asbestos materials during inspections.

Due to limited and difficult access, no attempts were made to carry out inspections within voids under floors, within roof spaces or on top of roofs.

Due to the inherent limitations of investigations carried out for this report, Arcuate Architecture cannot be held liable for any incorrect recommendations where the condition of the external fabric could not reasonably have been understood in the circumstances.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

#### 1.4 References

- Robe Conservation Study 1979 by Urban & Environmental Planning Group
- Robe Historical Interpretation Study 1983 by John Dallwitz and Susan Marsden
- Heritage Survey of the South East, District Council of Robe, 1984 by Danvers Architects.

#### 2.0 Executive Summary

Although the Robe Institute building is reasonably well maintained there are issues with poor condition of fabric that need be addressed.

A staged scope of works to cover repairs and upgrades over the next 20 years should be prepared following more comprehensive inspections of the fabric.

The roofs and rainwater goods should be renewed in Heritage Galv, and eaves woodwork repaired and repainted.

The external cement render should be removed from the original Institute building, an injected chemical damp proof course installed, and the exterior re-rendered with lime finished in breathable paint.

External cement render elsewhere must be repaired and areas of salt-damp addressed.

All external timber windows and doors should be overhauled.

A new heating system should be installed throughout the building. Internal spaces should be redecorated throughout, new carpets fitted and more modern lighting installed.

Both main entrances should be upgraded externally, and disabled access and facilities should be improved internally and externally.

All of the above works should be staged over 10 to 20 years.

#### 3.0 Current Condition of the External Fabric

##### 3.1 Roofs, gutters and downpipes

The roofs are all finished with full length corrugated galvanized steel roof sheets that, from distant inspection, appear to be in good condition, albeit some of the roof screws are badly rusted.



Above: Views of the roofs along the south elevation from the ground are difficult due to the parapets and low roof pitches.

A view of the underside of the corrugated sheets over the east verandah of the library, though, show rust lines at the overlapping joints between sheets suggesting that it would be worth inspecting the underside of the main roof sheets from within the Institute roof space.

The pitches on all roofs are shallower than is desirable in such an exposed location.

The painted metal flashings at the top of both the east and west extension roofs are rusting.

To the roofs over the oldest part of the Institute building, there is a valley gutter between the southern roof over the

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

Institute main entrance and the roof over the hall.



**Above:** Rust at junctions between galv roof sheets seen only be seen on underside of the east verandah.



**Above:** In the foreground is the galv roof above the main entrance and side rooms. Beyond is the roof to the hall. Apart from some rusted roof screws the roof sheeting appears to be in good condition.

There is also a parapet box gutter around the perimeter of the southern roof. The valley gutter and parapet gutter need to be checked at least twice a year for any blockages and cleaned out. There are Galv rainwater heads at both ends of the southern length of box gutter. There don't appear to be any overflows from the parapet or box gutters, only the overflows on the rainwater heads.



**Above:** Rusting abutment flashing to the roof of the east verandah. Note the galv rainwater head and uPVC downpipe. The gutter appears to be Colorbond. The gable flashing is painted lead.



**Above:** Galv rainwater head at the east end of the roof of the original building along the south elevation.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

To the north, west and east sides of the hall the roof falls to eaves gutters.



Above: View of north west corner showing D-profile painted galv eaves gutters. Note the rusting abutment flashings to the lower roof.



Above: A closer view of north west corner showing that the galv gutter and brackets to the top hall roof are badly rusted.

The library roof is L-shaped and pitches down to parapet box gutters along the north and east sides of the inside corner either side of the entrance to the library and visitor centre. Again, these box gutters drain to Galv rainwater heads.



Above: View of corner entrance to the library and visitor centre. The dashed red lines show where the parapet box gutters run. Note the rainwater heads that the box gutters drain to.

The eaves gutters to the main roofs appear to be painted galv in a D-profile, not an appropriate pattern for gutters on a State Heritage Place (SHP). During the survey it was not possible to ascertain the condition of these gutters, although the paint is peeling off in places and the gutter to the upper hall roof appears to be badly rusted.

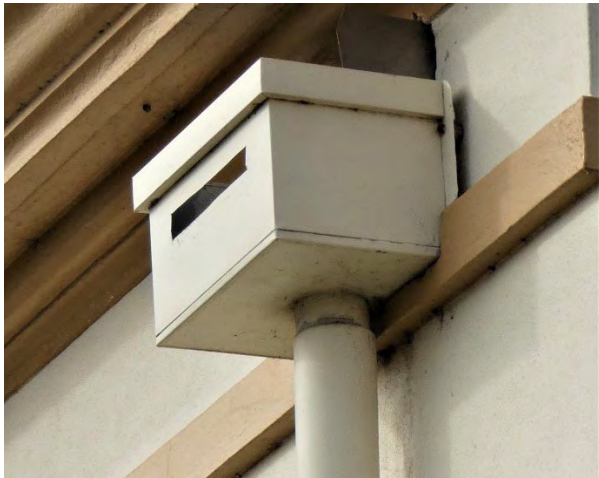
Downpipes appear to be a mix of uPVC and Colorbond, neither of which is inappropriate for a SHP. They all appear to be in good condition.

There is Gutter Guard leaf mesh visible in the eaves gutters along the west elevation.

There are a number of poor flashings details visible from the ground. It was not possible to inspect the flashings at roof level during the survey for this report.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



Above: Galv rainwater head with uPVC downpipe on the south west corner.



Above: There are several new Colonial-style Colorbond rainwater heads installed during works around 2015. One is to the west kitchen extension; the other is midway along the south elevation.



Above: Poor abutment flashing detail at the east end of the hall roof where it meets the library roof along the north elevation. The flashing is not properly sealed against the wall.



Above: Poor abutment flashing detail where a Colorbond flashing has been rivetted and screw-fixed to the end of the upper parapet wall.

The eaves woodwork appears to have been generally well maintained and seems to be in good condition, although there is a section of missing diagonal boarding to the north gable of the library east verandah roof.



Above: Missing area of diagonal boarding on the gable of the east verandah roof.

Also, most of the steel fixings to the same verandah roof structure are badly rusted.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

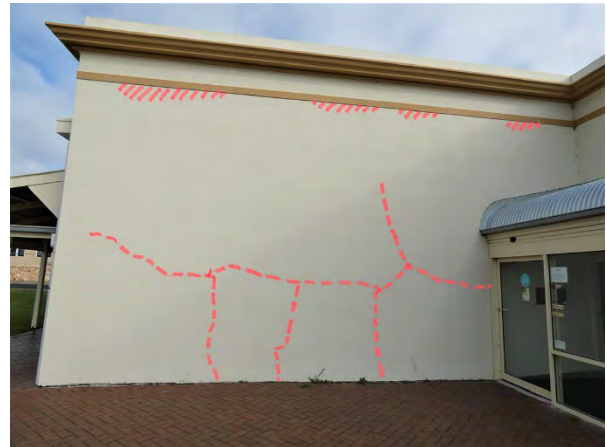
#### 3.2 External walls

All external walls have been finished with a cement render that appears to have been painted with an acrylic masonry paint. Probably because there are very few movement joints in the render, there are fine cracks throughout the external walls over the whole building as a result of minor movements. These cracks will be drawing in moisture because of the severe exposure of the building along the sea front, and the cement render and masonry paint will prevent the walls from breathing and drying out. Moisture readings taken inside the hall indicate relatively high levels of moisture along the exposed north elevation, confirming that the walls are damp.



**Above: East end of south elevation indicating the most obvious cracks the in render.**

The uniform cement render and paint applied to all external walls gives the overall building a sterile appearance and fails to acknowledge the delineation between that more recent extensions and the original part of the Institute that was formally finished with fair-faced stonework.



**Above: North elevation adjacent to library/ visitor centre entrance. Dashed lines show the cracks. Hatching higher up shows where trapped water and/ or salts is pushing off the paint.**



**Above: The uniform render and paint does not delineate the newer extensions from the original Institute building.**

The underfloor vents to the oldest parts of the Institute appear to be in good working order. Because the east and west extensions have solid concrete floors there are no underfloor vents to the bases of their walls.

The paint colours at the north end of the east gable of the library are inconsistent, suggesting that paint touch ups have not been carried out after alterations to signage.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above: Inconsistencies in paint colours suggest past alterations to signage.**

The doorway formed in the north elevation to the hall is likely to have been a later alteration. Its lintel has moved resulting in failure of the cement render at both ends.



**Above: The render is failing at both ends of the lintel to the northern door into the hall.**

### 3.3 External windows and doors

All windows and doors are timber. Their style varies occurring to the age of the part of building in which they are fitted.

The original Institute has large sash and case windows arched at their heads. These windows along the south and west have astragals to their bottom sashes only, while the sashes of those along the north elevation all have astragals. The inclusion of astragals appears to have been a later alteration as historic

photographs from 1913 and earlier show full panes of glass in sashes.

The north elevation of the hall has a doorway that may have been a later addition to provide a fire escape.



**Above: North elevation of hall with a doorway that appears likely to have been a later addition.**

The hall windows along the north elevation appear to be in reasonable condition, although they are inoperable as they are painted shut. These windows all have internal wooden shutters.



**Above: Hall window along north elevation. Note the internal timber shutter.**

The window to the west room/ gallery in the original Institute building seems also to

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

be in reasonable condition and the bottom sash appears to open, albeit the pulley ropes have been painted. The bottom sash is protected with an insect mesh screen.



**Above: Window to the west room/ gallery.**

The window to the east/ Kathleen Brown Room appears also to be operable and in good condition. The bottom sash has no astragals and is again covered by an insect mesh screen.

It may be that the window frames and weights boxes are original to the 1868 Institute but that the sashes may have been replaced due to wear and tear.



**Above: Window to the east/ Kathleen Brown Room.**

The entrance door to the original Institute building does not appear to match that in early photographs and is likely to have been replaced due to wear and tear, possibly during works in 1983. Although of relatively poor quality it appears to be in good condition.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

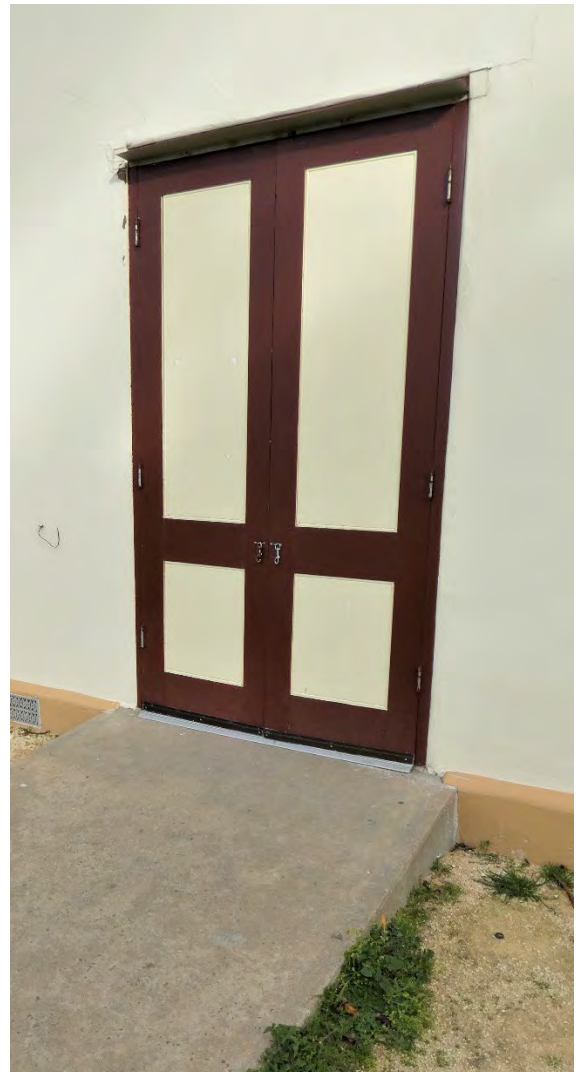


Above: Entrance door from photograph taken c. 1913. Note the painted lettering on the fanlight.



Above: Current main entrance door.

The doorway formed in the north elevation of the hall is again of poor quality and is likely to have been installed around the same time as the front entrance doors were replaced. The doors are in reasonable condition.



Above: Fire escape doors along north elevation of hall.

The windows and doors to the later Institute extensions are obviously of lesser significance.

The timber windows to the toilets along the south elevation are in reasonable condition.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above: Toilet windows along south elevation.**

The door and partially glazed side screen under the east verandah of the library, and the projecting timber-framed main entrance to the library/ visitor centre, both require maintenance as the paintwork looks thin and external metal fixings and fixtures are rusted.



**Above: Projecting timber-framed main entrance to the library/ visitor centre.**

There is a sash and case window to the north elevation of the library extension that matches those to the adjacent hall. It appears to be in reasonable condition.



**Above: Door and partially glazed side screen under the east verandah.**



**Above: Window to the north elevation of the library extension.**

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

There are modern timber sash and case windows to the west extension of a somewhat squat proportion. They are in reasonable condition.



Above: Modern timber sash and case windows to the west extension.

#### 4.0 Current Condition of the Internal Fabric

##### 4.1 Original Institute building

The entrance lobby has been well maintained. There has been some damp on the outside wall to the east side of the entrance door where the plaster has been repaired recently.



Above: Entrance lobby looking from the front door. The recent plaster repair can be seen on the right side of the image.

None of the ceilings throughout, apart from in the hall, appear to be original.

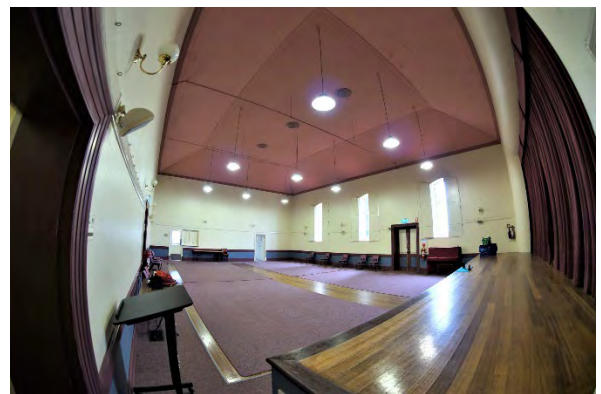
In the west room/ gallery the ceiling cornice, is separating from the walls, especially along the west and north sides. This may be as a result of water ingress from the box gutter above, which should be checked.



Above: West room/ gallery.

There is minor damage to the boarded ceiling in the hall, possibly because of past roof leaks.

There are minor movement cracks in the plaster to the left/ south side of the stage above and to the side of the curtain.



Above: Inside the hall looking into the north west corner.

Along the north elevation the base of the external wall is damp, seen clearly in the blistering paintwork.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above:** Blistering paint at the base of the wall into the north east corner adjacent to the steps onto the stage.

Using a moisture meter, high damp levels were registered to over 2 metres above floor level along the full length of the outside wall, extending around the west wall also.



**Above:** Thermal image looking into the north west corner of the hall. The purple, as opposed to red/ orange colour, indicates a lower temperature where moisture evaporating from the wall surface cools the wall slightly. The window glazing can be seen as purple also.

Thermal images confirm the presence of moisture, concentrated in particular into the north west and north east corners and beneath the windows.

The high moisture levels along the north elevation may be a combination of rising and falling damp. The eaves gutter may be leaking and/ or overflowing on occasions onto the gravel pathway beneath. If the external wall has no damp proof course (dpc) it may be that the moisture is being drawn up from the ground and into the walls. Multiple thin cracks in the cement render may also be drawing moisture into the masonry. Because the cement render and acrylic masonry paint prevent moisture from drying out through the outside surface of the elevation, moisture trapped in the walls will migrate inwards to dry out inside the hall, leading to blistering paint.

Damp can also be seen in the base of wall behind the compactus in the storage area to the north of the Kathleen Brown Room. This may again be combination of rising and falling damp – perhaps rising up from the ground because of a lack of dpc, and falling due to a failing valley gutter above.



**Above:** Storage area containing the compactus.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



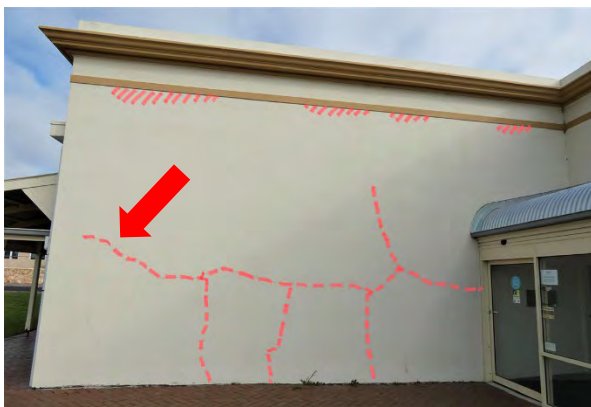
Above: Blistering paint at the base of the wall behind the compactus.

#### 4.2 Library and Visitor Centre

The toilets in this area are in reasonable condition, albeit they are dated in their finishes and somewhat utilitarian in character.

There is evidence of damp in several places internally within the library area.

On the other side of the north elevation wall leading to the main entrance into the library/ visitor centre, where the render is cracked, the paint is blistering internally. The parapet box gutter may be failing above and/ or moisture is being drawn through the wall cracks.

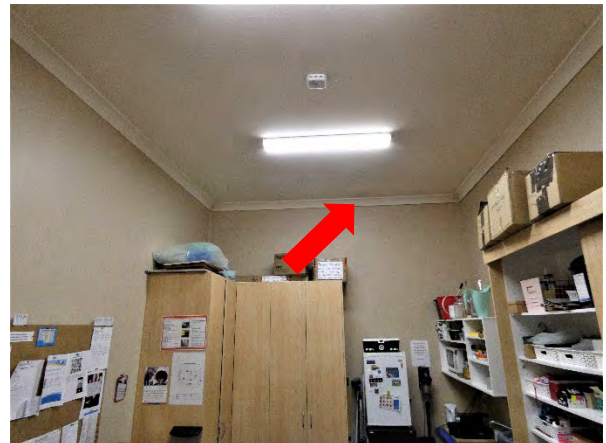


Above: North elevation wall leading to the main entrance into the library/ visitor centre.



Above: Red arrow indicates where the paint is blistering from moisture drying out through the wall surface.

In the south store room there is water staining at ceiling level along the external wall suggesting a possible failure of the abutment flashing at roof level above.



Above: Red arrow indicates water staining on the ceiling of the south store room.

#### 4.3 West Kitchen extension

The south end of the kitchen ceiling has water damage. This is likely to result from the concentration of storm water from the upper roofs draining onto a small area of roof above. The drainage pipe installed in place of a spreader may be exacerbating the problem.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above:** Water damage to the ceiling at the south end of the kitchen.



**Above:** Water draining from the upper roofs is concentrated onto the south end of the kitchen roof. The uPVC drainage pipe does not appear to be a spreader.

#### 5.0 Current Condition of the External Grounds

The external grounds are in reasonable order.

The gravel area along the north elevation, and partially along the east and west elevations, retains a lot of moisture and may be leading to issues of rising damp inside the building.



**Above:** Damp gravel strip along north, west and east elevations.

The cement-rendered walls to the grounds around the south entrance are in poor condition in places and look unsightly.



**Above:** The cement render to southern walls requires repairs.

It is unclear what purpose the ramp to the south kitchen door serves. If it is redundant as a result of the subsequent installation of the ramp along the north elevation it would be best to remove it.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above:** If the ramp to the south kitchen door is redundant it would be best to remove it.

There is a stainless steel-framed notice board fixed directly adjacent to the main entrance to the Institute. This detracts from the view of the significant elevation and should be relocated.



**Above:** The notice board at the main entrance to the Institute should be relocated.

A way should be found to conceal the gas bottles and wheelie bins along the west and south elevations as they can be seen from the main Institute entrance and are unsightly.



**Above:** Gas bottles and wheelie bins on the west elevation can be seen from the Institute entrance.



**Above:** Gas bottles on the south elevation.

The approach to the library and visitor centre entrance is unattractive and unwelcoming.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023



**Above: Unattractive approach to the library and visitor centre entrance.**

## 6.0 Recommendations for repairs to the External Fabric

### 6.1 Roofs, gutters and downpipes

A thorough high level inspection of the roofs and rainwater goods should be carried out as soon as possible to ascertain their detailed condition. Also, a CCTV survey of the underground drainage should be undertaken to ensure that all storm drains are running clear.

If sheeting to the upper roofs is the same age as that to the east verandah roof it is likely that the main roof sheets will require to be replaced now. This should be determined by inspection both from above, and from underneath the sheets within the main roof spaces. This is because galv sheeting often rusts at the vertical laps between sheets, as has happened on the east verandah roof.

Should roof sheeting require to be replaced, this should be done using new Z600 Heritage Galv sheeting. Prior to fixing new sheets all laps should be painted with a 2-pack paint system to protect from future rusting.

Obviously when the roof sheeting requires to be replaced, much or all of the existing flashings and box gutters will need to be renewed also. At that time new overflows should be formed through parapets to avoid overflowing into the building in the event of blockages.

It appears likely that the painted galv eaves gutters will require to be replaced now, and the opportunity should be taken to install more appropriate ogee-profile gutters in their place.

When required, all existing gutters, downpipes and rainwater heads should be replaced in Z600 Heritage Galv.

When the roof sheeting and rainwater goods are being replaced the eaves woodwork should be overhauled.

The missing diagonal boarding to the north gable of the east verandah roof should be replaced immediately.

As regards the water ingress through the south end of west extension kitchen roof, the area of roof sheeting concerned should be inspected and repaired/replaced as necessary as a matter of urgency. A proper double-spreader at least 1,200mm in overall length should be fixed onto the downpipe above, and ideally the large extract flue should be relocated from the roof to the outside wall where it can more easily be weatherproofed.

### 6.2 External walls

Much of the damp present within the external walls is likely to be due to the fine cracks throughout the external cement render. That render, and the acrylic paint finish, are also preventing that moisture from drying out through the external surfaces.

Ideally the external cement render should be removed from all of the outside walls

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

and a new breathable lime render applied in its place. This would be an extremely expensive undertaking. The alternative may be as follows:

- only remove the cement render from the original Institute building and re-render with lime finished with a mineral silicate paint such as Keim or Murobond;
- strip all acrylic paint off the cement render to the later extensions. Form movement joints in the cement render at suitable spacings. Use a suitable crack repair system compatible with a breathable mineral silicate paint to repair and recoat the cement.

It may be necessary to install an injected chemical damp proof course around the walls of the original Institute building once the cement render is removed and before the lime render is applied.

The gravel area that runs along the north elevation, and partially along the east and west elevations, should be dug up and new hard paving installed falling away from the building.

#### 6.3 External windows and doors

All timber windows and doors throughout should be overhauled, with special attention given to those within the original Institute building. The frames and sashes of the older sash and case windows should be stripped of paint, repaired as required, and repainted.

The non-original fire escape door to the north elevation of the hall should be reinstalled with improved jamb and head details prior to re-rendering the elevation with lime.

## 7.0 Recommendations for repairs to the Internal Fabric

### 7.1 Original Institute building

Works to repair the roofs and external walls will help to reduce the damp throughout the inside of the building.

A salt-damp survey should be carried out and proposals for remedial works implemented.

None of the rooms appear to have any existing means of heating or cooling. A central heating system should be installed to help keep the fabric dry and make the building more comfortable and usable for the community.

The electric lighting throughout is dated, as are the decorative finishes. All should be modernised, although it would be advisable to wait at least 2 years after the roof and external wall repairs are completed to allow for drying out before redecorating internally.

In the long run better disabled access into and throughout the building, as well as improved toilet facilities, should be provided.

### 7.2 Library and Visitor Centre

Minor plaster repairs and redecoration only are required.

### 7.3 West Kitchen extension

The repairs and redecoration of the water damaged internal fabric should be carried out once the problems with the southern end of the roof have been addressed.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

#### 8.0 Recommendations for Upgrades to the External Grounds

The cement render to the free-standing external walls along Smillie Street and up to the Institute south entrance should be repaired and the walls painted with a mineral silicate paint – either Keim or Murobond.

The garden approach and entrance to the Institute should be improved. A sensitively integrated ramp up to the Institute main entrance should be provided.

A new, more modern entrance canopy and lobby should be provided to the Library/ Visitor Centre, with a new landscaped entrance forecourt, all of a quality that befits the heritage significance of the Institute and acknowledges the importance of Robe as a visitor destination.

#### 9.0 Initial suggestions for making the property more energy efficient

**Note: The recommendations in Section 9 below relate to works that could be undertaken should the decision be made to make the overall property more energy efficient.**

By their very nature, many of the works that would be required to make the Institute building, including the library and visitor centre, much more energy efficient may compromise the historic character of the property and would therefore require careful consideration.

There is also the question of how far to go in making the property energy efficient.

The main principles that should be applied to improve energy efficiency are as follows:

- a. eradicate all thermal bridges in the fabric, where possible;
- b. make the fabric as airtight as possible;
- c. upgrade thermal insulation throughout;
- d. install energy efficient external doors and windows throughout;
- e. install energy efficient heating and cooling, combined with heat pumps and a heat recovery ventilation system;
- f. install renewable energy generation (most likely PV roof panels and/ or solar water heating);
- g. use the orientation of the property to optimise daylighting, natural ventilation for cooling and passive heating from thermal mass.

Principles a, b and g are the most difficult to achieve. Eradicating thermal bridges could only realistically be achieved by applying an external insulation to the outside walls, which may only be possible to the later extensions (library/ visitor centre and west kitchen).

Initial consideration would suggest that the following would make the greatest difference to the energy reductions in the property whilst altering the building's appearance relatively little:

- Super insulating the roof at the same time as replacing the existing roof finish;
- Injecting insulation into the cavities of any brick cavity walls.
- Upgrading the external windows and doors. This might involve either replacing single glazing with new double glazing, or installing double glazed secondary glazing inside the existing windows. The existing doors might be upgraded with double glazing, with the application thin high-tech insulation on the inside solid faces, and with full draught stripping all around.

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

A new heating system employing a ground source heat pump to supply low temperature hot water to a radiator system and/ or linked to a fresh air heat recovery ventilation system would provide space heating. Solar PV panels might power electric water heaters, or another heat pump could supply hot water needs. The fabric of the property might be made as airtight as possible at the same time as new space heating and ventilation systems are installed.

### 10.0 Conclusions

Although the Robe Institute building is reasonably well maintained, the poor condition of parts of the fabric needs to be addressed if deterioration of the finishes and structure is not to accelerate in the future.

The roofs and rainwater goods require attention, particularly the box gutters that appear to be leaking in places. The condition of the roof sheeting throughout needs to be assessed by close inspection.

There are details and materials that are inappropriate for a State Heritage Place, including uPVC downpipes, Colorbond rainwater heads and poorly located external signage.

External cement render applied without adequate movement joints has cracked throughout, drawing moisture into the outside masonry walls that is only able to dry through the internal finishes.

Outside woodwork needs to be repaired and repainted.

Areas of salt-damp need to be addressed.

External timber windows and doors throughout require to be overhauled.

Disabled access and facilities should be improved.

Ideally the approaches to both the south, main Institute entrance and the library/ visitor centre entrance should be upgraded, along with ground finishes all around the building.

### Immediate recommended exterior and interior Repairs

Comprehensive inspections should be carried out to provide more detailed information that will inform proposals to repair the overall building. These should be as follows:

- Inspect all roofs at high level.
- Inspect structural timbers throughout the roof spaces.
- Commission a termite inspection.
- Engage a good carpenter to inspect all the windows and doors to identify any timber repairs, and any window cords, pulleys and catches that may need to be overhauled.
- A CCTV survey of external storm drains should be undertaken.

The above inspections should inform the preparation of a staged scope of works to cover repairs and upgrades over the next 20 years. Proposals to improve the energy efficiency of the Institute fabric should be included in the staged scope of work, although these are not included in the descriptions below.

### Exterior and interior Repairs within 2 years

(Note: this assumes that the galv roof sheets to all roofs will be good for at least another 10 years.)

Remedial works should be carried out to the south end of the west kitchen extension roof.

Carry out patching and repairs to all roof sheeting, flashings, box gutters, parapet

## **The Institute, Robe.**

### **Fabric Condition Report with Recommendations. February 2023**

gutters, etc. Patch and repaint eaves gutters.

#### **Exterior Works within 5 years**

Remove the external cement render from the original Institute building. Install an injected chemical damp proof course. Repair stonework. Re-render exterior with lime finished in mineral silicate paint.

Remove the external acrylic masonry paint from the remaining cement render on non-original extensions. Form movement joints in render. Repair cracks. Paint all cement render with a mineral silicate paint.

#### **Interior Works within 7 years**

Install a new hydronic heating system throughout the whole Institute with radiators supplied with hot water from ground source heat pumps.

Redecorate throughout. Renew carpets. Install more modern lighting throughout.

#### **Exterior Works within 10 to 20 years**

Reroof throughout with new Z600 Heritage Galv roof sheeting, flashings, box gutters and rainwater goods.

Upgrade externally to and around entrances to both the Institute and the Library/ Visitor Centre. Upgrade disabled access and facilities.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## 11.0 Appendices

### 11.1 Arcuate 'A Stitch in Time' Guidance Notes on External Masonry



**ARCULATE**  
ARCHITECTURE  
DESIGN | HERITAGE | SUSTAINABILITY

## 'A Stitch in Time – Guidance Notes on Maintaining your Heritage Building' by Ian Hamilton.

### GUIDANCE NOTE 4 - EXTERNAL MASONRY

The intention in this guidance note is to give a quick overview of the main issues to consider when reviewing the condition of external masonry, in particular stonework. I propose to go into more detail in future guidance notes on specific issues such as managing salt-damp and repointing walls. In the mean time, please take this note as an introduction to the general subject of the care for traditional masonry walls.

Our fore bearers used natural materials to build traditional structures that worked in harmony with their environment. Because stone and early brick buildings used lime mortars in their construction they were able to breath to control moisture and move to manage expansion and contraction of structures.



Above: Salt-damp deterioration at the base of a heritage building wall in North Adelaide.

decades have largely been carried out using cement which is hard, inflexible and unbreathing. This exacerbates salt-damp and accelerates the decay of stone and brick, especially when masonry materials are naturally soft. Current practice is now to remove cement pointing and cement repairs from traditional masonry walls and replace it with lime mortar.



The hard, unbreathing cement pointing here has caused salt-damp deterioration to the adjacent blue stone.

Massive masonry walls were needed to construct large buildings. As well as being structural, their thick stone and brick walls help to regulate internal temperature.

Repairs to historic masonry walls in recent

Historically lime pointing was only meant to be sacrificial. It was accepted that it would be raked out and replaced every 25 or 30 years. By using lime, which is softer, more flexible and more breathable than stone or brick, the more expensive masonry is protected from deterioration. This situation reverses, though, when cement pointing is used in place of lime. Walls are then forced to dry out through the masonry which suffers accelerated deterioration as soluble salts are deposited within the surface layers of the stone or brick instead of within the sacrificial lime pointing.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## 11.1 Cont'd

### GUIDANCE NOTE 4 - EXTERNAL MASONRY (Continued)

Metal fixings embedded within stonework to secure decorative features can rust resulting in 'oxide jacking' – the process of expansion that iron undergoes as it rusts – putting surrounding stonework under enormous pressure, leading to cracking and disintegration of masonry.

It is very common to have high level decorative stonework supported by embedded ironwork. Where pointing is not maintained, and/or where movement cracking occurs, moisture is allowed to penetrate to rust & weaken the ironwork causing heavy stone decoration to fall with potentially dangerous consequences.



Above: Embedded iron fixing rusting and cracking a surrounding stone moulding that is now in danger of falling from height.

It is therefore important that stonework, particularly at high level, be inspected annually, and at least using high powered binoculars from the ground, to check for evidence of cracks and potentially unstable masonry. While there are hundreds of cases annually of people injured or killed in the UK by falling masonry, unlike South Australia, Great Britain is not an area prone to earthquakes.



Above: Decorative stonework on an Adelaide heritage building. Note the exposed and rusted iron fixing with a surrounding cement repair. This is where stone features have formally been located and have either been removed for safety reasons or have fallen off.

Below: Headlines from 2000 when an Australian waitress was killed by falling masonry in Edinburgh.

#### Waitress killed by falling masonry



Emergency services were quickly on the scene

A waitress has been killed and another person has been seriously injured after masonry fell on to a busy Edinburgh pub.

Blocks of masonry tumbled from a four-storey building in Hope Street and tore through the pavement awning of Ryan's Bar, showering staff and customers below.

Our soils in South Australia often react to the heavy rainfall by absorbing moisture and expanding, whilst long dry spells cause the ground to dry out and contract. Footings beneath the walls of traditional buildings are often small, and sometimes non-existent, and

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## 11.1 Cont'd

### GUIDANCE NOTE 4 - EXTERNAL MASONRY (Continued)

contraction of the adjacent ground usually results in cracks in external walls that, if not repaired promptly, can lead to water ingress. This situation is often exacerbated by the use of cement to point up masonry walls instead of lime.



Above: As a result of movement, cracking has taken place between the hard cement pointing & the stonework. The lack of flexibility of the pointing has also led to the cracking of the 'kneeler' stone.

Below: Hard cement pointing causes accelerated erosion of the adjacent stonework, as seen below in a South Australian heritage building where the stone has eroded away leaving the cement joints more exposed.



The cement's inability to accommodate movement causes it to crack along the joints and sometimes forces the stonework to split because it is weaker than the cement.

Another issue with cement pointing is that because it is generally harder than surrounding masonry the brick or stone erodes more quickly as water is thrown off the cement and onto the masonry. In a traditional lime-pointed wall the sacrificial joints are softer and erode first.

#### CONCLUSION

There has been a long legacy over the decades since World War Two of cement used in South Australia for repairs to masonry walls.

While this guidance note points out the drawbacks in using non-traditional cement it is unrealistic to expect that all custodians of historic masonry churches repaired with cement will rush to remove it in favour of lime pointing. In many cases where cement is used to point up hard bluestone its detrimental impacts may be limited.

It is important, though, to understand the tell-tale early signs of masonry deterioration where immediate action may be able to offset expensive future remedial repairs.

If you are in any doubt about the condition of your masonry walls, or of your church building in general, please don't hesitate to contact Arcuate Architecture and we would be delighted to assist you.

Ian Hamilton, Director.  
Arcuate Architecture, Adelaide.

website [www.arcuatearchitecture.com.au](http://www.arcuatearchitecture.com.au)  
email [ianh@arcuatearchitecture.com.au](mailto:ianh@arcuatearchitecture.com.au)  
phone (08) 7231 5701.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## 11.2 Arcuate 'A Stitch in Time' Guidance Notes on Cooling, Heating & Ventilation



### 'A Stitch in Time – Guidance Notes in Maintaining your Heritage Building' by Ian Hamilton.

#### GUIDANCE NOTE 6 - COOLING, HEATING & VENTILATION

Achieving reasonable comfort levels within heritage buildings can be challenging. Only with the advent of cheap and plentiful supplies of coal in Victorian times did public buildings have heating systems. Nowadays we all expect high levels of comfort in our buildings.

The fabric of traditional buildings usually does not accommodate the retrospective installation of modern heating and cooling systems well, especially where the building is of historic significance. Before environmental control systems are installed heat losses and gains should be reduced to a minimum by fitting insulation and by closing up gaps to prevent unwanted air movements. Once again, the sensitive nature of historic building fabric can make insulating and draughtproofing difficult, if not impossible.

New heating and cooling systems must be designed to suit the ways in which heritage places are used.

There are two alternative types of heating: Central heating, that provides an even distribu-



Above: The left image represents the effects of Central heating. The right image shows Local heating. Image thanks to [www.buildingconservation.com](http://www.buildingconservation.com)

tion of heat throughout a whole building whilst heating the fabric; and, Local heating, that dispenses only small amounts of radiant heat to targeted areas.

Because it minimises the dispersion of heat, Local heating is suitable for non-energy-efficient historic buildings because heat losses are smaller.

Local heating can be by heating foils, which are useful and versatile as they can be fitted into fixed seating or under carpets or rugs. Electric infrared heaters, if positioned close to where heating is needed, can also work well. At the end of the day being warmly dressed is the best and most economic means of staying comfortable in the cold during worship.



Above: Electric foils that can be installed within pew, within kneelers and under carpets to provide Local heating. Image thanks to [www.buildingconservation.com](http://www.buildingconservation.com)

Because of the large volumes characteristic of most heritage places cooling can also be difficult. Air conditioning is expensive and the large equipment required to supply evaporative cooling is difficult to hide.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

## 11.2 Cont'd

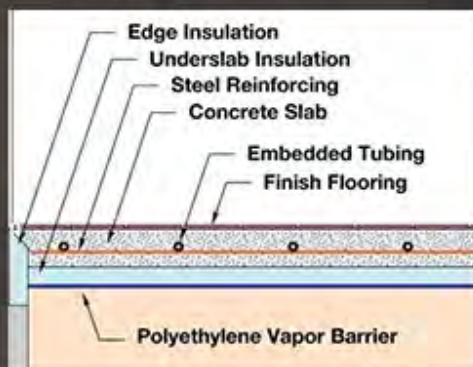
### GUIDANCE NOTE 6 - COOLING, HEATING & VENTILATION (CONT'D)

A great way to achieve environmental control in large spaces is by means of underfloor heating and cooling supplied by ground or air-source heater exchangers. Drawbacks are that capital costs are high and replacing heritage floors in many historic buildings may not be acceptable because of their heritage significance. The advantages are economic running costs, and the fact that floors can be heated in the cold months and cooled at hot times of the year. Also, under-floor heating can maintain a steady background warmth in the fabric of buildings during the winter and this works particularly well where they are used regularly during the week.



Above: An electric heated blanket designed to be used beneath carpets and rugs. These are available in a variety of sizes and shapes.

Below: Diagram showing the elements of a hydronic underfloor heating system within a ground-bearing concrete slab floor.



Good ventilation can obviously assist in keeping places cool but traditionally heritage buildings designed for large assembly, such as city halls and churches, did not have a lot of opening windows. Electric fans can be installed but these can be noisy and visually intrusive. One solution that the author used in the UK in a church in Glasgow was to install large ceiling fans that keep the space cool in the summer and push the centrally-heated air down from the high roof void in the winter months.



Above: Large ceiling fans used in a traditional church.

Cooling, heating and ventilation systems need to be designed to suit individual spaces and ways in which they are used. With the prospect of increasing energy prices these systems should also be economical in both their capital costs and running costs.

If you need assistance in reviewing suitable environmental control systems for your heritage building please don't hesitate to contact Arcuate Architecture and we will be delighted to assist you.

Ian Hamilton, Director.  
Arcuate Architecture, Adelaide.

website [www.arcuatearchitecture.com.au](http://www.arcuatearchitecture.com.au)  
email [ianh@arcuatearchitecture.com.au](mailto:ianh@arcuatearchitecture.com.au)  
phone (08) 7231 5701.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

### 11.3 Arcuate 'A Stitch in Time' Guidance Notes on Energy Efficiency (Part 1)



**ARCULATE**  
ARCHITECTURE

DESIGN | HERITAGE | SUSTAINABILITY

## 'A Stitch in Time – Guidance Notes in Maintaining your Heritage Building' by Ian Hamilton.

### GUIDANCE NOTE 11 - ENERGY EFFICIENCY IN HERITAGE BUILDINGS. PART 1: GOALS & SOLUTIONS

#### Why make our Heritage Places Energy Efficient?

Since every building uses precious (and costly) energy resources in their facilities, it beholds on communities to be good stewards of those resources through sound energy management, including through the use of renewable resources, where feasible. Thus, we should identify building energy use as a major short to medium term priority. Moreover, the energy cost savings will pay back the investment over a period of years, after which the savings will be available for other church programs.

#### Proposed goals for heritage buildings

Identify and implement energy efficiency retrofits in your heritage building. This involves four sub-goals:



Above: Solar panels on an historic roof.

1. Conduct an analysis of two or three years of monthly utility bills.
2. Have an appropriate consultant conduct an energy assessment of the lighting, appliances (water heaters, refrigerators, computers, etc.), and other equipment in your heritage buildings.
3. Based on the recommendations of this energy assessment, develop a plan to implement those recommendations.
4. Implement the plan within the resources and time table established by the heritage owners.

#### Process and Implementation

1. Establish an Environmental Stewardship Committee in your heritage owner group. This will provide a forum for educating those involved in environmental stewardship issues, and for coordinating the implementation of environmental programs in energy, water, and food resources.

#### HOW A SOLAR SYSTEM WORKS

- 1 Solar panels
- 2 Inverter
- 3 Switch board
- 4 Electricity meter
- 5 Electricity mains grid



Above: An image from the Energy Matters Australian website showing how a grid connect solar power system works.

The Institute, Robe.

Fabric Condition Report with Recommendations. February 2023

### 11.3 Cont'd

## GUIDANCE NOTE 11 - ENERGY EFFICIENCY IN HERITAGE BUILDINGS. PART 1: GOALS & SOLUTIONS (CONT'D)

2. Contact an appropriate consultant to schedule an energy assessment. This will include an analysis of energy bills, a site survey of your facilities, and a report that documents the site observations and recommendations for energy efficiency improvements.

3. The energy assessment will document recommended energy efficiency measures and will identify rebate and grant programs as potential sources of funding. The assessor will also identify energy efficiency contractors who can outline the cost of implementing these measures and who can stand ready to do the implementation work.

4. Identify funds needed to complete the retrofits; a phased approach is often the most workable.

### Sustainability Goals and Solutions

Arcuate has developed a simple strategy entitled *Sustainability Solutions for Churches in South Australia* which provides church congregations with a systematic process to enable them determine sustainability goals and solutions for their buildings. We have a similar initiative for schools that have heritage buildings, although the initiative is valid for any type of heritage place.

Arcuate has successfully implemented the *Sustainability Solutions* strategy both in the UK and in South Australia, carrying out audits of a variety of church buildings. We have prepared a set of documents tailored to the specific needs of South Australian heritage buildings that we use in compiling in depth reviews and exploring options.



Above: Part of the cover page from Arcuate's strategy booklet entitled *Sustainability Solutions for Churches in South Australia*. This strategy can be applied to any heritage place.

Please don't hesitate to contact us if you want us to carry out an audit of your heritage building.

Ian Hamilton, Director.  
Arcuate Architecture, Adelaide.

|         |                                                                                      |
|---------|--------------------------------------------------------------------------------------|
| website | <a href="http://www.arcuatearchitecture.com.au">www.arcuatearchitecture.com.au</a>   |
| email   | <a href="mailto:ianh@arcuatearchitecture.com.au">ianh@arcuatearchitecture.com.au</a> |
| phone   | 0488 106 451 and (08) 7231 5701.                                                     |

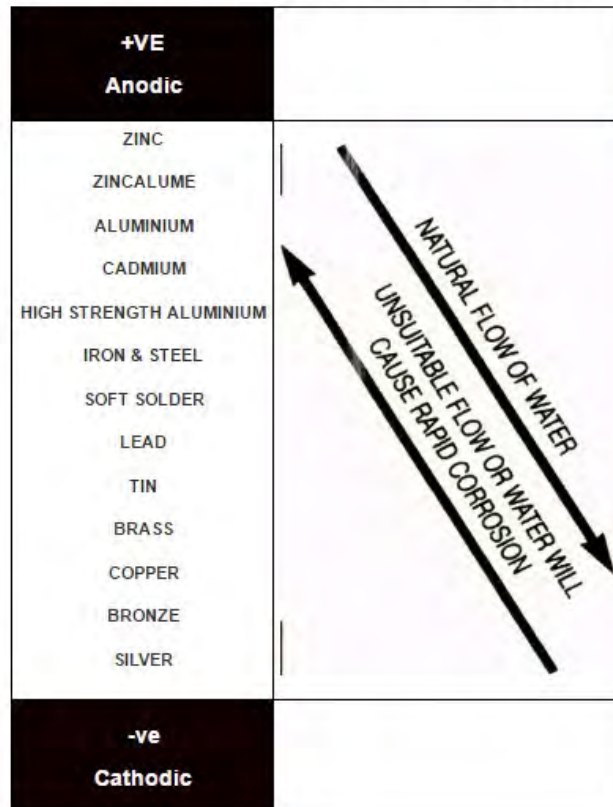
Note: Please also see Part 2 of ENERGY EFFICIENCY IN HERITAGE BUILDINGS entitled RENEWABLE ENERGY GENERATION FOR HERITAGE BUILDINGS.

## The Institute, Robe.

## Fabric Condition Report with Recommendations. February 2023

#### 11.4 Galvanic Charts for metals used in roofing and rainwater goods

The further apart the two metals on this chart, the faster the corrosion will take place.



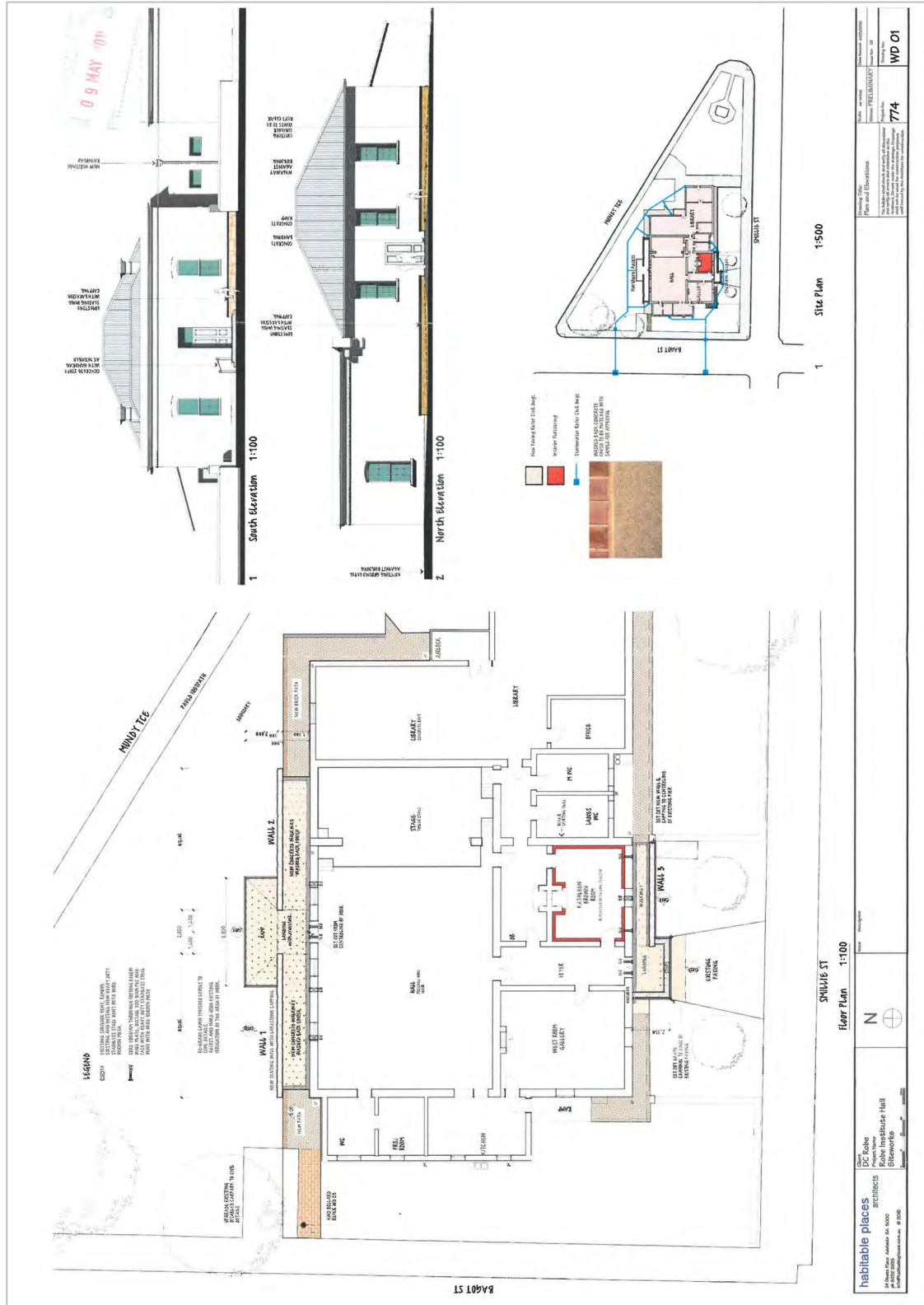
| ACCEPTABLE DRAINAGE FROM ONE SURFACE TO ANOTHER |               |           |           |         |           |        |      |      |
|-------------------------------------------------|---------------|-----------|-----------|---------|-----------|--------|------|------|
| LOWER SURFACE                                   | UPPER SURFACE |           |           |         |           |        |      |      |
|                                                 | GAL           | ZINCALUME | COLORBOND | S/STEEL | ALUMINIUM | COPPER | ZINC | LEAD |
|                                                 | GAL           | YES       | NO        | NO      | NO        | NO     | YES  | Y/NC |
|                                                 | ZINCALUME     | YES       | YES       | YES     | Y/NC      | YES    | NO   | YES  |
|                                                 | COLORBOND     | YES       | YES       | YES     | Y/NC      | YES    | NO   | YES  |
|                                                 | S/STEEL       | Y/NC      | Y/NC      | Y/NC    | Y/NC      | Y/NC   | Y/NC | Y/NC |
|                                                 | ALUMINIUM     | YES       | YES       | YES     | Y/NC      | YES    | NO   | YES  |
|                                                 | COPPER        | Y/NC      | Y/NC      | Y/NC    | YES       | YES    | NO   | YES  |
|                                                 | ZINC          | YES       | NO        | NO      | NO        | NO     | YES  | Y/NC |
| LEAD                                            | Y/NC          | Y/NC      | Y/NC      | Y/NC    | Y/NC      | Y/NC   | Y/NC | YES  |

|        |      |                                                    |
|--------|------|----------------------------------------------------|
| NOTE : | YES  | CONTACT AND DRAINAGE ACCEPTABLE                    |
|        | Y/NC | DRAINAGE ACCEPTABLE BUT NOT DIRECT METAL CONTACT   |
|        | NO   | NO DRAINAGE ACCEPTABLE AND NO DIRECT METAL CONTACT |

## The Institute, Robe.

### Fabric Condition Report with Recommendations. February 2023

#### 11.5 Drawings from Habitable Places Architects dated 2015







**ARCUATE**  
ARCHITECTURE

DESIGN | HERITAGE | SUSTAINABILITY