THE AUTOMATIC SPRINKLER INSPECTION BUREAU (PTY) LIMITED

REGISTRATION NUMBER: 1970/0110833/07

1407 IMBALI
CNR LOUIS BOTHA AND TUDHOPE AVENUES
BEREA
JOHANNESBURG
2198
TELEPHONE: +27 11 642 1703
FACSIMILE: +27 11 642 1019
E-MAIL: asib@asib.co.za
WEB SITE: http://www.asib.co.za

P O BOX 3139
HOUGHTON
2041

CAPE TOWN **E ARIEFDIEN**
Cellular Phone: +27 84 563 0506
Facsimile +27 21 697 5691

DURBAN **T GAMBLE**
Cellular Phone: +27 82 578 1732
Facsimile: +27 31 572 5846

G SNEEDON
Cellular Phone: +27 82 578 1737
Facsimile: +27 31 462 3714

Your Reference:

Our Reference: CA/ca/UNC.6930
Code: **"C"**

Inspection Date: 19th of October 2016
Date: 18th of November 2016

SCI-Bono Discovery Centre NPC
P O Box 61882
Marshalltown
2017

Attention: **Motheo Boroko**

INSPECTION OF AUTOMATIC SPRINKLER SYSTEM
SCI – BONO DISCOVERY CENTRE NPC : CORNER OF MIRIAM MAKEBA AND HELEN JOSEPH STREETS : NEWTOWN : JOHANNESBURG

We have pleasure in enclosing a copy of our inspector's report.

Whilst every care is taken in the preparation of the report which describes the conditions as found, such report is not a guarantee carrying responsibility for results and neither this Company nor any of its employees or agents shall be liable for any loss or damage of whatsoever nature and howsoever caused, (whether by actual or alleged negligence or otherwise), in any way arising out of the acts or omissions of the Company and/or its employees or agents aforesaid.

The report is based upon the visual inspection of the external condition of the equipment where accessible without having to provide scaffolding, ladders, stagings, lighting and not requiring the removal or displacement of any temporary or permanent structure, fitting or fixture.

We regret that a clearance certificate cannot be issued until such time as the requirements in our report have been attended to. Should you wish to continue with the inspection service, we enclose a contract form. It will be appreciated if you could sign and return the form to this office, then we will complete and send a copy to you for your records.

If there are any points arising on which you require clarification, kindly communicate with the undersigned.

Assuring you of our best attention at all times.

Yours faithfully,
THE AUTOMATIC SPRINKLER INSPECTION BUREAU (PTY) LIMITED

Digitally signed by John DN: cn=John, ou, email=prudence@asib.co.za, c=US Date: 2016.11.18 11:48:55 +02'00'

J W L Goring
Managing Director

Name of Premises:	Sci-bono Discovery Centre		
Physical Address:	Corner of Miriam Makeba and Helen Joseph Streets		
	Newtown		
	Johannesburg		
Postal Address:	Sci-Bono Discovery Centre		
	P O Box 61882		
	Marshalltown		
	2017		
E-mail:	motheo.boroko@sci-bono.co.za	**E-mail:**	
Copies to:			
		E-mail:	
Insurer or Broker:			
Contact Person:	Motheo Boroko	**Phone:**	011 639 8506
E-mail:	motheo.boroko@sci-bono.co.za	**Mobile:**	079 525 2119

Code:	C	**Installation Standard:**		10th Edition			
Percentage Hazard:		*Ordinary*	*See report*	*High*	*See report*		
Manufacturing:		Exhibition hall/lecture rooms/offices/parking basements					
Category:		III					
Design density (mm/min):		**See report**					
Storage:		Office equipment/educational equipment and displays					
Category:		**III**					
Design Density (mm/min):		**See report**					
Design Flows (l/min):		See report					
Design Pressures (kPa):		See report					
Pipe Size Table or Hydraulically Calculated:			Hydraulically calculated				
Size of Installation Control Valves:			4 x 150 mm				
Type of Sprinklers:		***Roof or Ceiling***		***Rack***		***Void***	
Number of Sprinklers:		+/- 3500					
Operating Temperature (º C.):		68					
Height of Building (m):		+/- 15 000		**Area: (m^2)**		+/- 25 000	

PERMITTED EXCEPTIONS / DETAILS OF ACCEPTED UNPROTECTED AREAS / REMARKS

DETAILS OF PRODUCTS STORED/PROCESS RISK
Office equipment/educational equipment and displays

STORAGE/PROCESS RISK – ORDINARY HAZARD				
Storage Method	*Free Standing* *Block Storage*	*Beam Pallet Racking* *Single Row Post Pallets*	*Solid or Slatted Shelving* *Multiple Row Post Pallets*	***Special Racking*** *Live* *Drive Through* *Push Back* *Mole*
Category:				
Stack Height:				
Category:				
Stack Height:				

STORAGE/PROCESS RISK – HIGH HAZARD				
Storage Method	*Free Standing* *Block Storage*	*Beam Pallet Racking* *Single Row Post Pallets*	*Solid or Slatted Shelving* *Multiple Row Post Pallets*	***Special Racking*** *Live* *Drive Through* *Push Back* *Mole*
Category:				
Stack Height:				
Category:				
Stack Height:				

HAND FIRE APPLIANCES							
	Hose Reels	*Foam*	*Dry Powder*	*CO_2 Water*	*CO_2 Gas*	*Other*	*Total*
Size:	30 m		9 kg			4,5 kg DCP	
Number:	30		15			56	
Units:	180		15			56	251
						Number Required:	**250**
						Shortfall:	**0**

TOWN MAIN					
Town Main Diameter (mm):	100	**Street/Road:**	President Street		
Standing Pressure (kPa):					
Flow (l/min):					
Pressure (kPa):					
Ninth Edition (50 mm valve fully open) (kPa):					
NINTH EDITION ELEVATED GRAVITY TANK					
Capacity (m^2):		**Type:**		**Height:**	
Standing Pressure (kPa):		**Running Pressure (kPa):**			
TENTH EDITION GRAVITY TANK					
Capacity (m^2):		**Type:**		**Height:**	
Standing Pressure (kPa)	**Flow (l/min)**		**Pressure at Flow (kPa)**		
ELEVATED PRIVATE RESERVOIR – *(Refer to town main for flows and pressures)*					
Full:		**Clean:**			
PUMPED WATER SUPPLY – SUCTION TANKS					
Suction Tanks Effective Capacity (m^3):		**Type:**	Concrete		
Inflow (l/min):	See report	**Pressure (kPa):**	See report		
PUMPED WATER SUPPLY – JOCKEY PUMP					
Cut-In Pressure (kPa):	600	**Cut-Out Pressure (kPa):**	800		
PUMPED WATER SUPPLY – DIESEL ENGINE DRIVEN PUMP					
Diesel Engine Driven Pump ASIB Approval Number:	1617				
Pump Make and Model:	KSB ETA 80-315				
Diesel Engine Make and Model:	John Deere				
Churn Pressure (kPa):	700	**Cut-in Pressure (kPa):**	400/500		
Flow (l/min):	See report	**Pressure at Flow (kPa):**	See report		
PUMPED WATER SUPPLY – ELECTRIC MOTOR DRIVEN PUMP					
Electric Motor Driven Pump ASIB Approval Number:	N/A				
Pump Make and Model:					
Electric Motor Make and Model:					
Churn Pressure (kPa):		**Cut-in Pressure (kPa):**			
Flow (l/min):		**Pressure at Flow (kPa):**			

Name of inspector:	Clive Adams
Date of First Inspection:	19th of October 2016
Was the water supply in order:	See report
Are the installation control valves due for overhaul:	No
Date of last overhaul for control valve assembly:	22/06/2015
Date of next overhaul for control valve assembly:	22/06/2018
Were the installation control valves in their correct operative positions:	Yes
Are the control valves secured in their operative positions:	Yes
How is the main isolating control valve secured in the open position:	Chain and padlock
How are the subsidiary test and isolating valves secured:	Chain and padlock
Number of plugs in the spares box:	13
Diameter of plugs in the spares box:	15 mm
Number of spare sprinklers kept on hand:	23
Is a sprinkler spanner kept within the spares box:	Yes
Have any sprinklers been painted or contaminated:	Yes
Have any spare sprinklers or plugs been used since the last inspection:	N/A
Did all the water supply alarms operate satisfactorily:	Yes
Does the client test the alarms on a weekly basis:	Yes
Are the alarms connected to the fire brigade – if so – state result:	N/A
Are alarms/ flow switches connected the dampers or the ventilation system:	See report
Are all hangers and carriers in order:	See report
State the external condition of the pipe work:	Good
Is the equipment generally in order:	See report
Are the hand fire appliances due for service:	No
Original system installed by:	
Extension carried out by:	
Date:	
Extension carried out by:	
Date:	

REPORT

CODE:	**"C"**	*Clearance certificate not issued*
STANDARD:	10th	Edition Rules
WATER SUPPLY:	Single	Pump supply
HAND FIRE APPLIANCES:	One unit per 100 m^2 of floor area	
HAZARD:	See report	Ordinary Hazard
	See report	High Hazard

Storage Guidance

Manufacturing Process/Occupancy	***Category of Risk***	***Design Density (mm/min)***
Exhibition hall/lecture rooms/offices/parking basements	III	5,0

Product Stored	***Category of Risk***	***Design Density***	***Storage Method***	***Stack Height (metres)***
Office equipment Educational equipment and displays	III	See report	Free standing/block storage Rack and palletised storage/shelves	See report

- In addition to the above storage guidance, where limited head space occurs, a minimum clearance of 1000 mm must be maintained between the sprinkler deflectors and the top of storage within the High Hazard areas and 500 mm clearance must be maintained within the Ordinary Hazard areas. This clearance must be maintained to avoid the distribution pattern of the sprinklers being obstructed by storage.

Water Supplies

The sprinkler systems design flows and pressures are:

Flow in litres per minute	*Pressure in kPa*
See Report	See Report

At the time of inspection the water supply was tested and the following results were recorded:

Flow in litres per minute	*Pressure in kPa*
See Report	See Report

REQUIREMENTS

An inspection of the sprinkler system installed at the premises was carried out and in order for the installation to comply with the minimum requirements in accordance with the Tenth Edition Rules governing fixed fire protection the following items must receive your attention.

Sprinkler System Design

1. As no information regarding the sprinkler system was available regarding the design of the sprinkler system and no block plan has been provided at the installation control valves, the following could not be determined:

    - The hazard class and design density of discharge for all areas of the protected building.

    - The calculated requirements for the system.

    Should there be no information available regarding the system, it will need to be re-calculated by your installer and the documentation regarding these calculations, submitted to the ASIB.

Water Supply

- The water supply is delivered from a diesel engine driven pump fed from a sub-divided concrete tank.

2. A water supply test could not be carried out at the time of inspection as no testing assembly has been provided for this purpose.

    The ability of the diesel engine driven pump to achieve the required pump duty indicated on the pump data plate could therefore not be determined.

    A water supply testing assembly in accordance with the minimum requirements must be installed and be designed to test to the maximum envisaged calculated requirement of the system

Suction Tank

3. The total effective stored capacity of the tank is unknown and must be clarified. If there is no information regarding this, the effective stored capacity must be re-calculated by your installer. These calculations must be submitted to the ASIB.

    The suction tank must be of sufficient effective stored capacity to provide the following:

High Hazard System	:	90 times the maximum envisaged flow rate
Ordinary Hazard System	:	60 times the maximum envisaged flow rate

4. A direct reading, flow measuring device must be installed in accordance with the following in order to measure the infill to the tank:

    An 80 mm discharge pipe with an isolating valve must be connected to the town main supply pipe. The water supply testing assembly must be installed downstream from the isolating valve in order to periodically test the flows of the town main.

A water supply testing assembly that is able to register flows from zero to 1000 litres per minute must be installed.

5. The ball valve, operating inflow to the section of the tank nearest to the pump house access door, was unable to stop inflow to the tank. The isolating valve on the infill pipe for this section of the tank was therefore closed.

   This must be investigated and attended to and the isolated valve on the infill line secured in the open position with a light chain and padlock thereafter.

6. The ball valve, operating inflow to the section of the tank furthest from the pump house access door, was unable to operate inflow to the tank at the time of inspection. This must be investigated and attended to.

7. The tank must be fitted with content gauges, or an indicator of the flag and ball type, or other approved indicator type to show the depth of water within the suction tanks.

8. Means must be installed to provide easy access to both sections of the tank and the valves therein, at all times.

Pump House

Diesel engine driven pump data plate details:

Make	:	KSB
Type	:	ETA 80-315
Serial number	:	9971456351/200
Calculated flow	:	180 m³/h
Pressure at flow	:	66,3 m
Impeller diameter	:	319 mm
Rotational speed	:	2050 Rpm
Power absorbed at rated capacity	:	39,4 kW
ASIB Approval Number	:	1617

9. The suction line is of such a diameter that the maximum water velocity allowable through this pipework will be exceeded when the pump duty is produced.

   A maximum water velocity of 1,8 metres per second is allowable through the suction line when the pump is operating at maximum capacity, (the maximum envisaged flow rate).

   Should this velocity be exceeded when the maximum envisaged flow rate for the system is produced, the suction line will not be acceptable and will need to be replaced with one having a diameter able to maintain the velocity within the limitation required.

10. As the pump house was installed within the protected building, access to this should have been through a 120 minute fire rated passage, stairs or combination of these.

    Should a fire occur within the parking basement, access to the pump house may not be possible.

11. The diesel engine was serviced and the pump overhauled on the 11th of June 2015. The attached ASIB tag numbers are as follows:

Diesel engine	:	076285
Pump	:	076185

The diesel engine is due for a service and the pump due for an overhaul and a service and overhaul must be carried out annually thereafter. This work must be carried out by an approved and registered pump and panel installer.

12. The System Fault Alarm was found activated for the diesel engine controller panel at the time of inspection. The alarm appears to have activated due to the "System On" indication lamps not functioning. This must be investigated and attended to.

13. The batteries for the diesel engine must be clamped to the stillage on which they are currently resting.

14. All main isolating valves must be secured in the open position with 25 mm link chains and padlocks and be preferably keyed alike.

All subsidiary valves must be secured in their correct operative positions with light chains and padlocks and be preferably keyed alike.

15. There is a down-stand beam that will obstruct the distribution pattern of several sprinklers within the pump house. Additional sprinkler protection must be installed to provide correct coverage.

16. There is a leak that must be attended to on the diesel engine cooling line pressure gauge.

17. There are securing bolts that have been short-bolted on the pump-suction line connection flange.

The bolts for these flanges must be removed and replaced with the correctly sized bolts so as to ensure that at least two full thread pitches past the chamfer protrude beyond the nut.

18. The tachometer is faulty and must be repaired or replaced on the diesel engine controller panel.

19. There are missing U-bolts that must be replaced for a suction line pipe-stand support the diesel engine cooling line angle iron bracket.

20. As the sprinklers within the pump house are fed directly from the delivery line, there must be a controlling stop valve, (secured in the open position), fitted on the distribution pipe to the sprinklers together with an approved alarm device with visible and audible indications of the operation of the sprinklers provided at the pump house.

The alarm must be in an approved position at a responsibly manned location in the plant or on the premises.

A 15 mm drain valve must be provided downstream of the flow alarm to permit a practical test of the alarm system.

21. We strongly recommend that platforms be installed to provide easy access to all areas of the pump house in the event of emergency. At present one must climb over pipework in order to access each side of the diesel engine driven pump.

22. It appears that the extraction fan provided has been installed to draw air into the pump house from the parking basement. Should this be the case, it has been installed incorrectly. It is supposed to extract air from the pump house.

    This fan also failed to activate when tested. This must be investigated and attended to.

23. A pump house sign and notice stating where keys for the pump house are obtainable must be mounted on the access door.

24. The auto-start instruction chart provided must be fixed to a wall adjacent to the test valves.

25. An additional jockey pump has been installed within the pump house. The supply pipe for this pump is fed from the suction line feeding the diesel engine driven pump. It is uncertain as to what service this jockey pump feeds, although it appears to be for the use of hose reels.

    Should this pump feed the hose reels, it is not considered an acceptable method of connecting the hose reel supply to the sprinkler system. Should a supply for the hose reels be required, it must either be taken from the town's main supply or from the trunk main for the sprinkler system. If the connection is taken from the trunk main for the sprinkler system, it must be ensured that the connection is a maximum of 50 mm in diameter and that water supply has been sized to provide for the simultaneous operation of the sprinkler system and hose reels.

    We require clarification regarding the foregoing.

26. There appears to be a town's main bypass connected to the delivery line for the sprinkler system in the area of the ramp leading from the Phase 2 Parking Basement to the Main Driveway. The isolating valve on this line is in the open position. Should it be the town main bypass line, this isolating valve must be kept closed. If this valve is kept in the open position, the town main supply will delay the activation of the main water supply for the sprinkler system which is not acceptable.

    Only when the pump set is isolated should the isolating valve for the town main bypass be opened in order to provide a water supply while the pump set is out of commission.

    This must be investigated and attended to if applicable.

27. Recent experience has shown that copper fuel lines are not suitable for delivering diesel fuel to the engine. Condensation in the tank and lines combines with the sulphur in the diesel fuel to produce sulphuric acid. The molecular structure of copper or galvanised lines or tanks reacts with the acid and contaminates the fuel. Materials that are not deemed to be suitable are copper, cast iron, aluminium or galvanised tubing. Copper and aluminium also tend to harden over time and become brittle. The fuel lines should be replaced with an acceptable alternative such as braided hose.

28. The hour meter for the diesel engine driven pump was recorded at 82,7 hours at the time of inspection. This unit must be tested for at least 30 minutes every week in accordance with the minimum requirements.

Auto-start Test

- The churn pressure for the diesel engine driven pump was recorded at 700 kPa at the time of inspection.

  The cut in and cut out pressures were as follows at the time of inspection:

  Jockey pump

Cut in pressure	:	600 kPa
Cut out pressure	:	800 kPa

  Diesel engine

Primary cut in pressure Manual stop	:	400 kPa
Secondary cut in pressure Manual stop	:	500 kPa

29. The pressure switches must be set to the following in accordance with the churn pressure:

  Jockey pump

Cut in pressure	:	630 kPa, (90 % of churn pressure)
Cut out pressure	:	700 kPa, (Churn pressure) or 1200 kPa

  Diesel engine

Primary cut in pressure Manual stop	:	560 kPa, (80 % of churn pressure)
Secondary cut in pressure Manual stop	:	510 kPa, (50 kPa below primary pressure switch)

Installation Control Valves

- The installation control valves were overhauled on the 22nd of June 2015. The attached ASIB tag numbers are as follows:

PH2 Valve	:	074764
PH 1 East Valve	:	074763
PH 1 West Valve	:	074762
PH 3 Valve	:	074761

  The installation control valves must be overhauled every three years by an approved and registered installer. The next overhaul will be due on the 22nd of June 2018.

Note: *Weekly tests of the installation control valve water motor alarms must be carried out with the alarms sounding for at least 30 seconds. All water pressure gauge readings must be checked and recorded. Testing and records should be carried out by a member of staff delegated to do this.*

30. Once the design and calculated requirements for the sprinklers system have been determined, a block plan of the risk must be provided at the installation control valves with the following indicated thereon:

- Particulars of the water supplies.
- The occupancy of each building.
- The Hazard Class of the system.
- The design density of discharge provided for the system.
- The extent of the protection.
- The calculated flow and pressure requirement of the system.
- A cross-section of the full height of the building or buildings indicating the height of the highest sprinkler with respect to a stated datum level.

31. The alarm gongs must be externally located to the building as near the alarm valve as practicable so that in the event of them sounding, they may be recognised for what they are.

32. Drip-union drain pipes must be installed for each of the water motor alarms.

33. A valve location sign must be mounted on an external wall as near to the installation control valves as possible and where it can be readily seen by firemen or others responding to the alarm.

34. The trunk main riser must be correctly supported.

35. The valve chamber must be sprinkler protected.

36. 15 mm test valves and discharge pipe must be installed to periodically test the water motor alarms.

37. The strainers for the water motor alarms have been installed on the vertical sections of the supply pipes the feed the gongs. These strainers must be installed on a horizontal section of the supply pipes, as near to the gong as possible.

38. As the building is classed as a life safety environment, we recommend that tamper proof devices be installed on the main isolating valve for each of the installation control valve sets.

    Should these be installed, they must be connected to indicate on a remote panel at a responsibly manned location, the partial opening or closing of the valves.

39. A 25 mm galvanised steel test pipe fitted with a stop valve must be fitted not less than two diameters downstream of each water flow alarm switch in order to periodically test the switches. The test valve must be accessible at hand level. The test pipe must run into a common drain and be fitted above this in order to see the test water flow or alternatively be fitted with a suitable sight glass.

Sprinkler System

Note: *For the purpose of this report, President Street is taken as South and all other locations are determined from this point.*

General Items

40. An assortment of sprinklers from differing manufacturers has been installed throughout the protected building. In several of the areas where this occurs, the sprinklers from different manufacturers are also of differing distribution patterns.

    Sprinklers of differing types, operating temperatures, distribution patterns or manufacturers must not be installed in the same area.

    The protection must be revised so that the manufacturer of the sprinklers and installation control valves are uniform throughout the sprinkler system. It must also be ensured that all sprinklers protecting an area are of the same distribution pattern.

Phase 2

Level 5

- *The ICT Manager's Office as well as the Outreach Offices could not be accessed at the time of inspection as there were no keys available. The state of the protection within these rooms could therefore not be determined.*

41. The sprinkler protection within the lift lobby, adjacent to the main stairwell, is out of effective working distance from the area of the door leading to the canteen and must be revised to provide correct coverage.

    The sprinkler protection within this area is also out of effective working distance from a wall and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

42. The sprinkler protection is out of effective working distance from partitions within the ICT Office and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Level 4

43. There are pendent spray pattern sprinklers that have been installed in the upright position within the VIP Boardroom foyer. These sprinklers must either be turned 180˚ or be replaced with upright spray pattern sprinklers.

44. There are two sprinklers that are spaced too far apart within the VIP Boardroom foyer. The protection must be revised in this area so that the following spacing is achieved:

Ordinary Hazard Requirements

- Sprinklers must be spaced a maximum of 4,0 metres apart.
- Each sprinkler must cover a maximum area of 12 m^2.

High Hazard Requirements

- Sprinklers must be spaced a maximum of 3,7 metres apart.
- Each sprinkler must cover a maximum area of 9 m².

45. We recommend that additional sprinkler protection be installed within the skylight, in the Boardroom.

46. There are two sprinklers that are spaced to far apart within the passage leading from the VIP Boardroom to the restrooms. The protection must be revised in this area so that the following spacing is achieved:

Ordinary Hazard Requirements

- Sprinklers must be spaced a maximum of 4,0 metres apart.
- Each sprinkler must cover a maximum area of 12 m².

High Hazard Requirements

- Sprinklers must be spaced a maximum of 3,7 metres apart.
- Each sprinkler must cover a maximum area of 9 m².

47. There appear to be pendent spray pattern sprinklers installed in the upright position at upper ceiling level within the Festo Lab, Dow Chemistry Room and the ICT Lab. This must be investigated and rectified if applicable. Pendent spray pattern sprinklers must be installed with the deflectors facing the ground below.

48. The sprinkler protection is out of effective working distance from partitions and walls and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom within the following areas:

- Beneath the ceiling bulkhead, at the back of the Festo Lab.
- The store room within the Festo Lab
- Adjacent to the entrance door within the Festo Lab.
- Within the Dow Chemistry Room.
- Within the kitchen, between the public restrooms

49. Sprinkler protection is required beneath the underdrawn ceiling panels within the ICT Lab.

Auditorium

- *The visibility of the pipework and sprinklers at ceiling level was poor within the Auditorium at the time of inspection. The following may therefore not represent the minimum level of rectification required.*

50. There are sprinkler outlets that have been plugged within the passage where the DB Boards are located, behind the Auditorium. The plugs must be removed from these outlets and the sprinkler protection reinstated.

Level 3

51. The sprinkler protection is out of effective working distance from the wall separating Phase 1 from Phase 2 in several areas and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

52. There is a conventional pattern sprinkler that must be replaced with a spray pattern sprinkler within Class Room 1B so that the sprinklers are uniform throughout the room.

53. Sprinkler protection is required beneath the rectangular air-conditioning unit over 1,0 metres wide within the Tobias Lecture Room.

54. The cooking hoods within the kitchen must be protected with nozzles specifically approved for this application. Where the supply has to be taken from a sprinkler installation protecting the remainder of the building, a subsidiary stop valve can be provided to isolate the sprinklers in the event of operation.

    Where deep fat frying occurs, if nozzles specifically approved for this purpose are not used, an automatic foam, dry powder or gas extinguishing system must be installed.

    Water from a sprinkler will initially excite a fat fire before the suppression process commences, occupants of a sprinkler protected kitchen must leave immediately if a fire occurs.

    Sprinkler protection must be installed within all cooking equipment ventilation systems.

    Extraction canopies where these are designed to extract grease laden vapours or heat through a ventilation system shall be fully sprinkler protected, inclusive of exhaust ducts and exhaust plenum chambers, using 141° Celsius operating temperature spray pattern type nozzles unless alternative protection is installed.

    The operation of the fire protection measures taken to protect extract canopies should automatically shut off any source of fuel and heat.

55. The sprinkler protection within the kitchen is out of effective working distance from the passage behind the small store room and must be revised to provide correct coverage of this area.

56. The small store room, within the kitchen must be sprinkler protected.

Level 2

57. The cooking hoods within the kitchen must be protected, (refer to Item 54).

58. Sprinkler protection is required beneath the back-to-back air duct within the kitchen.

59. There is a wall that will obstruct the distribution pattern of a sprinkler from providing correct coverage within the store room, in the kitchen. The protection must be revised to provide correct coverage within this area.

60. The sprinkler protection is out of effective working distance from the main fire escape stairwell and must be revised to provide correct coverage of this area.

61. The server room within the boardroom must be sprinkler protected within the Stic Kids Lab.

62. Sprinkler protection is required beneath the concrete slabs extending along the back wall and one of the side walls within the Stic Kids Lab.

63. Sprinkler protection is required beneath the ceiling bulkheads, in the Visual Art alcove areas of the Stic Kids Lab.

64. One room within the old ATM Room has yet to be protected. This must be attended to.

65. There is a pendent spray pattern sprinkler that has been installed in the upright position within the ATM Room. This sprinkler must either be turned 180˚ or be replaced with an upright spray pattern sprinkler.

Central Atrium Stairwell

66. The arm pipes feeding the sprinklers beneath the gutters on either side of the stairwell must be correctly supported.

Level 1

- *The DID Room could not be accessed at the time of inspection as there were no keys available. The state of the protection within this room could therefore not be determined.*

67. The sprinkler protection within the Reception Desk/Security area is out of effective working distance from the glass partition for the Security Office and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

68. The sprinkler protection within the lift lobby adjacent to the Security Desk, at the entrance to the building, is out of effective working distance from a glass partition and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

69. There is an assortment of pendent spray pattern sprinklers that have been installed in the upright position amongst conventional pattern sprinklers in the within the Cleaner's Back of House Passage. The pendent spray pattern sprinklers must be replaced with conventional pattern sprinklers so that the protection is uniform throughout the area.

70. There are upright spray pattern sprinklers that have been installed in the pendent position in the area of the lifts, within the Cleaner's Back of House Passage. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

71. The sprinkler protection within the Cleaner's Back of House Passage is out of effective working distance from the fire escape stairwell and must be revised to provide correct coverage of this area.

Exhibiting Workshop

72. There is an air-conditioning duct that will obstruct the distribution pattern of a sprinkler adjacent to the entrance door for the workshop. The protection must be revised to provide correct coverage in this area.

73. There is an air duct, extending along the back wall of the workshop that will obstruct the distribution patter of several sprinklers. Additional sprinkler protection is required beneath this duct in order to provide correct coverage.

74. The sprinkler protection within the Spray Booth is out of effective working distance from the alcove and must be revised to provide correct coverage of this area.

Shop 3

75. The store room/office adjacent to the archive store room must be sprinkler protected.

76. There is a sprinkler that has been painted and must be replaced with a new one within the archive store room.

77. Additional sprinkler protection is required beneath the ceiling slab in order to provide correct coverage within the open-plan office area.

Shop 2

- This area appeared to be in order at the time of inspection.

Shop 1

- This shop could not be accessed at the time of inspection as there were no keys available. The state of the protection within this area could therefore not be determined.

Phase 2 Parking Basement

- *The majority of the store rooms could not be accessed at the time of inspection as there were no keys available. The state of the protection within these rooms could therefore not be determined.*

78. There are upright spray pattern sprinklers that have been installed in the pendent position throughout the parking basement. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

79. The sprinkler protection is out of effective working distance from partitions for the Printer Room and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

80. The passage outside of the Printer Room and the TDU Storeroom must be sprinkler protected.

81. The sprinkler protection is out of effective working distance from the north wall and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

82. There is a distribution pipe hanger that has come adrift and must be re-fixed at Parking Bay 17.

83. There are sprinklers that are spaced too far from those on adjacent sprinkler arrays in several areas of the parking basement. The protection must be revised in these areas so that the following spacing is achieved:

Ordinary Hazard Requirements

- Sprinklers must be spaced a maximum of 4,0 metres apart.
- Each sprinkler must cover a maximum area of 12 m².

High Hazard Requirements

- Sprinklers must be spaced a maximum of 3,7 metres apart.
- Each sprinkler must cover a maximum area of 9 m².

84. There is a cable tray that will obstruct the distribution pattern of several sprinklers within the Sump Pump Room and within the store room adjacent to this. Either the sprinklers or the cable tray must be repositioned so that the sprinklers are able to provide correct coverage.

85. The sprinkler protection is out of effective working distance from walls at Parking Bay 1 and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Ramp extending between the Main Driveway and the Parking Basement

86. There are upright spray pattern sprinklers that have been installed in the pendent position beneath the lower ceiling. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

Main Driveway Areas

- *The Facilities Storeroom could not be accessed at the time of inspection as there were no keys available. The state of the protection within this room could therefore not be determined.*

87. There are 25 mm diameter risers feeding range pipes over 300 mm in length for the protection within the driveway leading to the entrance. Where range pipes exceed 300 mm in length, the pipework feeding these are classed as distribution pipes and must be sized accordingly. Distribution pipes must have a minimum nominal diameter of 32 mm.

88. Additional hangers are required for the distribution pipe, feeding the sprinkler protection within the driveway leading to the entrance, so that there is at least one support within either the first or last thirds of each section of distribution pipe extending between couplings.

89. There is a plugged sprinkler outlet outside of the door leading to the Cleaner's Back of House Passage. The plug must be removed from this outlet and the sprinkler protection reinstated.

90. There are several pendent spray pattern sprinklers that have been installed in the upright position within the driveway leading to the entrance. These sprinklers must either be turned 180˚ or be replaced with upright spray pattern sprinklers.

91. The store room adjacent to the Refuse Room must be sprinkler protected.

92. The sprinkler protection is out of effective working distance from the east wall of the driveway leading to the entrance, in several areas and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Phase 1

- *The store room within the Catacomb West Room could not be accessed at the time of inspection as there were no keys available. The state of the protection within this room could therefore not be determined.*

93. It must be ensured that the roof vents are operated in accordance with either of the following:

    - Using a fusible link set to activate at a minimum temperature of 180˚ Celsius, or
    - Using a flow switch within the rising feed main set to activate once the initial critical sprinklers have opened.
    - Be manually operated, (this is strongly recommended).

    We require clarification of the foregoing.

94. There is a cable tray that will obstruct the distribution pattern of several sprinklers adjacent to the customer service counter, within the Coffee Shop. Either the sprinklers or the cable tray must be repositioned so that the sprinklers are able to provide correct coverage.

95. Heat collection plates must be fitted above the sprinklers that are located beneath the roof air vents.

    We would recommend that the protection be revised so that no sprinkler is located directly beneath the vents.

96. The following areas must be sprinkler protected:

    - The Server Room.
    - The Security Room.
    - The Main DB Board Room opposite to the Security Room and Server Room.

97. The sprinkler protection is out of effective working distance from walls and partitions and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom, within the following rooms:

    - The Birthday Room.
    - The Catacomb Storeroom.
    - The Catacomb West Room.

98. Additional sprinkler protection is required beneath the ceiling bulkhead extending along the wall within the Birthday Room.

99. Additional sprinkler protection is required beneath the ceiling bulkhead extending along the wall within the Catacomb West Room.

100. There is a range pipe that has been disconnected and must be reinstated beneath the first mezzanine level, outside of the Team Leader’s Office.

101. A hanger must be installed a maximum of 450 mm from the end of the distribution pipe adjacent to the stairs, beneath the first mezzanine level, in the area outside of the Team Leader's Office.

102. There are several upright spray pattern sprinklers that have been installed in the pendent position beneath the walkways leading to the first mezzanine level. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

103. There are terminal range pipe hangers that have been spaced too far from the ends of range pipes in the area beneath the first mezzanine level, between the Astrology/Astronomy display area and the door leading to the Phase 2 Building. Additional hangers must be installed so that there is a hanger a maximum of 750 mm from the ends of each of the range pipes.

104. There upright spray pattern sprinklers that have been installed in the pendent position for the cut of sprinklers within the circular fire escape stairwells. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

105. There are several terminal range pipe hangers that have been spaced too far from the ends of the range pipes for the roof level protection, adjacent to the east and west walls of the Phase 1 Building. Additional hangers must be installed so that there is a hanger a maximum of 750 mm from the ends of each of the range pipes.

106. It has been noted that there are as many as eight sprinklers that are being fed from side of a distribution pipe for the roof level protection. This is not in conformity with the accepted rules. A maximum of six sprinklers being fed from one side of a distribution pipe is allowable within hydraulically calculated systems.

We recommend that the design be revised.

107. There are sprinklers that are spaced too far from those on adjacent sprinkler arrays, in the area above the offices along the south wall, for the roof level protection. The protection must be revised in this area so that the following spacing is achieved:

Ordinary Hazard Requirements

- Sprinklers must be spaced a maximum of 4,0 metres apart.
- Each sprinkler must cover a maximum area of 12 m².

High Hazard Requirements

- Sprinklers must be spaced a maximum of 3,7 metres apart.
- Each sprinkler must cover a maximum area of 9 m².

108. The roof level sprinkler protection appears to be spaced too far from the south wall of the Phase 1 Building. This must be investigated and rectified if applicable. It must be ensured that the sprinklers are spaced a maximum of 1,5 metres or half the design spacing, (whichever is the lesser) therefrom.

109. The first sprinkler outlet east of the main distribution pipe has been plugged beneath the west roof of the Phase 1 Building, on the fourth sprinkler array from the south wall of the Phase 1 Building, for the roof level protection. The plug must be removed from this outlet and the sprinkler protection reinstated.

110. There are several pendent spray pattern sprinklers that have been installed in the upright position beneath the first mezzanine level, in the south-east corner of the Phase 1 Building. These sprinklers must either be turned 180˚ or be replaced with upright spray pattern sprinklers.

111. Sprinkler protection is required beneath the walkway leading from the uppermost mezzanine level to the Phase 2 Building.

112. There are several pendent spray pattern sprinklers that have been installed in the upright position on the first mezzanine level, in the south-west corner of the Phase 1 Building. These sprinklers must either be turned 180˚ or be replaced with upright spray pattern sprinklers.

113. There is a sprinkler outlet that has been plugged on the first mezzanine level, within the south-west corner, beneath the ceiling bulkhead. The plug must be removed from this outlet and the sprinkler protection reinstated.

114. The sprinkler protection above the first mezzanine level walkway, extending along the north wall of the Phase 1 Building, is out of effective working distance from the north wall of the Phase 1 Building and must be redesigned so that the sprinklers are spaced a maximum of 1,5 metres or half the design spacing, (whichever is the lesser) therefrom.

115. There are walkway beams that will obstruct the distribution pattern of several conventional pattern sprinklers installed above the first mezzanine level walkway extending along the north wall of the Phase 1 Building, in the north-west corner. These sprinklers must be repositioned to provide correct coverage and the conventional pattern sprinklers must be removed and replaced with spray pattern sprinklers so that the protection is uniform throughout the area.

116. The sprinkler protection beneath the cable/light trays, above the first mezzanine level walkway extending along the north wall of the Phase 1 Building, in the north-west corner, is out of effective working distance from the west wall of the Phase 1 Building and must be redesigned so that the sprinklers are spaced a maximum of 1,5 metres or half the design spacing, (whichever is the lesser) therefrom.

Internal Offices – Level 1 – CEO's Offices

117. The sprinkler protection is out of effective working distance from several partitions and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Internal Offices – Level 1 – TDO Offices

118. The sprinkler protection is out of effective working distance from several partitions and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Internal Offices – Level 4 – Finance Offices

119. The sprinkler protection is out of effective working distance from several partitions and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Internal Offices – Level 4 – Educational Offices

120. The sprinkler protection is out of effective working distance from several partitions and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Office Block

121. In order to correctly separate the unprotected office block from the protected Phase 1, 2 and 3 Areas all door openings within the separating walls must be fitted with self-closing hardwood or Class B fire rated doors. Cut-off sprinklers must be installed above the lintel of these doors on the unprotected-side, (within the Office Block).

Phase 3B

122. Sprinkler protection is required at roof level for this building.

Level 2

123. The installation of the sprinkler protection between the floating ceiling bulkheads, within the Himla Soodyall Room, the Joseph Mokoena Room and the Wilkie Kambule Room is not acceptable due to the following:

- There are now floating bulkheads that will obstruct the distribution pattern of several sprinklers.

- The sprinklers are spaced too far from the ceiling and therefore, there will most likely be a delay in their operation. The fitting of heat collection plates above these sprinklers in order to reduce the operating time is unlikely to provide sufficient heat collection areas.

The protection must be revised so that the sprinklers are installed beneath the floating bulkheads.

124. Sprinkler protection is required beneath the metal slab extending along the west wall within the Himla Soodyall Room.

Level 1

125. The installation of the sprinkler protection between the floating ceiling bulkheads, within the lecture rooms is not acceptable due to the following:

- There are now floating bulkheads that will obstruct the distribution pattern of several sprinklers.

- The sprinklers are spaced too far from the ceiling and therefore, there will most likely be a delay in their operation. The fitting of heat collection plates above these sprinklers in order to reduce the operating time is unlikely to provide sufficient heat collection areas.

The protection must be revised so that the sprinklers are installed beneath the floating bulkheads.

126. The store room in the south-west corner as well as the passage leading to this room, adjacent to the lift lobby area, must be sprinkler protected.

Ground Floor

127. There are several sprinklers that have been spaced too far from the ceiling within the Marie Curie and Isaac Newton Areas. Sprinklers must be spaced a maximum of 450 mm from roofs of incombustible construction. The protection must be revised in these areas to achieve the foregoing.

128. The sprinkler protection is out of effective working distance from a wall within the passage outside of the men's and ladies restrooms and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Phase 3 A/Career Centre

Level 3

129. There are upright spray pattern sprinklers that have been installed in the pendent position within the lift lobby. These sprinklers must either be turned 180˚ or be replaced with pendent spray pattern sprinklers.

Level 2

130. There are two 79˚ Celsius operating temperature sprinklers that must be replaced with 68˚ Celsius operating temperature sprinklers above the entrance lobby so that the protection is uniform throughout the area.

131. The sprinkler protection within the Frank Nabarro room appears to be out of effective working distance from the north glass wall. This must be investigated and rectified if applicable. It must be ensured that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) from this wall.

Level 1

- *The IT Storeroom could not be accessed at the time of inspection as there were no keys available. The state of the protection within this room could therefore not be determined.*

132. The sprinkler protection at upper ceiling level within the Library is out of effective working distance from walls and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Phase 3 Parking Basements

Basement -1

- *The Finance Storeroom and the GDE Storeroom could not be accessed at the time of inspection as there were no keys available. The state of the protection within these rooms could therefore not be determined.*

133. There are several sprinklers that have been spaced too far from the ceiling. Sprinklers must be spaced a maximum of 450 mm from ceilings of incombustible construction. The protection within the parking basement must be revised to achieve the foregoing and provide correct coverage.

134. Additional sprinkler protection is required beneath the down-stand beams within the parking basement in order to provide correct coverage.

135. There are first range pipe hangers that are spaced too far from the distribution pipe. Additional hangers must be installed so that the first hanger on each of the range pipes is spaced a maximum of 2,0 metres from the distribution pipe.

136. It has been noted that there are nine sprinklers that are being fed from one side of the distribution pipe for the third sprinkler array from the north wall. This is not in conformity with the accepted rules. A maximum of six sprinklers being fed from one side of a distribution pipe is allowable within hydraulically calculated systems.

The design must be revised to achieve the foregoing for this sprinkler array.

137. The sprinkler protection is out of effective working distance from the area of the door leading to the Finance Storeroom and must be revised to provide correct coverage.

138. There are two spray pattern sprinklers that are spaced too close together above the parking bay for the disabled. Spray pattern sprinklers must be spaced a minimum of 1,8 metres apart. The protection must be revised in this area to achieve the foregoing.

Ramp extending between Basement -1 and Basement -2

139. The sprinkler protection is out of effective working distance from a wall within the store room at the top of the ramp and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

140. There are sprinklers that are spaced too far apart at the bottom of the ramp. The protection must be revised in this area so that the following spacing is achieved:

Ordinary Hazard Requirements

- Sprinklers must be spaced a maximum of 4,0 metres apart.
- Each sprinkler must cover a maximum area of 12 m².

High Hazard Requirements

- Sprinklers must be spaced a maximum of 3,7 metres apart.
- Each sprinkler must cover a maximum area of 9 m².

Basement -2

- *The store rooms adjacent to the fire escape stairwells could not be accessed at the time of inspection as there were no keys available. The state of the protection within these rooms could therefore not be determined.*

141. The remote test valve must be brought to hand-testing level, (about 1,7 metres from the floor) and a location plate must be fixed to the wall adjacent to the valve.

142. There first range pipe hangers that are spaced too far from the distribution pipe. Additional hangers must be installed so that the first hanger on each of the range pipes is spaced a maximum of 2,0 metres from the distribution pipe.

143. The sprinkler protection is out of effective working distance from a wall within Facilities Storeroom 2 and must be redesigned so that the sprinklers are spaced a maximum of 2,0 metres or half the design spacing, (whichever is the lesser) therefrom.

Hand Fire Appliances

These must be serviced annually by a South African Qualification and Certification Committee approved technician. This service must be carried out in accordance with SABS 1475.

Clearance Certificate

Regrettably a Clearance Certificate cannot be considered until the following items have been attended to and the water supply is found to be in good working order:

- Items 1, 2, 3, 5, 6, 9, 11, 12, 15, 20, 22, 25, 26, 28, 29, 30, 32, 33, 34, 35, 40, 42, 43, 44, 46, 47, 48, 49, 50, 54, 55, 56, 57, 61, 62, 63, 64, 65, 66, 69, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 86, 89, 90, 91, 92, 93, 96, 97, 98, 99, 100, 105, 107, 108, 109, 110, 112, 113, 115, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 132, 133, 134, 135, 137, 139, 140 142 and 143.