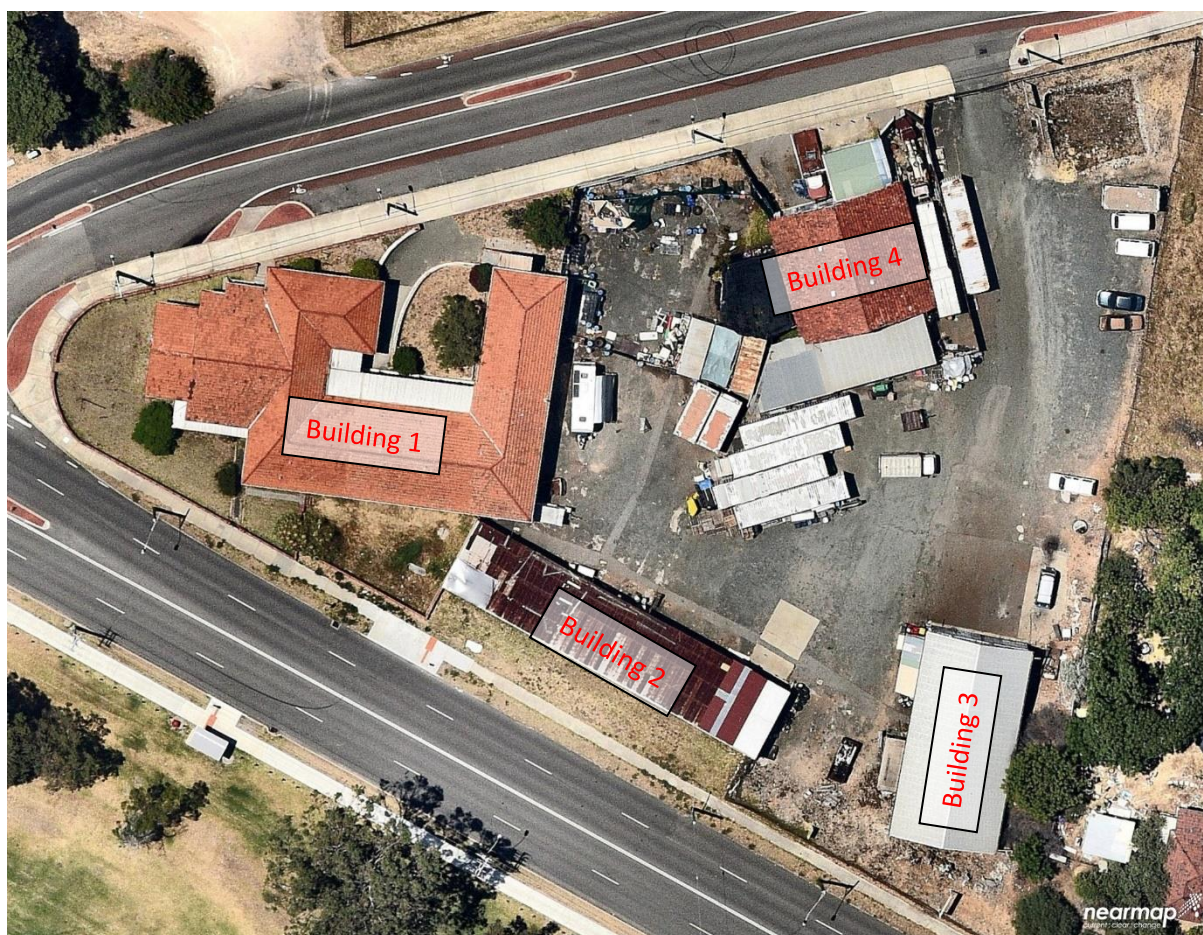


1 Forrest Rd, Hamilton Hill

Structural Inspection Report

M15819



INTRODUCTION

BPA Engineering were requested, by Dwayne Rowland of Kardan Construction, to undertake a structural audit of the existing buildings at 1 Forrest Rd, Hamilton Hill.

An inspection was undertaken by Aaron Murray, a Director and Structural Engineer with BPA Engineering, on the 3rd December 2019. At that time Building 4 was not accessible, so a follow up inspection was undertaken on the 17th December 2019. The inspection was a visual inspection only of those areas that were accessible.

There are four buildings on the site. Refer to the cover page for an aerial photo reference plan.

The roof structure was not visible in Building 1 and the ceiling space was not accessible; nor was access available to the basement of Building 1. The other buildings had visible roof structure. For lightweight roofs (sheet metal), the footings are critical to the structural integrity and capacity of the building. Footing sizes and condition was not investigated.

Building 1 consists of an accountant's offices and a community hall. The building appears to have been extended a number of times in the past, with the original building housing the accountant's office, then the hall (previously Council Chambers) added, followed by the East wing now housing a kitchen and storage.

Building 2 appears to have been stables or similar.

Building 3 is a mechanics workshop. Originally it appears to have been a truck servicing workshop used by the City / Shire of Cockburn.

Building 4 may also have been an original building on the site. It appears to be a workshop, though currently used as storage. There are a number of lean-tos and attached sheds surrounding the original building.

SUMMARY

BUILDING 1

The majority of this building appears to be in sound condition. Refer to the attached report for details. There are some cracks requiring repair while others are cosmetic. The steelwork to the North verandah requires some repair work. Steel posts are corroding and damaging the concrete and brickwork in various locations. The limestone wall at the basement entry has embedded steel that is severely corroded. This must be removed. The South West verandah slab has subsided and should be removed, and further investigation undertaken to discover the cause. The basement should be accessed for a termite inspection.

BUILDING 2

Building 2 is in very poor condition. This building contains the amenities for the mechanics workshop and possibly for Building 4 as well. These amenities are also in very poor condition. Refer to the attached inspection report for our observations.

The roof sheeting is severely corroded with numerous holes. A number of timber purlins have been notched, compromising their capacity. Some purlins along the North face are missing. Most of the original posts have been replaced with steel or timber. The remaining original posts are in poor condition and are unlikely to provide the tie-down capacity for the roof. Some of the new posts are not correctly fitted. The West end of the building is termite damaged.

In our opinion, this building should be demolished.

BUILDING 3

Building 3 is a steel framed shed. There appear to be some structural deficiencies with the framing of the shed, particularly for support of the end walls. The purlins on the West side have corroded and the North East corner has timber framing that has deteriorated (weathered) and requires replacement. The South West corner has termite damage and the sheet metal wall is acting as retaining. The soil requires excavating away from the walls on the South West and along the East wall.

Some of the roof trusses are buckled from impact damage. These would require replacement. The roof design appears to be as a portal frame; however, the knee of the portal is not correctly framed to tie into the trusses.

Refer to the attached inspection report.

BUILDING 4

Building 4 is primarily brick and timber trusses, with attached lean-tos or sheds to the North and South. Refer to the attached inspection report for details.

The Northern portion of the building is severely termite damaged. It is not structurally sound and should be treated with caution. The roof timbers in this region would require replacing. Some rafter members may be salvageable but would require inspection for termite damage before re-use. The remainder of the structural timber appears to be in fair condition. Eaves linings and gutters are generally in poor condition and require replacement.

The lean-to on the North side of the building does not appear to be adequately fixed back to the main building wall. Footings or tie downs were not investigated.

The South side shed has some corrosion near its perimeter. The framing support is trusses; however, the webs within the trusses are not coincident; therefore, making it act as a Vierendeel truss. This has much less capacity. Given that the truss is constructed from steel angles, it does not appear that it would have adequate capacity for the span (note that a design check has not been undertaken).

PROJECT: 1 Forrest Road, Hamilton Hill M15819 DATE: 3/12/2019

VISIT NAME: Building 1 REPORT NO: 001

AUTHOR: Aaron Murray STATUS: Final

VISIT DETAILS

WEATHER: Fine START TIME: 8:45 AM
END TIME: 10:45 AM

GENERAL COMMENTS: A building inspection was carried out by Aaron Murray of BPA Engineering at 1 Forrest Rd, Hamilton Hill. There are 4 buildings on the site. The initial inspection on the 3rd December 2019 was of three of the buildings, being (1) the accountant's office and hall, (2) an old stables / storage building and (3) the mechanics workshop. The final building (4), being used for storage, was inspected on the 17th December 2019. Refer to the attached aerial view showing building reference numbers.

PARTICIPANT NAME	COMPANY	TITLE	EMAIL
Aaron Murray	BPA Engineering	Director	amurray@bpaeng.com.au

OBSERVATIONS

Site Visit

DATE:
SITE VISIT:
REPORT NO:

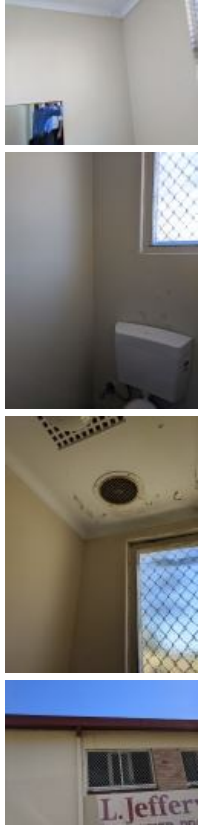
3/12/2019
Building 1
001

LOCATION:	B1 - Male Toilet		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-001	Cracks observed to various walls and one across the floor. Moisture damage to ceiling paintwork. The external wall has a significant crack over the window opening.	- Most of the cracks observed were cosmetic. They do indicate that some movement has occurred in the foundations; however, most are not of structural significance. - The vertical cracks over the window in the external brick should be stitched using the Helifix Crack Repair System.	

Site Visit

DATE:
SITE VISIT:
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3/12/2019
Building 1
001

LOCATION:	B1 - Female Toilet		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-002	Cracks in wall above window, near toilet. Moisture damage to ceiling paintwork. The external wall has a significant crack over the window opening.	- Most of the cracks observed were cosmetic. They do indicate that some movement has occurred in the foundations; however, most are not of structural significance. - The vertical cracks over the window in the external brick should be stitched using the Helifix Crack Repair System.	

LOCATION:	B1 - Filing room antechamber		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-003	Small crack above side of door opening	The crack appears to be cosmetic and may be patched if required.	

Site Visit

DATE:
SITE VISIT:
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Building 1
001

LOCATION:	B1 - Entry Foyer		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-004	Crack in wall between doors, and some ceiling cracks	The crack between the doors is indicative of some foundation movement. This crack should be stitched at every second course using the Helifix Crack Repair System.	

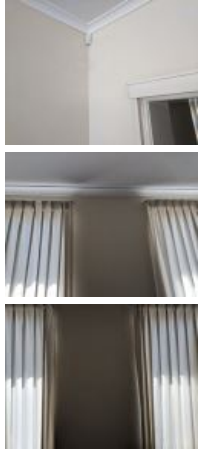
LOCATION:	B1 - Accountant's offices		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-005	Cracking around top of wall / cornice. Some moisture damage to ceiling paintwork	- Cracking along the cornice can be a symptom of a number of things. Commonly, the roof timbers expand and contract with variations in temperature and moisture. This can lead to minor movements that crack the brittle plaster. - Externally, some sag was noticeable in the roof; likely due to moisture and long term loads. - Where leaks occur, they should be traced and repaired to avoid damage to ceilings. As it was summer (and dry) at the time of inspection, the ceiling was not wet at the time of inspection.	

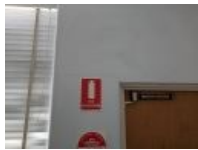
LOCATION:	B1 - Meeting Hall		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-006	Crack in the brickwork below the window in the meeting hall. This appeared to above the entry to the basement. Externally, there was some deterioration of the foundation limestone; and the embedded steel was corroded.	- The crack should be repaired using the Helifix Crack Repair System. - The crack is likely due to the condition of the supporting wall. As there was no access to inspect within the basement, we can only go on the condition of the external wall, which was deteriorating. - The external basement wall should have the corroding steel removed and the mortar joints re-pointed. As the wall appears to be limestone, it will likely require lime mortar for repair works. (Cementitious mortar may cause further damage to the limestone blocks)	

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Building 1
001

LOCATION:	B1 - East of Hall		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-007	The wall beside the door to the meeting room has stepped cracking from the top of the door. The East side piers between the windows were cracked vertically.	• Repair the crack using the Helifix Crack Repair System. Reinforce at two course centres. • The vertical cracks in the piers should be repaired using the Helifix Crack Repair System.	

LOCATION:	B1 - Kitchen		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-008	Horizontal crack from top of Eastern door in kitchen.	• This crack is in a weakened portion of the wall due to the position of the door and window. Patch and monitor for future movement.	

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Building 1
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LOCATION:	B1 - North Verandah		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-009	Metalwork above the north entry and windows to the hall was corroded through. The timber threshold step is weathered and does not appear to have been painted in some time. The verandah post base is embedded in the brickwork upstand and is corroding, resulting in cracking. The concrete verandah slab has cracked. It was also noted that there are no downpipes off the verandah gutter.	- The metalwork above the door appeared to be cosmetic, to hide the end of the sheeting; however, it was also clear that water has run over the top ends of the roof sheets. - Ensure that the top end of the roof sheets are correctly turned up. - Remove the damaged flashing. Replace if desired. - The timber step should be sanded back and painted or varnished. - The brickwork around the verandah post should be removed. Prop the verandah, cut off the post at the top of the brickwork level and weld on a new base plate; reinstate the brickwork, then bolt the new base plate down with drilled and epoxied anchors. Anchors should have at least 200mm embedment.	

LOCATION:	B1 - Verandah (West end)		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-010	Post near the West end of the hall verandah has peeled paint. Corrosion deposits stain the West wall - indicating that the gutter is leaking and causing corrosion of the fixings. The steel beam below the gutter appears to have significant corrosion.	- The paint on the verandah post appears to be an incompatible paint applied over galvanising. Clean back the outer paint coating; etch prime, then re-apply paint treatment using an epoxy based intermediate coat and polyurethane (or similar) finish coat. - Investigate the condition of the gutter. Remove and replace the corroded fixings where the gutter has leaked. - Further investigate the steel beam (would likely require removal of the gutter). Depending on condition, either replace the beam, or clean it back to steel (bristle blast or power tool clean) and apply a 3 coat paint system.	

Site Visit

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LOCATION:	B1 - Near driveway		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-011	The limestone foundation on the West side of the driveway has deteriorated.	Monitor for future damage. If re-pointing mortar, use lime mortar or similar.	

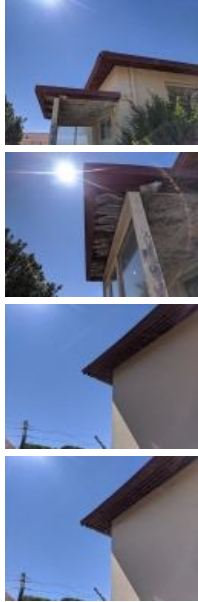
LOCATION:	B1 - Garden bed		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-012	Downpipe in garden bed adjacent driveway spills onto ground near foundations	Re-direct stormwater away from foundations.	

LOCATION:	B1 - NE Stairs		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-013	Stair has subsided. Outer handrail has been removed. Inner handrail may have been impact damaged. It has also corroded and spalled the brickwork surrounding it.	- Seal the horizontal crack in the stair and monitor for further subsidence. - Repair brickwork and replace handrails.	   

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LOCATION:	B1 - NE Stair roof		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-014	Timber lining to eaves of main roof and lining to stair roof have deteriorated.	• Replace missing timber lining. • Paint existing timber lining to provide protection.	

LOCATION:	B1 - North wall		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-015	The north wall (filing room) has some mortar loss.	• Re-point missing mortar.	

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LOCATION:	B1 - NW Entry		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-016	Entry steps to the accountant's office are cracked. The steel post on the right is embedded in the concrete and has severely corroded. The West end of the porch has a similar embedded post base plate that has corroded resulting in large cracks in the concrete.	- While in poor condition, the steps are function. Over time, they will deteriorate further. To prolong the life of the stairs, inject cracks with Roadware 10-Minute Concrete Mender; or an epoxy such as Sikadur 52. - Break out the concrete around the base of the steel posts; prop the roof structure; cut off the column above the floor level and install a base plate; re-instate the concrete using a bonding agent and keyed in reinforcing bars; Fix down the new base plate. Ensure all steel is treated with a 3 coat system e.g. PUR5 (AS/NZS 2312.1)	

LOCATION:	B1 - NW Corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-017	Horizontal cracking at corner near switch board.	Repair the cracks using Helifix Crack Repair System. For horizontal cracks this does not involve reinforcement.	

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LOCATION:	B1 - West Fence		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-018	Brick fence has cracked and is leaning outward.	- Expansion of the brickwork has likely contributed to the movement of the wall. - Cut a joint in the wall near where it has cracked. Then break back and re-build adjacent cracked brickwork.	

LOCATION:	B1 - SW Pier		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-019	Brick pier at South West corner is cracked horizontally.	- In our opinion, it is unlikely that the brick pier is reinforced. The small roof over is a sheet roof, rather than tile, so the cracking may be the result of uplift forces. - Chase a tie down rod into the pier, fixing to the timber beam at the top and chemically anchored into the concrete at the base.	

LOCATION:	B1 - SW		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-020	Refrigerated air conditioning unit in wall is corroded.	This does not affect the function of the building.	

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LOCATION:	B1 - SW Verandah		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-021	The SW verandah has cracked and subsided. The roof over shows considerable sag.	- The cause of the subsidence is unknown. - Remove the slab and investigate the cause. This may include water leaks or poor compaction. - Roof is likely to have saged as a result of moisture and long term loads. Review with internal ceiling moisture damage. Repair any leaks or re-seal tile roof.	

LOCATION:	B1 - Basement		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-022	The basement was not accessible. There was some deterioration of the limestone blockwork and mortar around the basement entry. Embedded steel in the blocks has corroded and expanded.	- The basement should be accessed for a termite inspection. - Remove corroded steel from the limestone blocks. - Re-point the joints with lime mortar or similar to prevent damage to the limestone blocks.	

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LOCATION:	B1 - East of Hall		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-023	The exterior face of the hall had a significant crack above the pier between windows.	Stitch the cracks using Helifix Crack Repair System. Reinforce at every second bed joint.	

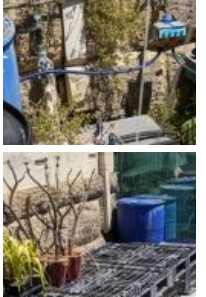
LOCATION:	B1 - SE Corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-024	The downpipe on the South face of the SE corner of the building is severely corroded.	Replace this downpipe. Ensure stormwater is directed away from the base of the wall.	 

LOCATION:	B1 - Kitchen stairs		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-025	The stair up to the unused kitchen door had spalled around the embedded handrail posts.	- Remove the handrail and embedded steel. - Repair the stair and replace the handrail. - Alternatively, if not required for escape, demolish the stairs and brick up the door to the kitchen.	 

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LOCATION:	B1 - NE Exterior		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-026	Downpipes were corroded away near their base with one also being partially crushed.	Trim the corroded portions of the downpipes and replace the bottom portion, redirecting water away from the footings. If no garden beds are available for this disposal, then install a soakwell.	

LOCATION:	South Brick Fence		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
001-037	The brick wall / fence to the south of Building 1 has grouted in posts from an old fence. The steel has corroded and expanded resulting in cracking of the brickwork.	Core out the corroding posts and grout up the post holes. If brickwork has spalled, the replace the adjacent bricks.	

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PHOTOS

ITEM:	PHOTO:
001-001	 A photograph of a bathroom interior. The top half of the image shows a large, irregular crack running vertically down a light-colored wall. The bottom half of the image shows a white pedestal sink with a chrome faucet, a red fire alarm pull station on the wall above it, and a shower area with a dark door and a speckled floor.

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ITEM:	PHOTO:
	

Site Visit

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ITEM:	PHOTO:
	 A photograph of the exterior of a single-story building. The building has a light-colored facade with a brick section around the windows. The windows are covered with white diamond-patterned security screens. A large sign is mounted on the wall, reading "Jeffery Accountants" in a large, bold, serif font. Below this, in a smaller font, it says "PRACTISING ACCOUNTANTS" and "Fax. 9430 5210". The sky is clear and blue.
001-002	 A photograph of an interior room. The walls are a light beige color. In the lower-left corner, there is a small rectangular inset image showing a person wearing a blue button-down shirt and dark trousers, standing in a doorway. The main image shows the corner of the room with a white ceiling and a window on the right side.

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ITEM:	PHOTO:
	 A photograph of a white toilet in a room. The toilet is positioned in the lower right corner of the frame. Above the toilet, there is a window with a blue and white diamond-patterned screen. The wall to the left of the toilet is a light beige color and shows some signs of wear, including a vertical crack and some discoloration. The floor is a light-colored tile.

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ITEM:	PHOTO:
	 A photograph showing a ceiling with a circular vent and a square light fixture. The ceiling is off-white and shows signs of damage, including peeling paint and small holes. The vent has a metal mesh cover. The light fixture is a square with a grid pattern. The walls are a light beige color. A window with a blue-tinted, diamond-patterned glass is visible on the right side of the frame.

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ITEM:	PHOTO:
	 A photograph showing the exterior of a building with a light-colored wall and a dark brown roofline. A window with a metal mesh screen is visible. Below the window, a sign with the name 'L. Jeffery' in large, dark letters is partially visible. The sky is clear and blue.
001-003	 A photograph showing the interior of a room with a textured, light brown wall. A man in a white shirt and glasses is standing in a doorway, pointing his right arm towards the right. A large, round, orange object is visible on the left side of the frame.

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ITEM:	PHOTO:
001-004	

Site Visit

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ITEM:	PHOTO:
001-005	

Site Visit

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ITEM:

001-006

PHOTO:



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ITEM:	PHOTO:
001-007	

Site Visit

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001

ITEM:	PHOTO:
	
001-008	

Site Visit

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ITEM:

001-009

PHOTO:



Site Visit

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ITEM:

PHOTO:



Site Visit

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001

ITEM:	PHOTO:
	
001-010	

Site Visit

DATE:
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Building 1
001

ITEM:	PHOTO:
	

Site Visit

DATE:
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001

ITEM:	PHOTO:
001-011	 A photograph showing a concrete sidewalk in the foreground. In the background, there is a wall with a brick base and a white upper section. A small, square, white vent is visible on the white section of the wall. The wall appears to be part of a building.
001-012	 A photograph showing a concrete sidewalk in the foreground. In the background, there is a wall with a brick base and a white upper section. A small, square, white vent is visible on the white section of the wall. The wall appears to be part of a building. A green bush is visible to the right of the wall.

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ITEM:

001-013

PHOTO:



Site Visit

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Building 1
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ITEM:

PHOTO:



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ITEM:

001-014

PHOTO:



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ITEM:	PHOTO:
	

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ITEM:	PHOTO:
001-015	
001-016	

Site Visit

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ITEM:

PHOTO:



Site Visit

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001

ITEM:	PHOTO:
001-017	 The table contains two photographs. The top photograph shows a narrow hallway with a red metal structure above and a door labeled 'SITE MAIN SWITCHBOARD'. The bottom photograph is a closer view of the switchboard door and a metal mesh enclosure.

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ITEM:	PHOTO:
	
001-018	

Site Visit

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ITEM:

PHOTO:



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ITEM:	PHOTO:
001-019	
001-020	

Site Visit

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Building 1
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ITEM:

001-021

PHOTO:



Site Visit

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ITEM:

PHOTO:



Site Visit

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Building 1
001

ITEM:

001-022

PHOTO:



Site Visit

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Building 1
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ITEM:	PHOTO:
	

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ITEM:	PHOTO:
001-023	 A photograph showing the exterior of a light-colored building. Two windows with blue-tinted glass and white frames are visible. Above the windows is a thick, dark brown wooden beam. The sky is clear and blue. A thin white rope or wire runs across the bottom of the frame.

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ITEM:

001-024

PHOTO:



Site Visit

DATE:
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Building 1
001

ITEM:

PHOTO:



Site Visit

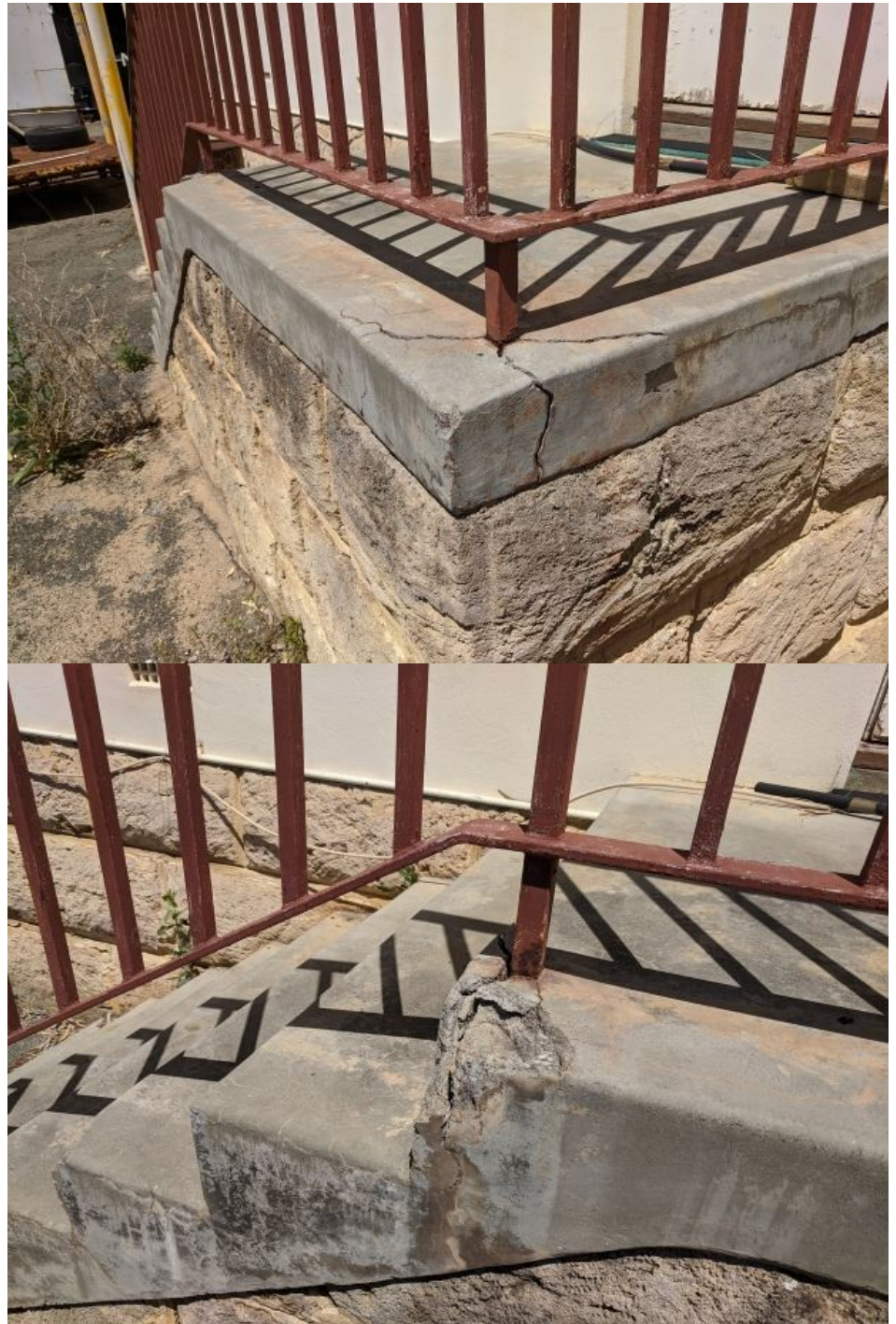
DATE:
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001

ITEM:

001-025

PHOTO:



Site Visit

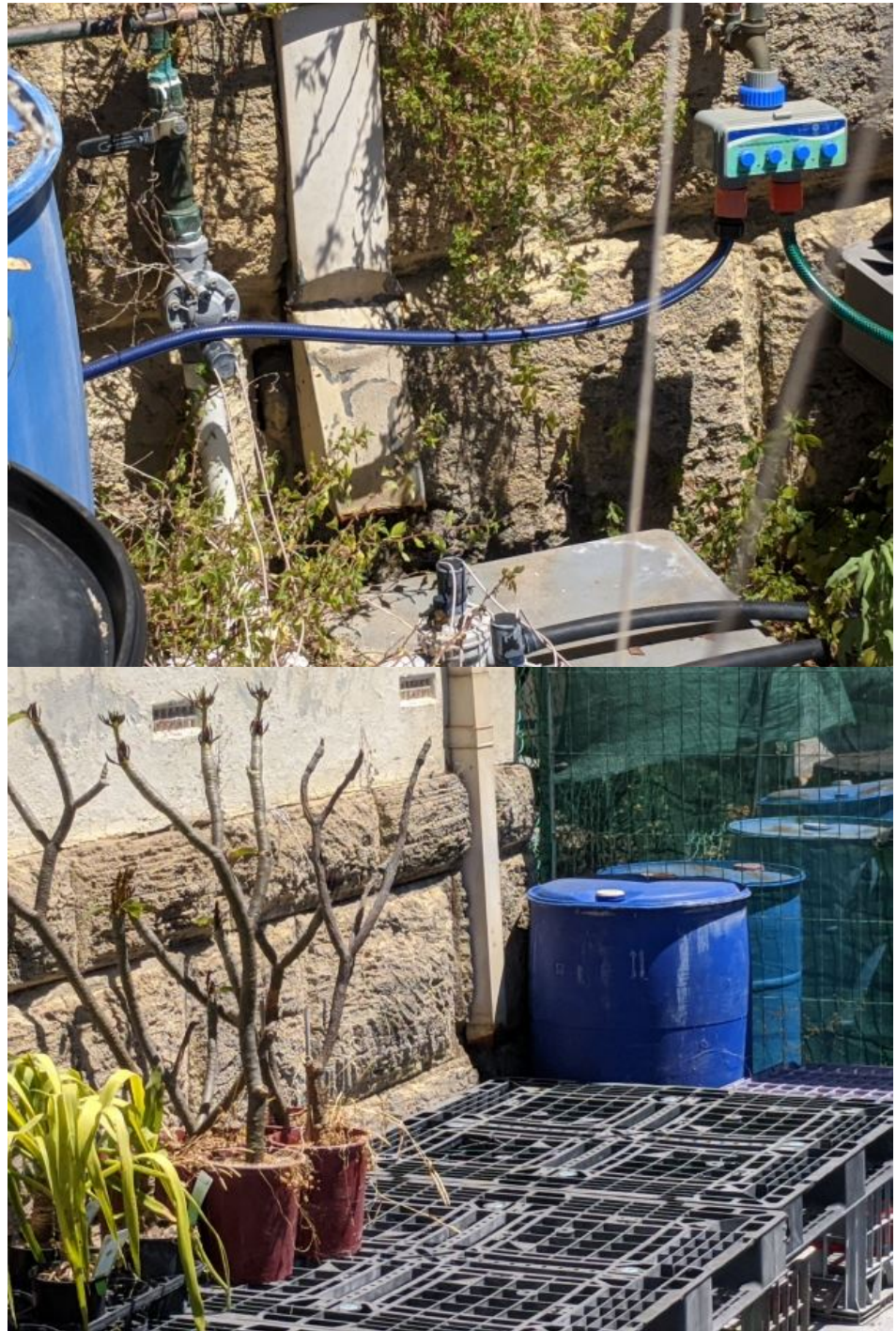
DATE:
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001

ITEM:

001-026

PHOTO:



Site Visit

DATE: 3/12/2019
SITE VISIT: Building 1
REPORT NO: 001

ITEM:	PHOTO:
001-037	

PROJECT:	1 Forrest Road, Hamilton Hill M15819	DATE:	3/12/2019
VISIT NAME:	Building 2	REPORT NO:	002
AUTHOR:	Aaron Murray	STATUS:	Final

VISIT DETAILS

WEATHER:	Fine	START TIME:	8:45 AM
		END TIME:	10:45 AM

GENERAL COMMENTS: A building inspection was carried out by Aaron Murray of BPA Engineering at 1 Forrest Rd, Hamilton Hill. There are 4 buildings on the site. The initial inspection on the 3rd December 2019 was of three of the buildings, being (1) the accountant's office and hall, (2) an old stables / storage building and (3) the mechanics workshop. The final building (4), being used for storage, was inspected on the 17th December 2019. Refer to the attached aerial view showing building reference numbers.

PARTICIPANT NAME	COMPANY	TITLE	EMAIL
Aaron Murray	BPA Engineering	Director	amurray@bpaeng.com.au

OBSERVATIONS

LOCATION:	B2 - West End (Ext)	
ITEM	OBSERVATIONS	PHOTO
002-001	A large vertical crack was evident in the end wall of the building. The flashing on the NW corner was partially detached. On the SW corner, a tarp had been placed over the roof. The opening in the wall to the toilet has a timber surround that has deteriorated.	 

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LOCATION:	B2 - SW Exterior	
ITEM	OBSERVATIONS	PHOTO
002-002	The South West corner of the building has a flashing that has severely corroded. The remainder has a timber barge board.	

LOCATION:	B2 - South Exterior	
ITEM	OBSERVATIONS	PHOTO
002-003	The steel roof beams were railway irons built	

LOCATION:	B2 - SE Corner	
ITEM	OBSERVATIONS	PHOTO
002-004	The East end of the roof has a corroded flashing along the South wall. An edge purlin remained in the end bay.	

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LOCATION:	B2 - Roof (East)	
ITEM	OBSERVATIONS	PHOTO
002-005	The edge purlin was missing in the first two bays. The sheeting had been replaced. The remaining purlin (back from the edge) in the end bay had been deeply notched.	

LOCATION:	B2 - Roof	
ITEM	OBSERVATIONS	PHOTO
002-006	Timber purlins along the North face have been notched.	

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LOCATION:	B2 - Roof Sheeting	
ITEM	OBSERVATIONS	PHOTO
002-007	Generally the roof sheeting was in very poor condition, with extensive corrosion and many holes.	

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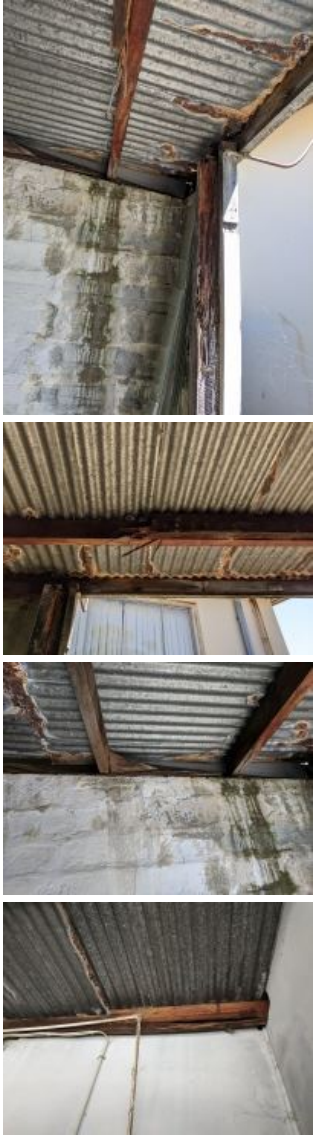
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LOCATION:	B2 - Roof (West)	
ITEM	OBSERVATIONS	PHOTO
002-008	The edge purlin is missing along the North face near the West end of the building.	

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LOCATION:	B2 - West End	
ITEM	OBSERVATIONS	PHOTO
002-009	The West end of the building has comprehensive termite damage.	

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LOCATION:	B2 - North Face	
ITEM	OBSERVATIONS	PHOTO
002-010	Columns along the North face are timber or steel. The original posts appear to have been timber. Those remaining are badly weathered or termite damaged. A number have been replaced with steel columns; however, they are largely untreated or have welds that are untreated. Tie down fixings are compromised by timber deterioration, corrosion or inadequate anchors.	    

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PHOTOS

ITEM:	PHOTO:
002-001	

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ITEM:

002-002

PHOTO:



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ITEM:	PHOTO:
002-003	

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ITEM:	PHOTO:
002-004	
002-005	

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ITEM:	PHOTO:
	
002-006	

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ITEM:	PHOTO:
	

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ITEM:

002-007

PHOTO:



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ITEM:

PHOTO:



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ITEM:

002-008

PHOTO:



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ITEM:	PHOTO:
	

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ITEM:	PHOTO:
002-009	

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ITEM:	PHOTO:
	

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ITEM:	PHOTO:
	
002-010	

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ITEM:

PHOTO:



Site Visit

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ITEM:

PHOTO:



PROJECT: 1 Forrest Road, Hamilton Hill M15819 DATE: 3/12/2019

VISIT NAME: Building 3 REPORT NO: 003

AUTHOR: Aaron Murray STATUS: Final

VISIT DETAILS

WEATHER: Fine START TIME: 8:45 AM
END TIME: 10:45 AM

GENERAL COMMENTS: A building inspection was carried out by Aaron Murray of BPA Engineering at 1 Forrest Rd, Hamilton Hill. There are 4 buildings on the site. The initial inspection on the 3rd December 2019 was of three of the buildings, being (1) the accountant's office and hall, (2) an old stables / storage building and (3) the mechanics workshop. The final building (4), being used for storage, was inspected on the 17th December 2019. Refer to the attached aerial view showing building reference numbers.

PARTICIPANT NAME	COMPANY	TITLE	EMAIL
Aaron Murray	BPA Engineering	Director	amurray@bpaeng.com.au

OBSERVATIONS

LOCATION:	B3 - Trusses		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-001	The roof trusses near the entry to the building and further in are buckled. They appear to have been sustained impacts - we understand that prior to becoming a mechanics workshop, the building was a truck workshop and was likely damaged at that time. The centre of the first bay has cross bracing rods but does not have a horizontal brace, thus rendering them ineffective.	- The structural capacity of the trusses has been compromised. - The spandrel above the entry sliding door is not adequately restrained by the bracing.	   

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LOCATION:	B3 - Truss knees		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-002	The knees of the trusses have a corner brace to act as a portal frame; however, it is braced to the truss bottom chord only, compromising the capacity of the truss to act as a portal.	Additional web members would be required within the truss to effectively act as a portal frame.	

LOCATION:	B3 - Purlins		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-003	The purlins are CHS members. The purlin at the eaves and one row in are heavily corroded, particularly on the West side. The roof sheet is also affected where in contact with the purlins.	- The edge purlins are no longer protected by the galvanising coating that has delaminated. - Some material loss has occurred as a result of corrosion. It would be difficult to determine the remaining capacity of the section.	 

LOCATION:	B3 - SW Corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-004	Timber wall support in the South West corner is termite damaged.	Timber requires replacement.	   

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LOCATION:	B3 - SW Corner (Ext)		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-005	Soil is built up against the sheet wall of the shed in the SW corner. There was no evidence of retaining.	- The buildup of soil has likely provided an entry path for the termites. - The wall of the shed does not have capacity to retain this soil.	

LOCATION:	B3 - NE Corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-006	The downpipe has corroded away. Timber at the corner has deteriorated and pulled away from the structure. Wall sheeting at the bottom of the wall near the tap has corroded away and appears to have been replaced. Rock and soil is built up against the base of the wall.		

LOCATION:	B3 - Office		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
003-007	A cross brace as the entry to the lean-to office has been cut.	The brace on the opposite diagonal should be replaced with a compression strut.	

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PHOTOS

ITEM:	PHOTO:
003-001	 The top photograph shows a close-up view of the interior of a large industrial building, focusing on the corrugated metal roof and the wooden truss system. A long fluorescent light fixture is visible on the right side of the frame. The bottom photograph provides a wider view of the same interior space, showing multiple fluorescent light fixtures and a ceiling fan hanging from the truss system. The walls are made of corrugated metal, and a red piece of equipment is partially visible on the right side.

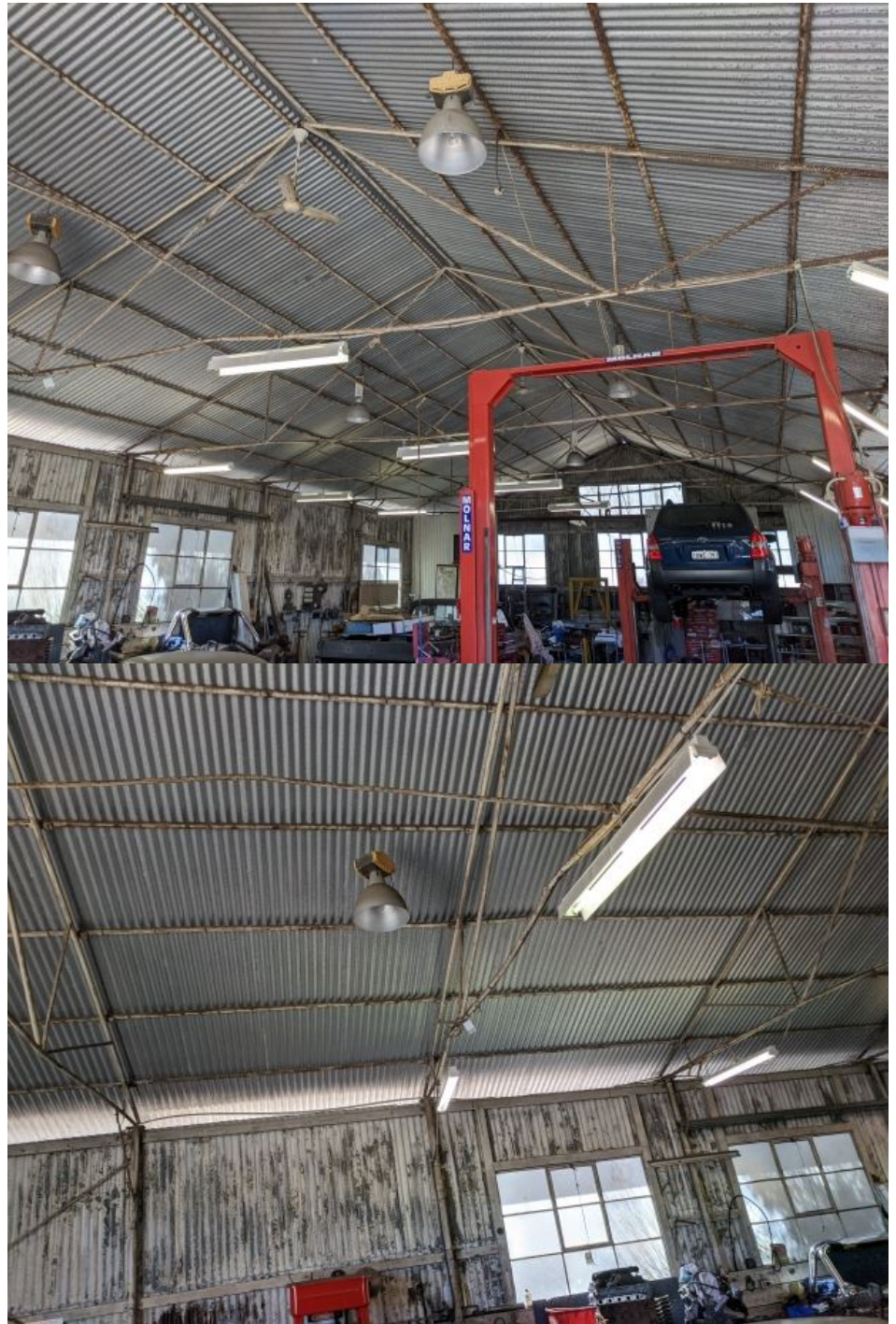
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ITEM:

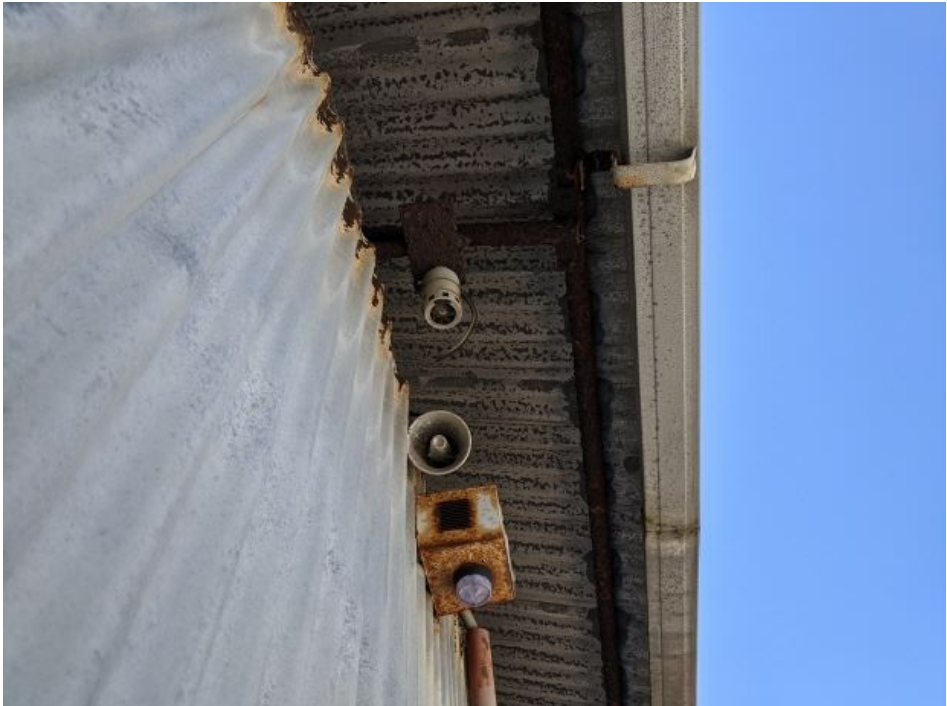
PHOTO:



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ITEM:	PHOTO:
003-002	
003-003	

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ITEM:	PHOTO:
	
003-004	

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ITEM:

PHOTO:



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ITEM:

PHOTO:



003-005



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ITEM:

PHOTO:



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ITEM:

003-006

PHOTO:



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003-007

PHOTO:



PROJECT: 1 Forrest Road, Hamilton Hill M15819 DATE: 17/12/2019

VISIT NAME: Building 4 REPORT NO: 004

AUTHOR: Aaron Murray STATUS: Final

VISIT DETAILS

WEATHER: Fine START TIME: 11:00 AM
END TIME: 12:15 PM

GENERAL COMMENTS: A building inspection was carried out by Aaron Murray of BPA Engineering at 1 Forrest Rd, Hamilton Hill. There are 4 buildings on the site. The initial inspection on the 3rd December 2019 was of three of the buildings, being (1) the accountant's office and hall, (2) an old stables / storage building and (3) the mechanics workshop. The final building (4), being used for storage, was inspected on the 17th December 2019. Refer to the attached aerial view showing building reference numbers.

PARTICIPANT NAME	COMPANY	TITLE	EMAIL
Aaron Murray	BPA Engineering	Director	amurray@bpaeng.com.au
Dwayne Rowland	Kardan Construction		dwayne@kardan.net.au

OBSERVATIONS

LOCATION:	B4 - Entry Lean To		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-001	The lean-to truss is fixed to the wall sheeting using a single bolt. Purlins are improperly lapped	At least two fixings should be installed. Ensure there is timber within the wall to fix to.	

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004

LOCATION:	B4 - North		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-002	The timber structure supporting the north face of the building is severely damaged by termite activity. Timber members providing lateral support over the doors have also been compromised.	- The north face of the building requires demolition and re-construction. - Note that the facade cladding may be asbestos.	

LOCATION:	B4 - North		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-003	The ridge beam has disintegrated due to termite activity. The central support beam was removed due to termite damage and not replaced. Struts for the ridge and trusses are unsupported.	- The roof is not structurally sound. - The Northern bay of the building requires demolition and re-construction.	

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LOCATION:	B4 - North		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-004	A Platform has been added in using lightweight sections.	- The capacity did not appear adequate for floor loads. - Consideration should be given to either removing the platform, or a design review to check its load capacity.	

LOCATION:	B4 - Main		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-005	Beyond the North bay of the building, the majority of the timber structure appeared to be in acceptable condition.		

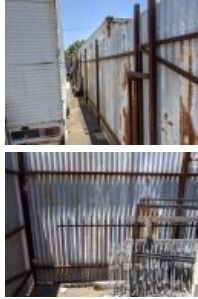
LOCATION:	B4 - South		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-006	A power switch was hanging suspended rather than fixed to the wall.	Electrician to review	

LOCATION:	B4 - South East (Shed)		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-007	The entry to the attached shed on the south of the main building had evidence of impact damage.	This truss may require replacement.	

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LOCATION:	B4 - South Fence		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-008	The fence posts and rails were corroded; though did not appear to be structurally compromised at the time of inspection.	These will have a limited life and may begin to fail in the intermediate term (2 to 5 years).	

LOCATION:	B4 - East		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-009	The eaves gutter on the East side was corroded out. Some of the slat lining timbers were damaged, particularly near the North corner. Some windows were broken.	- The gutters require replacement. - Eaves linings require repair or replacement of damaged areas. They should also be painted to provide protection to the timber.	

LOCATION:	B4 - South West		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-010	The purlins for the shed were generally corroded; however, this was considerably worse along the West side. There was no flashing on the interface between wall and roof.	Purlins will require replacement near the perimeter in the intermediate term. To extend the life, a flashing could be installed.	

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LOCATION:	B4 - NE Office		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-011	The flooring to the office was chipboard on a steel frame. The spacing of the supports appeared to be too great resulting in a flexible floor.	This is primarily an issue for use and comfort.	

LOCATION:	B4 - NE Corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-012	The brick pier at the corner of the building appears to have some brick displacement.	The top portion of the pier should be broken down and rebuilt.	

LOCATION:	B4 - NW corner		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-013	The gutter appears to be missing on part of the West face. The remaining gutter is severely corroded. The eaves lining is badly weathered.	- The eaves lining and gutter require replacement. - Note also that the facade cladding may be asbestos.	

LOCATION:	B4 - North		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-014	The north face has no eaves overhang and there is no edge flashing. Windows appear to be broken.	- A flashing should be installed to seal the roof edge. - Windows will require replacement with the timber framing. - Note that the cladding may be asbestos.	

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LOCATION:	Wall / Fence near B1		
ITEM	OBSERVATIONS	DISCUSSION	PHOTO
004-015	The fence around the yard adjacent building 4 and near building 1 has spalled around the fixings for the fence posts. The bottom rail at the return to building 1 is not connected to the post.	• Remove the fence and rebuild the brickwork where required. • Install a fence by core drilling and grouting the posts at least 400mm into the brickwork. • Connect the fence rails to the posts.	

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PHOTOS

ITEM:	PHOTO:
004-001	

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004-002

PHOTO:



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004-003

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ITEM:	PHOTO:
	
004-004	

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ITEM:	PHOTO:
	
004-005	

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004-006	
004-007	

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ITEM:	PHOTO:
	 A close-up photograph showing the intersection of a white corrugated metal roof and a weathered, rusty metal wall. The roof has a distinct wavy pattern, and the wall below it shows signs of significant rust and wear. The sky is visible in the background.
004-008	 A photograph of a narrow alleyway. On the left is the side of a white truck with a license plate that reads 'XUA-536'. On the right is a tall, rusty metal fence made of corrugated metal sheets and vertical posts. The ground is paved, and the sky is clear and blue.

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ITEM:	PHOTO:
	
004-009	

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ITEM:	PHOTO:
	 The table contains two photographs documenting building damage. The top photograph shows a window with a missing pane and a corrugated metal roof. The bottom photograph is a close-up of a window with shattered glass and a large hole.

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004-010	
004-011	

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ITEM:	PHOTO:
004-012	
004-013	

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ITEM:	PHOTO:
004-014	
004-015	

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PHOTO:

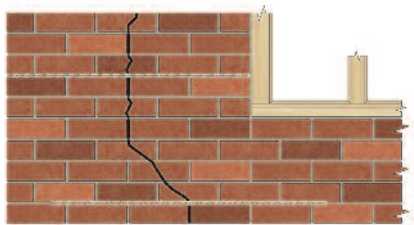


HeliBar

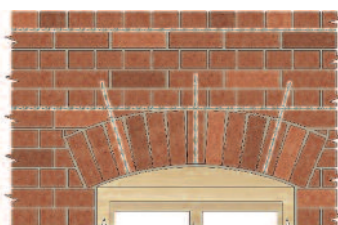
Helical stainless steel reinforcing bar for masonry repair and strengthening in both remedial and new build situations

Applications

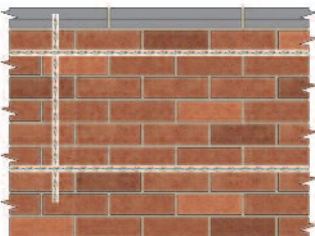
- Crack stitching
- Lintel repair and creation
- Forming deep masonry beams
- Horizontal structural restraint (when used with BowTie systems)
- Reconnecting separated walls
- Securing parapet walls
- Support existing masonry when creating new openings
- Reinforcing new build masonry
- Seismic upgrades for existing masonry
- Repairing bridges, tunnels and arches



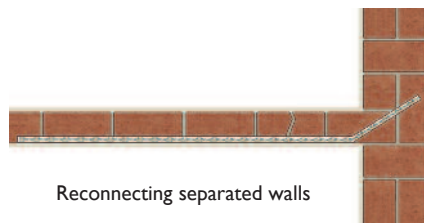
Crack stitching



Lintel reinstatement



Securing parapet walls



Reconnecting separated walls



Features

- Austenitic stainless steel helical bars
- Combines great axial strength with flexibility
- Accommodates differential building movement
- No additional stresses introduced into structure
- Generates high tensile strength with mortar (new build only) or HeliBond grout
- Extremely economical compared with alternative methods
- May remove or reduce the need for mass underpinning
- Fully concealed once installed
- Avoids expensive taking down and rebuilding
- Minimal disruption to building's fabric or occupants
- Spreads structural loads to avoid secondary cracking
- Reduces the potential for cracking in shrinkable materials



HeliBar is inserted into HeliBond grout within a cut slot

Over 50 standard repair specifications are available online, covering all common structural faults.

Relevant Repair Details: CS01 to CS03; LB01 & LB04; LR01 & LR10; PVW02; RVW03; SC01; SN01; NH03



Scan the QR Code for full Product Information, Case Studies and downloadable Repair Details

Installation Procedures

Example Application: Crack Stitching

1. HeliBar to be long enough to extend a minimum of 500mm either side of the crack or 500mm beyond the outer cracks if two or more adjacent cracks are being stitched using one rod.
2. Where a crack is less than 500mm from the end of a wall or an opening, the HeliBar is to be continued for at least 200mm around the corner and bonded into the adjoining wall or bent back and fixed into the reveal, avoiding any DPC.
3. For solid masonry in excess of 230mm thick and in a cavity wall where both leaves are cracked, the wall must be crack stitched on both sides.
4. If there is render/plaster, this thickness must be added to the depth of slot. Crack stitching must be installed in the masonry and never in the render.
5. Ensure the masonry is well wetted or primed to prevent premature drying of the HeliBond due to rapid de-watering, especially in hot conditions. Ideally additional wetting of the slot should be carried out 1 to 2 minutes prior to injecting the HeliBond grout.
6. Do not use HeliBond when the air temperature is +4°C and falling or apply over ice. In all instances the slot must be thoroughly damp or primed prior to injection of the HeliBond grout.



1. Rake out or cut slots into the horizontal mortar beds, a minimum of 500mm either side of the crack



4. Using the HeliBar Insertion Tool push one HeliBar into the grout to obtain good coverage



2. Clean out slots and flush with clean water and thoroughly soak the substrate within the slot



5. Insert a further bead of HeliBond over the exposed HeliBar, finishing 12mm from face and 'iron' firmly into the slot using the HeliBar Insertion Tool



3. Using the Helifix Pointing Gun, inject a bead of HeliBond along the back of the slot



6. Re-point the mortar bed and make good the vertical crack with CrackBond TE3

Slot Depth and Spacing

	Single skin/ Cavity wall	Solid Masonry		
		Up to 102.5mm	102.5mm to 225mm	Over 230mm
Depth of slot	25 – 35mm	25 – 40 mm	25 – 40 mm	25 – 40mm On both sides
Vertical Spacing	Every 4 courses (approx. 340mm)			

Characteristic Material Properties

HeliBar Diameter	4.5mm	6.0mm	SuperSix	8.0mm	10.0mm
Product Code	HBR45	HBR60	HBR60S	HBR80	HBR10
Cross Sectional Area (mm ²)	5.6	8.1	9.4	10.0	15.0
Stock Length (m)	7.0	7.0	7.0	7.0	7.0
Pitch (mm)	25	29	30	39	45
Ultimate Tensile Strength (MPa)	1400	1112	1200	1100	1088
Tensile Strength (kN)	8.0	9.5	11.2	11.4	16.7
0.2% Proof Stress (MPa)	1150	840	1000	860	770
Shear Strength — Averaged (MPa)	900	650	770	700	750
Grade of Stainless Steel	ASTM304	ASTM316	ASTM304	ASTM316	ASTM316
Weight (g/m)	53	58	73	80	120