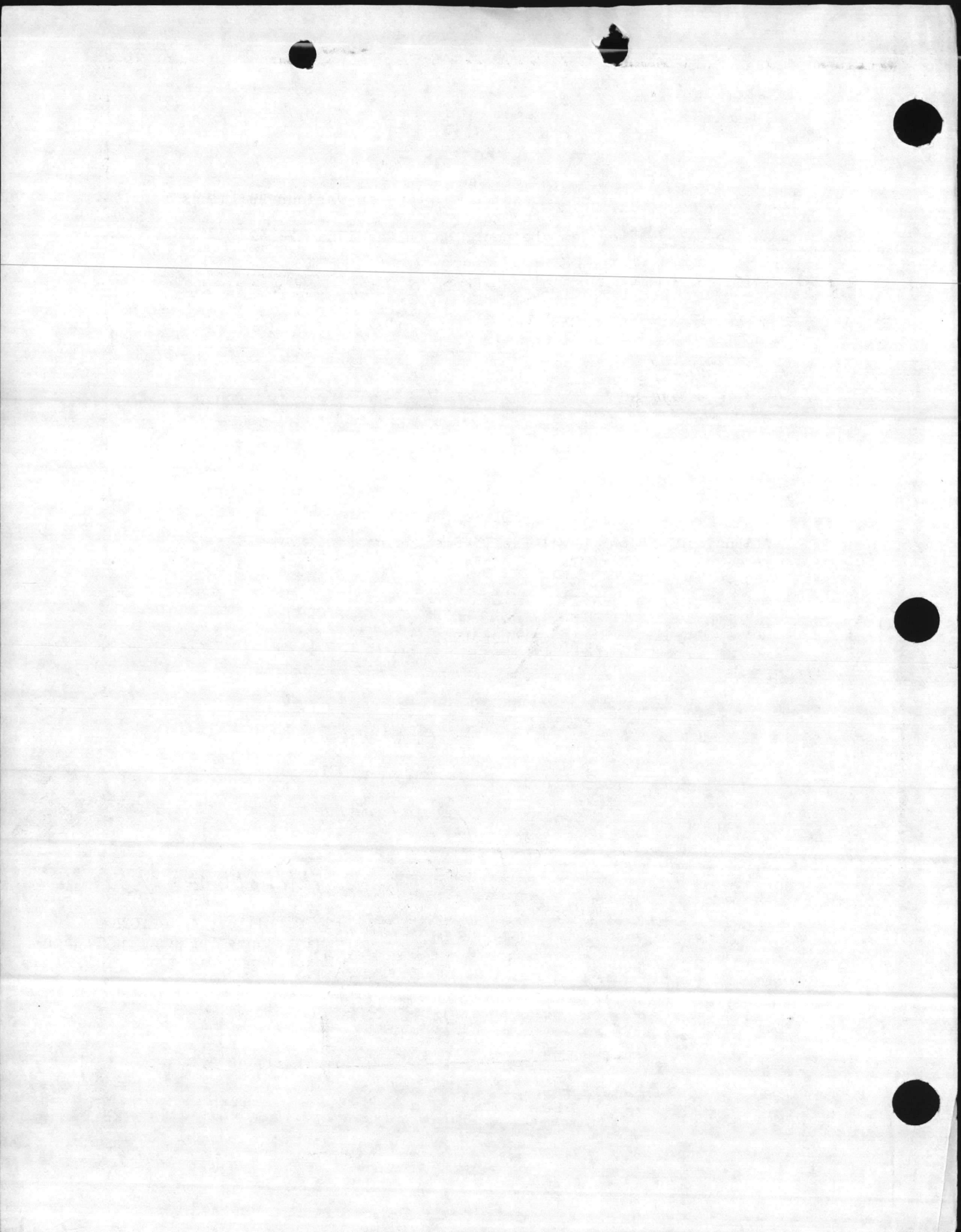


Report On  
Study Concerning Mildew and Excessive Moisture in Various Buildings  
At The  
Marine Corps Base, Camp Lejeune, North Carolina 28542

Prepared by  
Atlantic Division, Naval Facilities Engineering Command  
Norfolk, Virginia 23511

19 October 1981

*AS4 allup for*  
C. C. Miller, Code 102B2  
Maintenance Engineering Branch  
Maintenance Division



REPORT ON  
STUDY CONCERNING MILDEW AND EXCESSIVE MOISTURE IN VARIOUS BUILDINGS  
AT THE  
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542



DEPARTMENT OF THE NAVY

ATLANTIC DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
Norfolk, Virginia 23511



Report on Study Concerning Mildew and  
Excessive Moisture in Various Buildings  
MCB, Camp Lejeune, NC

1. Introduction

An on-site survey was made during 3-7 August 1981 to determine the extent and source of mildew and excessive moisture in various buildings at Camp Lejeune which are located in the Hadnot Point, Air Station, French Creek, Hospital, Courthouse Bay, and Montford Point areas. All buildings included in this survey are Unaccompanied Enlisted Personnel Housing except the Hostess House complex (Bldgs. 896, 897 and 898 in the Hadnot Point area).

2. Description

a. The 38 buildings considered in this study and included in Attachment 'A' are basically represented by five types of floor plan designs which are summarized and will be referred to in groups as noted below.

Group No. 1

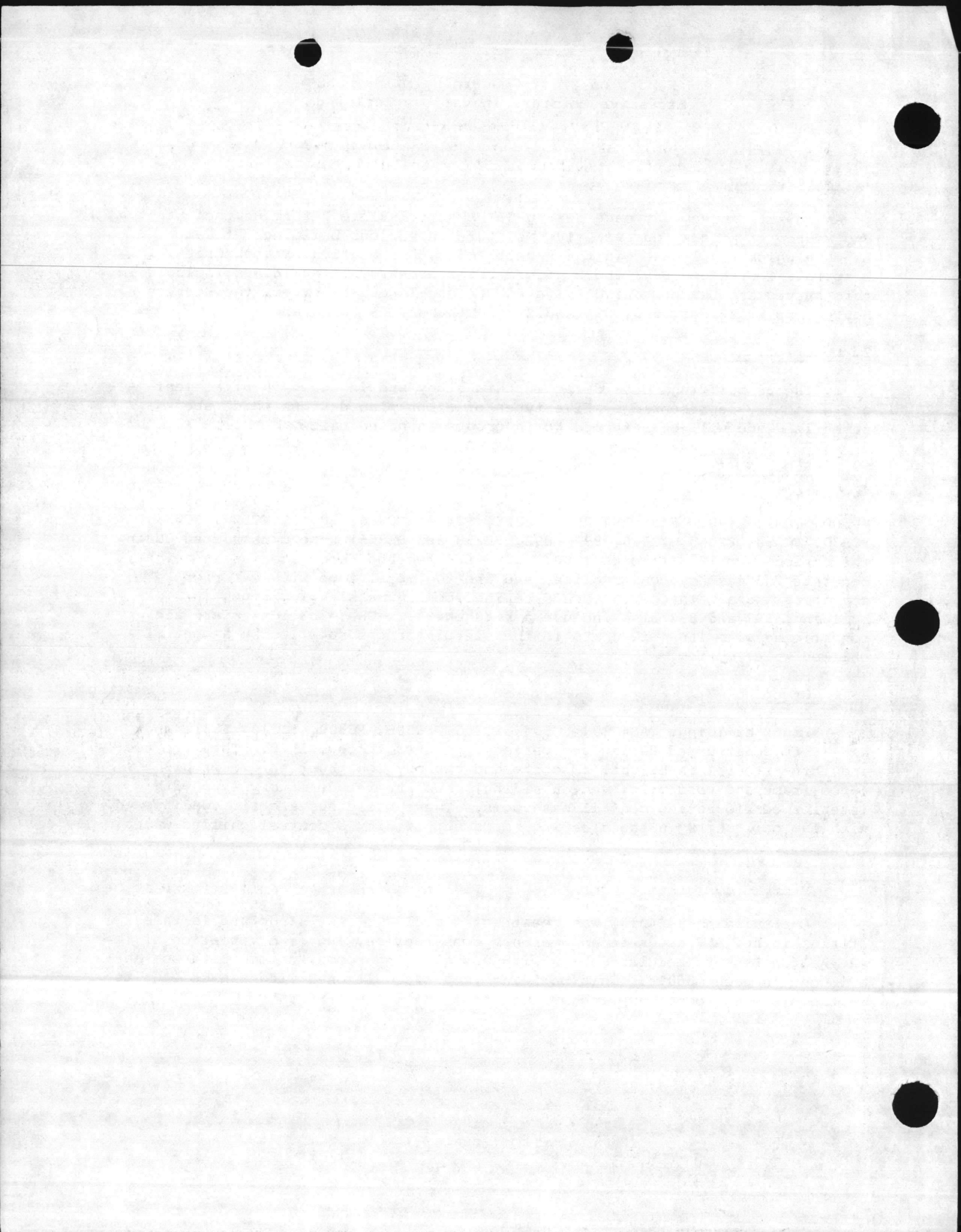
Twenty-six buildings (HP51, HP53, HP55, HP165, HP185, HP195, HP550, HP560, 1042, 1140, 1340, AS4020, AS4025, FC414, FC415, FC515, FC520, FC525, FC530, FC550, FC555, FC560, 897, 898, BB250 and BB255) were constructed during the period from 1973 through 1980. They are two and three stories in height, concrete and masonry construction, and are the motel type with exterior corridors and a bathroom in each sleeping room. The sleeping rooms in buildings 897 and 898 also include a kitchenette. These buildings are air conditioned with fan coil units in the sleeping rooms supplied by a central chilled water system.

Group No. 2

Eight buildings (AS4010, FC304, FC305, FC306, FC309, FC310, FC311 and H16) were constructed during the period from 1943 through 1970. They are two and three stories in height, concrete and masonry construction except H16 (wood frame and wood/brick veneer siding), and are the dormitory type with interior corridors and central bathrooms. These buildings are air conditioned with fan coil units in the sleeping rooms supplied by a central chilled water system.

Group No. 3

One building (AS4015) was constructed in 1971. The structure is three stories in height, concrete and masonry construction, and is a variation of the Welton Beckett modular design with six sleeping rooms, common bathroom and a lounge in each module. This building is air conditioned with fan coil units in the sleeping rooms supplied by a central chilled water system.



Group No. 4

Two buildings (M614 and M616) were constructed during 1942-1943. They are one story in height, masonry and wood construction, and have open bay sleeping areas with central bathrooms. These buildings are not air conditioned.

Group No. 5

One building (896) was constructed in 1973. The structure is one story in height, concrete and masonry construction, and is the office/administrative building for the Hostess House complex. This building is air conditioned with a central air handling unit and ductwork.

b. All bathroom areas have an exhaust system with the type varying from building to building. The five existing types are summarized and can be referred to as follows:

System No. 1

Individual room exhaust fans connected to a common duct riser that discharges above the roof. This type of system exists in Bldgs. HP165, HP185, HP195, HP550, HP560, 1042, FC515, FC520, FC525, FC530, FC550, FC555, FC560 in Group No. 1.

System No. 2

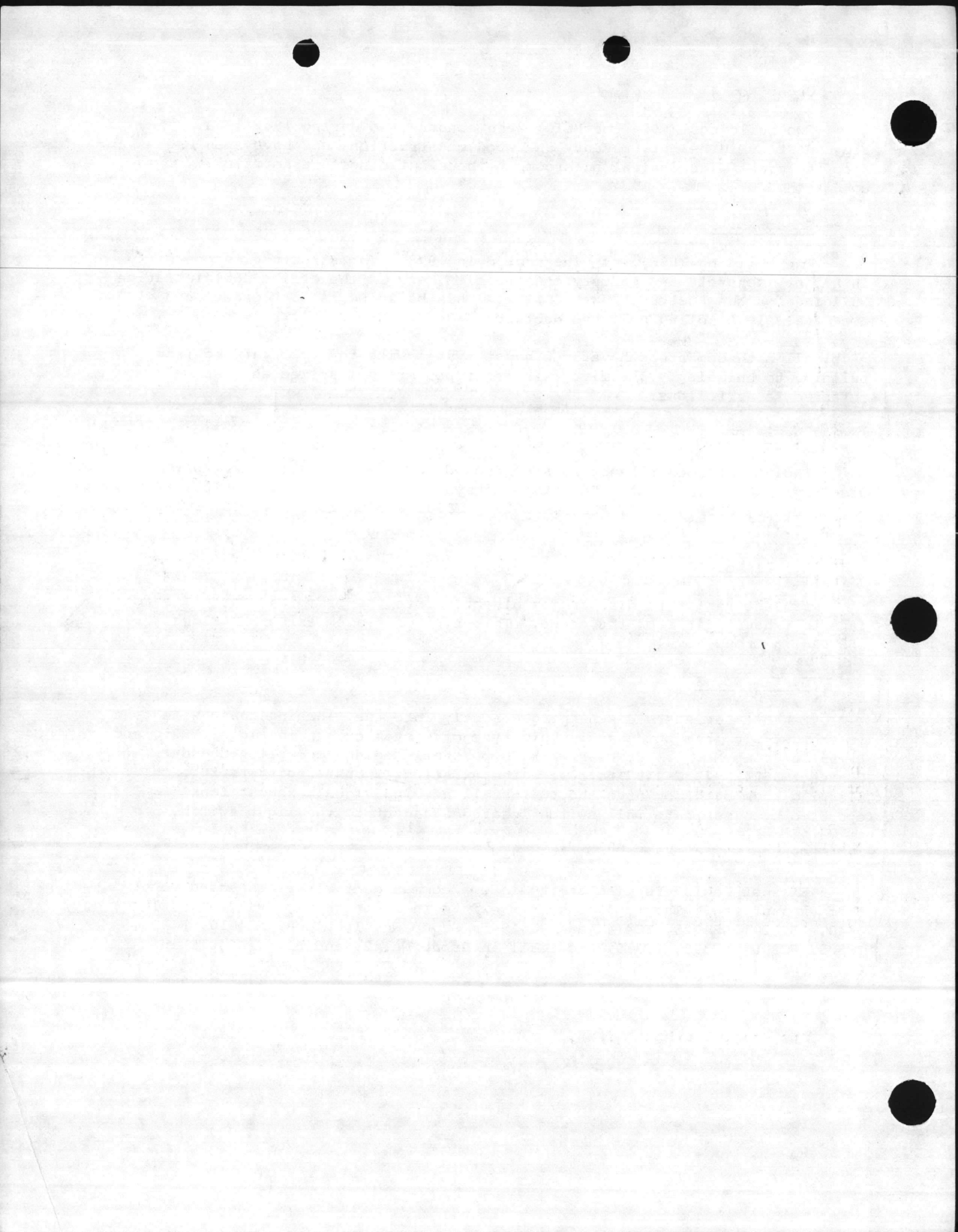
Exhaust registers discharging directly into the plumbing chase with roof fans to exhaust air from the chase. This type of system exists in Bldgs. 897 and 898 in Group No. 1. X

System No. 3

Exhaust registers discharging directly into the plumbing chase with fans to exhaust air from the chase. This type of system exists in Bldgs. BB250 and BB255 in Group No. 1. However work is presently being accomplished under Contract N62470-79-C-9497 to remove the existing exhaust registers in each sleeping room bathroom area and to install new individual exhaust fans operated by a separate wall switch located adjacent to the light switch.

System No. 4

Exhaust registers discharging into a common duct riser connected to a roof exhaust fan. The type of system exists in Bldgs. HP51, HP53, HP55, 1140, 1340, AS4020, AS4025, FC414, and FC415 in Group No. 1; Bldgs. AS4010, FC304, FC305, FC306, FC309, FC310, and FC311 in Group No. 2; and Bldg. AS4015 in Group No. 3.





## System No. 5

Ceiling register with exhaust fan and duct in attic discharging air through gable louver. This type of system exists in Bldgs. M614 and M616 in Group No. 4.

### 3. Findings

Attachment 'A', sheets one through forty, provides specific information and comments for each building. The presence of mildew and excessive moisture varied from room to room and building to building. Generally, the problem did not exist throughout the building in those buildings reported to have a problem. The problem existed in some but not all buildings of the same type.

Domestic hot water temperatures, observed from thermometers on the storage tanks, varied from 108°F to 190°F among the buildings. Overall it appeared the mildew and excessive moisture was more extensive in buildings with the higher domestic hot water temperatures. From room to room it was evident that usage of hot water in the shower and lavatory areas varied with the occupants. Some of the occupants will allow the water to flow from the faucet or shower head as hot as they can endure while others use a nominal amount. Some of the personnel commented the water was too hot and they could not temper it adequately with cold water. Also the hot water can flow into the shower stall and lavatory at the high temperature resulting in excessive moisture added to the space. Where individual room exhaust fans exist, they are controlled by the room light switch. According to information provided on-site, regulations or instructions issued for energy conservation require personnel to turn off the light when they leave the toilet area which also stops the exhaust fan before the space is properly ventilated following use of the shower.

Other conditions observed that will add excessive moisture to the spaces are as follows:

a. Drain pans in some of the fan coil units were holding water because drains were clogged resulting in the unit acting as a humidifier rather than providing dehumidification control. Some of the pans were overflowing.

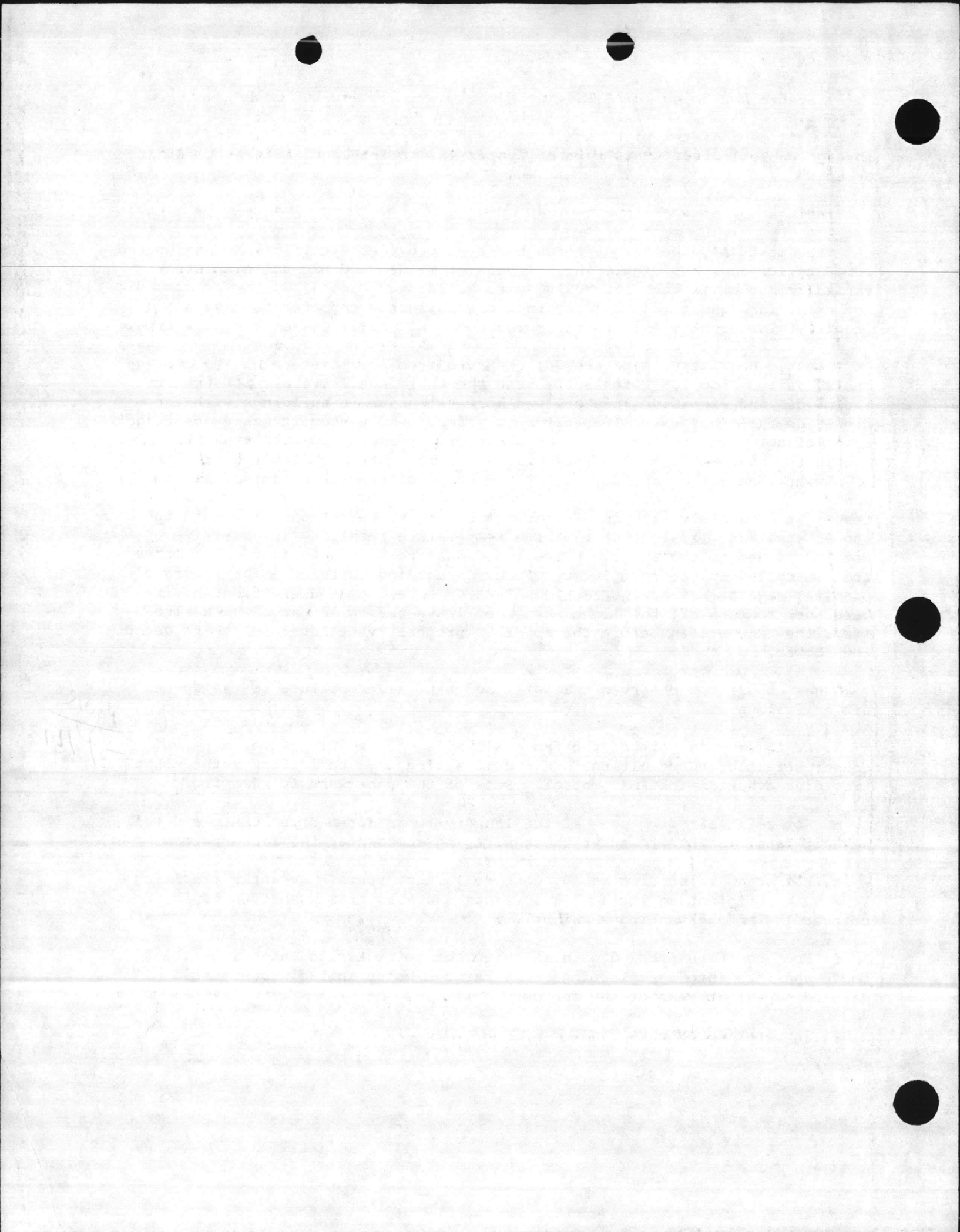
b. Hot moist air from some of the laundry rooms (from dryer vents and wall exhaust fans) is able to enter those sleeping rooms near the laundry room.

c. Wet areas in some rooms adjacent to laundry rooms apparently resulting from water originating in the laundry room (such as from wash down of the room or overflow of the washing machines).

d. Roof scuttles propped open allowing hot moist air to enter into the pipe chase and then into the sleeping rooms through holes in the masonry wall (around pipes) at rear of the fan cool units.

e. Inoperative exhaust fans.

*poor*  
*-PM*



f. Water from pipe leaks and condensation on uninsulated or improperly insulated piping. (Particularly applicable to Bldg. 1042).

g. Improper drainage around buildings. (Particularly applicable to Bldg. HP185).

h. Doors to common bathroom propped open allowing hot moist air to enter sleeping rooms.

i. Absence of vapor barrier over ground in crawl space. (Particularly applicable to Bldg. H16).

Activity personnel advised that the problem with condensation on the front-window walls of the sleeping rooms in Bldgs. 897 and 898 has existed since the buildings were constructed and occurs primarily during the winter months. According to As Built drawings the window walls are 7/32" thick sheetglass with 1/8" thick cement asbestos panels below (See Attachment 'C', Sheet 1).

Personnel at the site advised that mildew problems in the open bay sleeping areas of buildings at Montford Point did not occur until ceiling insulation was recently installed. From observations in Bldgs. M614 and M616, it appears mildew and excessive moisture problems have existed in the central bathroom areas for some time.

#### 4. Conclusions and Recommendations

Most mildew and moisture problems are maintenance/operation related rather than inadequacy of the air conditioning and ventilation systems. The systems cannot provide humidity control for all conditions, but should be adequate for most conditions (except possibly the exhaust/ventilation systems in buildings at Montford Point). However, it will be necessary to control the amount of moisture allowed to enter the spaces through continuing maintenance and operational procedures.

It is recommended that:

a. The following action be implemented as soon as possible:

(1) Set and maintain domestic hot water temperature at 105 F in accordance with Attachment 'B'.

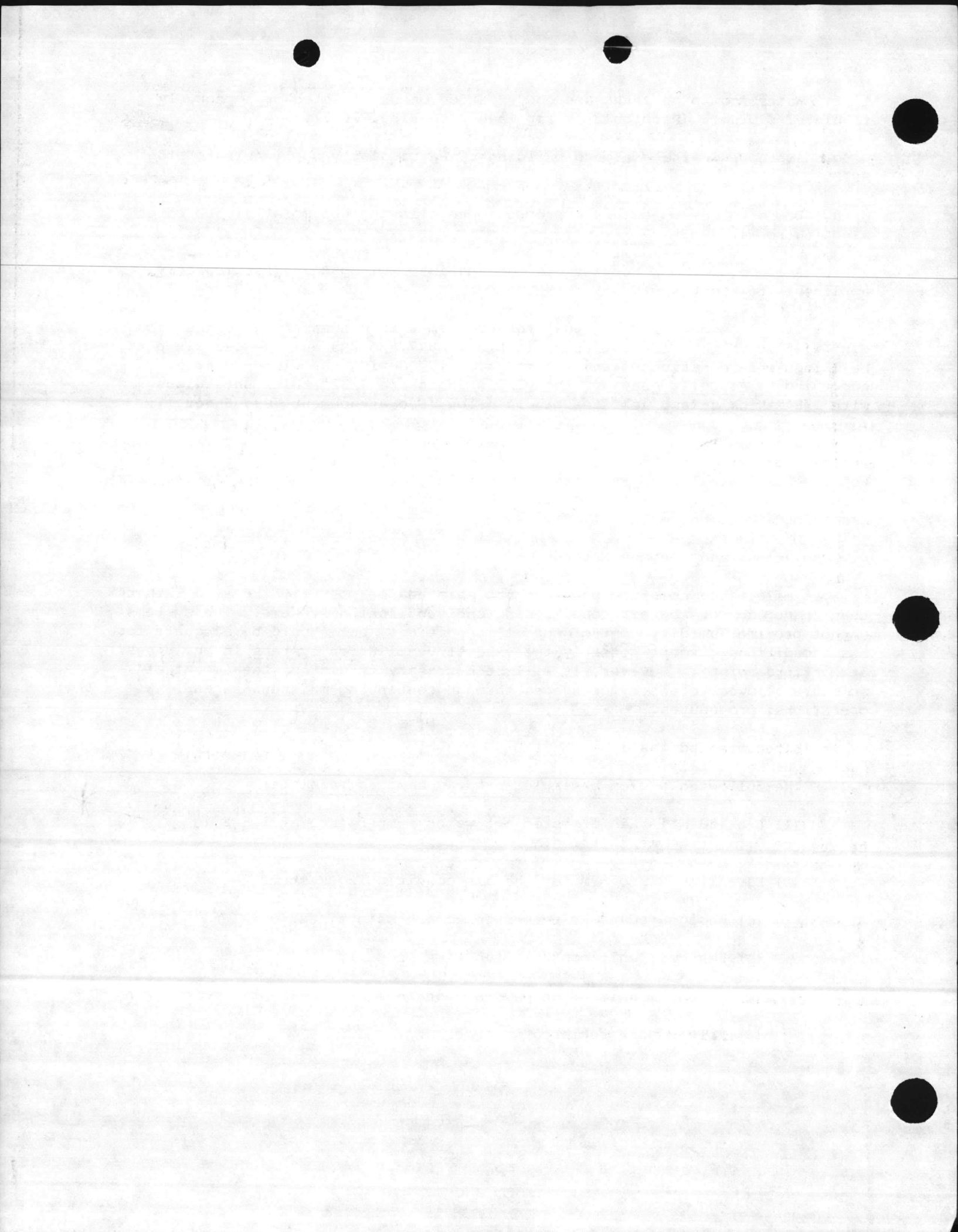
(2) Establish a program for the air conditioning systems to insure:

(a) Designated water temperatures are maintained.

(b) Fan coil unit controls function properly.

(c) Fan coil unit drain pans and drain lines are kept from clogging.

(d) Filters are replaced as necessary.



(3) Correct pipe leaks and pipe insulation/vapor barrier deficiencies.

(4) Repair or replace exhaust fans as necessary and provide adequate preventive maintenance program to keep them operating properly.

(5) Be sure vents from dryers in laundry rooms are functioning properly.

(6) Restrict hot moist air from laundry room dryer vents and wall exhaust fans from entering the sleeping rooms.

(7) Keep doors to common/central bathrooms closed. Do not allow them to be propped open.

(8) Control use of water for wash down in laundry rooms and avoid overflowing of washing machines.

(9) Revise regulations or instructions as necessary regarding light switches (that control bathroom exhaust fans) in buildings with bathrooms in sleeping rooms. Occupants should be allowed to leave the switch and fan on until the space is properly ventilated after each use of the shower.

(10) Keep roof scuttles closed. Do not allow them to be propped open.

(11) Close up and seal any holes in masonry walls around pipes as seen from the pipe chases adjacent to sleeping rooms in buildings where such conditions exist.

(12) Regrade around any building as necessary to assure rain water drains away from the building. — YES

(13) Operate fan coil units at low speed as long as they can maintain space temperature at 78° F cooling. This will provide for a larger portion of the cooling capacity to be used for moisture removal.

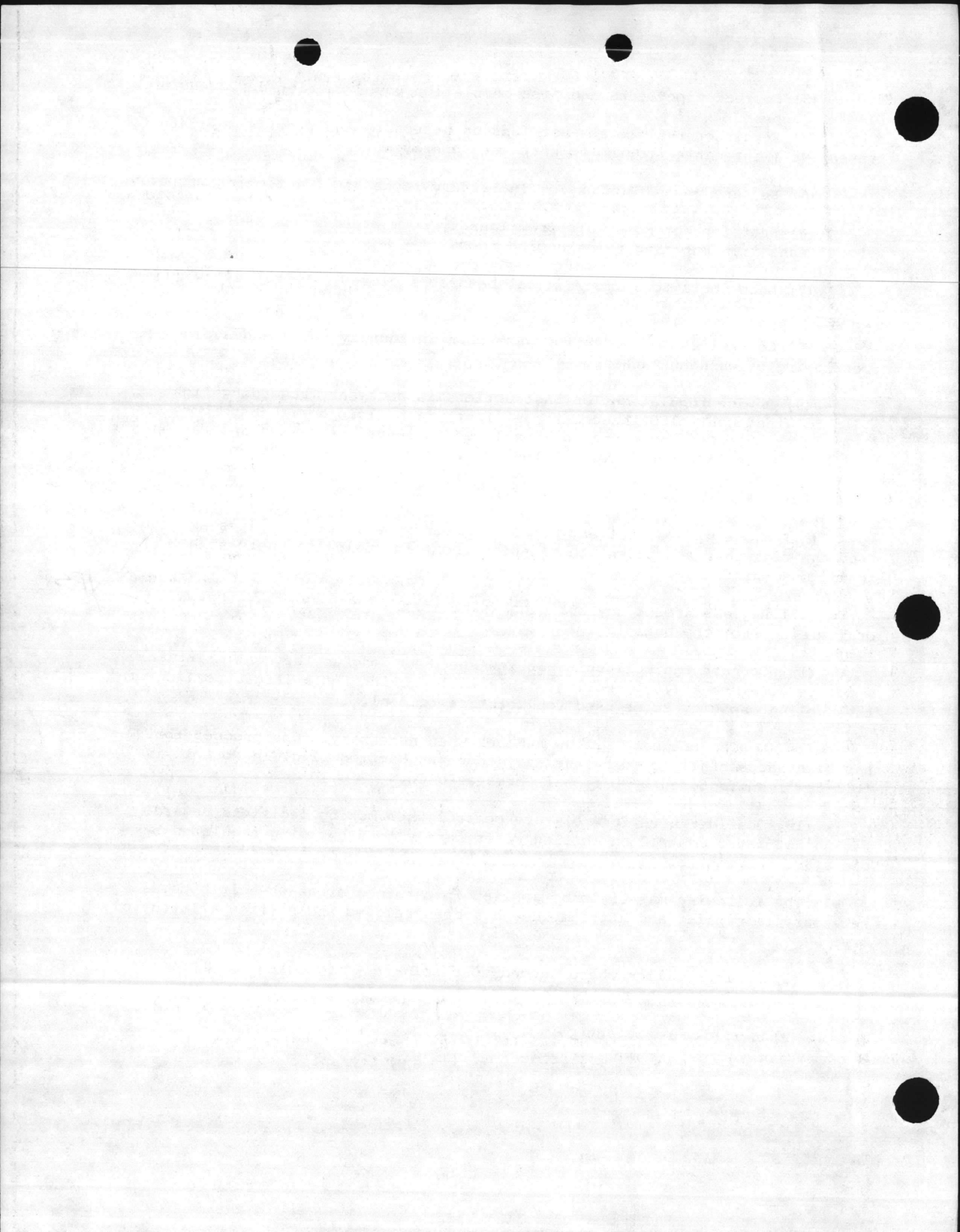
(14) Use an adequate mildew remover when necessary. One product that has been successfully used by the Navy Lodge on Hampton Blvd. in Norfolk is "Wil-dew" manufactured by National Chemsearch Co.

(15) Consider need for moisture control when making decisions regarding having automated control on chilled water supply to a building regulated by one space thermostat.

b. The following materials be applied in bathroom areas when it becomes necessary to repaint and after mildew has been removed and surface allowed to dry:

(1) A block filler where needed to eliminate porous areas and provide for a reasonably smooth washable surface.

(2) A mildew-resistant paint.



c. A vapor barrier be provided on the ground in the crawl space of Bldg. H16.

d. In addition to the applicable items in A and B above, the following be implemented and/or considered for Bldgs. 897 and 898.

(1) Modify the front window wall on each sleeping room according to one of the following alternatives (See Attachment 'C' Sheet 1 for existing elevation):

(a) Install 1" thick insulated glass with a thermal break around the perimeter where 7/32" thick glass now exists and provide 2" thick insulated panels having a thermal break around the perimeter where cement asbestos panels now exist.

(b) Remove the entire wall including the 3" x 8" hollow metal door with operable louver and replace with an insulated stud wall to include a 3' x 6'-8" insulated metal door and a double hung window with insulating glass. (See Attachment 'C' Sheet 2).

Cost estimates for (a) and (b) are provided as Attachment 'D', Sheets one through four. The initial cost of (b) is more than (a). However (b) may be the best alternative when considering energy conservation and the cost to purchase and maintain draperies.

(2) Provide non-combustible flush mounted access panel whenever it is necessary to cut a hole in the sheetrock wall in the pipe chase to gain access to tub plumbing. This will provide easy access to plumbing for future requirements and a quick repair to the wall. In the past, holes have been cut in the sheetrock (and later repaired) when it was necessary to unstop the condensate drain line from the fan coil unit drain pan. (The condensate drain line is connected to the tub drain line).

(3) Provide printed instructions installed in a permanent manner and readily visible at each kitchenette range for occupants to turn on the hood fan whenever using the range burners.

e. In addition to the applicable items in 4 a. and 4 b. above, the following be implemented for buildings considered in the Montford Point area:

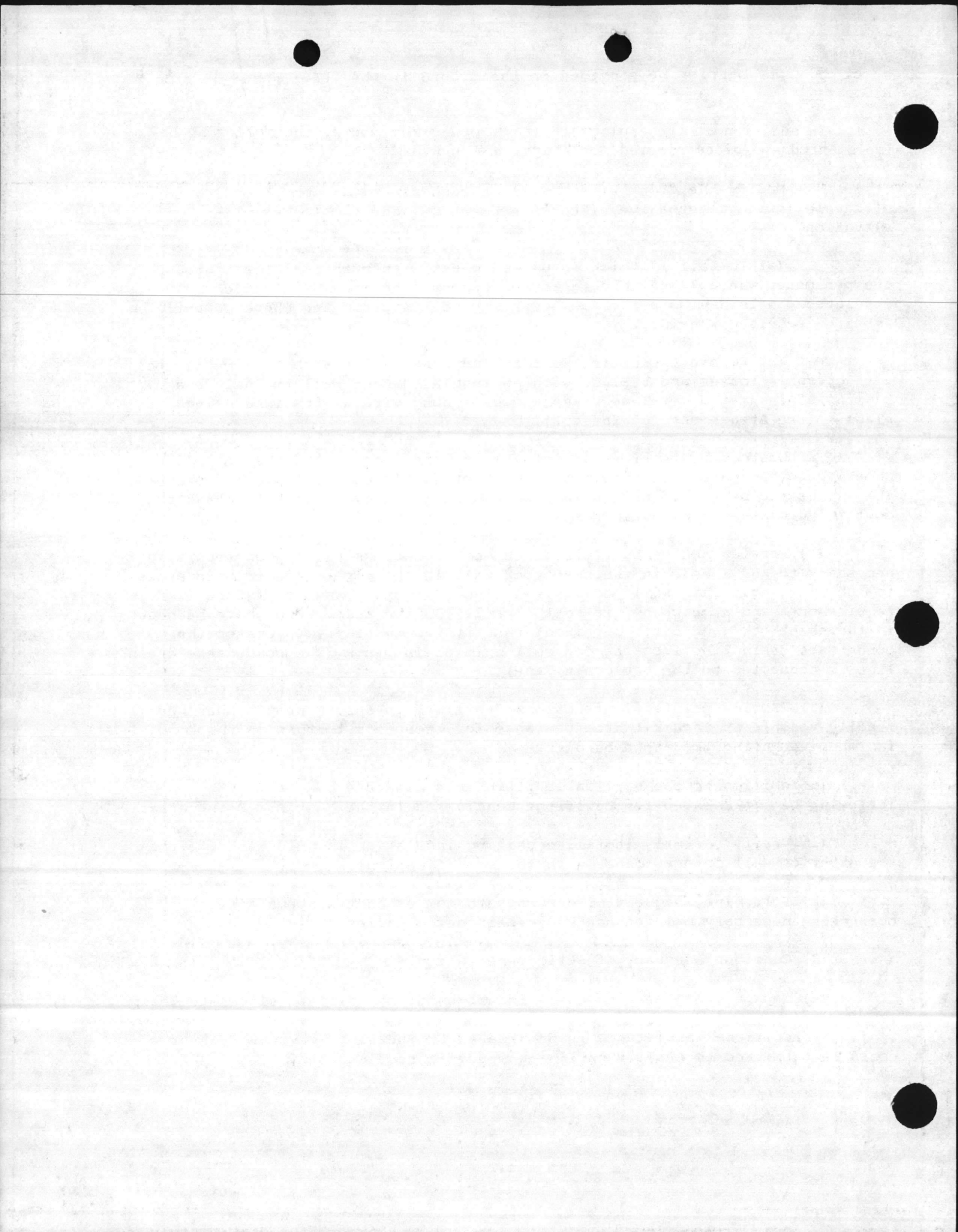
(1) Verify recently installed ceiling insulation is held back 6" from the exterior wall in accordance with the specifications.

(2) Determine adequacy of common bathroom exhaust systems after correcting necessary maintenance and repair deficiencies.

(3) Consider adequacy of attic ventilation.

(4) Repair steam/heating coils in air handling units to eliminate leaks.

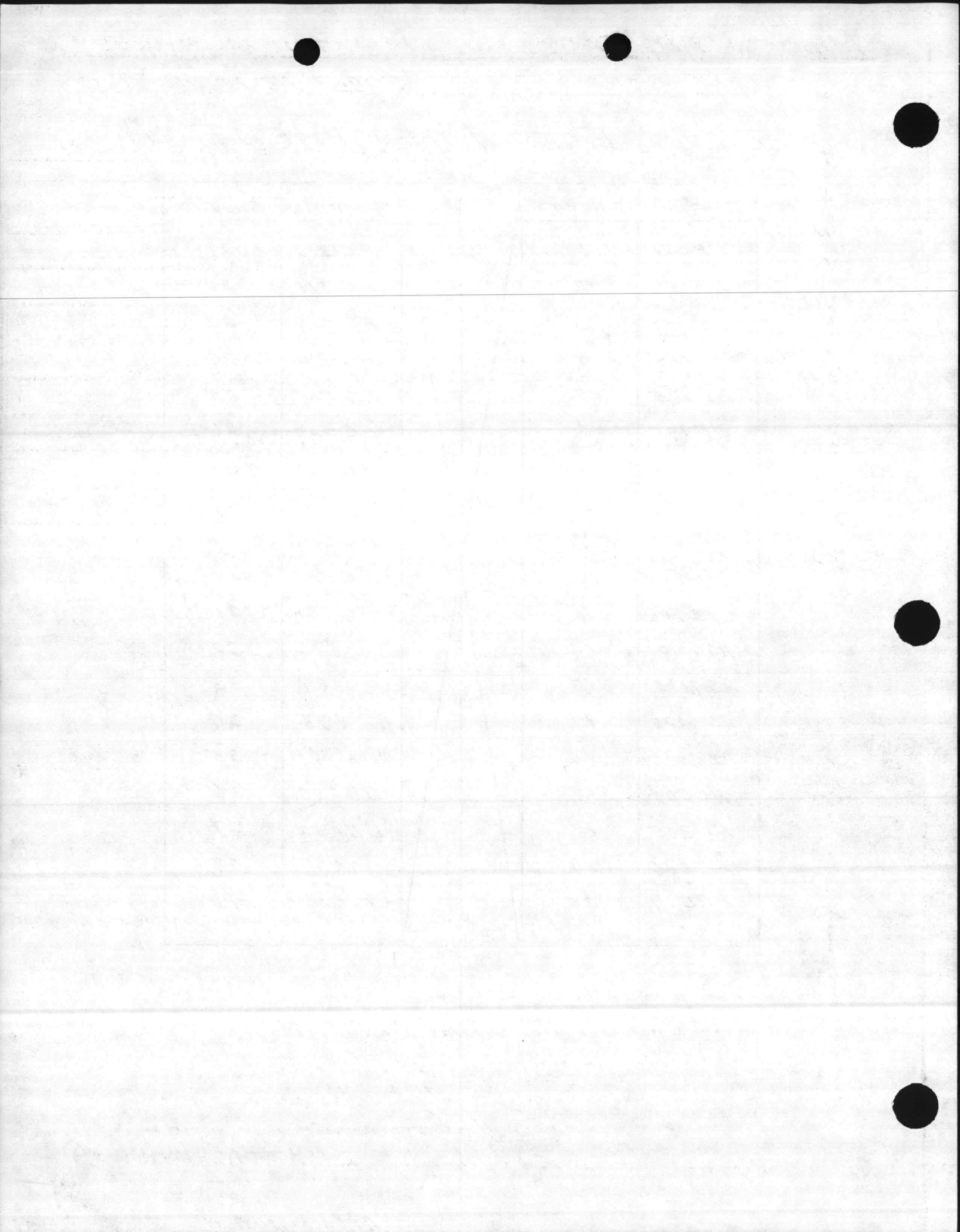
f. If additional assistance is desired an Engineering Services Request could be submitted to LANTDIV outlining specific requirements.





# INDEX FOR ATTACHMENT A

BUILDING	SHEET		BUILDING	SHEET
HP 51	1		FC 310	21
HP 53	2		FC 311	22
HP 55	3		FC 414	23
HP 165	4		FC 415	24
HP 185	5		FC 515	25
HP 195	6		FC 520	26
HP 550	7		FC 525	27
HP 560	8		FC 530	28
1042	9		FC 550	29
1140	10		FC 555	30
1340	11		FC 560	31
AS4010	12		896	32
AS4015	13		897	33
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AS4025	16		H 16	35
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FC 305	18		BB255	37
FC 306	19		M 614	38
FC 309	20		M 616	40



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-51 SURVEY DATE 5 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1976 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 35,566 SQ. FT.

FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharges into a common  
duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) 146

COMMENTS:

Room 102 - No visible evidence of mildew or excessive moisture.

" 104 - minor mildew on walls and ceiling in toilet. Water stains on wall  
at fan coil unit supply grille.

" 108 - No visible evidence of mildew or excessive moisture.

" 109 - " " " " " " " " " " " "

" 118 - minor mildew on walls and ceiling in toilet.

" 119 - " " " " " " " " " " " "

" 208 - " " " " " " " " " " " "

" 209 - mildew on walls and ceiling in toilet.

" 218 - " " ceiling of sleeping area and minor mildew on  
walls and ceiling in toilet.

" 219 - minor mildew on walls and ceiling in toilet.

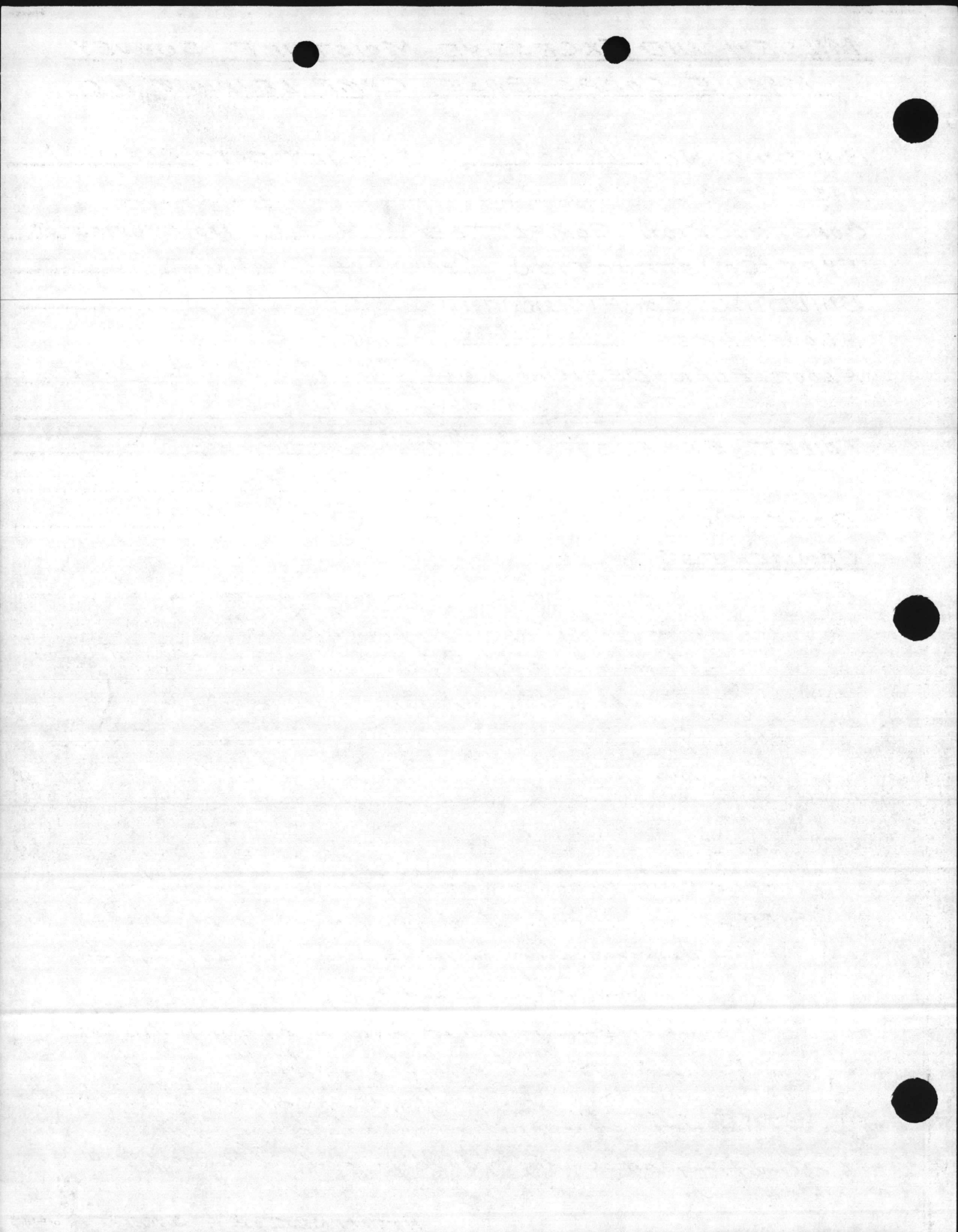
" 308 - Water stains on wall at fan coil unit supply grille.

" 309 - mildew in toilet and sleeping area.

" 318 - No visible evidence of mildew or excessive moisture.

" 319 - Water stains on wall at fan coil unit supply grille

Air conditioning not working in building. Chiller being repaired.

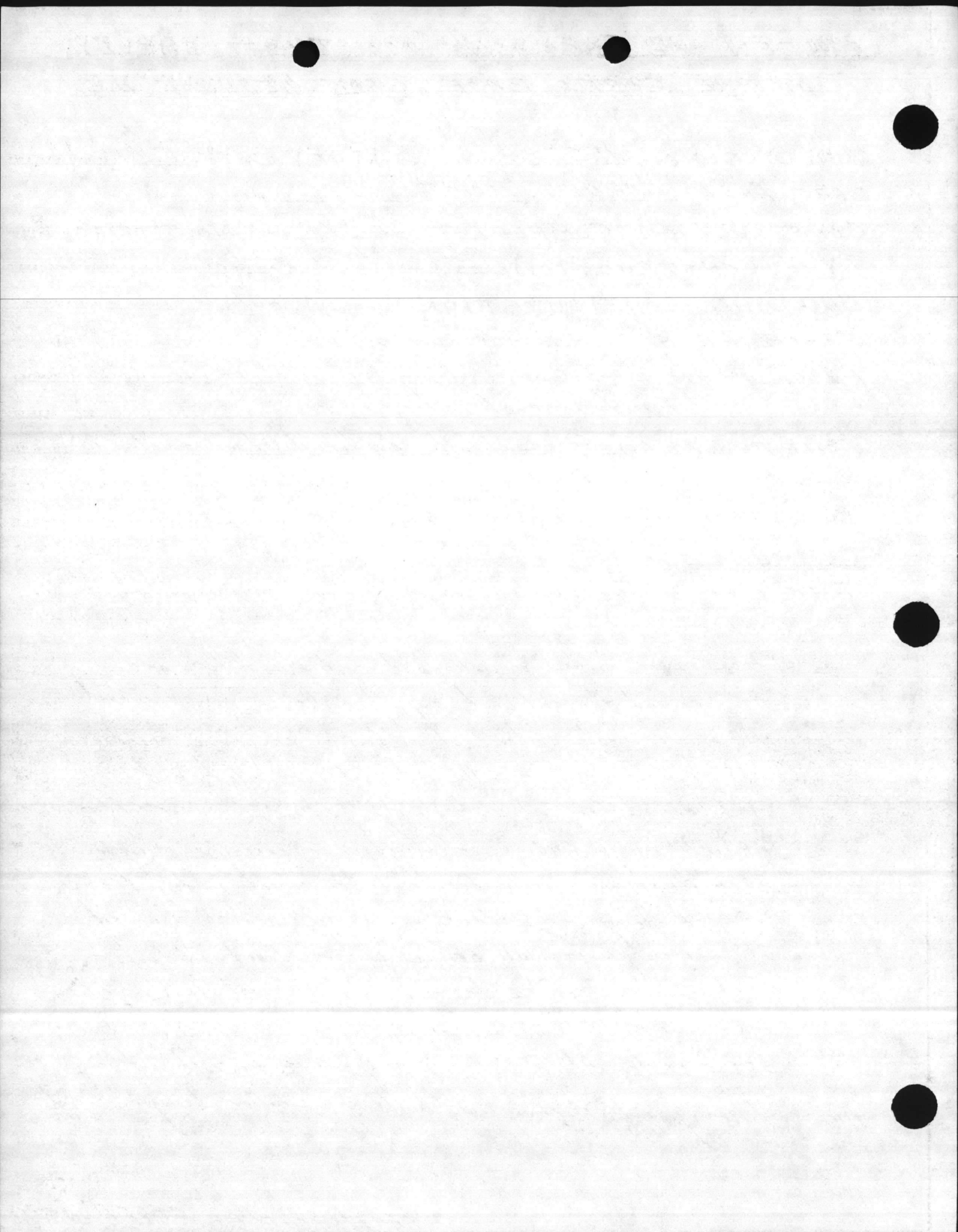


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-53 SURVEY DATE 5 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1976 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 35,566 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust register discharging into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 146

COMMENTS:

- Room 108 - No visible evidence of mildew or excessive moisture.  
" 109 - " " " " " "  
" 118 - minor mildew on walls and ceiling in toilet and  
around fan coil unit supply grille.  
" 119 - No visible evidence of mildew or excessive moisture.  
" 208 - minor mildew on walls and ceiling in toilet and  
around fan coil unit supply grille.  
" 209 - No visible evidence of mildew or excessive moisture.  
" 308 - moisture in wall beside water closet in toilet.  
Evidence of a leak.  
" 309 - moisture in wall beside water closet in toilet.  
Evidence of a leak.  
" 318 - No visible evidence of mildew or excessive moisture.  
" 319 - Water stains on ceiling opposite fan coil unit.  
Air conditioning not working in building. Chiller being repaired.



MILDEW AND EXCESSIVE MOISTURE SURVEY

MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-55 SURVEY DATE 5 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1976 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 39,909 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharging into a  
Common duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) 150

COMMENTS:

Room 108 - No visible evidence of mildew or excessive moisture.

" 109 - some mildew on ceiling in sleeping area.

" 112 - " " " " " toilet.

" 122 - " " " " and wall around fan coil  
unit supply grille.

" 123 - some mildew on ceiling in toilet.

" 208 - No visible evidence of mildew or excessive moisture.

" 209 - " " " " " " " " " " " "

" 222 - some mildew in both toilet and sleeping area.

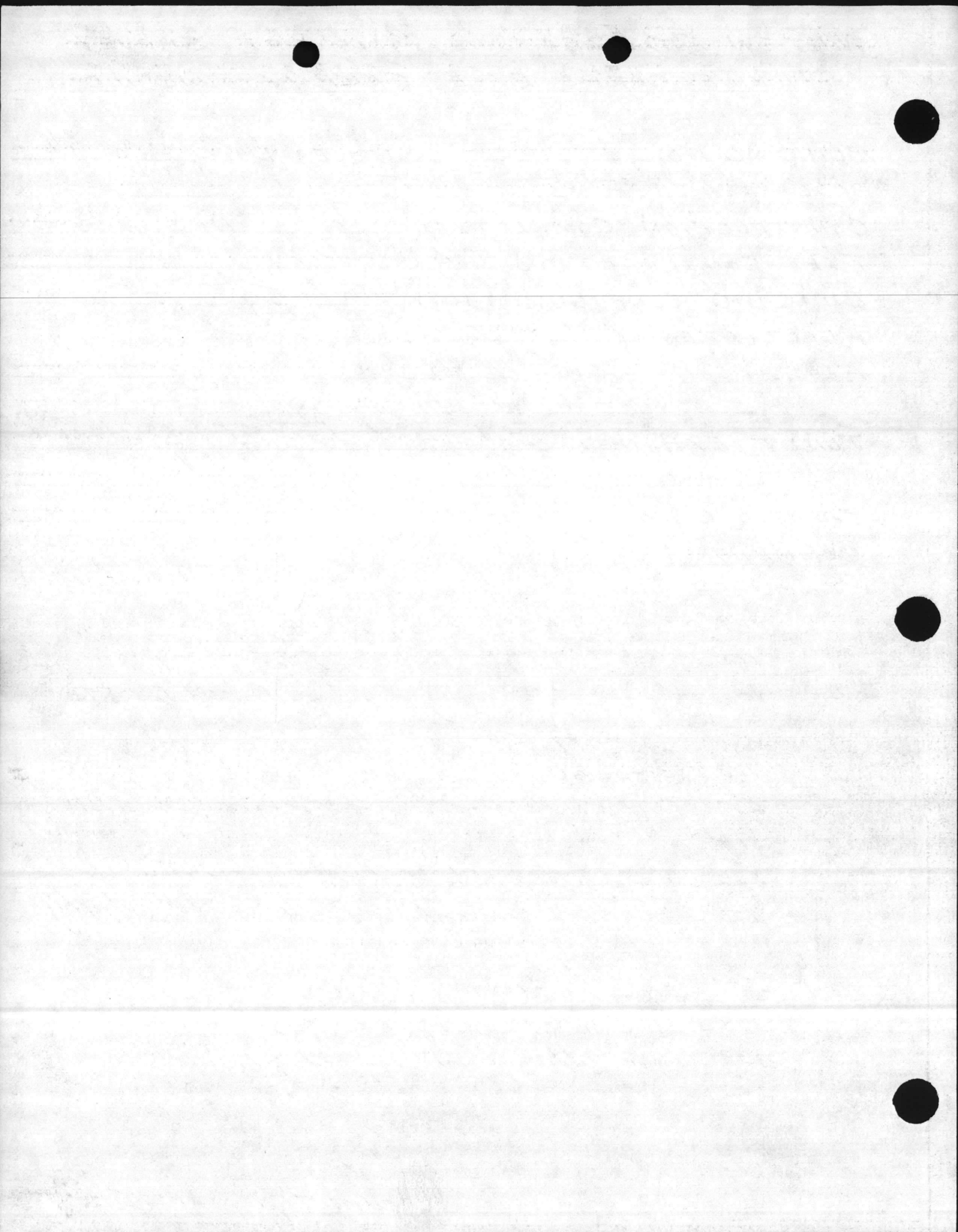
" 223 - " " on ceiling and wall around fan coil  
unit supply grille.

" 308 - some moisture around fan coil unit supply grille.

" 309 - some mildew in sleeping area.

" 322 - minor mildew on walls and ceiling in toilet.

" 323 - " " " " " " " " " " " "



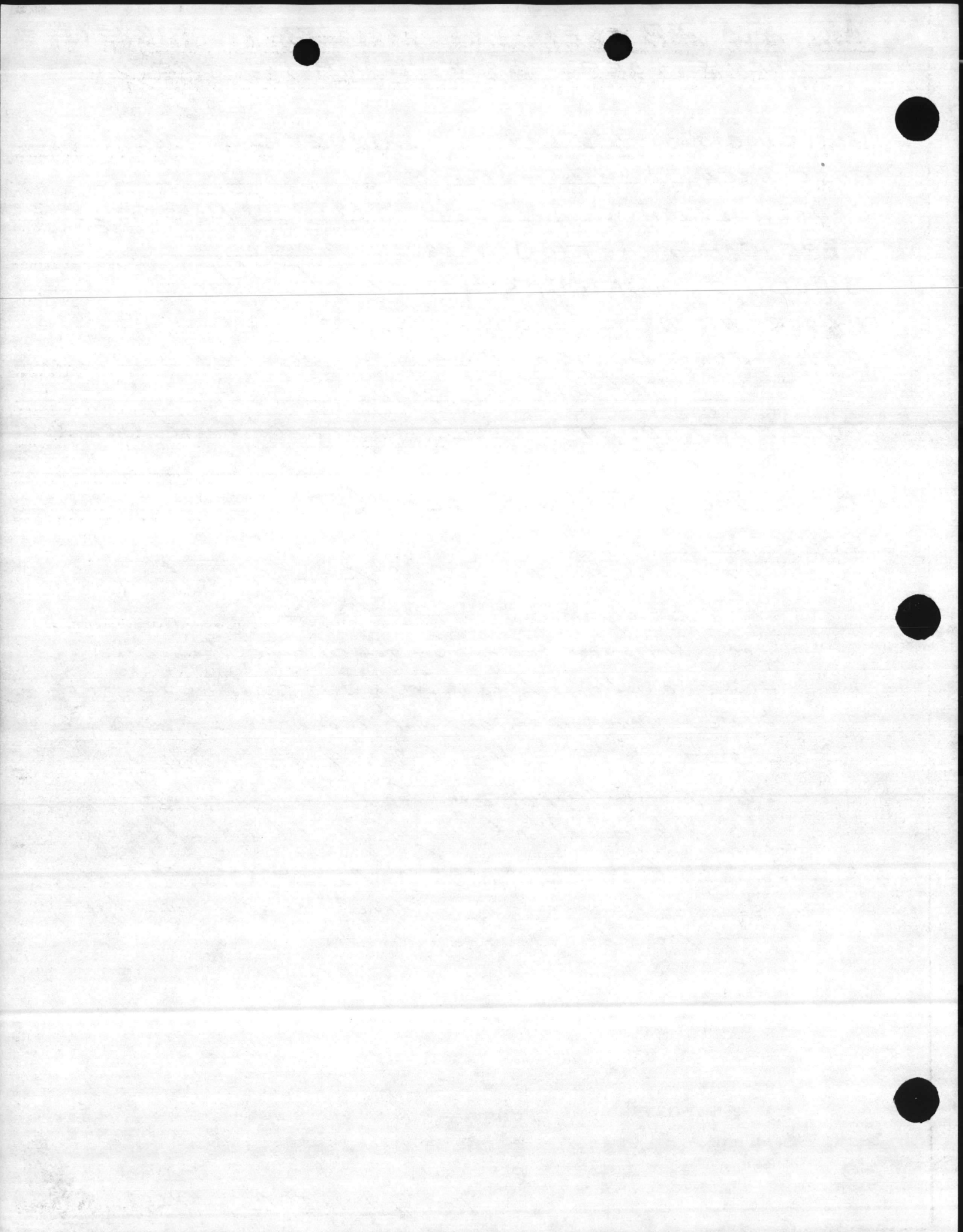


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-165 SURVEY DATE 4 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1980 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 43,220 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch  
DOMESTIC HOT WATER TEMP. (°F) 122

COMMENTS:

- Room 117 - Evidence of water leaking in from adjacent  
Laundry Room.
- " 200 - Water overflowing from fan coil unit drain pan.
- " 203 - No visible evidence of mildew or excessive moisture.
- " 212 - moisture on fan coil unit cabinet
- " 223 - " " bottom of fan coil unit cabinet.
- " 301 - Water dripping from fan coil unit cabinet. Large  
hole in wall at rear of fan coil unit which exposes  
unit to air in adjacent pipe chase. Roof  
scuttle above pipe chase was open and subjecting  
the chase to the elements.



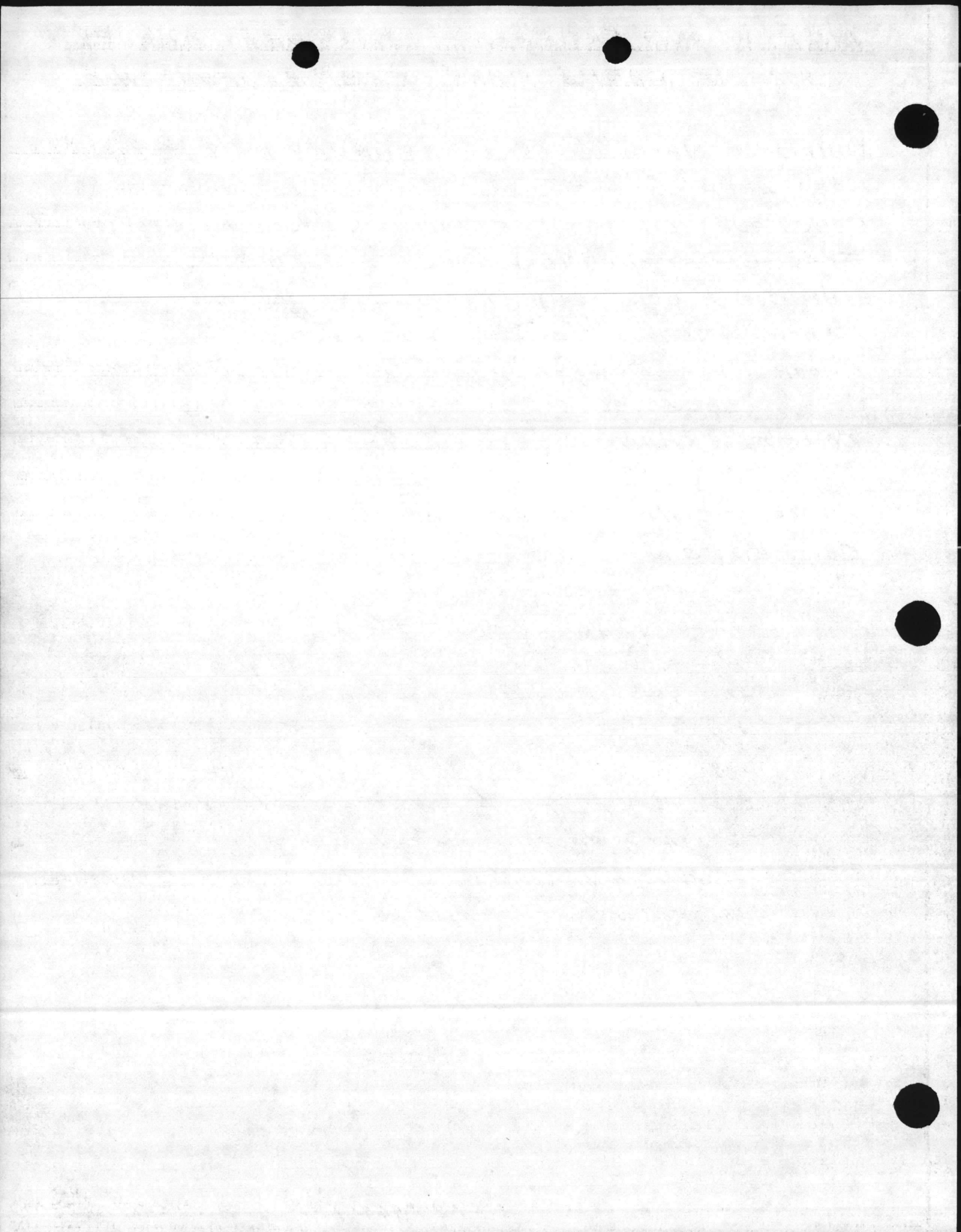
MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-185 SURVEY DATE 4 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1980 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & Masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 43,220 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch  
DOMESTIC HOT WATER TEMP. (°F) 115

COMMENTS:

- Room 205 - moisture on fan coil unit cabinet.  
" 207 - No visible evidence of mildew or excessive moisture.  
" 211 - " " " " " " " " " " " "  
" 213 - moisture on fan coil unit cabinet.  
" 217 - " " " " " " " " " " " "  
" 229 - No visible evidence of mildew or excessive moisture.  
" 230 - Fan coil unit not cooling. occupants advised  
water drips from fan coil unit.  
" 300 - No visible evidence of mildew or excessive moisture.  
" 330 - Fan coil unit not cooling.

Poor drainage around building.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-195 SURVEY DATE 3 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1980 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 43,220 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch

DOMESTIC HOT WATER TEMP. (°F) 140

COMMENTS:

Room 101 - occupants advised water leaks from fan coil unit.

" 105 - Water leaking from fan coil unit. mildew visible  
on mattress.

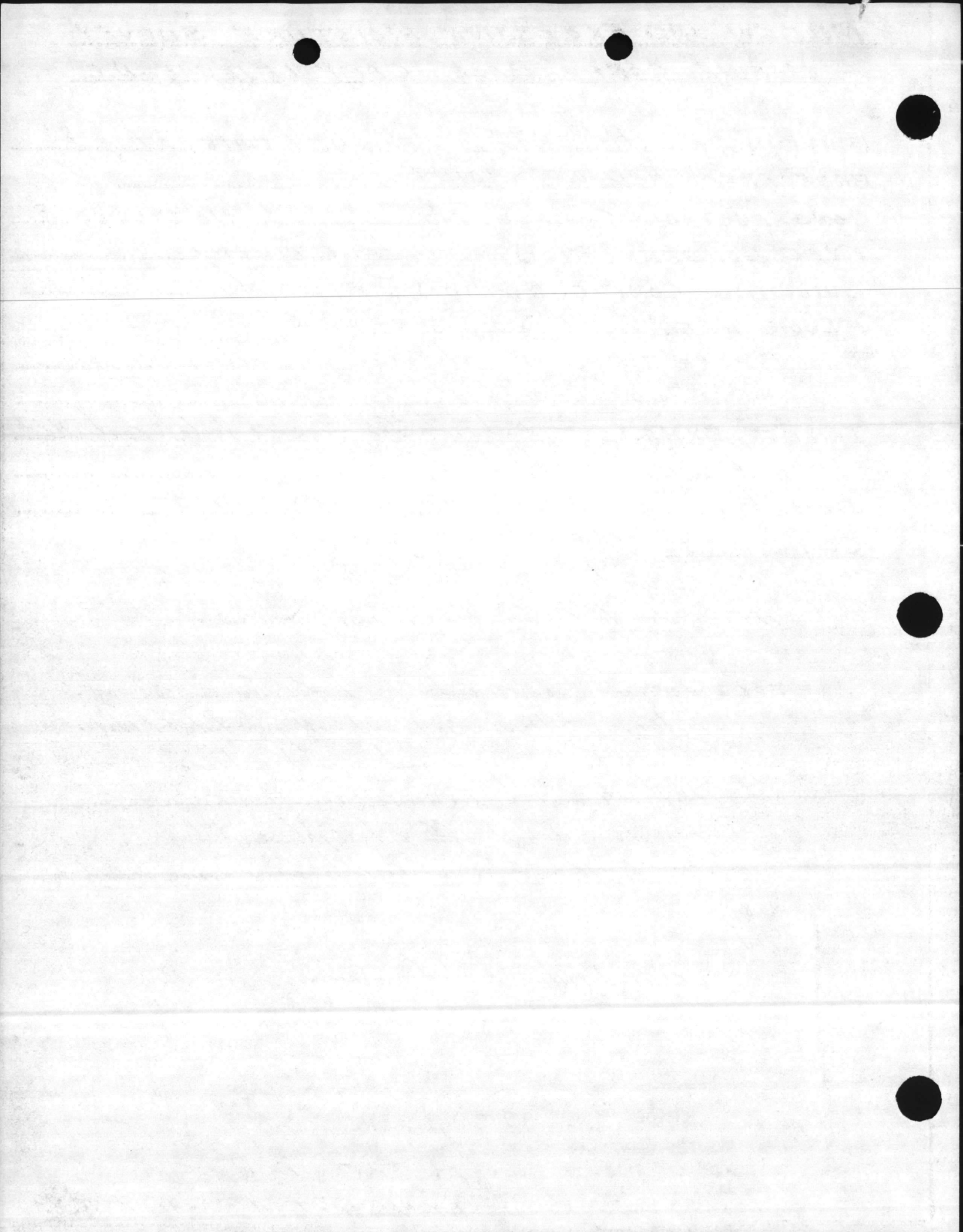
" 208 - occupants advised water has leaked from fan coil unit.  
Extensive mildew on walls and ceiling in toilet. Water  
dripping from ceiling in and around shower. Evident  
that shower had been used recently. Exhaust fan  
had been turned off with light switch.

" 210 - No visible evidence of mildew or excessive moisture.

" 218 - " " " " " " " " " "

" 301 - " " " " " " " " " "

checked filter. Needed replacing.

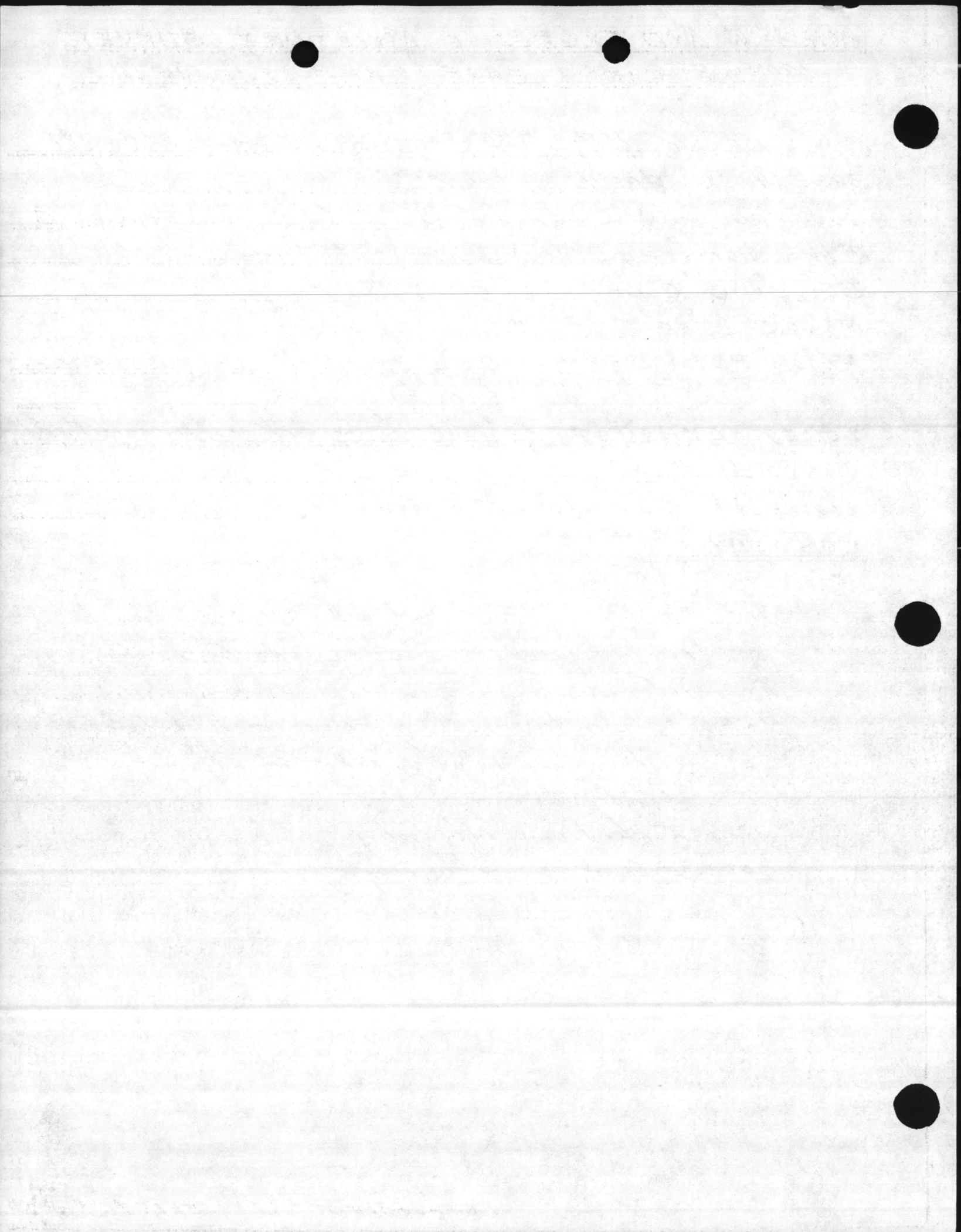


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-550 SURVEY DATE 5 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1979 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 43,220 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch  
DOMESTIC HOT WATER TEMP. (°F) 130

COMMENTS:

- Room 104 - mildew visible on front of lockers.  
" 115 - " " " " Vanity and mattresses. Room has  
been unoccupied for some time with fan coil unit  
left on.  
" 127 - Some mildew on walls in shower area of toilet.  
" 221 - Water stains indicate leaks from adjacent  
Laundry Room.  
" 321 - Fan coil unit not cooling  
" 326 - Exhaust fan not working.



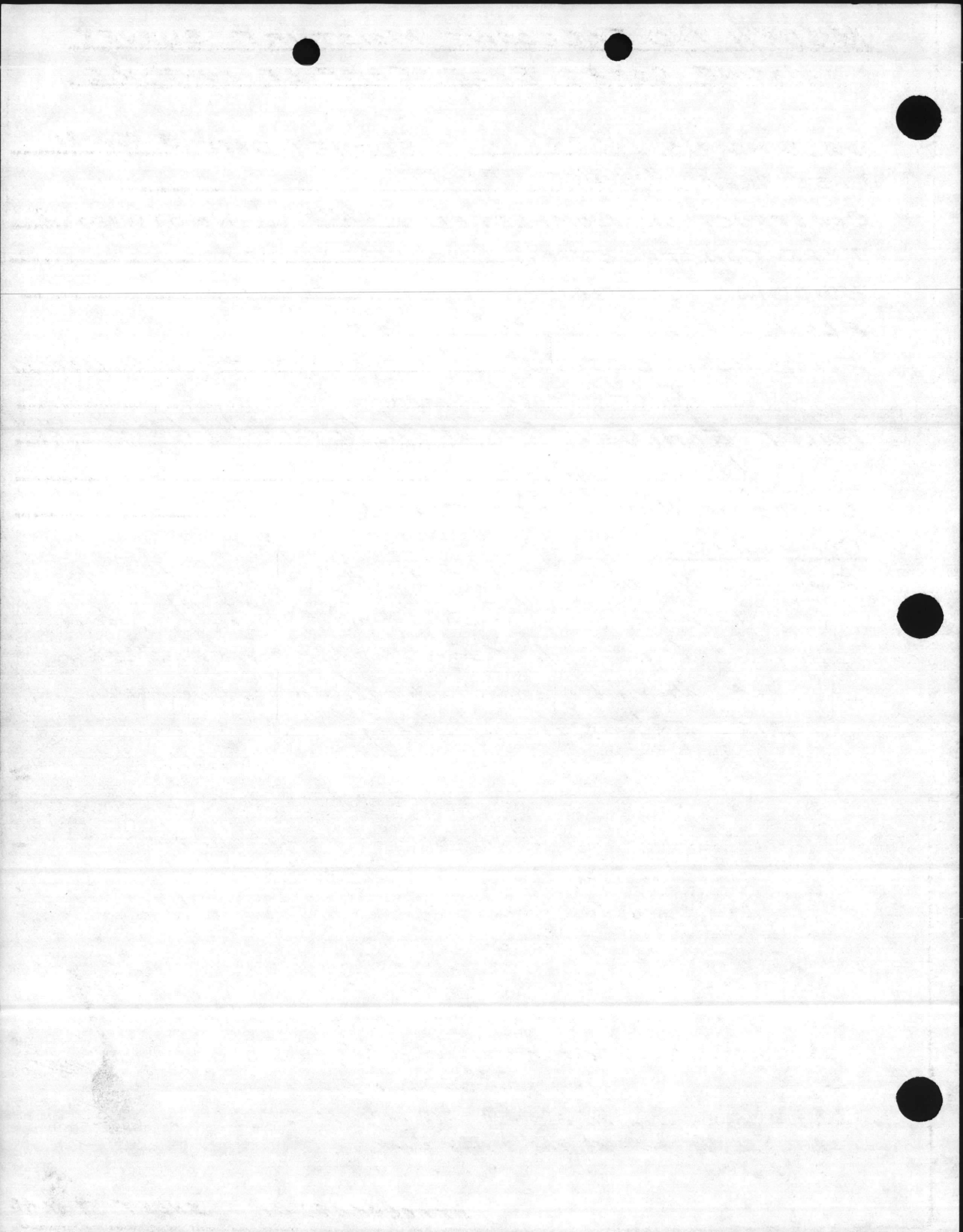


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. HP-560 SURVEY DATE 5 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1979 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 42,976 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch  
DOMESTIC HOT WATER TEMP. (°F) 129

COMMENTS:

- Room 127 - No visible evidence of mildew or excessive moisture
- " 221 - minor mildew in shower area of toilet. Evidence of water leak from Laundry Room on 3<sup>rd</sup> floor.
- " 224 - No visible evidence of mildew or excessive moisture.
- " 312 - Exhaust fan not working.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. 1042 SURVEY DATE 3 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1974 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "L" shape  
FLOOR AREA 34,002 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch  
DOMESTIC HOT WATER TEMP. (°F) Unable to check

COMMENTS:

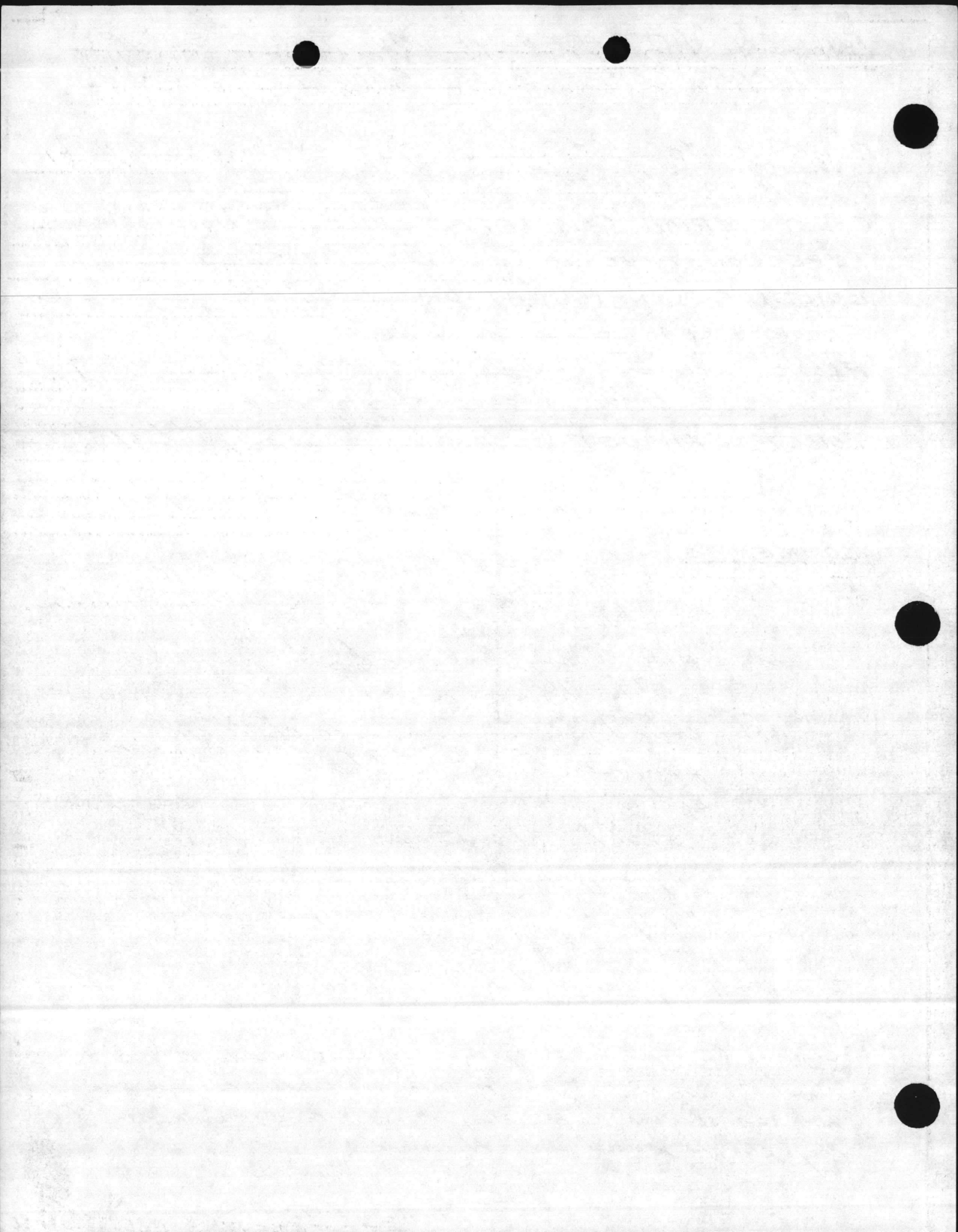
Room 120 - Water dripping from chilled water piping where insulation has been removed or damaged.

" 122 - Water dripping from chilled water piping where insulation has been removed.

" 219 - Water dripping from insulation on chilled water piping. Inadequate insulation under fitting covers.

" 222 - Insulation and vapor barrier on chilled water piping appears to have been slit. Water dripping from insulation and inadequate insulation under fitting covers.

Base Maintenance personnel have completed a survey of each room in the building and found 42 rooms that need checking for leaks and repairing or replacing the insulation/vapor barrier. These rooms are nos. 103, 107, 108, 110 thru 118, 120 thru 123, 201, 207, thru 224, 304, 306, 310 thru 312, 317 and 318. It is understood they plan to proceed with this work.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. 1140 SURVEY DATE 3 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1976 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 39,909 SQ. FT.

FLOOR PLAN DESIGN motel type with exterior corridors.

Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharging into a  
common duct which is connected to a roof fan

DOMESTIC HOT WATER TEMP. (°F) 158

COMMENTS:

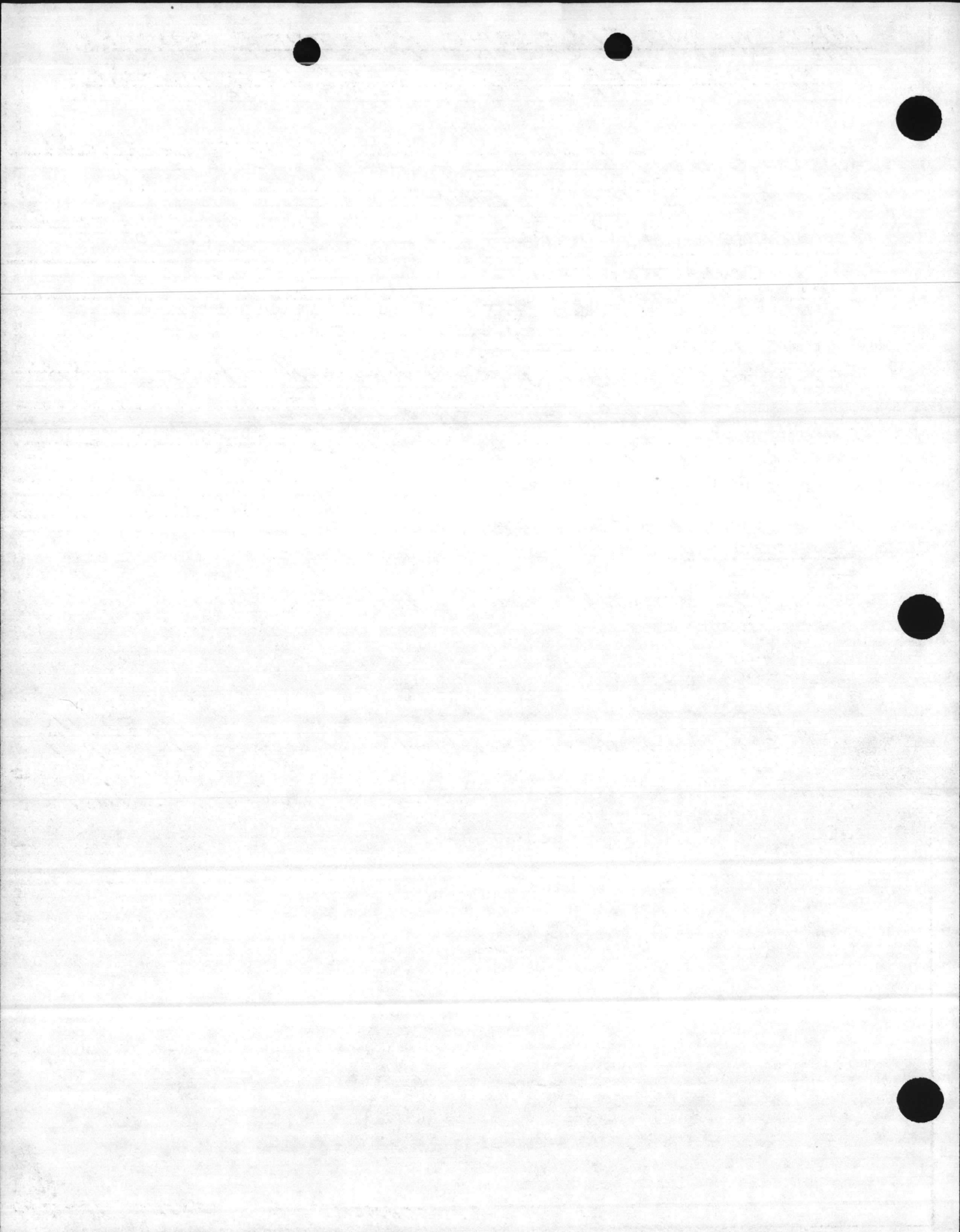
Room 117 - No visible evidence of mildew or excessive moisture.

" 127 - " " " " " " " " " "

" 210 - some mildew on walls in toilet.

" 322 - minor " " " " " "

" 330 - No visible evidence of mildew or excessive moisture.



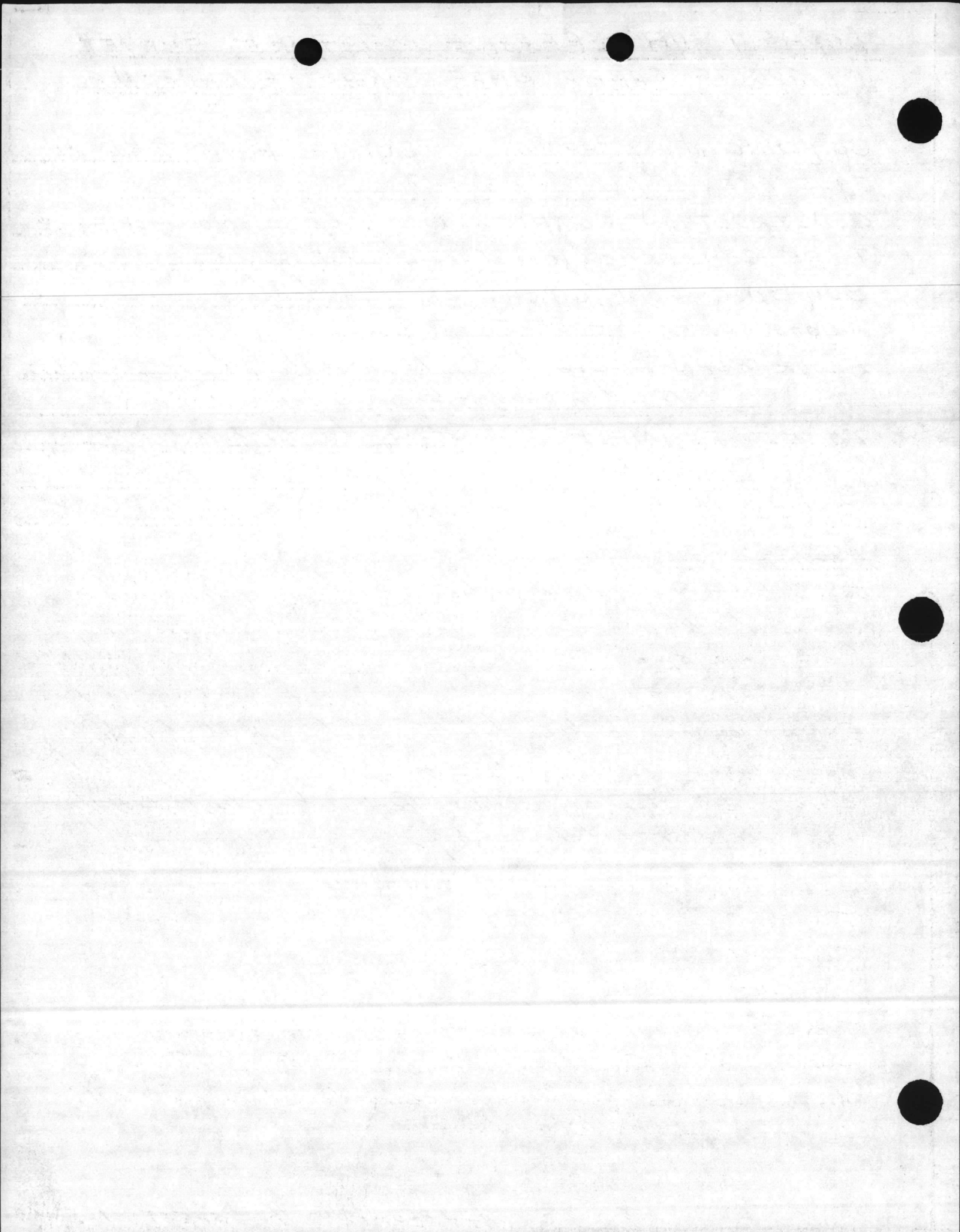
MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. 1340 SURVEY DATE 3 Aug. 81  
BASE AREA HADNOT POINT  
CONSTRUCTION COMPLETED 1977 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 42,975 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust register discharging into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) unable to check

COMMENTS:

Room 117 - some mildew visible in toilet  
" 217 - minor " " "  
" 221 - some " " "  
" 327 - " " "

Exhaust registers in the toilet in each room in this building are located 4' above the floor just above the water closet. Wall separating shower from water closet extends from the floor to the ceiling.





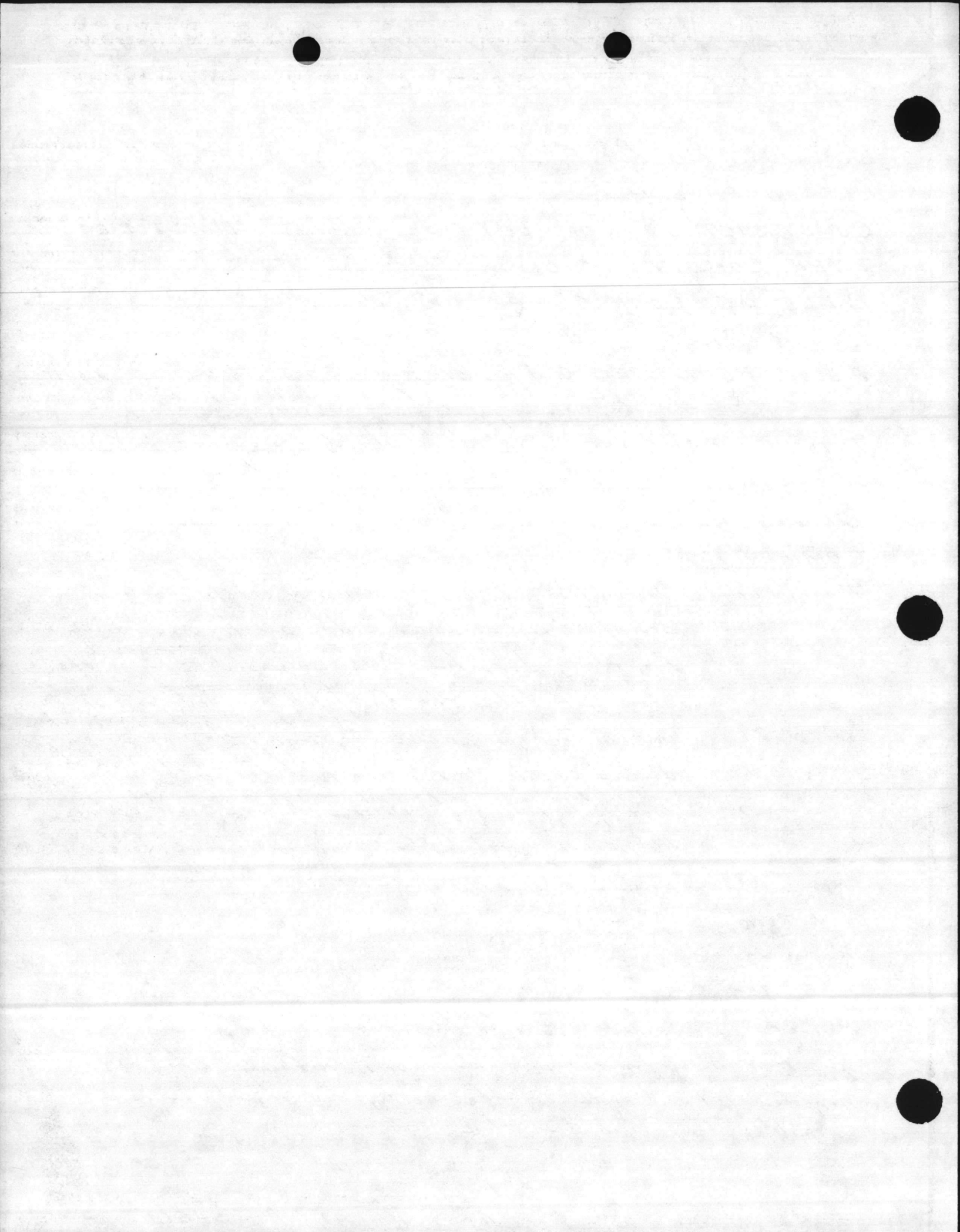
MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. AS-4010 SURVEY DATE 7 Aug. 81  
BASE AREA AIR STATION  
CONSTRUCTION COMPLETED 1969 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "H" shape  
FLOOR AREA 79,358 SQ. FT.  
FLOOR PLAN DESIGN Dormitory type with interior corridors.  
Common toilets (sleeping rooms do not have toilets)  
TOILET EXHAUST Exhaust registers discharging into a common  
duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 132

COMMENTS:

- Room 214 - No visible evidence of mildew or excessive moisture. Several 2'x2' acoustical ceiling panels were missing from the grid system of the suspended ceiling in the area just below the floor/wall mounted fan coil unit in the room above. Apparently the panels were damaged by water leaking from the f.c. unit.
- " 215 - Wet spots, mildew, and water stain on some of ceiling tiles in area just below fan coil unit in the room above.
- " 223 - same condition as Room 215
- TV Room - " " " " "
- Room 241 - " " " " "
- " 254 - " " " " "

Barracks personnel advised they had been experiencing problems with fan coil unit drain pans overflowing. When this happens, wet spots appear on the ceiling below and can result in mildew being visible in those areas.

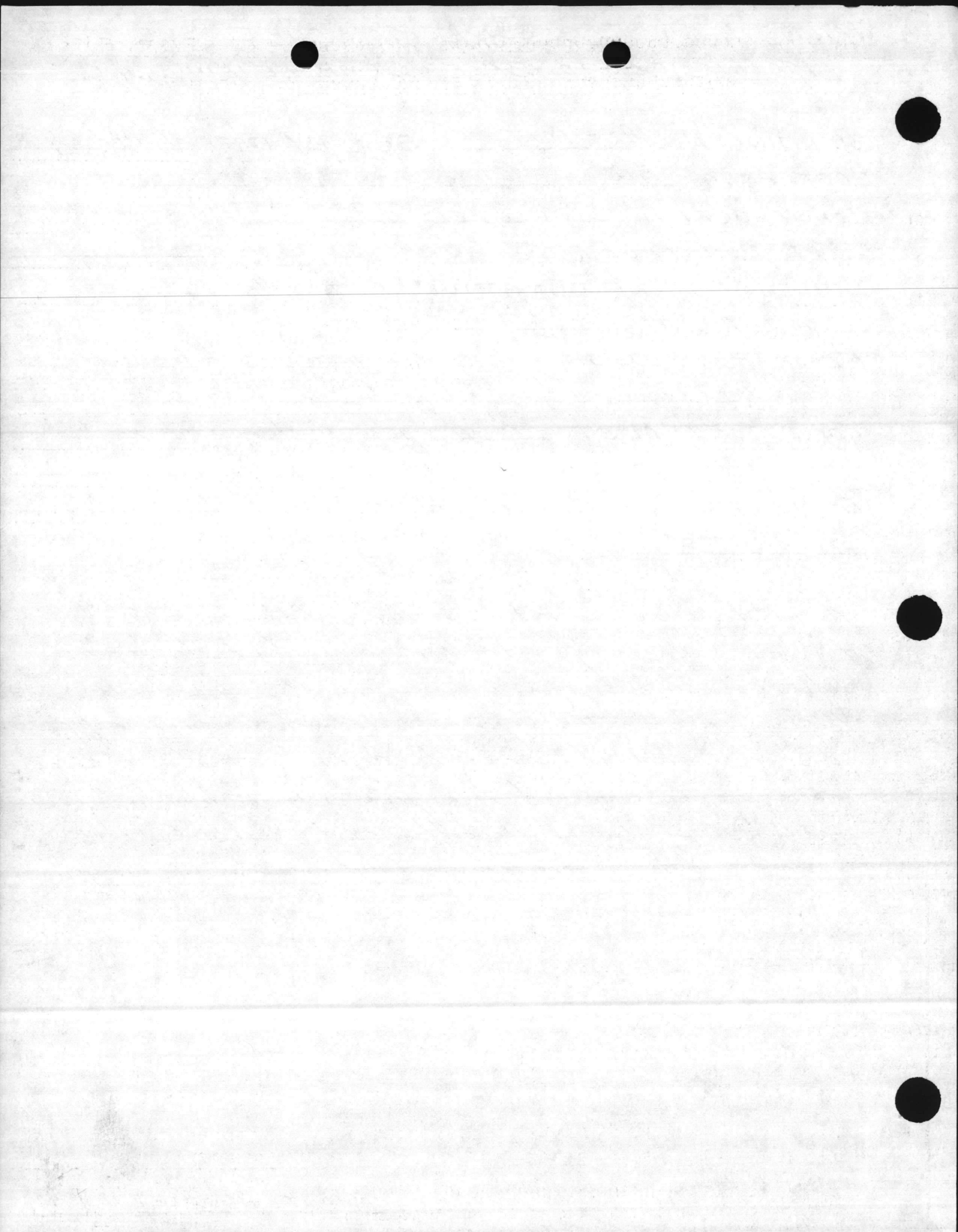


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

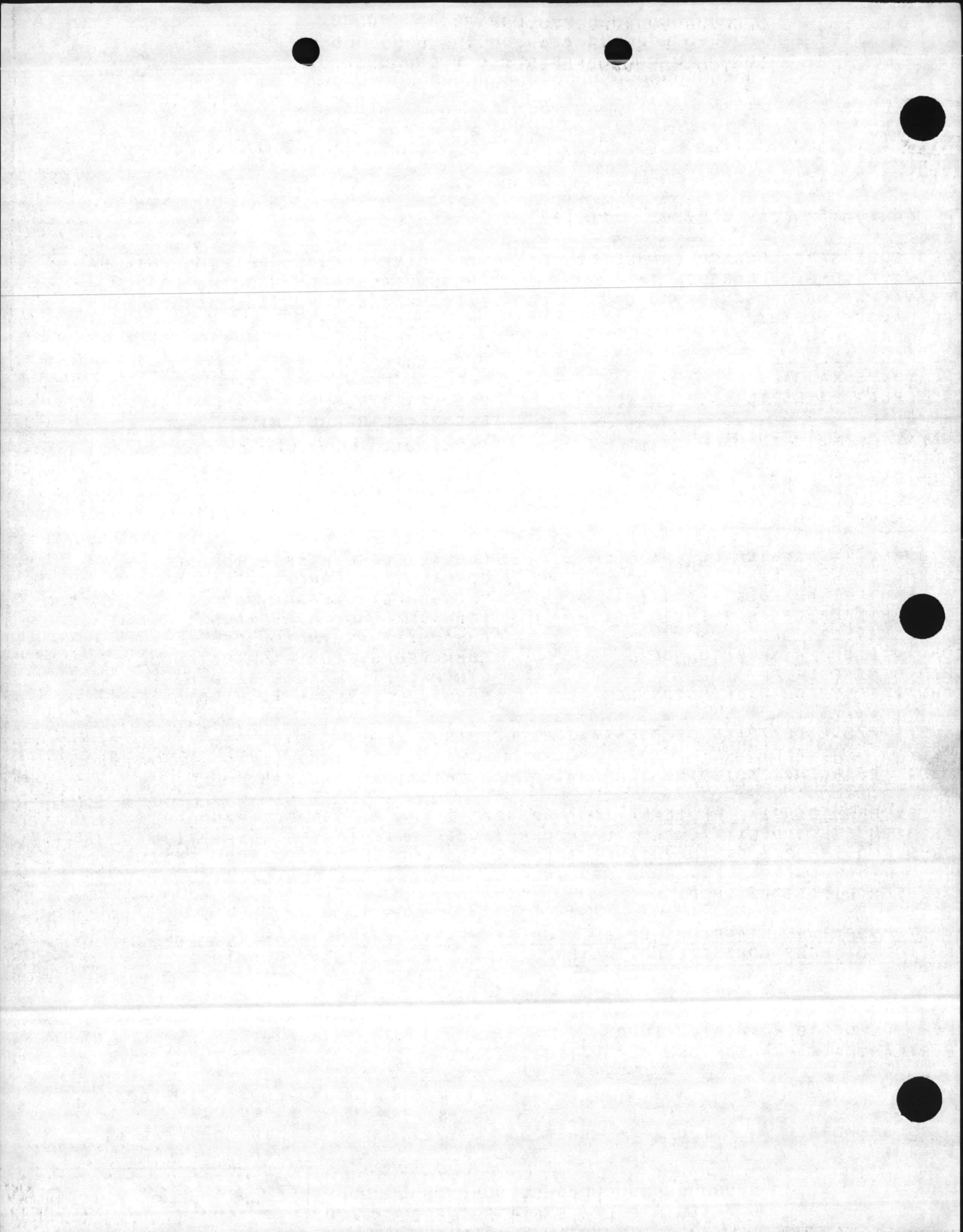
BUILDING NO. AS-4015 SURVEY DATE 7 Aug. 81  
BASE AREA AIR STATION  
CONSTRUCTION COMPLETED 1971 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & Masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 24,680 SQ. FT.  
FLOOR PLAN DESIGN 9 modules or units with 6 sleeping  
rooms, common toilet, and a lounge for each. Exterior corridors.  
TOILET EXHAUST Exhaust registers discharging into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 140

COMMENTS:

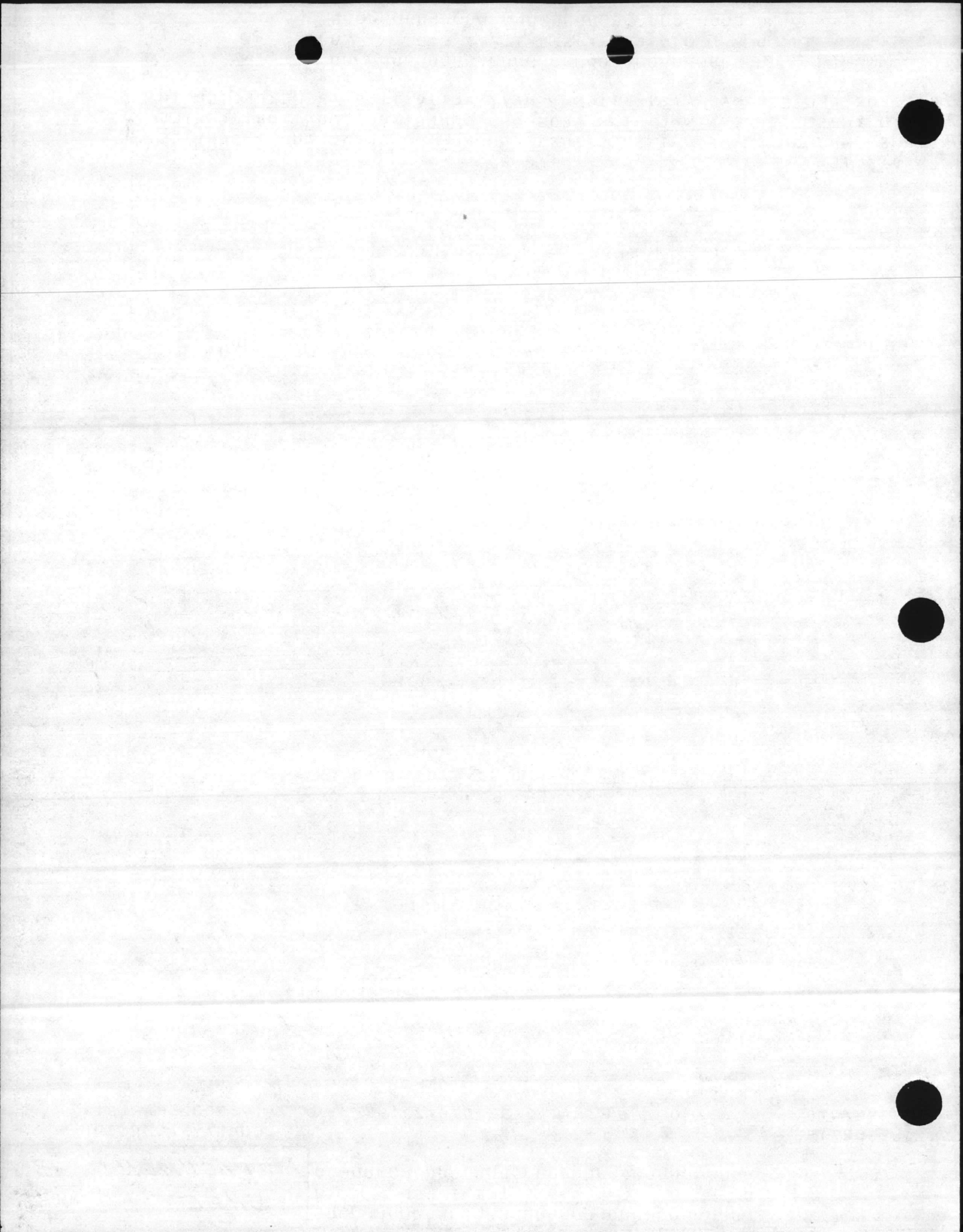
only 2 of the 9 modules reported mildew problems.  
"A" module experienced mildew on linen, clothing in lockers,  
furniture, walls, ceilings and floors. Both doors to the common  
toilet were propped open. A washer and dryer are also in  
the common toilet. The dryer is vented into a common vertical  
duct riser that also serves the dryers in the two modules  
above and is connected to a power roof ventilator. A  
cleansut is provided at the bottom of the riser. "E" module  
experienced mildew in the common toilet.









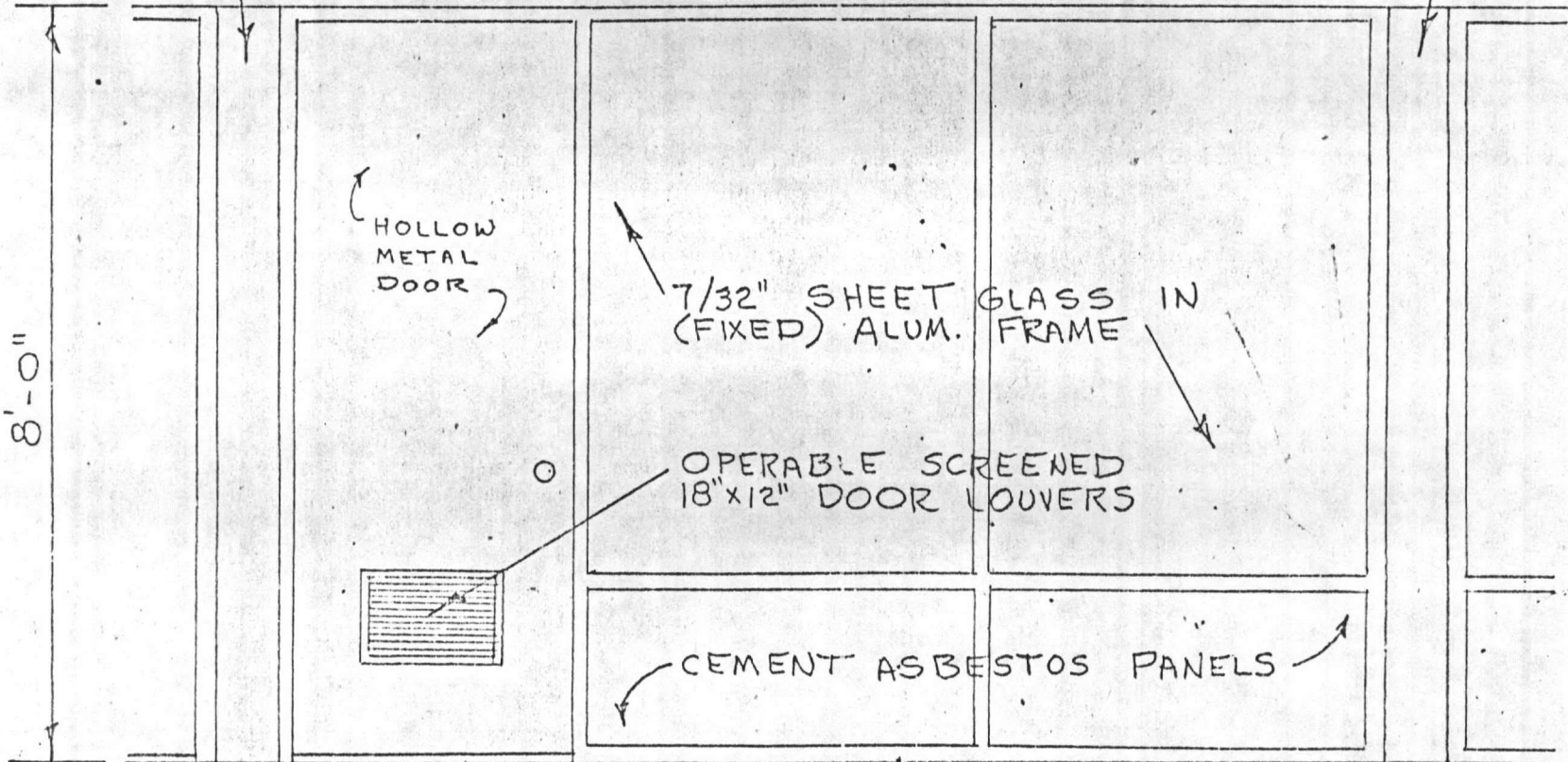




8" MASONRY  
BLOCK WALL  
BETWEEN  
SLEEPING  
ROOMS

2'-0"

8" MASONRY  
BLOCK WALL  
BETWEEN  
SLEEPING  
ROOMS



EXISTING ELEVATION OF FRONT WALL FOR  
TYPICAL SLEEPING ROOM, BLDGS. 897 & 898,  
MCB, CAMP LEJEUNE, N.C.



8" MASONRY  
BLOCK WALL  
BETWEEN  
SLEEPING  
ROOMS.

12'-0"

8" MASONRY  
BLOCK WALL  
BETWEEN  
SLEEPING  
ROOMS.

10'-8"

3' x 6'  
INSULATED  
METAL  
DOOR.

VINYL SHUTTERS

34" x 42"  
DOUBLE HUNG WINDOW  
W/ INSULATING GLASS  
(VINYL OR ALUM. CLAD.)

VINYL SIDING

PROPOSED ELEVATION OF FRONT WALL FOR  
TYPICAL SLEEPING ROOM, BLDGS. 897 & 898,  
MCB, CAMP LEJEUNE, N.C.

ATTACHMENT C  
SHEET 2 OF 2



**COST ESTIMATE**

DATE PREPARED  
**13 OCT. 1981**

SHEET

ACTIVITY AND LOCATION

**MCB, CAMP LEJEUNE, N.C.**

CONSTRUCTION CONTRACT NO.

IDENTIFICATION NUMBER

ESTIMATED BY

**MILLER, LANTON, CODE 102B2**

CATEGORY CODE NUMBER

PROJECT TITLE

**INSTALLING INSULATED GLASS & INSULATED PANELS  
IN FRONT WALLS OF SLEEPING ROOMS, BLDG. 897**

STATUS OF DESIGN

PED  30%  100%  FINAL  Other (Specify) \_\_\_\_\_

JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
<u>Installing insulating glass and insulated panels in existing aluminum frames.</u>								
1. 1" HK insulating glass w/thermal break	2040	S.F.	6.50	13,260	5.25	10,710	11.75	23,970
2. 2" HK insulated panels w/thermal break	640	S.F.	8.60	5504	3.90	2496	12.50	8,000
						Total		\$ 31,970
Estimated Project Cost						Say		32,000
Estimated Planning Cost								2,000

ATTACHMENT D SHEET 1 OF 4



COST ESTIMATE

DATE PREPARED  
13 OCT. 1981

SHEET

ACTIVITY AND LOCATION

MCB, CAMP LEJEUNE, N.C.

CONSTRUCTION CONTRACT NO.

IDENTIFICATION NUMBER

PROJECT TITLE

INSTALLING INSULATED GLASS & INSULATED PANELS  
IN FRONT WALLS OF SLEEPING ROOMS, BLDG. 898

ESTIMATED BY

MILLER, LANTOIN, CODE 102B2

CATEGORY CODE NUMBER

STATUS OF DESIGN

PED  30%  100%  FINAL  Other (Specify)

JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
<u>Installing insulating glass and insulated panels in existing aluminum frames.</u>								
1. 1" thick insulating glass w/thermal break	2550	S.F.	6.50	16,575	5.25	13,388	11.75	29,963
2. 2" thick insulated panels w/thermal break	800	S.F.	8.60	6,880	3.90	3,120	12.50	10,000
						Total		\$ 39,963
						Say		40,000
								2,500

ATTACHMENT D SHEET 2 OF 4





ACTIVITY AND LOCATION

MCB, CAMP LEJEUNE, N.C.

CONSTRUCTION CONTRACT NO.

IDENTIFICATION NUMBER

ESTIMATED BY

MILLER, LANTON, CODE 102B2

CATEGORY CODE NUMBER

PROJECT TITLE

MODIFICATION TO FRONT WINDOW WALLS OF  
SLEEPING ROOMS, BLDG. 897

STATUS OF DESIGN

PED  20%  100%  FINAL  Other (Specify)

JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
<u>Remove existing window wall &amp; construct stud wall with window &amp; door</u>								
1. Removal of existing window walls & doors	3840	S.F.			1.10	4,224		4,224
2. 2x4 wood stud wall w/3/2" fiberglass insulation, 5/8" thk. sheetrock w/vinyl covering on interior, sheathing & vinyl siding exterior.	3840	S.F.	1.97	7,565	2.04	7,833	4.01	15,398
3. Double hung window w/insulating glass, vinyl or aluminum cladding.	40	ea.	118.00	4,720	42.00	1,680	160.00	6,400
4. Insulated metal door w/frame, hardware & weatherstripping	40	ea.	194.00	7,760	68.00	2,720	262.00	10,480
5. Window shutters	40	pr.	21.50	860	12.25	490	33.75	1,350
						Total		\$ 37,852
Estimated Project Cost						Say		38,000
Estimated Planning Cost								2,500

ATTACHMENT D  
SHEET 3 OF 4



COST ESTIMATE

DATE PREPARED  
13 OCT. 1981

SHEET

ACTIVITY AND LOCATION

MCB, CAMP LEJEUNE, N.C.

CONSTRUCTION CONTRACT NO.

IDENTIFICATION NUMBER

ESTIMATED BY

MILLER, LANTON, CODE 102B2

CATEGORY CODE NUMBER

PROJECT TITLE

MODIFICATION TO FRONT WINDOW WALLS OF  
SLEEPING ROOMS, BLDG. 898

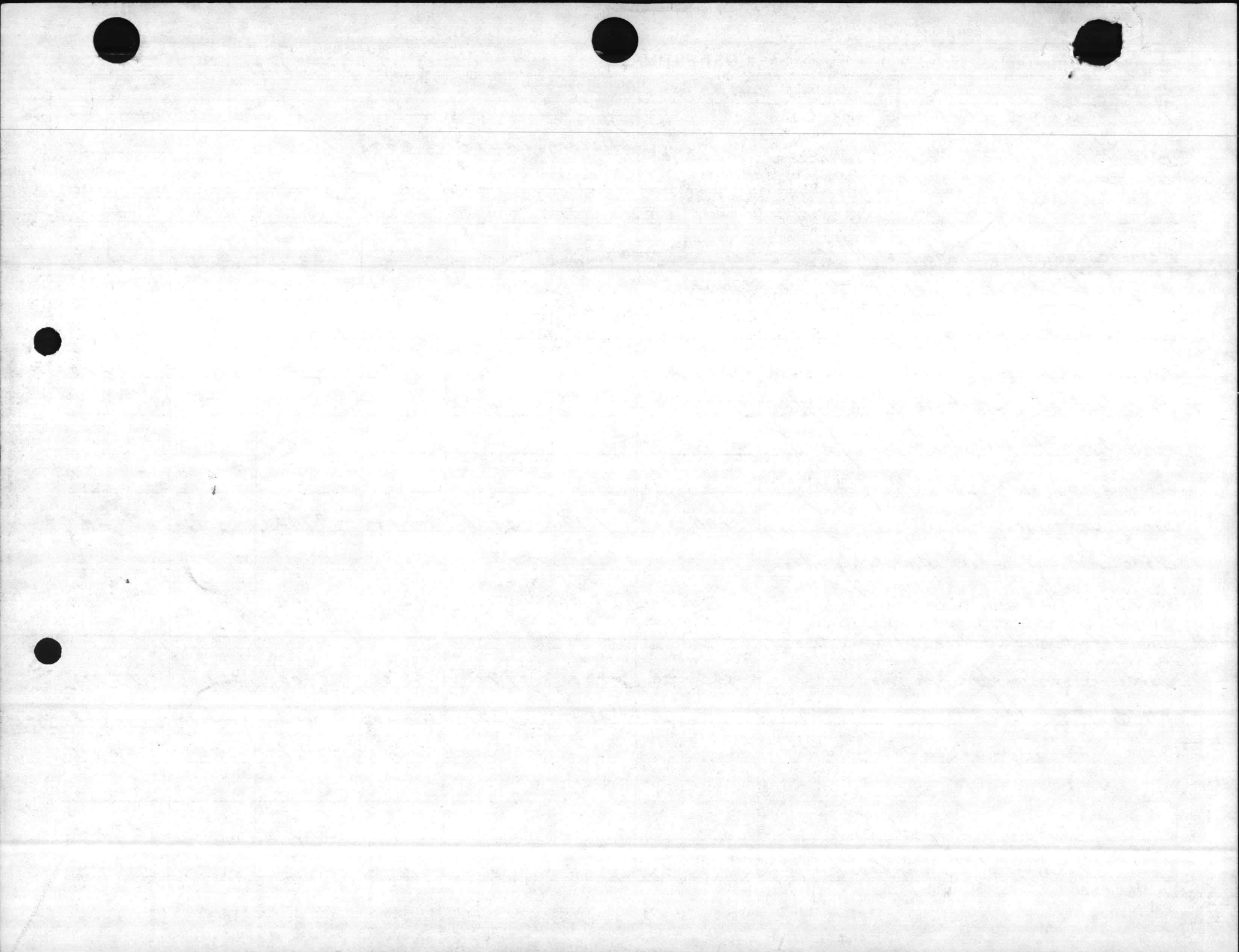
STATUS OF DESIGN

PED  30%  100%  FINAL  Other (Specify)

JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
<u>Remove existing window wall &amp; construct stud wall with window &amp; door</u>								
1. Removal of existing window walls & doors	4800	S.F.			1.10	5,280	1.10	5,280
2. 2x4 wood stud wall w/ 3 1/2" fiberglass insulation, 5/8" thick sheetrock w/ vinyl covering on interior, sheathing & vinyl siding exterior.	4800	S.F.	1.97	9,456	2.04	9,792	4.01	19,248
3. Double hung window w/ insulating glass, vinyl or aluminum cladding	50	ea.	118.00	5,900	42.00	2,100	160.00	8,000
4. Insulated metal door w/ frame, hardware & weatherstripping.	50	ea.	194.00	9,700	68.00	3,400	262.00	13,100
5. Window shutters	50	pr.	21.50	1,075	12.25	613	33.75	1,688
						Total		\$47,316
Estimated Project Cost						Say		47,500
Estimated Planning Cost								3,000

ATTACHMENT D  
SHEET 4 OF 4

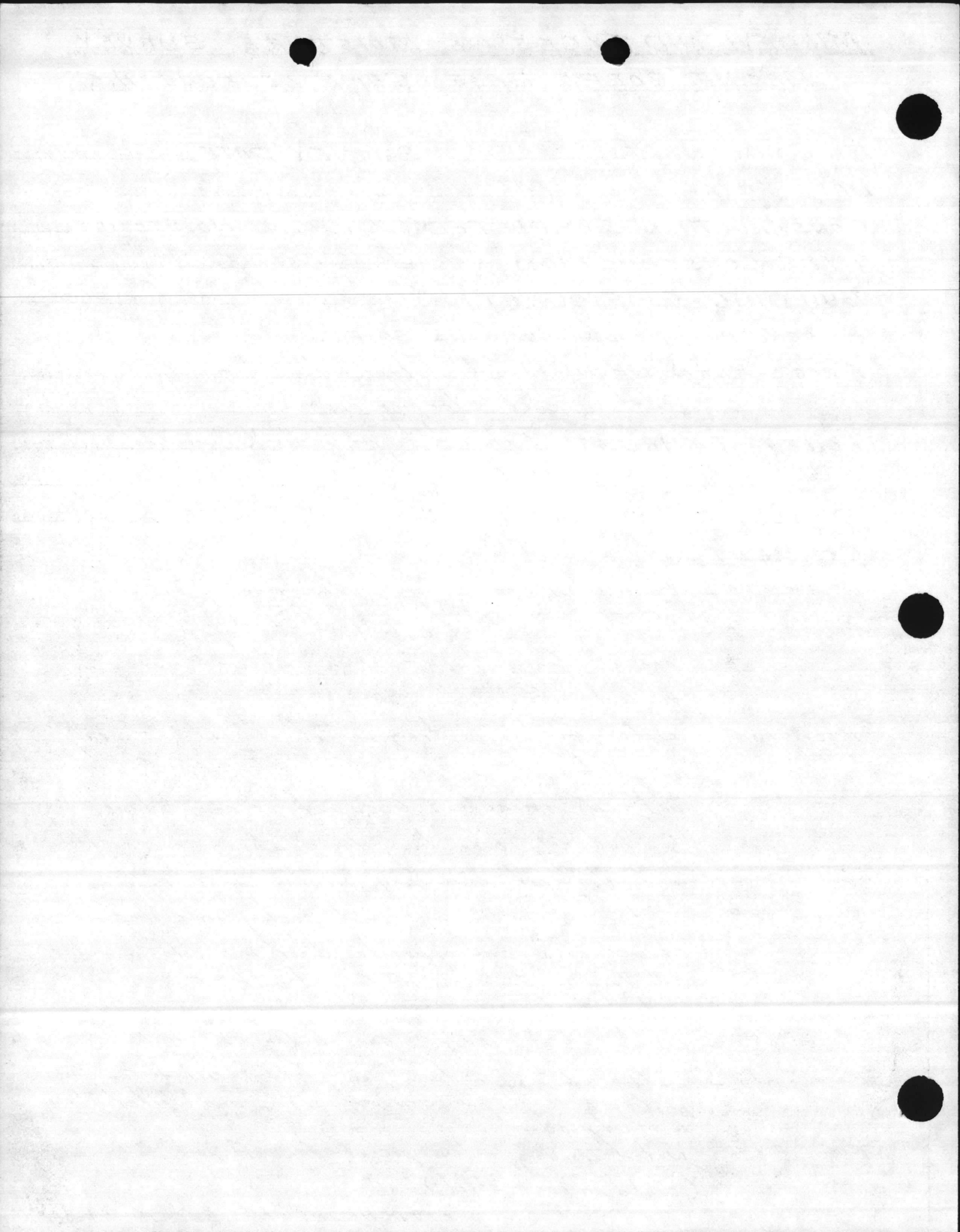


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. AS-4020 SURVEY DATE 7 Aug. 81  
BASE AREA AIR STATION  
CONSTRUCTION COMPLETED 1975 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Central section and four wings.  
FLOOR AREA 69,012 SQ. FT.  
FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust register discharges into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 148

COMMENTS:

- Room 125 - Evidence of mildew and paint peeling on ceiling of shower in toilet. Water standing in drain pan of fan coil unit. Fan coil unit was turned off.
- Room 135 - Water standing in drain pan of fan coil unit. Only low position of 3 speed fan switch for fan coil unit was operable. Occupant of room advised he had only been living there about one month and did not have any problem with mildew.
- Room 139 - Evidence of mildew and paint peeling on ceiling in shower area and opposite door in toilet. Water standing in drain pan of fan coil unit. Fan coil unit was turned off.
- Room 157 - Water standing in drain pan of fan coil unit.
- Room 217 - Water standing in drain pan of fan coil unit. Paint peeling on ceiling in shower area and toilet has a musty odor.
- Room 234 - Water standing in drain pan of fan coil unit.  
(cont'd on next sheet)



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. AS-4020 (Cont'd) SURVEY DATE \_\_\_\_\_

BASE AREA \_\_\_\_\_

CONSTRUCTION COMPLETED \_\_\_\_\_ NO. STORIES \_\_\_\_\_

TYPE CONSTRUCTION \_\_\_\_\_

BUILDING CONFIGURATION \_\_\_\_\_

FLOOR AREA \_\_\_\_\_ SQ. FT.

FLOOR PLAN DESIGN \_\_\_\_\_

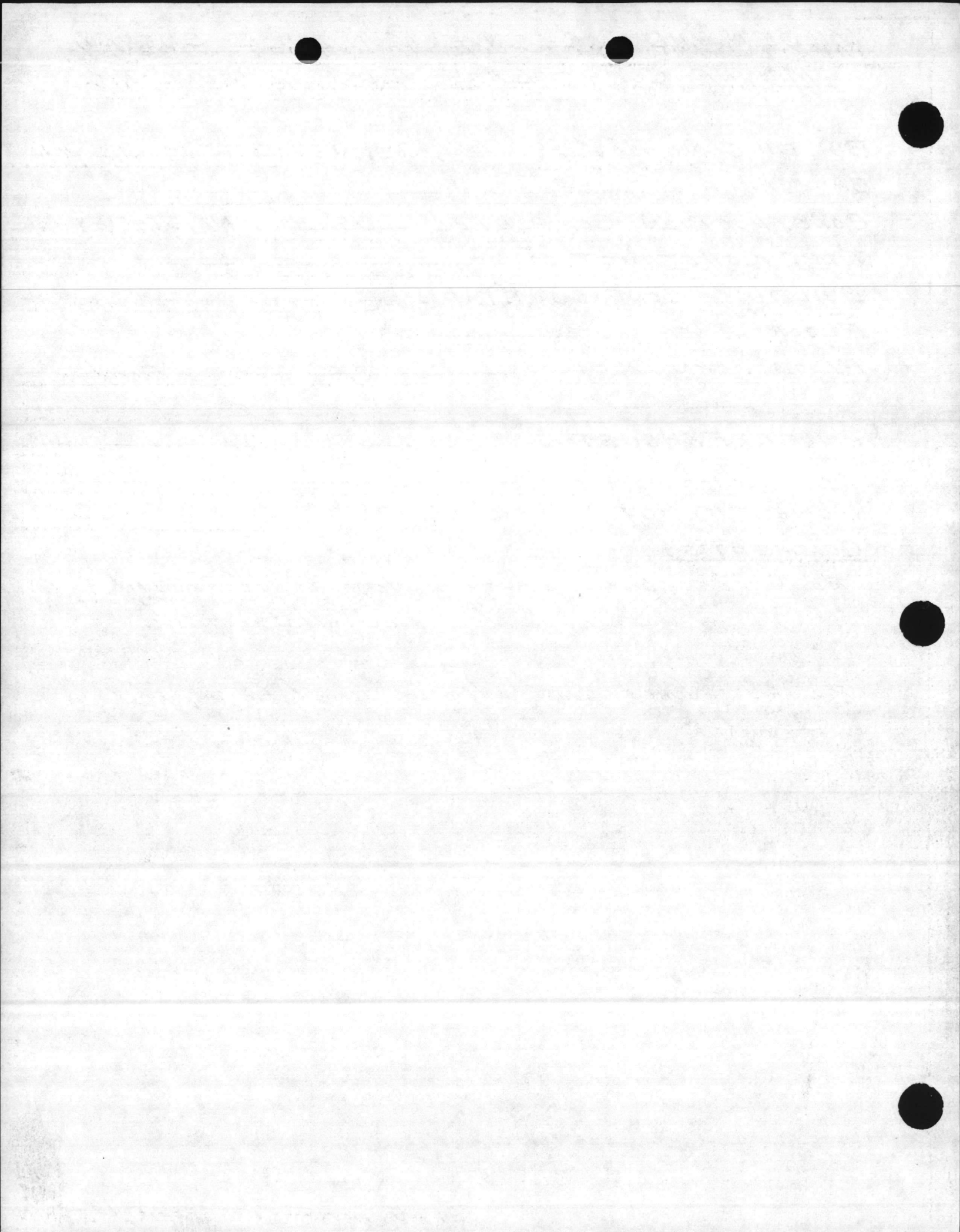
TOILET EXHAUST \_\_\_\_\_

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

Room 255 - Water standing in drain pan of fan coil unit. Evidence of some mildew in toilet.

Personnel advised rooms had been cleaned for inspection last night.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. AS-4025 SURVEY DATE 7 Aug. 81

BASE AREA AIR STATION

CONSTRUCTION COMPLETED 1975 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION central section and four wings

FLOOR AREA 65,200 SQ. FT.

FLOOR PLAN DESIGN motel type with exterior corridors.

Toilet in each sleeping room.

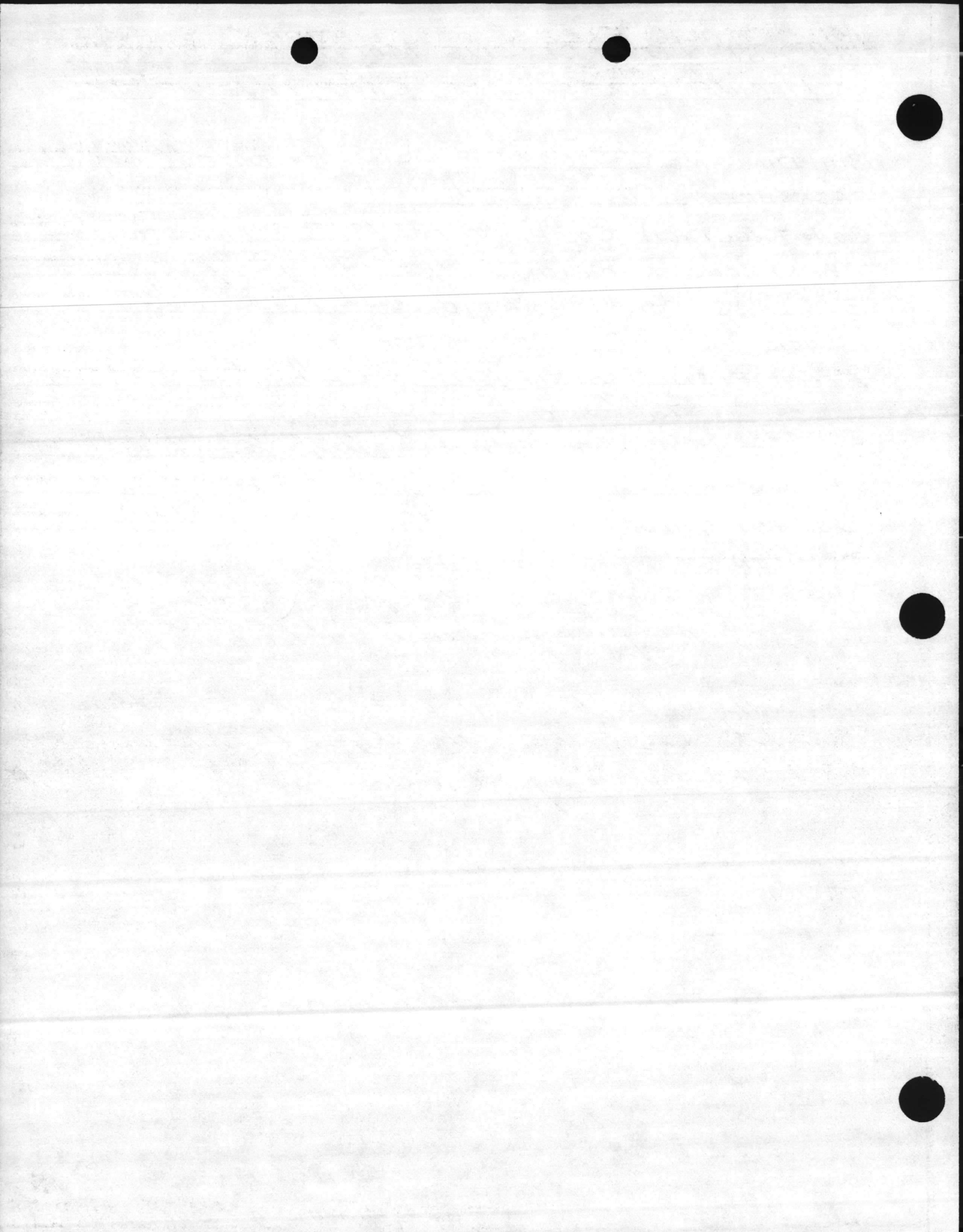
TOILET EXHAUST Exhaust register discharges into a  
common duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) Unable to check

COMMENTS:

Room 129 - Water standing in drain pan of fan coil unit. Paint peeling in shower area of toilet.

This building similar to AS-4020. Personnel advised they were having some problems with mildew in the toilet areas but not in the sleeping and locker areas.

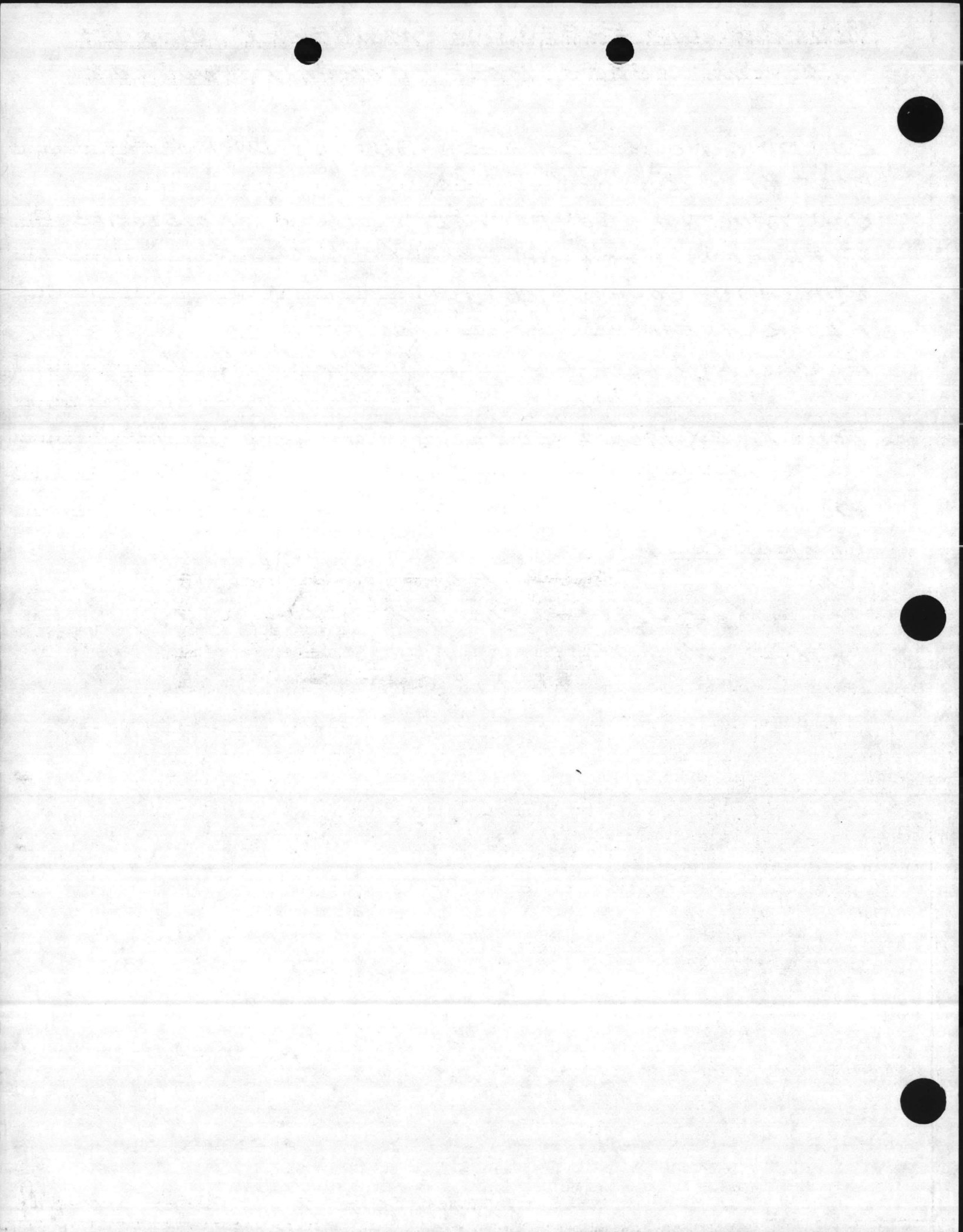


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-304 SURVEY DATE 6 Aug. 81  
BASE AREA FRENCH CREEK  
CONSTRUCTION COMPLETED 1968 NO. STORIES 2  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "L" shape  
FLOOR AREA 33,163 SQ. FT.  
FLOOR PLAN DESIGN Dormitory type with interior  
Corridors. Common toilets (sleeping rooms do not have toilets)  
TOILET EXHAUST Exhaust registers discharge into a  
common duct which is connected to a roof fan  
DOMESTIC HOT WATER TEMP. (°F) 130

COMMENTS:

This building is similar to buildings FC-305, FC-306, FC-309,  
FC-310, & FC-311. The building has not reported any  
problems with mildew.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-305 SURVEY DATE 6 Aug. 81  
BASE AREA FRENCH CREEK  
CONSTRUCTION COMPLETED 1970 NO. STORIES 2  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "L" shape  
FLOOR AREA 33,163 SQ. FT.  
FLOOR PLAN DESIGN Dormitory type with interior corridors.  
Common toilets (sleeping rooms do not have toilets)  
TOILET EXHAUST Exhaust registers discharging into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 135

COMMENTS:

Evidence of mildew in common toilets only. None in sleeping rooms.

Exhaust systems for the common toilets are connected to four (4) roof fans. one (1) fan was not working.

This building is similar to buildings FC-304, FC-306, FC-309, FC-310 & FC-311.

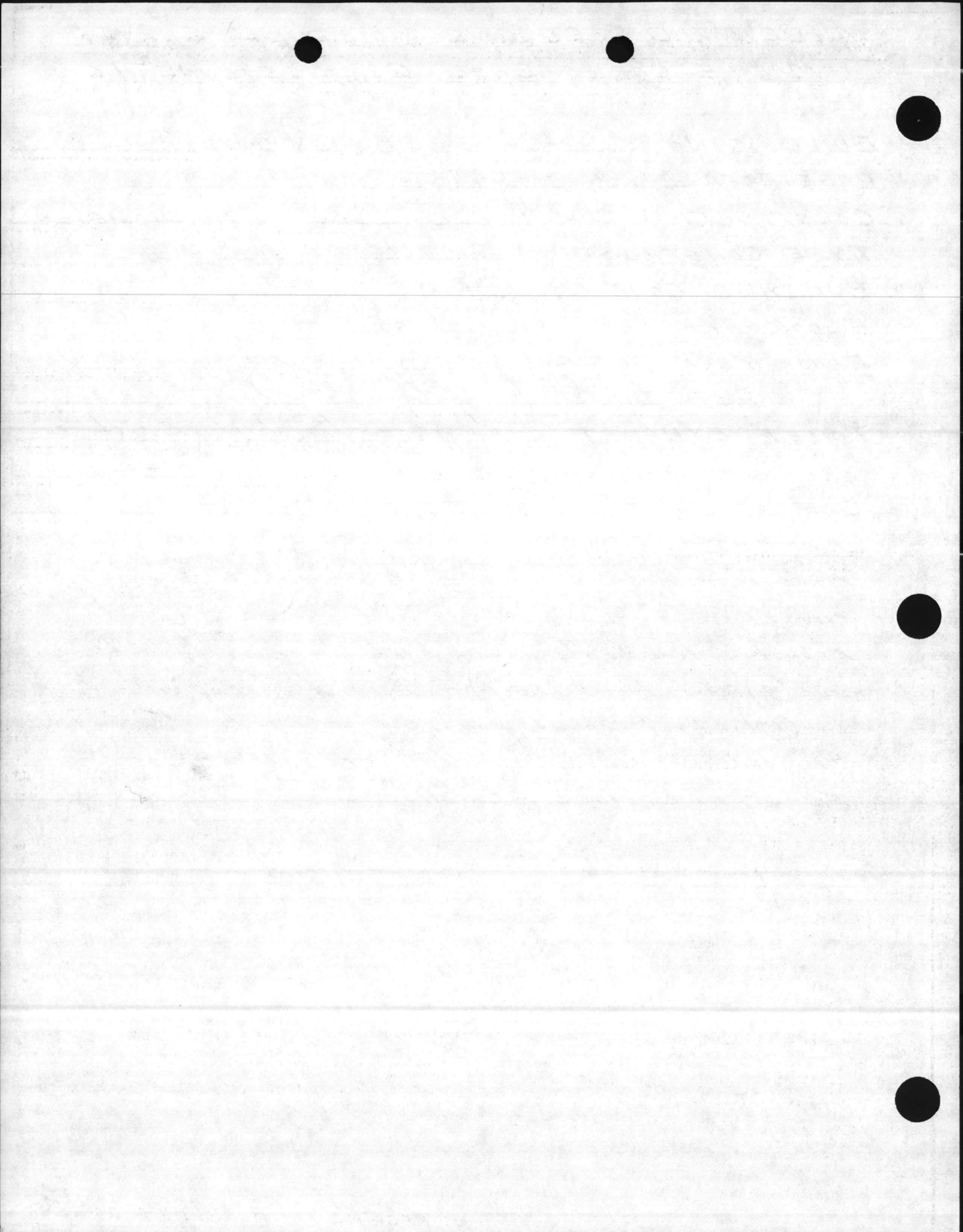


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-306 SURVEY DATE 6 Aug. 81  
BASE AREA FRENCH CREEK  
CONSTRUCTION COMPLETED 1970 NO. STORIES 2  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "L" shape  
FLOOR AREA 33,163 SQ. FT.  
FLOOR PLAN DESIGN Dormitory type with interior corridors.  
Common toilets (sleeping rooms do not have toilets)  
TOILET EXHAUST Exhaust registers discharge into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 142

COMMENTS:

Evidence of mildew in common toilets only. None in sleeping rooms.  
Exhaust systems for the common toilets are connected to four (4) roof fans. One (1) fan was not working and one (1) was not operating properly.  
This building is similar to buildings FC-304, FC-305, FC-309, FC-310 & FC-311.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-309 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1968 NO. STORIES 2

TYPE CONSTRUCTION Concrete & Masonry

BUILDING CONFIGURATION "L" shape

FLOOR AREA 33,163 SQ. FT.

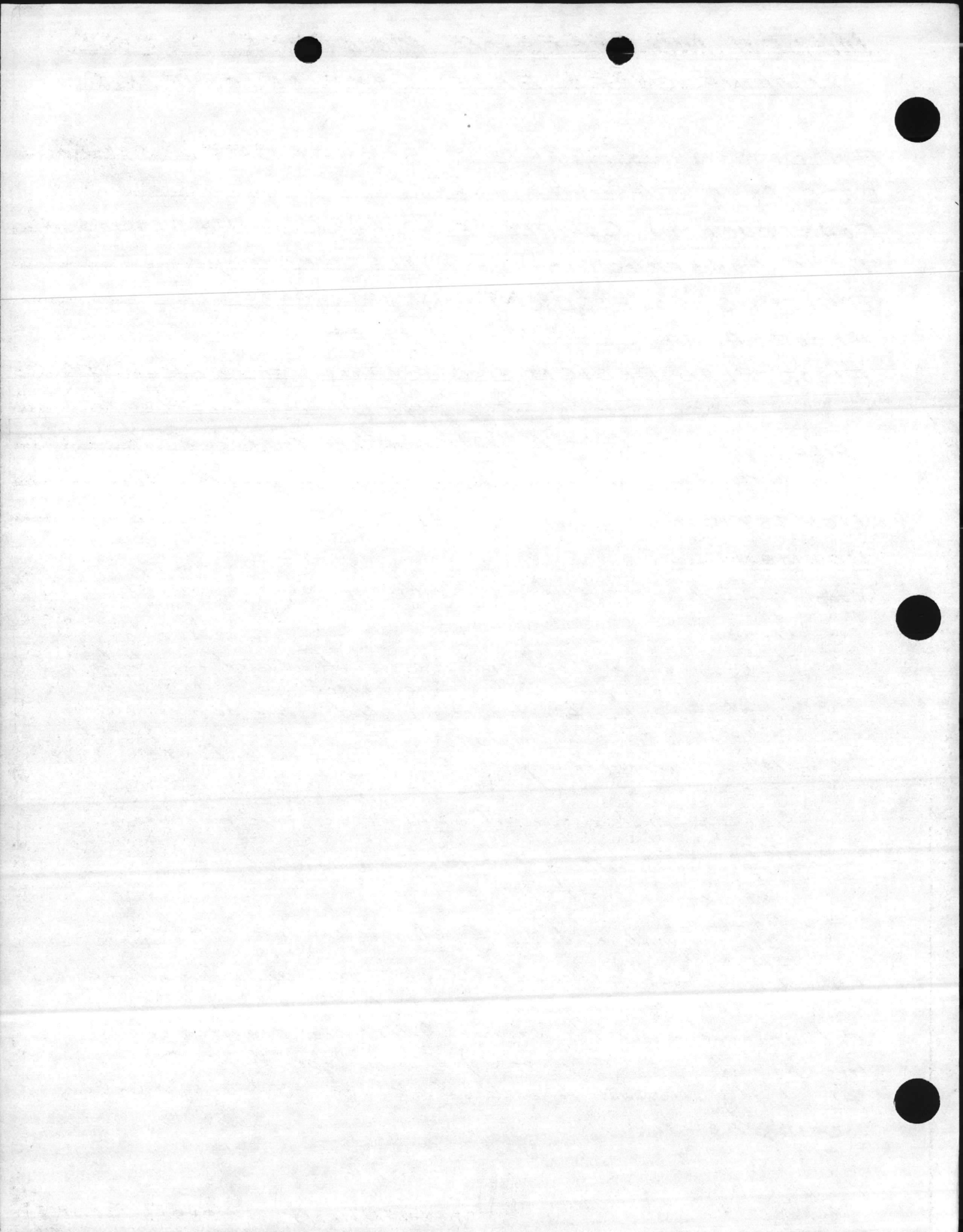
FLOOR PLAN DESIGN Dormitory type with interior corridors.  
Common toilets (sleeping rooms do not have toilets)

TOILET EXHAUST Exhaust registers discharge into a  
common duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) 137

COMMENTS:

- Room 102 - No visible evidence of mildew or excessive moisture.  
" 103 - " " " " " " " " " " " "  
" 104 - " " " " " " " " " " " "  
" 105 - " " " " " " " " " " " "  
" 106 - Fan coil unit not cooling. Occupant advised has had  
problem in past with drain pan overflowing in fan coil unit.  
" 107 - Fan coil unit not operating. Water has been overflowing  
from drain pan in unit.  
" 109 - Water overflowing from drain pan in fan coil unit.  
" 122 - " " " " " " " " " " " "  
" 126 - No visible evidence of mildew or excessive moisture.  
" 127 - " " " " " " " " " " " "  
" 128 - Water overflowing from drain pan in fan coil unit.  
" 134 - Janitor's closet  
" 144 - " " " " " " " " " " " "  
" 151 - No visible evidence of mildew or excessive moisture.  
" 215 - " " " " " " " " " " " "  
Rooms 216 thru 220, 244, 244A & 244B - These rooms were not identified.  
Evidence of mildew in common toilets.  
Exhaust systems for the common toilets are connected to  
four (4) roof fans. Only one (1) fan was operating.  
This building is similar to buildings FC-304, FC-305, FC-306,  
FC-310, FC-311.

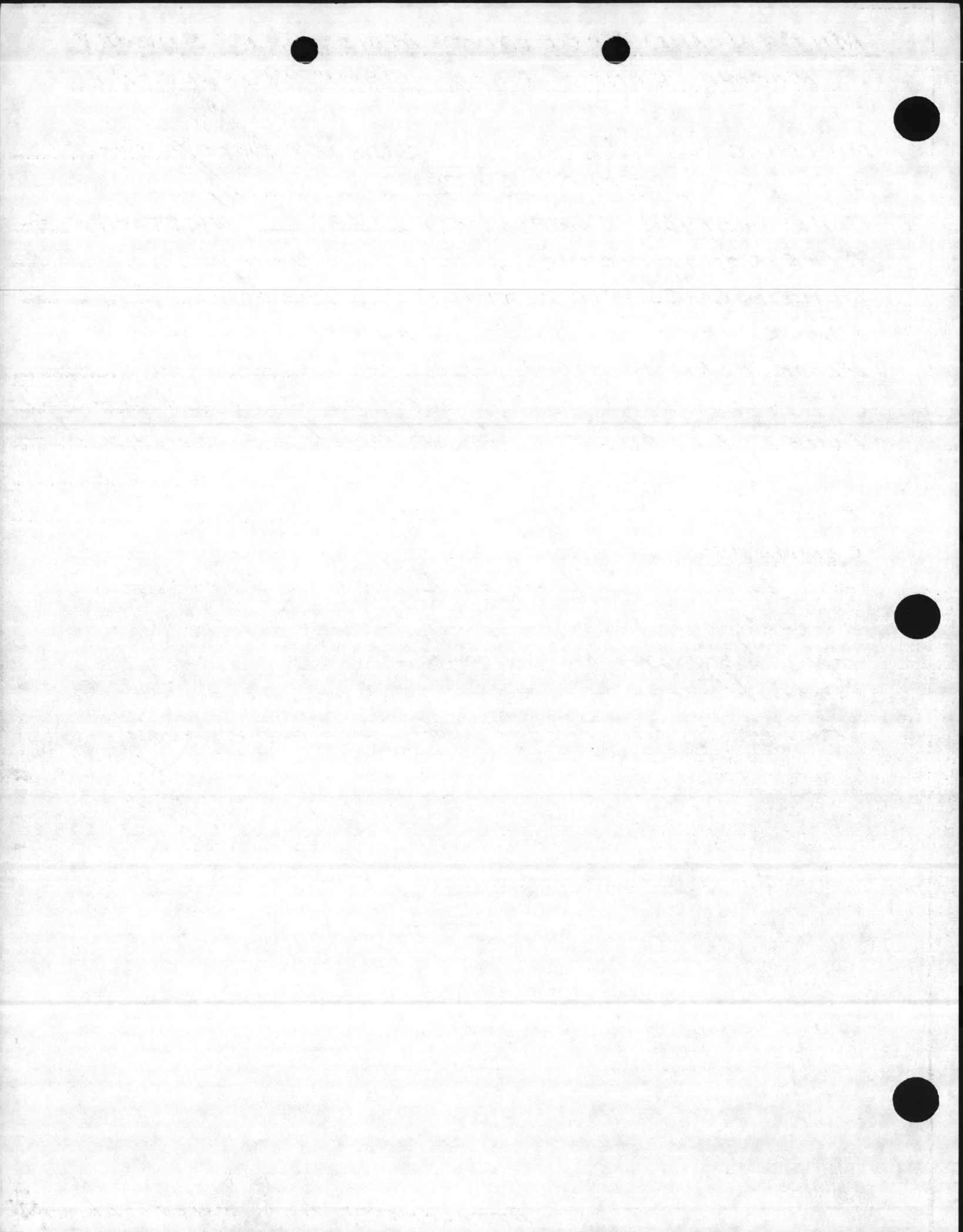


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-310 SURVEY DATE 6 Aug. 81  
BASE AREA FRENCH CREEK  
CONSTRUCTION COMPLETED 1968 NO. STORIES 2  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION "L" shape  
FLOOR AREA 33,163 SQ. FT.  
FLOOR PLAN DESIGN Dormitory type with interior corridors.  
Common toilets (sleeping rooms do not have toilets)  
TOILET EXHAUST Exhaust registers discharging into a  
common duct which is connected to a roof fan.  
DOMESTIC HOT WATER TEMP. (°F) 131

COMMENTS:

This building is similar to buildings FC-304, FC-305, FC-306, FC-309, & FC-311. The building has not reported any problems with mildew. Exhaust systems for the common toilets are connected to four (4) roof fans. All fans were operating properly.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-311 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1968 NO. STORIES 2

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION "L" shape

FLOOR AREA 33,163 SQ. FT.

FLOOR PLAN DESIGN Dormitory type with interior  
corridors. Common toilets (sleeping rooms do not have toilets)

TOILET EXHAUST Exhaust registers discharging into a  
common duct which is connected to a roof fan.

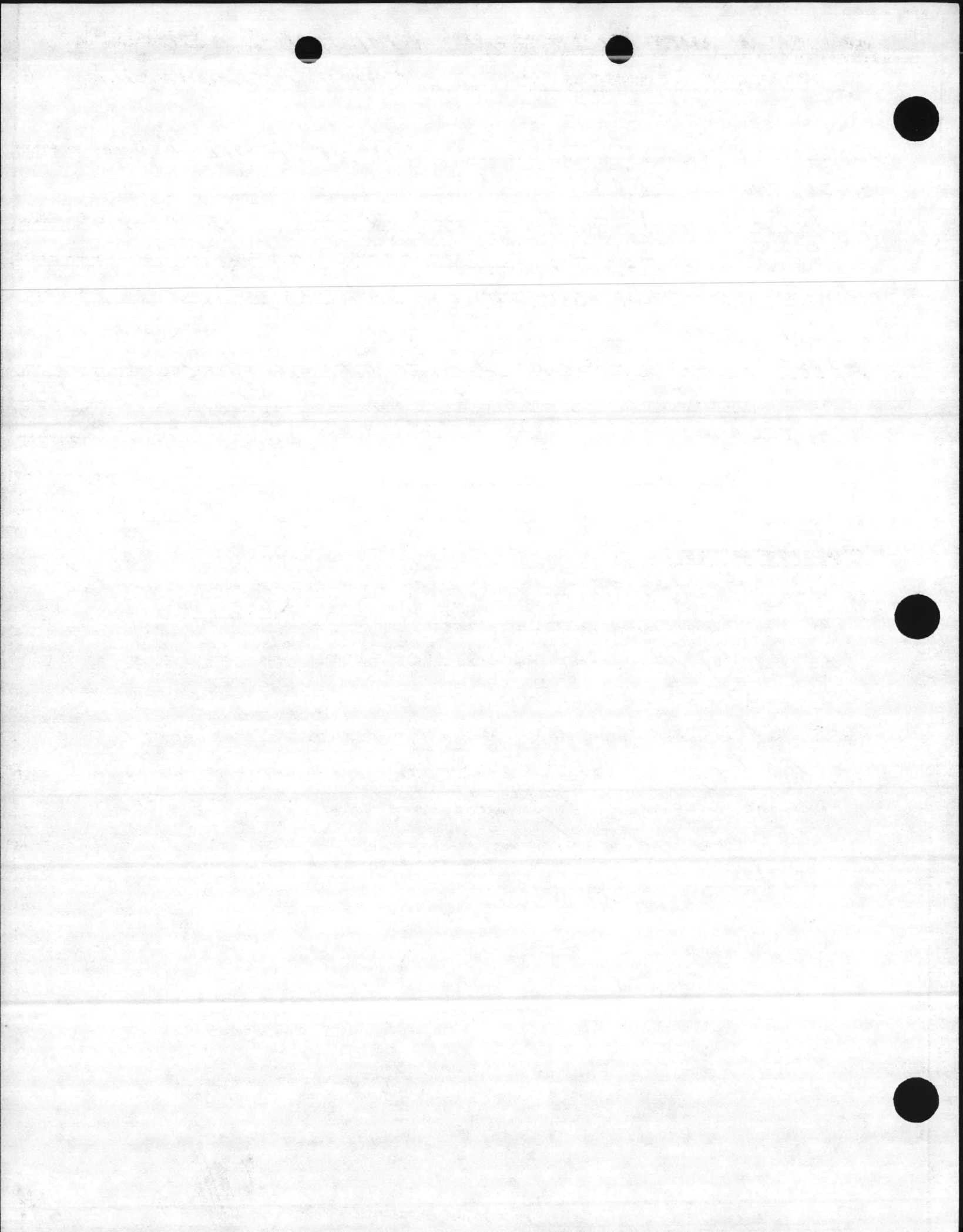
DOMESTIC HOT WATER TEMP. (°F) 133

COMMENTS:

Rooms 117, 142, 145A, 145B, 218, 244A and 244B - These  
rooms were not identified.

This building is similar to buildings FC-304, FC-305,  
FC-306, FC-309, & FC-310.

Exhaust systems for the common toilets are connected  
to four (4) roof fans. One (1) fan was not operating.  
Personnel advised they were not having any problems  
with mildew and excessive moisture in the sleeping  
rooms.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-414 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1975 NO. STORIES 2

TYPE CONSTRUCTION Concrete & Masonry

BUILDING CONFIGURATION 4 sections with a courtyard

FLOOR AREA 38,983 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharges into a  
common duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) 132

COMMENTS:

Room B110 - No visible evidence of mildew or excessive moisture.

" B108 - some mildew on ceiling in shower area of toilet.

" B112 - " " " " " " " " " " " "

" B212 - No visible evidence of mildew or excessive moisture.

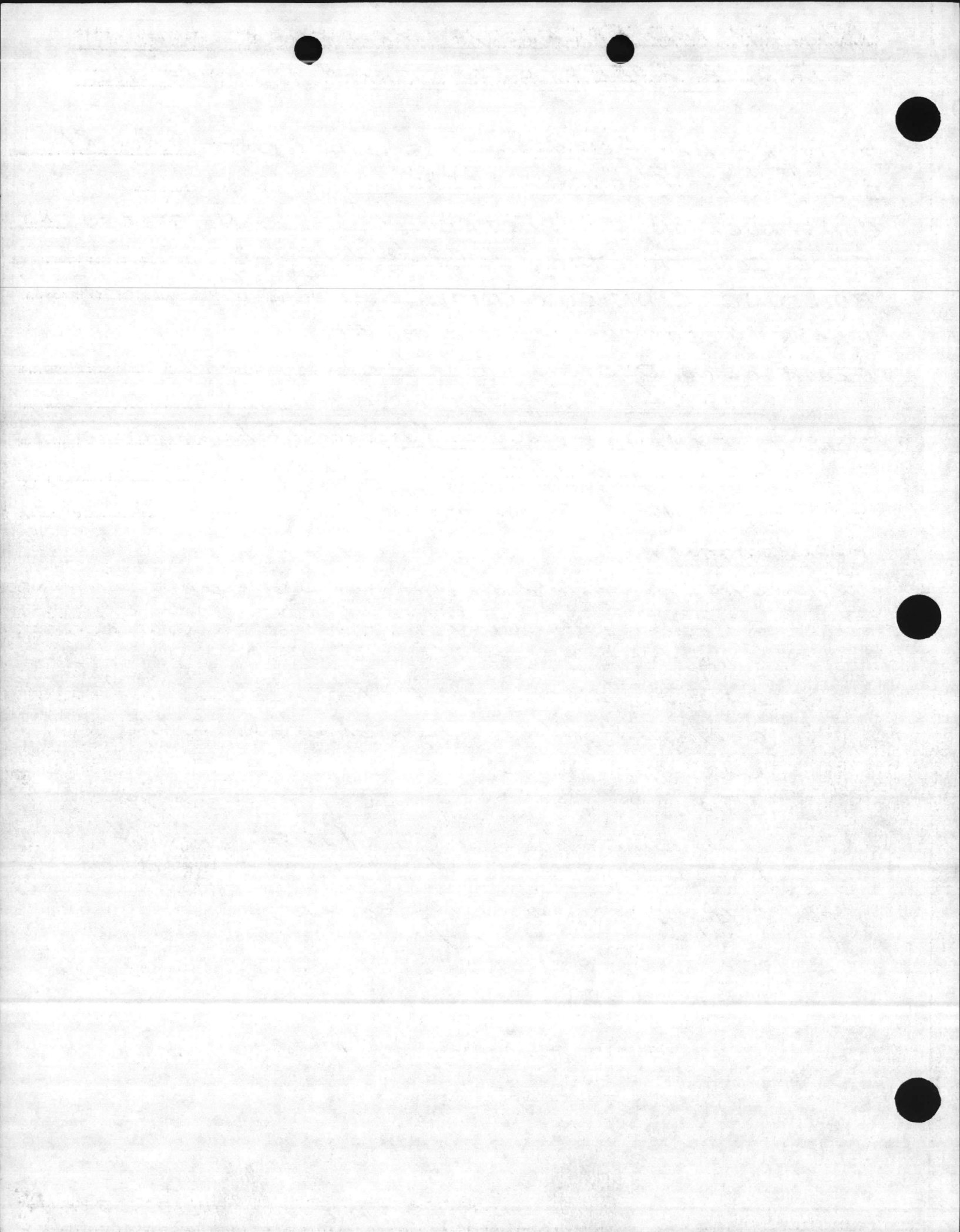
" C107 - Paint peeling on ceiling in shower area of toilet.

" C109 - " " " " " " " " " " " "

" C112 - " " " " " " " " " " " "

" D205 - some mildew on ceiling in shower area of toilet.

This building is similar to building FC-415.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-415 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1976 NO. STORIES 2

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION 4 sections with a courtyard.

FLOOR AREA 37,849 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharging into a  
common duct which is connected to a roof fan.

DOMESTIC HOT WATER TEMP. (°F) 135

COMMENTS:

Room B 106 - minor mildew in toilet.

" B 112 - " " " "

" C 201 - No visible evidence of mildew or excessive moisture.  
Fan coil unit not cooling.

" C 209 - No visible evidence of mildew or excessive moisture

" C 211 - Unoccupied but no evidence of mildew or  
excessive moisture.

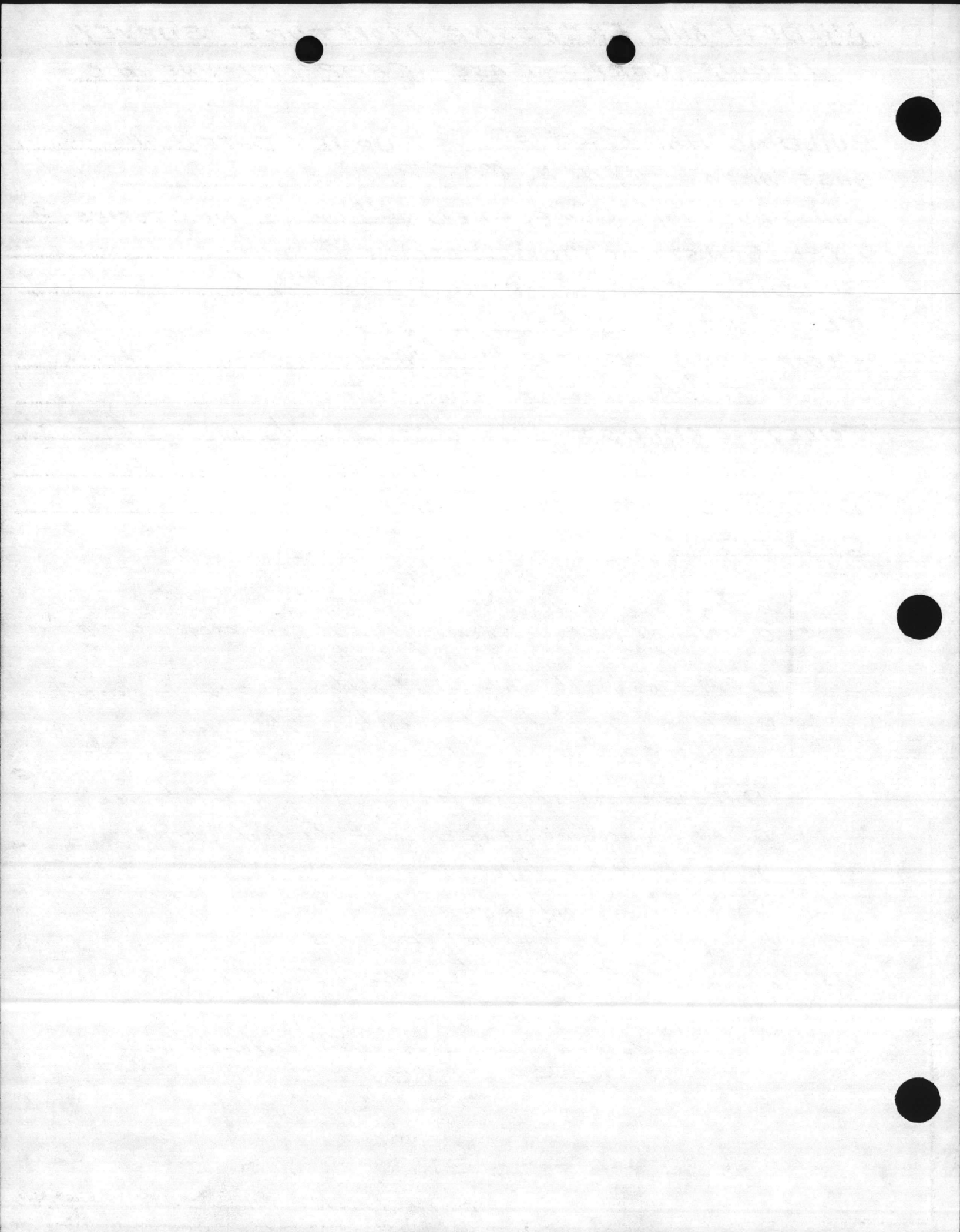
" D 103 - Considerable mildew on ceiling in toilet area.

" D 109 - Unoccupied. Fan coil unit not cooling. minor  
mildew in toilet.

" D 206 - minor mildew in toilet

This building is similar to building FC-414.

Laundry Rooms on 1<sup>st</sup> & 2<sup>nd</sup> floors - chilled water flowing through  
pipe and coils (for heating only) resulting in  
extensive condensation with water dripping  
on equipment and floors.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-515 SURVEY DATE No physical survey

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1979 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 43,220 SQ. FT.

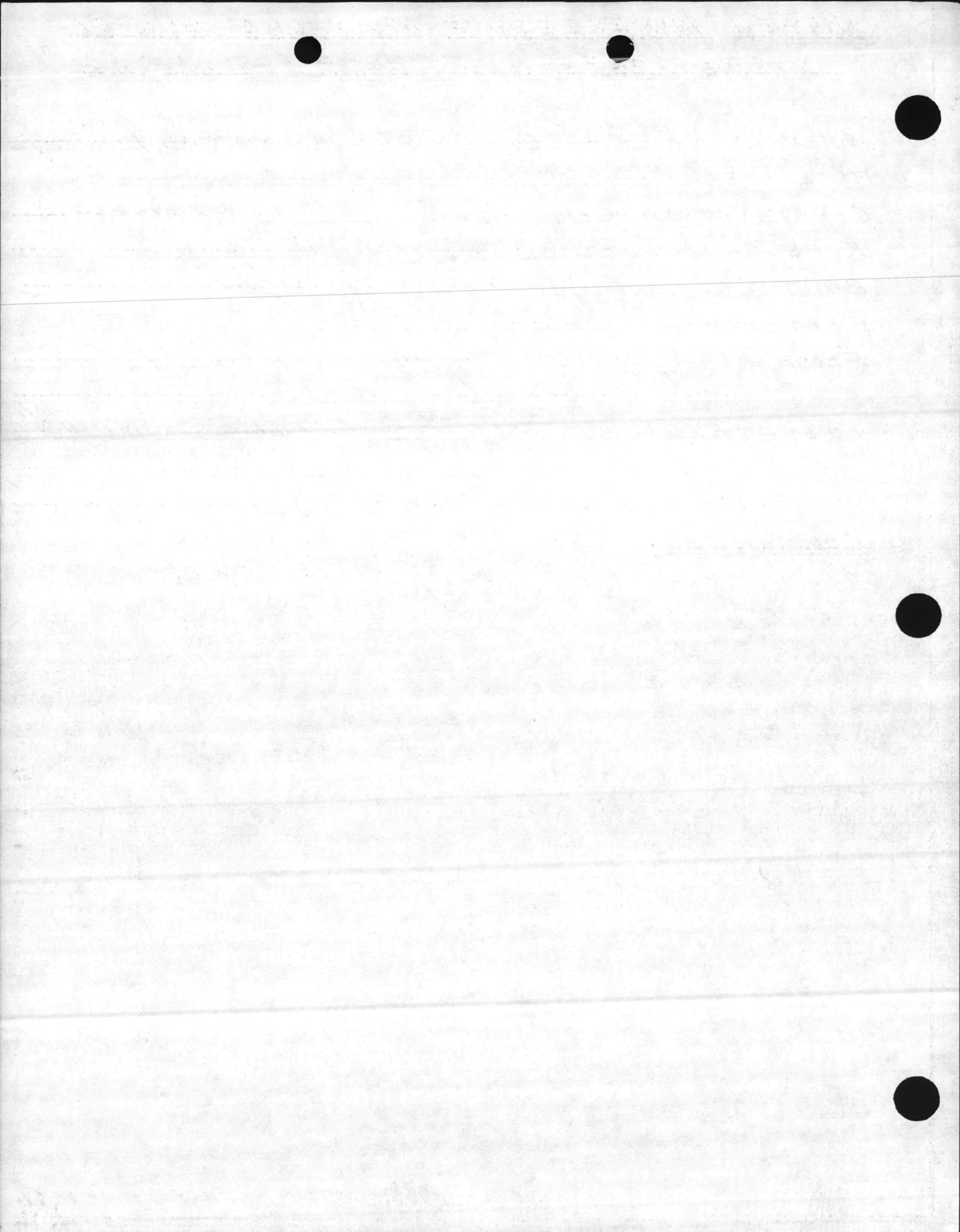
FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch.

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

This building is similar to buildings FC-550, HP-165,  
HP-185, HP-195, & HP-550



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-520 SURVEY DATE No physical survey  
BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1978 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 42,976 SQ. FT.

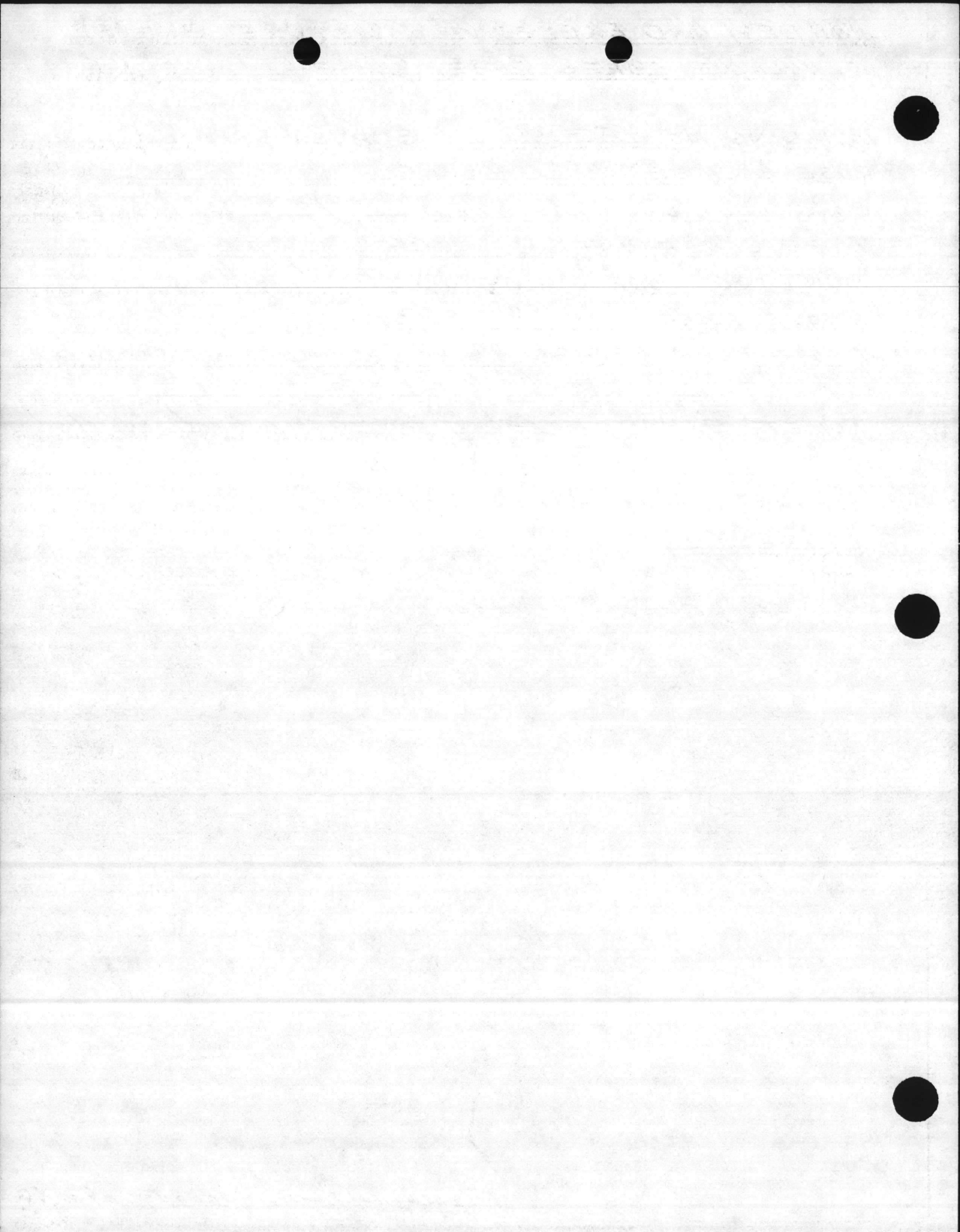
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet controlled  
by light switch.

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

This building is similar to buildings FC-525, FC-530,  
FC-555, FC-560 & HP-560.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-525 SURVEY DATE No. physical survey

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1978 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 42,976 SQ. FT.

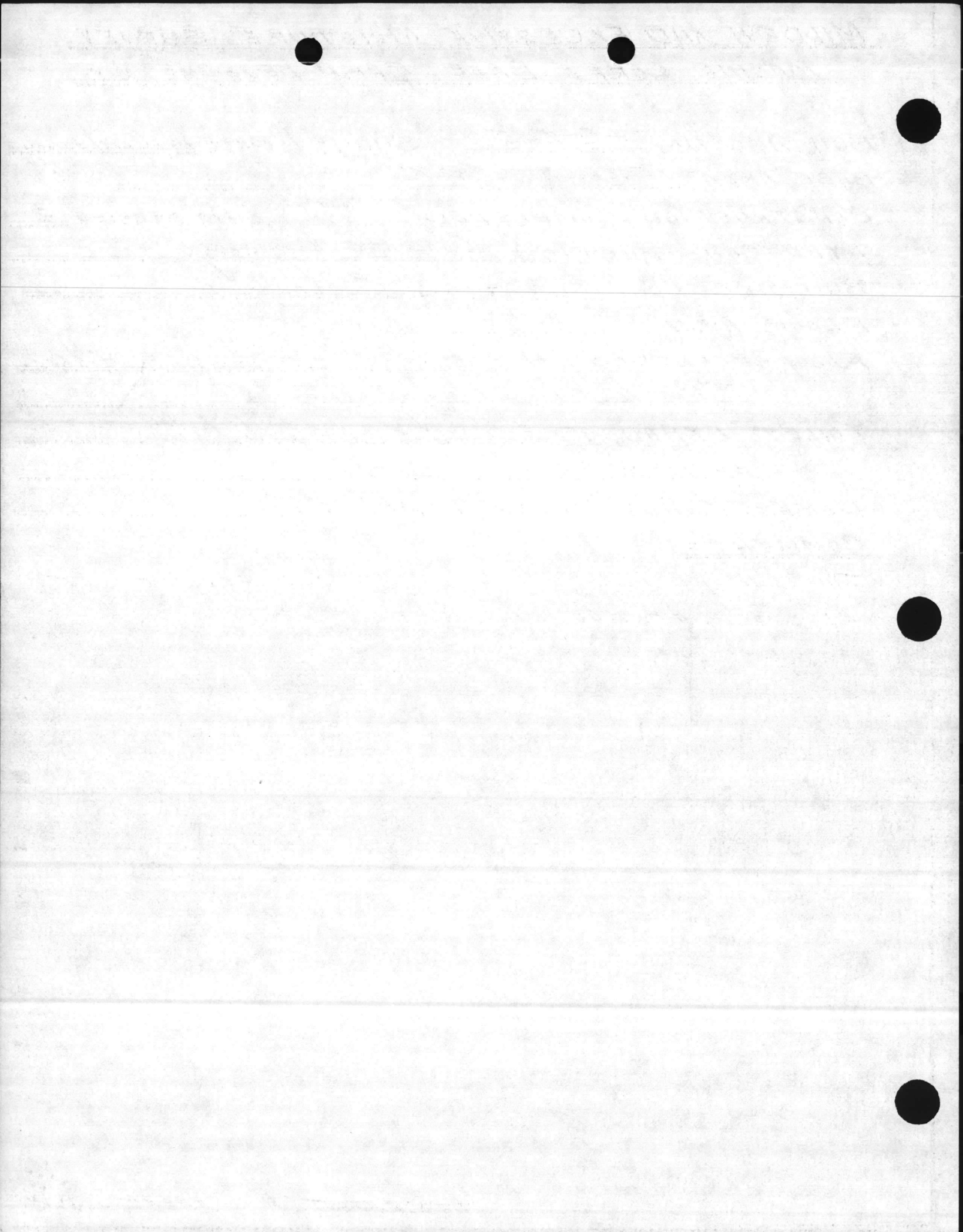
FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet  
Controlled by light switch.

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

This building is similar to buildings FC-520, FC-530, FC-555,  
FC-560 & HP-560.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-530 SURVEY DATE No physical survey

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1978 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 42,976 SQ. FT.

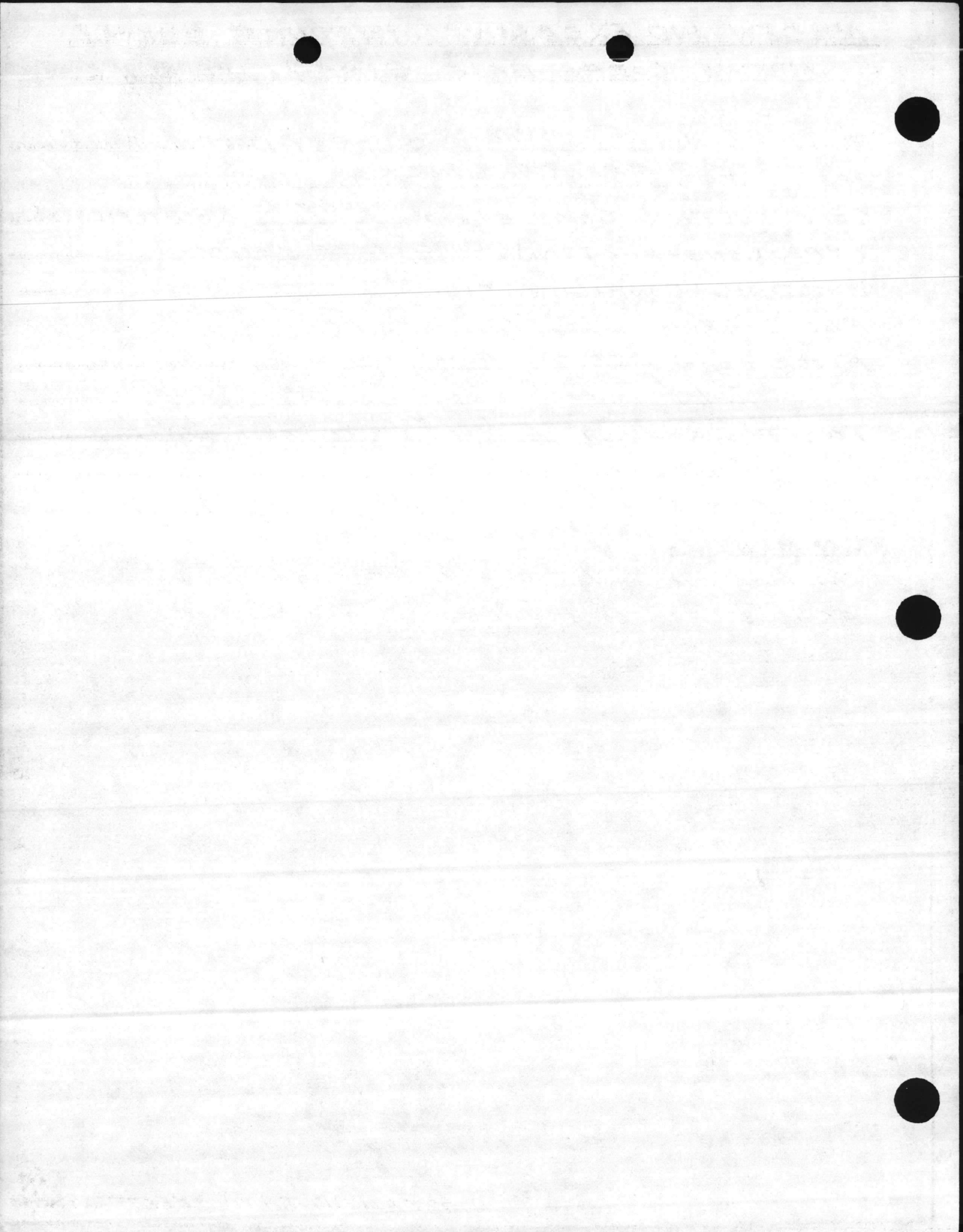
FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet  
Controlled by light switch.

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

This building is similar to buildings FC-520, FC-525,  
FC-555, FC-560 & HP-560.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-550 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1979 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 43,220 SQ. FT.

FLOOR PLAN DESIGN motel type with exterior  
corridors. Toilet in each sleeping room.

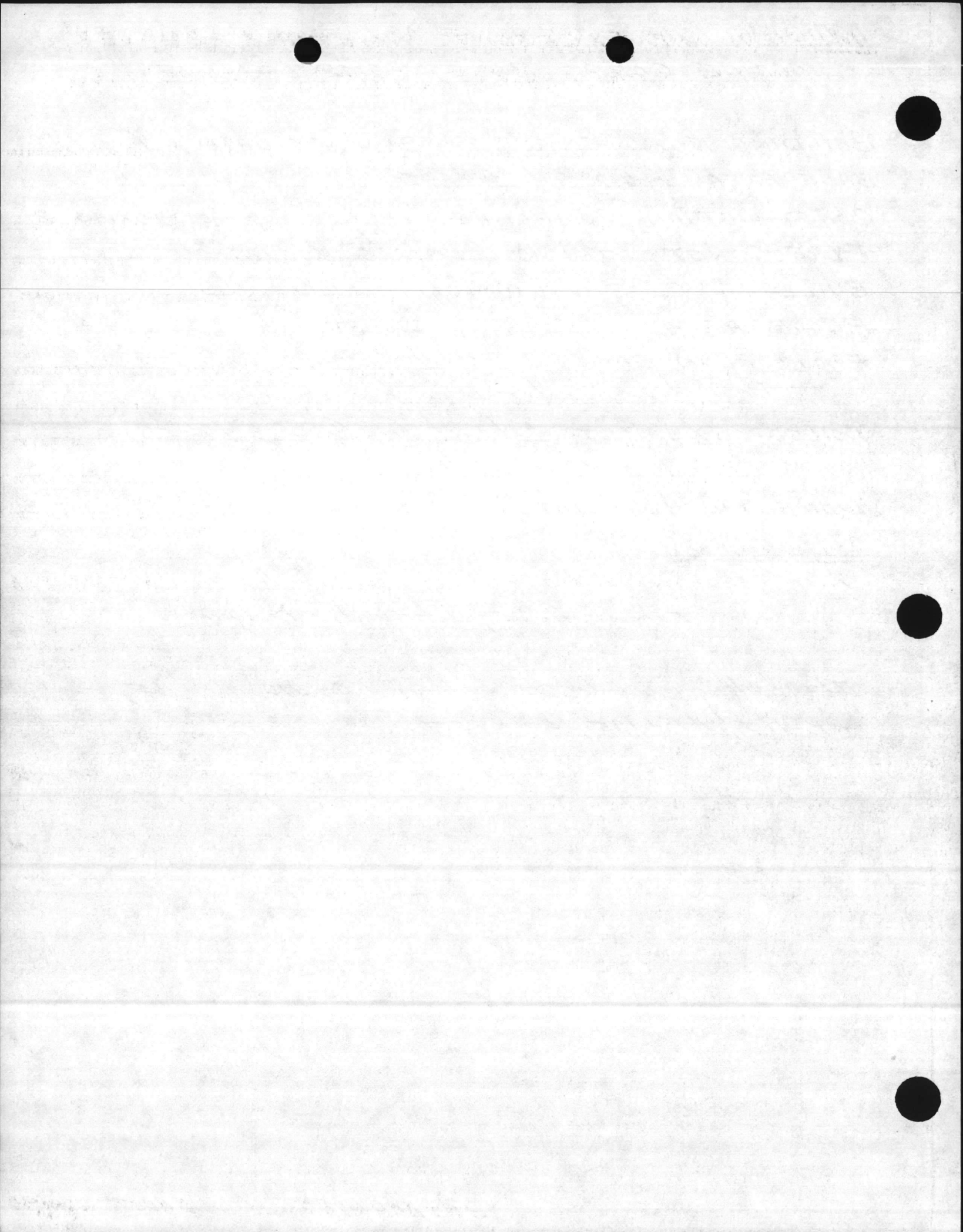
TOILET EXHAUST Exhaust fan for each toilet  
controlled by light switch.

DOMESTIC HOT WATER TEMP. (°F) 132

COMMENTS:

Room 200 - some mildew in shower area of toilet.  
Exhaust fan in toilet would not operate.

This building is similar to buildings FC-515, HP-165,  
HP-185, HP-195, & HP-550.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-555 SURVEY DATE 6 Aug. 81

BASE AREA FRENCH CREEK

CONSTRUCTION COMPLETED 1978 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 42,976 SQ. FT.

FLOOR PLAN DESIGN motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust fan for each toilet  
Controlled by light switch.

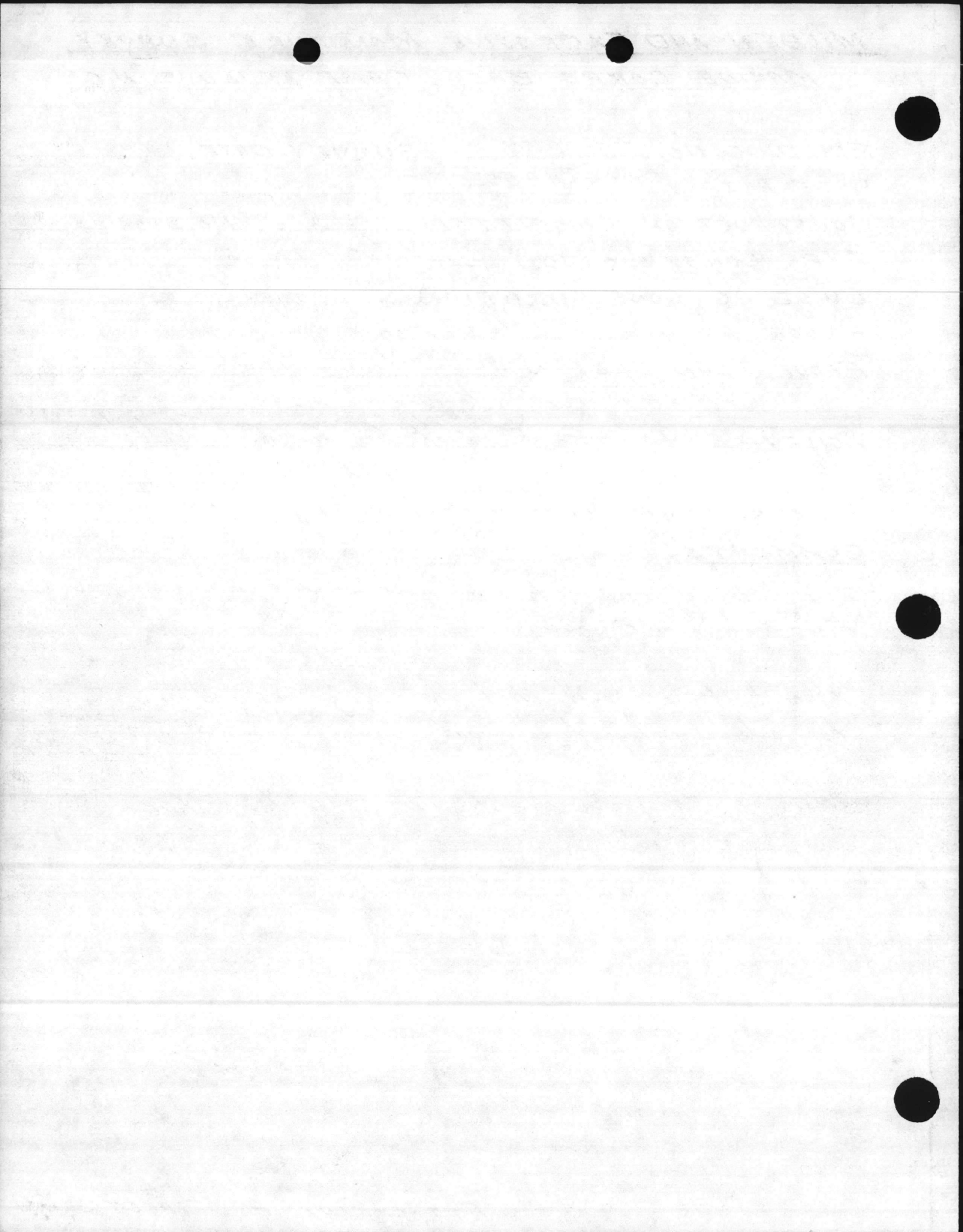
DOMESTIC HOT WATER TEMP. (°F) 190

COMMENTS:

This building is similar to buildings FC-520, FC-525, FC-530  
FC-560 & HP-560.

Several of occupants had their rugs draped over  
the outside railing to air out.

Note the excessive domestic hot water temperature.

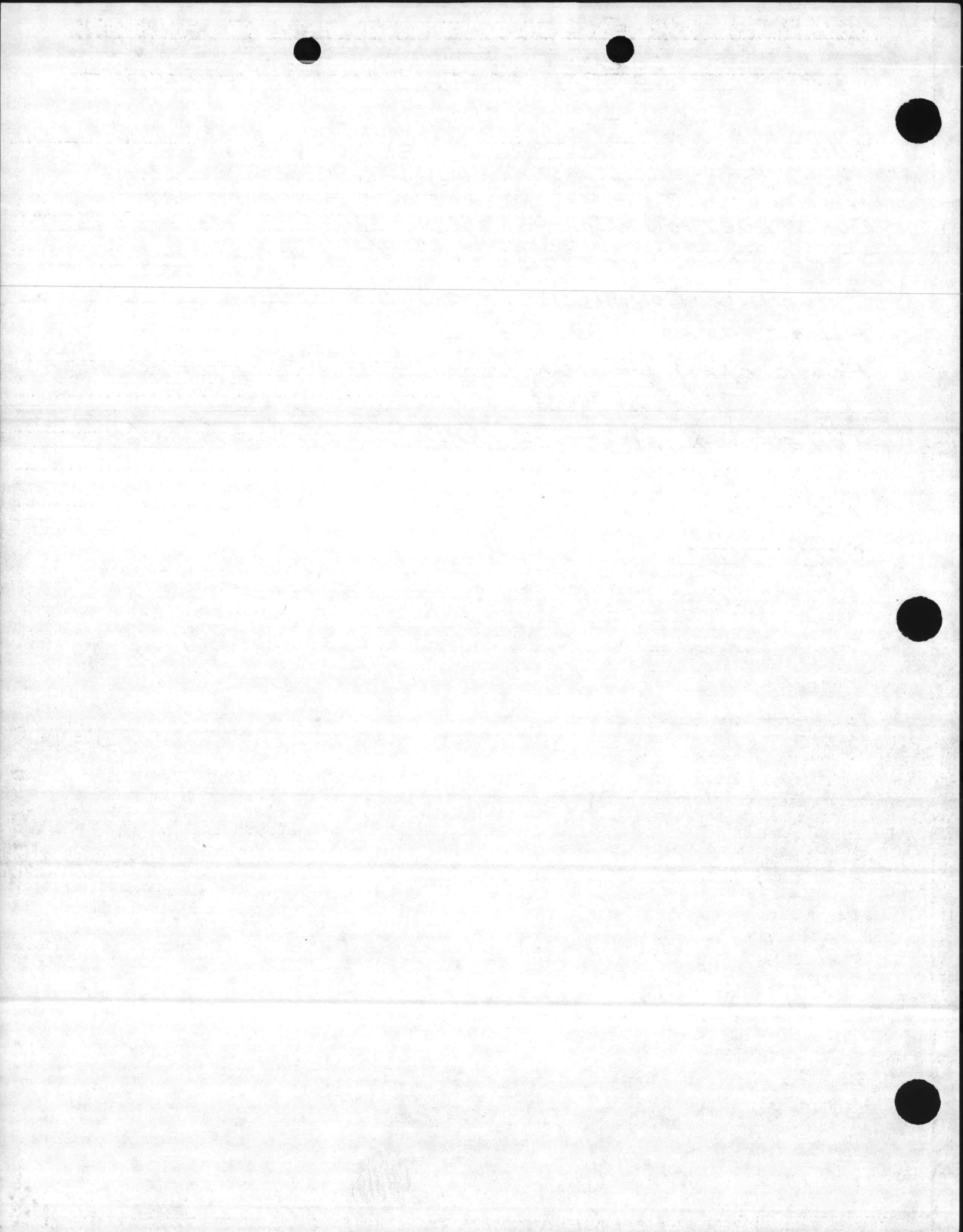


MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. FC-560 SURVEY DATE 6 Aug. 81  
BASE AREA FRENCH CREEK  
CONSTRUCTION COMPLETED 1978 NO. STORIES 3  
TYPE CONSTRUCTION Concrete & masonry  
BUILDING CONFIGURATION Rectangular  
FLOOR AREA 42,976 SQ. FT.  
FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.  
TOILET EXHAUST Exhaust fan for each toilet  
controlled by light switch.  
DOMESTIC HOT WATER TEMP. (°F) 132

COMMENTS:

This building is similar to buildings FC-520, FC-525,  
FC-530, FC-555 & HP-560.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. 896 SURVEY DATE 5 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1973 NO. STORIES 1

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 1596 SQ. FT.

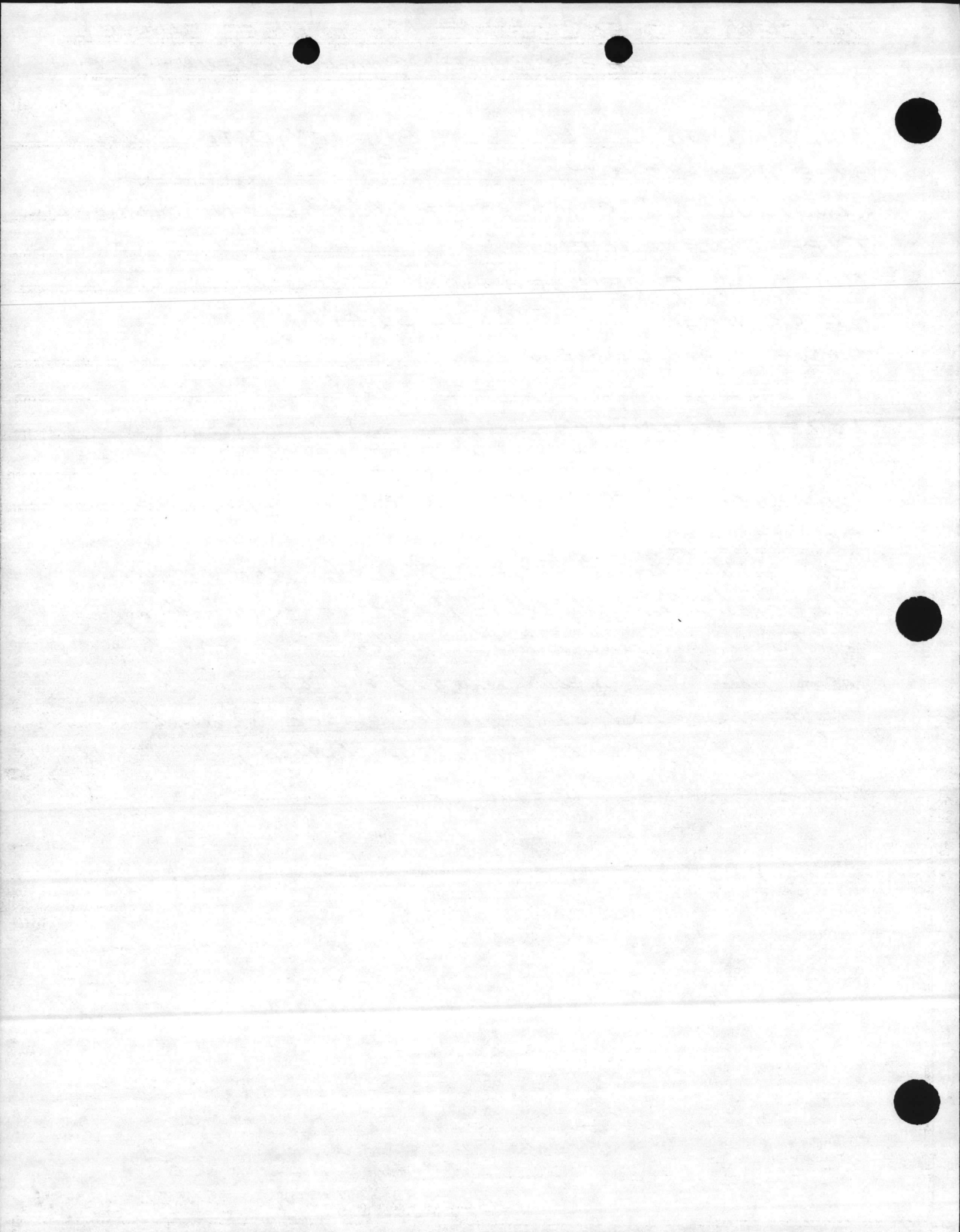
FLOOR PLAN DESIGN \_\_\_\_\_

TOILET EXHAUST \_\_\_\_\_

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

This building serves as the office for the "Hostess House" complex. The building has not experienced any mildew or excessive moisture problems. The sleeping rooms which are in buildings 897 and 898 of the complex have had some problems (see individual survey sheets for the respective buildings)



MILDEW AND EXCESSIVE MOISTURE SURVEY

MARINE CORPS BASE, CAMP LEJEUNE, N.C.

5 Aug. 81 &

BUILDING NO. 897 SURVEY DATE 7 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1973 NO. STORIES 2

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 20,563 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet and Kitchenette in each sleeping room.

TOILET EXHAUST Exhaust register discharging into pipe chase.  
Roof fans exhaust air from pipe chase.

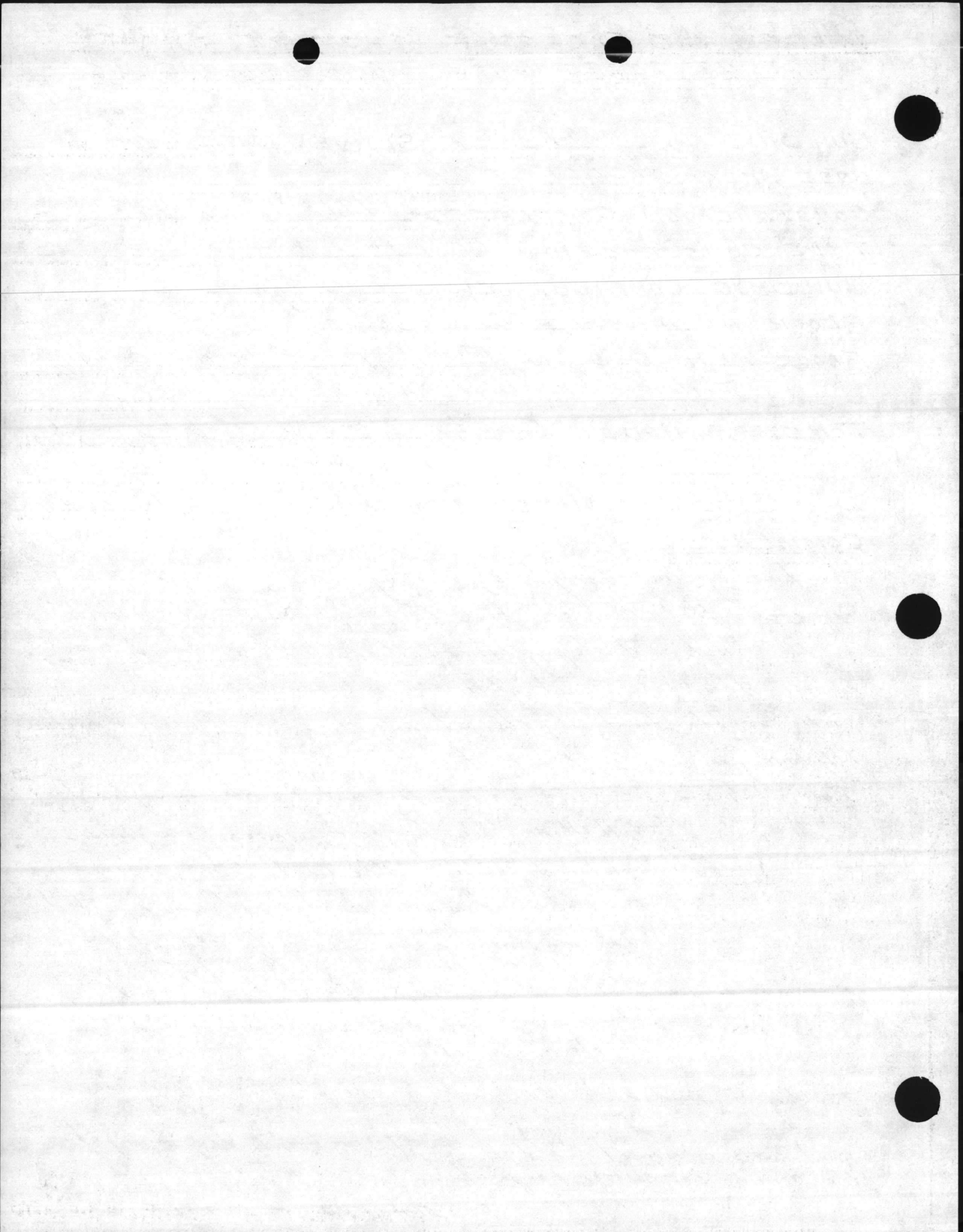
DOMESTIC HOT WATER TEMP. (°F) Unable to check.  
Thermometer broken

COMMENTS:

This building has forty (40) sleeping rooms. It was reported that problems have been experienced with mildew in the toilets and sleeping rooms. Also, extensive condensation forms on the large sheet glass and aluminum frame window walls on the front of the sleeping rooms during the winter months. The building is part of the "Hostess House" complex.

Rooms 129 & 233 - sheet glass in the window wall was replaced with thermopane for test purposes as a possible solution to eliminate the condensation problem. From observations last winter, it was reported that condensation was generally eliminated except for the lower portion which is just above the cement asbestos panels at the bottom of the window walls.

Building is similar to building 898 except for the number of sleeping rooms. Maintenance personnel at the complex advised they thought the domestic hot water temperature was around 160°F.



MILDEW AND EXCESSIVE MOISTURE SURVEY

MARINE CORPS BASE, CAMP LEJEUNE, N.C.

5 Aug. 81 &

BUILDING NO. 898 SURVEY DATE 7 Aug. 81

BASE AREA HADNOT POINT

CONSTRUCTION COMPLETED 1973 NO. STORIES 2

TYPE CONSTRUCTION Concrete & Masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 27,547 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet and Kitchenette in each sleeping room.

TOILET EXHAUST Exhaust register discharging into pipe chase.  
Roof fans exhaust air from pipe chase.

DOMESTIC HOT WATER TEMP. (°F) Unable to check.  
Thermometer broken

COMMENTS:

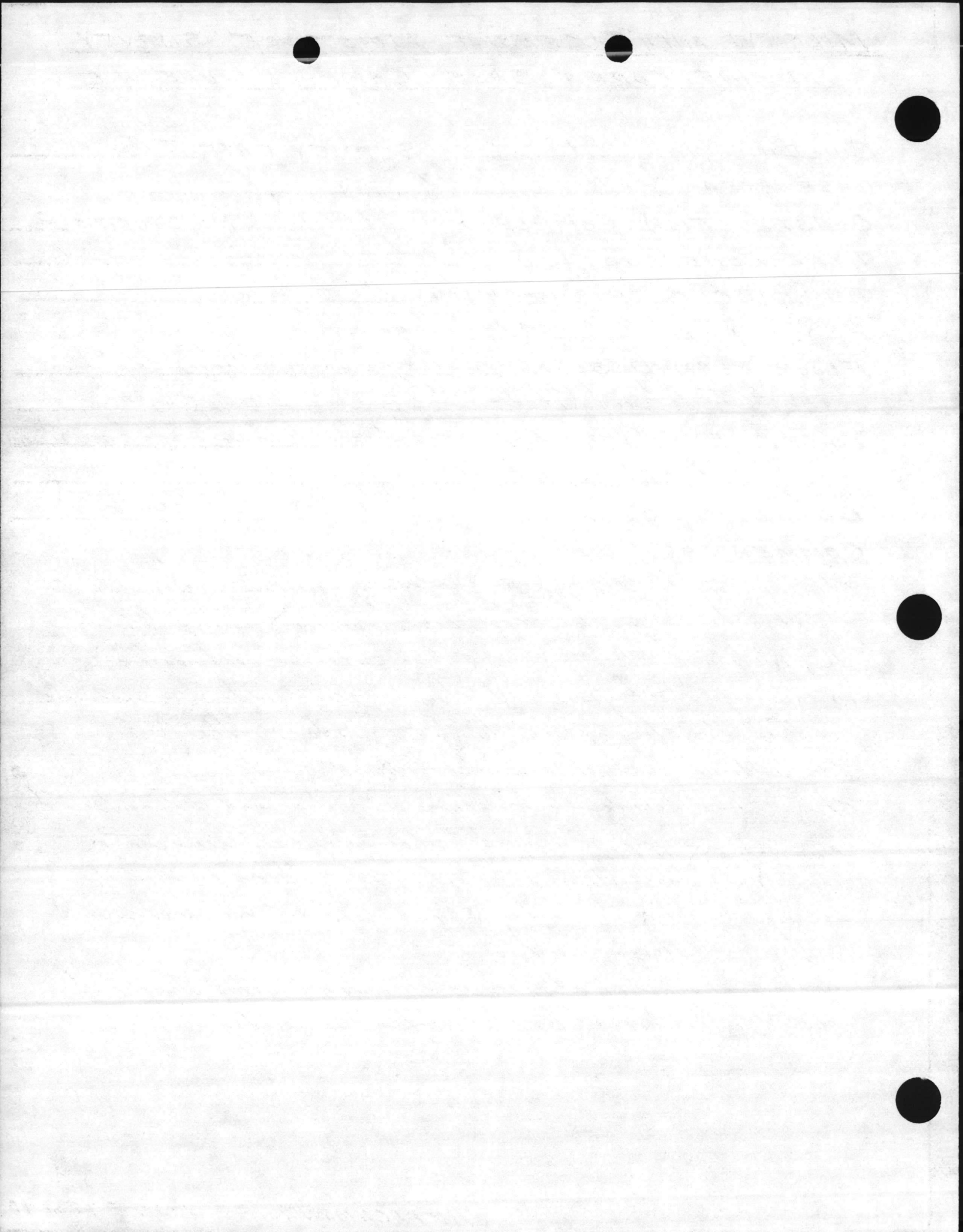
This building has fifty (50) sleeping rooms. It was reported that problems have been experienced with mildew in the toilets and sleeping rooms. Also extensive condensation forms on the large sheet glass and aluminum frame window walls on the front of the sleeping rooms during the winter months.

The building is part of the "Hostess House" complex.

Room 122 - Considerable moisture on and around fan coil unit supply grille and ceiling opposite. Drain pan in fan coil unit was full of water.

Building is similar to building 897 except for the number of sleeping rooms.

Maintenance personnel at the complex advised they thought the domestic hot water temperature was around 160°F.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. H-16 SURVEY DATE 5 Aug. 81

BASE AREA HOSPITAL

CONSTRUCTION COMPLETED 1943 NO. STORIES 2

TYPE CONSTRUCTION Wood frame, Wood/brick veneer siding

BUILDING CONFIGURATION "L" shape

FLOOR AREA 8,572 SQ. FT.

FLOOR PLAN DESIGN Dormitory-type with interior corridors.

Common toilets (sleeping rooms do not have toilets but do

TOILET EXHAUST have individual lavatories).

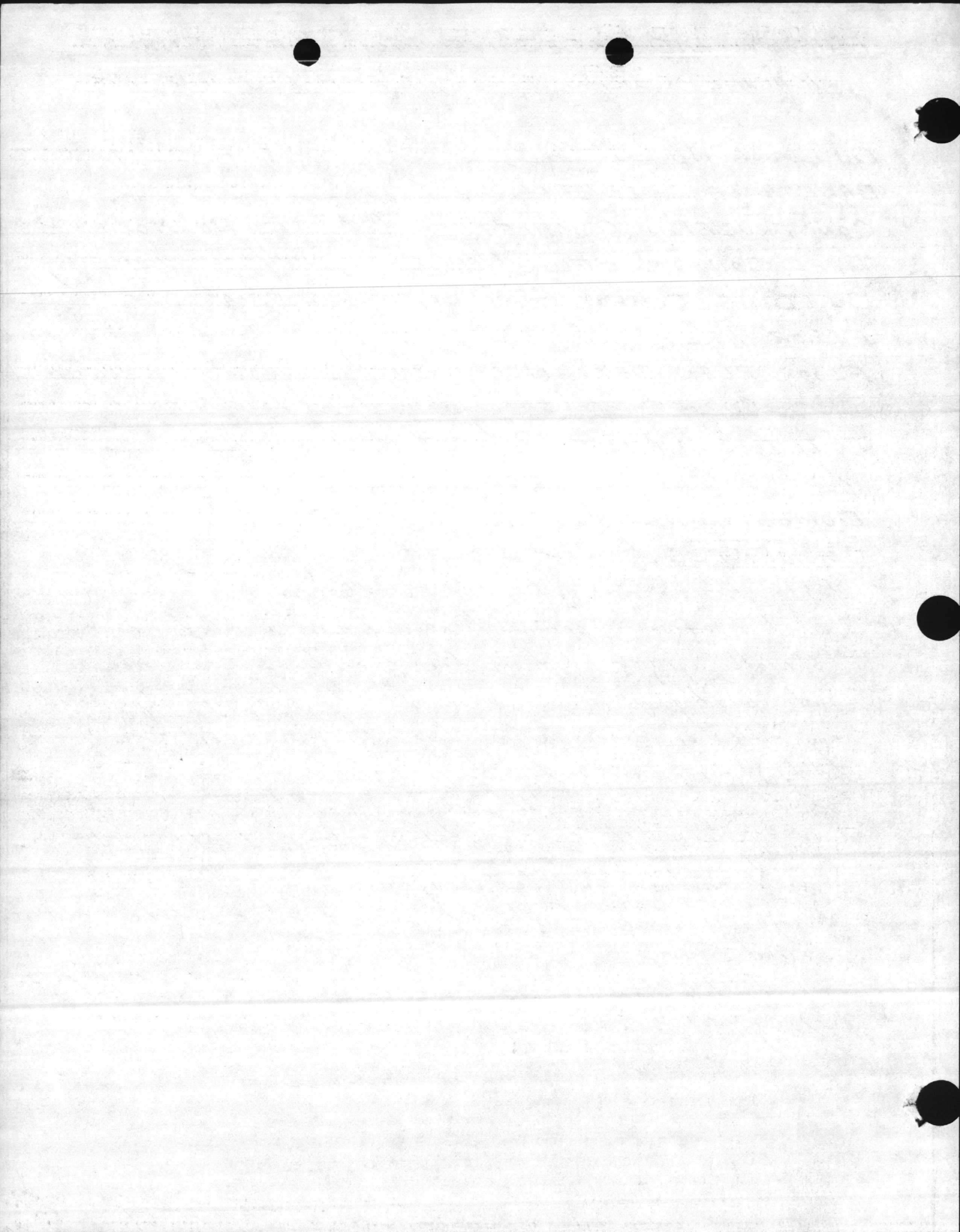
DOMESTIC HOT WATER TEMP. (°F) ?

COMMENTS:

No visible evidence of mildew in the rooms. Dehumidifiers (which maintenance personnel advised were installed about 6 months ago) existed in the corridors. Maintenance and operating personnel advised they had not experienced any mildew or excessive moisture problems since the dehumidifiers were installed.

Paint was peeling on the ceiling and walls (more predominant on ceiling) of the common head on the first floor. It appears moisture could be coming from water leaking through the floor of the common head above on the second floor.

The building has a crawl space under the first floor but the ground is not covered with a vapor barrier.





MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. BB-250 SURVEY DATE 4 Aug. 81  
BASE AREA COURTHOUSE BAY

CONSTRUCTION COMPLETED 1977 NO. STORIES 3

TYPE CONSTRUCTION Concrete & Masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 49,898 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharging into pipe chase.  
Wall fans exhaust air from pipe chases.

DOMESTIC HOT WATER TEMP. (°F) 112

COMMENTS:

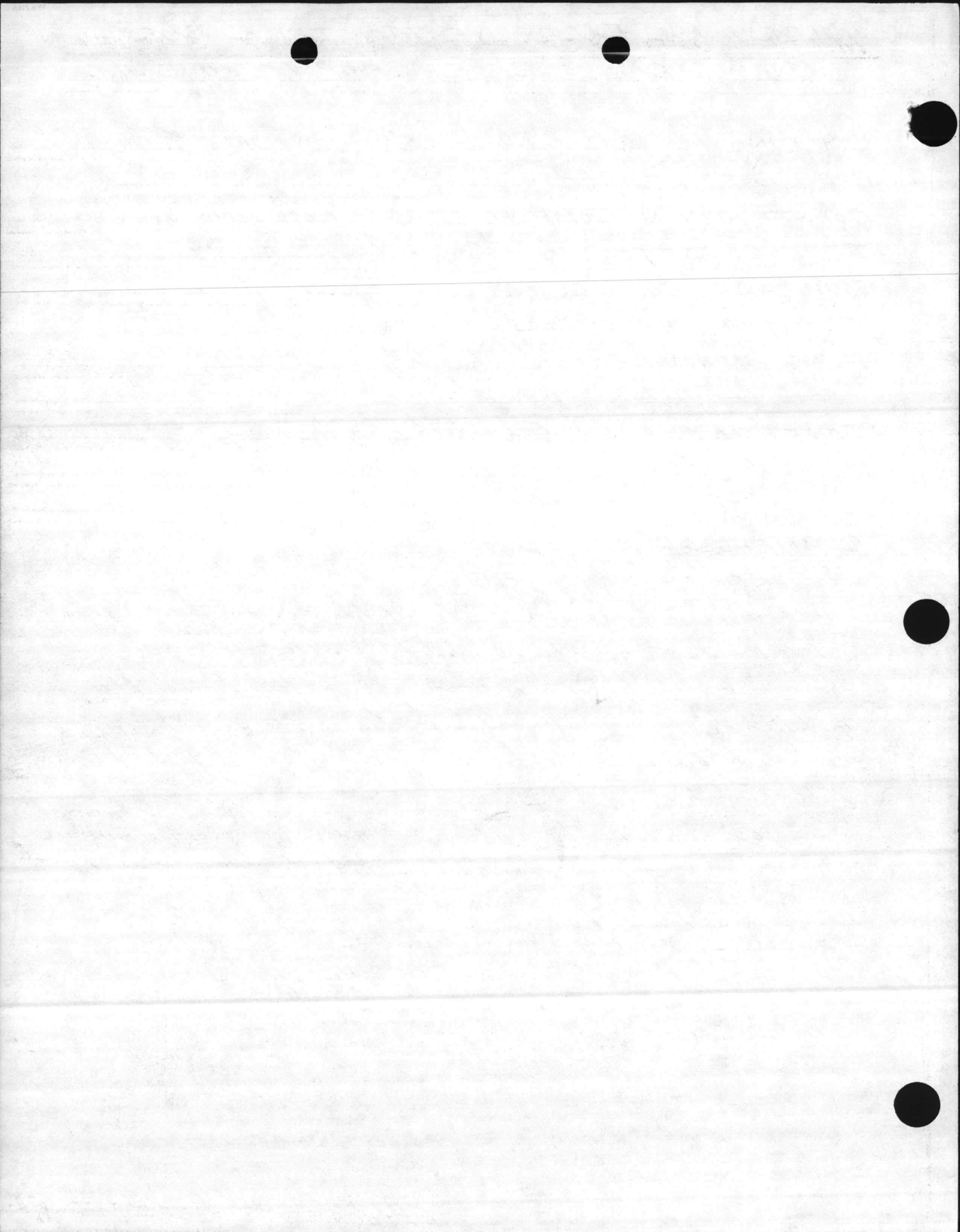
Work is currently being performed under Contract N62470-79-C-9497 "Correction to Ventilation System, Bldg. BB-250 and BB-255". This contract provides for the removal of the exhaust register in each toilet and the installation of a wall exhaust fan in the same location controlled by a separate wall switch adjacent to the light switch.

Room 102 - No visible evidence of mildew or excessive moisture. Occupants advised they had cleaned for inspection yesterday.

Room 110 - same condition as room 102.

" 315 - No visible evidence of mildew or excessive moisture.

" 319 - Unoccupied. No visible evidence of mildew or excessive moisture.



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. BB-255 SURVEY DATE 7 Aug. 81

BASE AREA COURTHOUSE BAY

CONSTRUCTION COMPLETED 1977 NO. STORIES 3

TYPE CONSTRUCTION Concrete & masonry

BUILDING CONFIGURATION Rectangular

FLOOR AREA 49,898 SQ. FT.

FLOOR PLAN DESIGN Motel type with exterior corridors.  
Toilet in each sleeping room.

TOILET EXHAUST Exhaust register discharges into pipe chase.  
Wall fans exhaust air from pipe chases.

DOMESTIC HOT WATER TEMP. (°F) 138

COMMENTS:

Work is currently being performed under Contract N62470-79-C-9497  
"Correction to Ventilation system, Bldg. BB-250 and BB-255".

This contract provides for the removal of the exhaust register  
in each toilet and the installation of a wall exhaust fan  
in the same location controlled by a separate wall switch  
adjacent to the light switch.

Room 101 - Fan coil unit cut off because of excessive condensation  
on unit cabinet.

" 103 - No visible signs of mildew or excessive moisture, occupants  
advised they experience problems with mildew.

" 109 - Condensation on bottom of fan coil unit cabinet.

" 201 - Some mildew on ceiling in toilet.

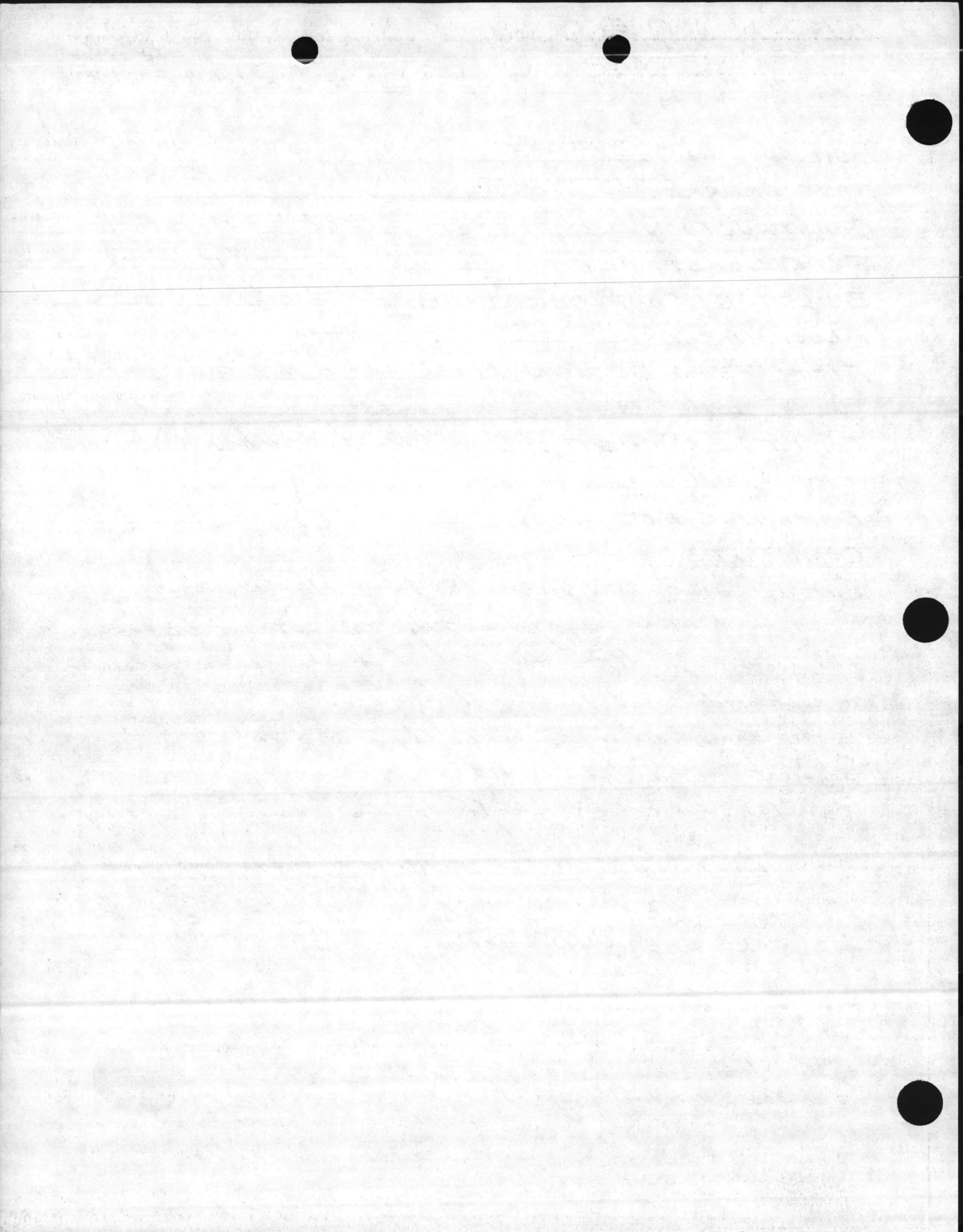
" 202 - minor mildew in toilet

" 206 - No visible sign of mildew or excessive moisture.

" 212 - minor mildew in toilet

" 301 - " " " "

" 302 - No visible sign of mildew or excessive moisture.



MILDEW AND EXCESSIVE MOISTURE SURVEY

MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. M-614 SURVEY DATE 7 Aug. 81

BASE AREA MONTFORD POINT

CONSTRUCTION COMPLETED 1942 NO. STORIES 1

TYPE CONSTRUCTION Masonry & Wood

BUILDING CONFIGURATION "H" shape

FLOOR AREA 8592 SQ. FT.

FLOOR PLAN DESIGN Open bay sleeping areas, common toilet.

TOILET EXHAUST Ceiling register, fan and duct in attic space exhausting through louver in gable.

DOMESTIC HOT WATER TEMP. (°F) No thermometer

COMMENTS:

This building is similar to buildings M-303, M-305, M-309, M-311, M-316, M-321, M-403, M-409, M-416, M-420, M-422, M-504, M-507, M-509, M-514, M-516, M-518, M-522, M-604, M-607, M-609, M-616 & M-622. However M-321 is designated as a Library and M-403, M-409, M-416, M-420, M-422 & M-514 have "Instruction" designation.

The buildings (along with others) have recently received ceiling insulation as a part of Contract N62470-78-C-8107.

Specifications for the job stipulated that the insulation shall be held back 6" from the exterior wall to provide for ventilation of space above ceilings and insulation that are not vented to the exterior.

Personnel at Montford Point advised the mildew problems were in the buildings designated as BEQ's.

This building (M-614) had visible evidence of mildew primarily on the ceilings. Continual excessive moisture was obvious in the common toilet. The building is not air conditioned. operation and

(cont'd on next sheet)



MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. M-614 (Cont'd) SURVEY DATE \_\_\_\_\_

BASE AREA \_\_\_\_\_

CONSTRUCTION COMPLETED \_\_\_\_\_ NO. STORIES \_\_\_\_\_

TYPE CONSTRUCTION \_\_\_\_\_

BUILDING CONFIGURATION \_\_\_\_\_

FLOOR AREA \_\_\_\_\_ SQ. FT.

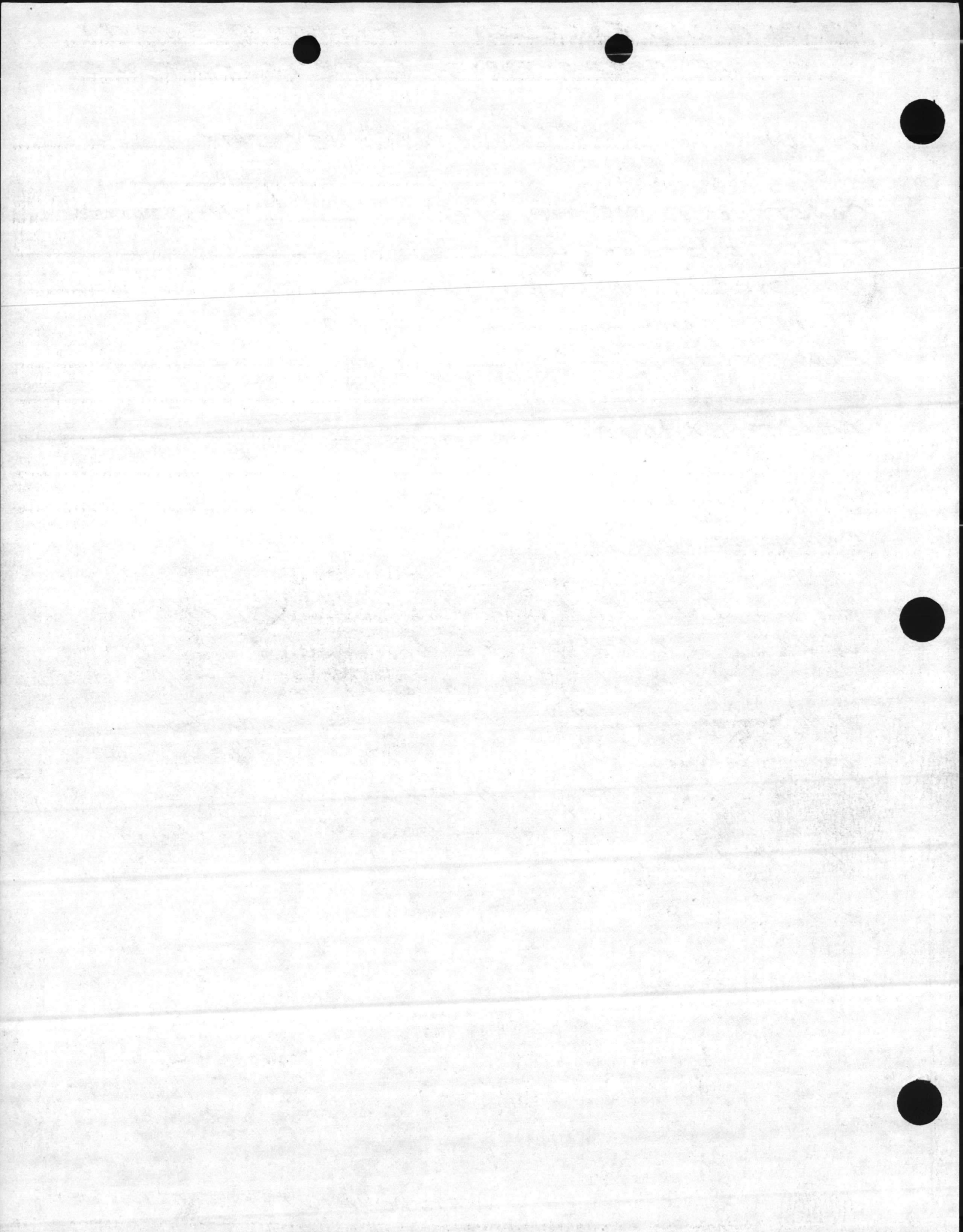
FLOOR PLAN DESIGN \_\_\_\_\_

TOILET EXHAUST \_\_\_\_\_

DOMESTIC HOT WATER TEMP. (°F) \_\_\_\_\_

COMMENTS:

adequacy of the toilet exhaust is questionable. Attic ventilation is limited to gable louvers which may not be sufficient considering the shape and size of the building and the conditions that now exist. Maintenance personnel advised they have had problems with leaks in the steam heating coils in the air handling unit which results in moist air entering the spaces through the duct system.

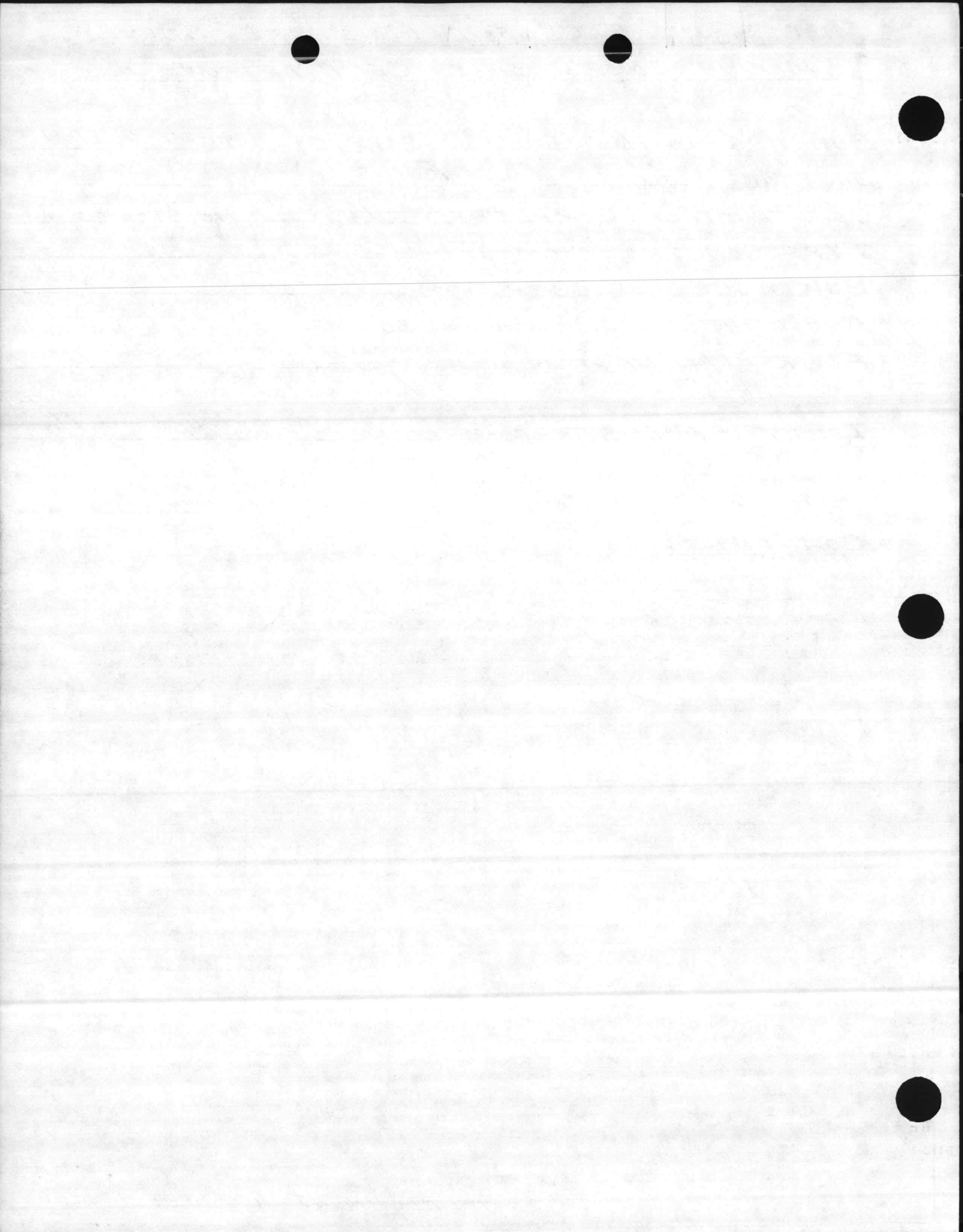




MILDEW AND EXCESSIVE MOISTURE SURVEY  
MARINE CORPS BASE, CAMP LEJEUNE, N.C.

BUILDING NO. M-616 SURVEY DATE 7 Aug. 81  
BASE AREA MONTFORD POINT  
CONSTRUCTION COMPLETED 1943 NO. STORIES 1  
TYPE CONSTRUCTION Masonry & wood  
BUILDING CONFIGURATION "H" shape  
FLOOR AREA 8592 SQ. FT.  
FLOOR PLAN DESIGN Open bay sleeping areas, common toilet.  
TOILET EXHAUST Ceiling register, fan and duct in attic space exhausting through louver in gable.  
DOMESTIC HOT WATER TEMP. (°F) No thermometer  
COMMENTS:

Same as for Building No. M-614



To Ops - For File

REPORT ON HIGH HUMIDITY AND MOISTURE  
CONDITIONS IN MISCELLANEOUS BUILDINGS

I visited several buildings at various locations at Camp Lejeune and found high humidity and moisture conditions exist in sleeping rooms and bathrooms. The conditions vary from room to room in the buildings. I think this can be attributed in part to the living habits of the occupants and to the fact there are leaking lines and exhaust fans not working.

On page (2) is a list of the actions taken by Base Maintenance in recent years to attempt to solve mildew-related problems. However, these things have not been totally successful because I found exhaust fans not working, dirty coils, dirty fan scrolls, stopped-up drain pans and fresh air fans not working. I think we need to intensify our maintenance work and, in addition, I recommend we make the changes outlined in the LANTDIV study to add make-up air handlers to condition fresh air induced into the rooms and the other recommendations for each specific type of building.

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## ACTIONS TAKEN TO RESOLVE MILDEW PROBLEMS

The following actions have been taken by Base Maintenance in recent years to attempt to resolve mildew-related problems in the new UEPH's:

1. Reduced domestic hot water temperature.
2. Intensified maintenance to exhaust fans and systems.
3. Repaired drain pans that were either misaligned or clogged.
4. Ensured filters are replaced on a set schedule.
5. Improved preventive maintenance to fan/coil units.
6. Reduced chilled water temperature on several buildings.
7. Published instructions to occupants to help prevent mildew growth (such as running space temperature fan on low, operating exhaust fan for 10-15 minutes after showers, etc.)
8. Increased surveillance for pipe leaks during cyclic maintenance repairs.



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GROUP 1

Bldgs HP 51, HP 53  
Bldgs HP 55, 1140

POC: LCpl Waldrop  
POC: SSgt Spann

Observations:

I went to Buildings HP 51 and HP 53 on 8-22-84 and talked to the BEQ manager. We checked several rooms and found mildew on walls and ceilings of bathrooms and small amounts of mildew on ceilings below the air handling units. Rooms 103, 117, 226, and 302 need ceiling repairs and insulation repairs on chilled water lines.

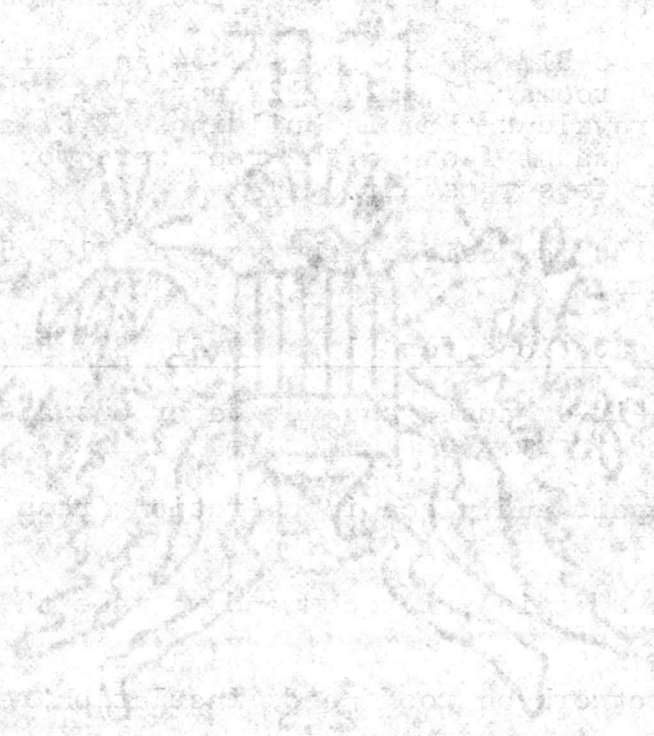
The exhaust systems for bathrooms are centrally-ducted with seven (7) exhaust fans on the roof. Some of these fans are not operating and several are not operating to capacity. The make-up air handlers on the roof are not operating.

I went to Bldg HP 55 on 8-23-84 and talked to SSgt Spann. We visited rooms 112, 120, 122 and 119. The mildew problems were more prevalent than in buildings HP 51 and 53. Only two of the seven exhaust fans on the roof were working and the fresh air make-up fans were off.

Bldg 1140 is designed the same as Bldg 51 and has the same problems.

Recommendations for Bldgs HP 51, 53, 55, 57 and 1140:

1. Repair exhaust fans for bathrooms and adjust air flow cfm for each room.
2. Repair and place in operation fresh air make-up air handlers.
3. In addition, I recommend we make the changes outlined in the LANTDIV study.
4. Ductwork on roof needs insulation repaired.





GROUP 2

Bldgs. FC 414  
FC 415

POC: LCpl Roble  
POC: LCpl Beaulieu

Observations:

I went to FC 414 and 415 on 8-28-84 and talked to the police sergeants in each building. We visited rooms 106D and 106C in FC 415 and found the blower scroll and coil of the room air handler stopped up with lint and dirt. The filter had been removed from the unit. The chilled water lines had ragged insulation and were dripping on the ceiling. There was a small amount of mildew on the ceiling of bathrooms and on suspended ceilings of sleeping rooms. The fresh air make-up handlers were not working and several exhaust fans were not running. I visited FC 414 and found the same problems.

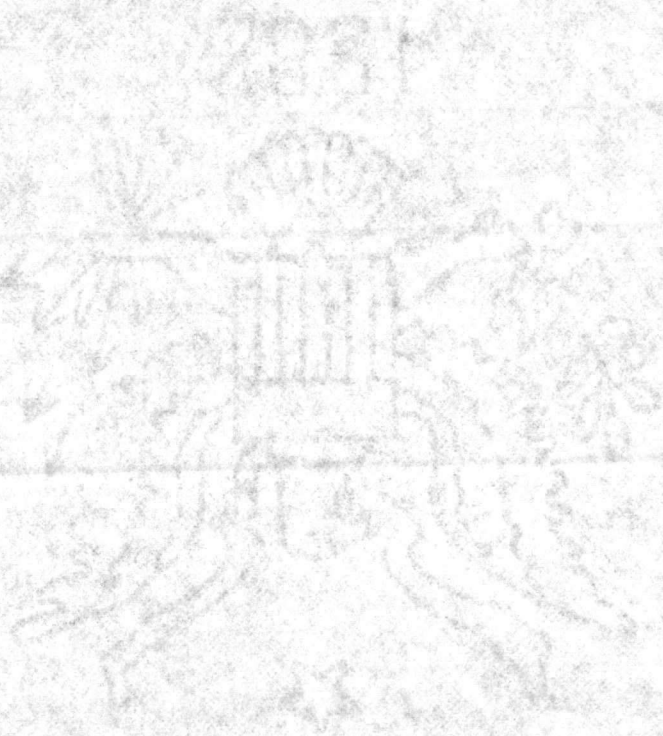
Recommendations:

1. Repair exhaust fans for bathrooms.
2. Repair and place in operation fresh air make-up air handlers.
3. In addition, I recommend that we make changes outlined in the LANTDIV study.

1954

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GROUP 3

Bldg 1042

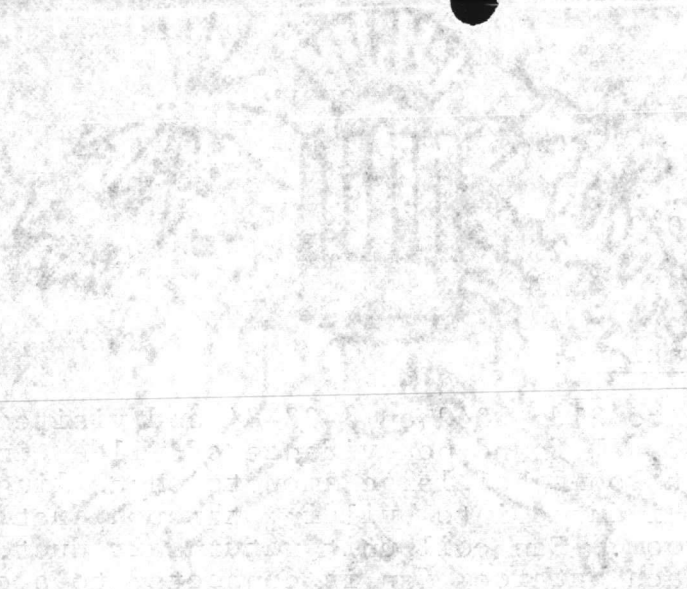
POC: SSgt Downs

Observations:

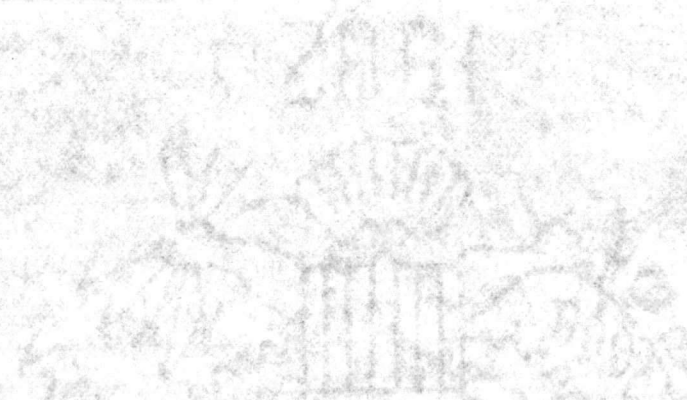
I went to Bldg 1042 on 8-23-84 and visited rooms 113, 114 and 116. I found no evidence of mildew in sleeping rooms. The bathrooms had large amounts on ceiling and walls. Fresh air is induced into building through ductwork from outside each room. Fan coil unit return air duct. Exhaust air from each bathroom fan is connected to a common duct riser. There is not a plumbing chase in the building. The dual hot and chilled water lines run above suspended ceiling with air handling units.

Recommendations:

1. I agree with the recommendations outlined in the LANTDIV study.



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GROUP 3

Bldgs. HP 550, 560

FC 520, 525, 530, 550, 555, 560

POC: GySgt Palmer

Observations:

I went to FC 520 on 8-27-84 and talked to GySgt Palmer. We visited several rooms and found small amounts of mildew on ceilings of bathrooms and sleeping rooms. The exhaust fans in the bathrooms are turned on with the light switch and are ducted to a common duct system in the pipe chase. The make-up air for exhaust system is by infiltration. FC 525, 530, 550, 555 and 560 are of identical construction and have the same problems.

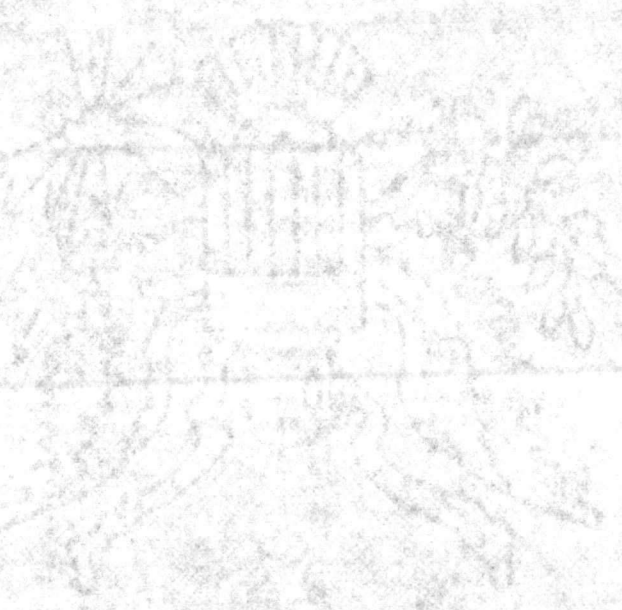
Recommendations:

1. I recommend we set up a P. M. Program to check exhaust fans monthly.
2. I agree with the recommendations suggested in the LANTDIV study.



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28



GROUP 3

Bldgs BB 250 and 255  
HP 550  
HP 560

POC: Pfc Moody

POC: LCpl Kath

Observations:

I visited HP 550 and 560 on 8-23-84 and visited several rooms in each building. I found evidence of mildew problems in rooms 105, 104 and 130 at HP 550 and rooms 224, 218 and 215 in Building HP 560. There was evidence of some water leaks from piping in several of the pipe chases. The bottom deck chase at HP 560 had water standing the length of the building.

Recommendations:

1. I agree with all the recommendations in the LANTDIV study.
2. I also recommend we repair water leaks in pipe chase.



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GROUP 5

Bldg AS-4010

POC: (1st Deck)  
Police Sgt. McNeal  
POC: (3d Deck)  
Police Sgt. Huff

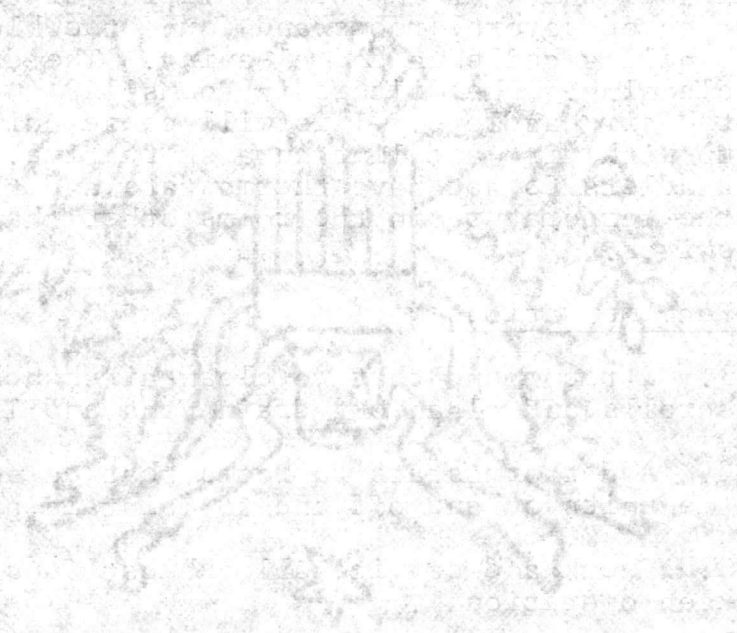
Observations:

I went to AS-4010 on 8-21-84 and talked to Police Sergeants on the first and third decks. Neither knew of any mildew problems in any of the rooms. Both said they had problems with mildew in the heads. The air conditioning system was inoperative so I could not get any true humidity or temperature readings. I checked several rooms and found the blower scrolls and air handling coils needed cleaning. The drain pans also need cleaning. The filters in Rooms 159 and 160 were removed from the air handlers. This will cause coils and scrolls to stop up with dirt and lint in a short time. The third floor air handlers do not have thermostats and there is no way to control the temperature in the rooms other than cutting off the fan switch.

Recommendations:

1. I recommend that we clean air handler coils and blower scrolls and clean out drain pans and lines.
2. Add thermostats to rooms that do not have them to cycle the units on and off and to maintain a set point temperature.
3. Check and service all exhaust fans from toilet areas and keep operational.
4. Add make-up air handlers with heat coils for winter operation in the toilet areas.
5. Keep chilled water temperatures low enough for adequate moisture removal.

1950  
1951  
1952



GROUP 6

FC 305

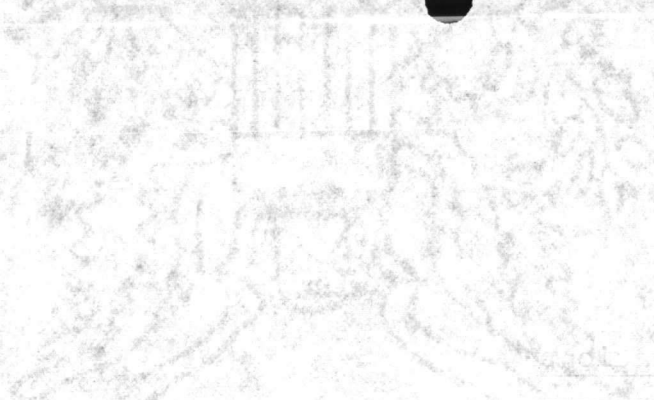
POC: LCpl D. Smith

Observations:

I visited Bldg FC 305 on 8-24-84 and talked to Police Sergeant LCpl Smith. He said they had not had any complaints on mildew problems in sleeping rooms with the exception of where the fan coil unit had leaked. I checked several rooms and saw no evidence of mildew. The centrally located toilet and shower areas had mildew in several locations on ceilings and walls.

Recommendations:

1. I agree with recommendations in the LANTDIV study to repair exhaust fans in bathrooms and rebalance the air flow.
2. I also recommend we set up a maintenance program to check and service exhaust fans on a regular basis.



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GROUP 6

FC 311

POC: Sgt Cuddeback

Observations:

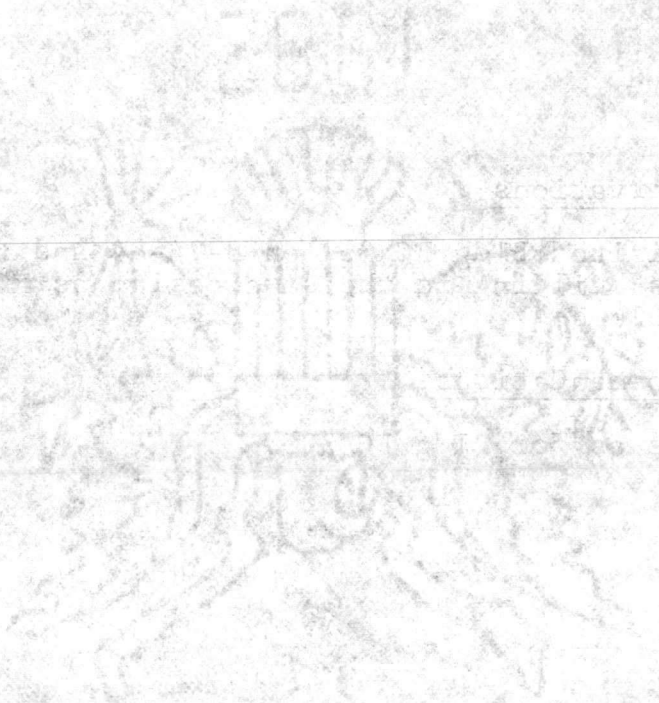
I visited Bldg FC 311 on 8-24-84 and talked to Sgt Cuddeback. This building is the same design as FC 305 and has the same problems.

Recommendations:

Same as for Bldg FC 305.



1952 217



1952

GROUP 6

FC 309

POC: (1st deck)  
Cpl Travis  
(2d deck)  
Cpl Callicutt

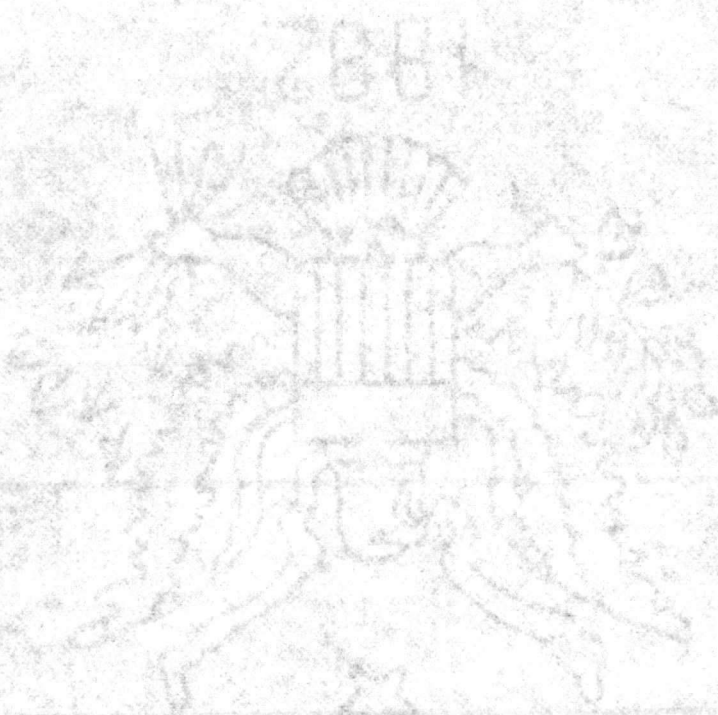
Observations:

I visited Bldg FC 309 on 8-24-84 and talked to the Police Sergeants on the first and second decks. This building is the same design as FC 305 and has the same problems.

Recommendations:

Same as for FC 305.

1225  
1700  
1800  
1900





GROUP 6

Bldg FC 306

POC: Cpl Gibson

Observations:

I visited Bldg FC 306 on 8-24-84 and talked to Cpl Gibson. Same problems were found as in Bldg FC 305.

Recommendations:

Same as for Bldg FC 305.



7-18-17

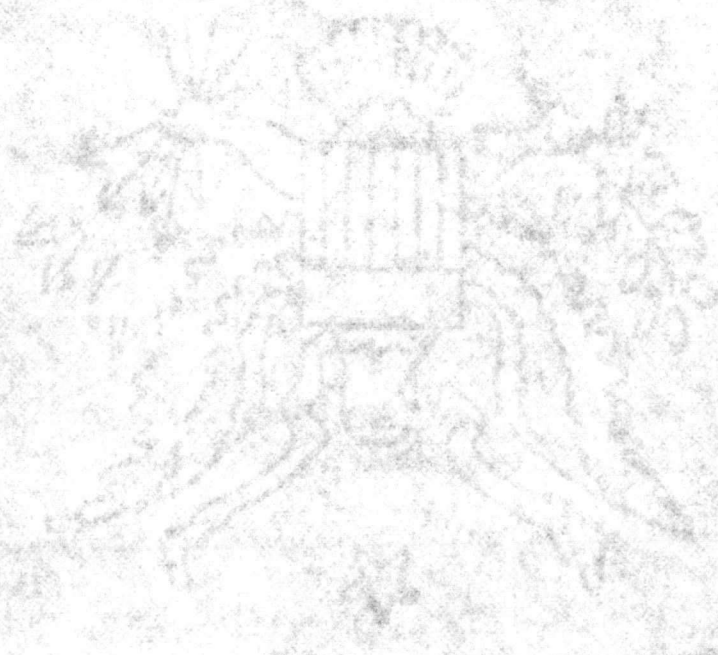
RECEIVED

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GROUP 7

Bldg H 16

POC: No one in building

Observations:

I went to Bldg H 16 on 8-30-84. There was no one in building to speak to. I observed mildew on ceilings and walls of central bathrooms. Bathroom exhaust air goes through the wall of the bathroom with fans. There are several dehumidifiers mounted in hallways of the building. I did not see any sign of mildew in hallways or lounges. Outside air is supplied directly to fan coil units in rooms through exterior wall louvers.

Recommendations:

1. I agree with recommendations in the LANTDIV study to provide fresh air make-up handlers to condition air induced into rooms.



THE  
2361



2361

GROUP 8

Bldg AS-4015

POC: Sgt. Jones  
Cpl. Terry

Observations:

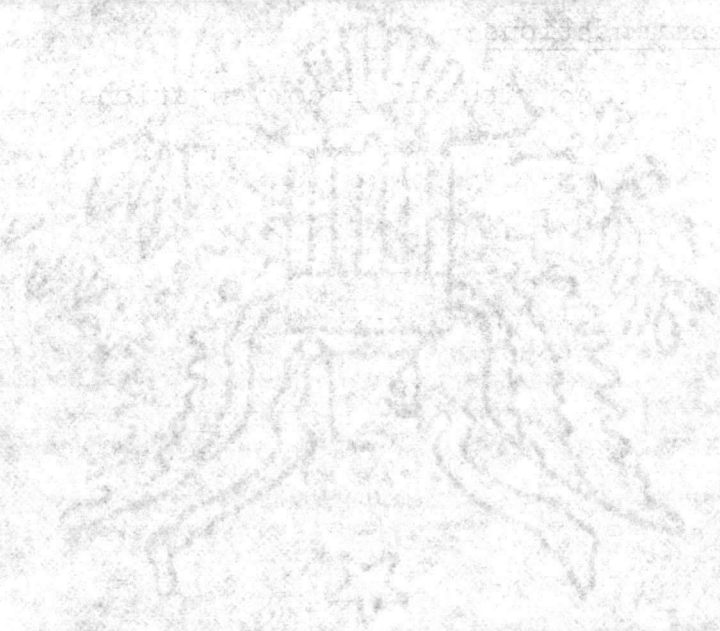
I visited Building AS-4015 on 8-29-84 and talked to the Police Sergeants. We visited several rooms and found a small amount of mildew in one room. The central bathroom had small amounts of mildew on ceilings. The lounge ceiling had plaster peeling from an area about three feet square from apparent roof leak.

Recommendations:

1. I agree with all recommendations in the LANTDIV study.



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GROUPS 9 & 10

Bldgs 896, 897, 898

POC: Mrs. Zihar  
Mr. Kincaide

Observations:

Went to the Hostess House on 8-16-84 and talked to Mr. Kincaide and Mrs. Zihar. I did not notice any evidence of mildew or humidity problems in rooms. I did notice wet ceiling tiles in kitchen area where air handling units and chilled water lines had been leaking. Drain pans were partially filled with algae, lint and dirt. Fans and coils were dirty and needed cleaning. Insulation on drain lines and chilled water lines were in bad shape and needed replacing. When buildings were renovated and ceiling replaced in kitchen area with 2' x 2' ceiling tiles in a suspended ceiling, filter grills were installed in ceiling tiles and not connected to return air handlers. This leaves large cracks and openings above ceiling and does not permit all of the return air to be filtered. Mr. Kincaide said he had not noticed any of the windows sweating after exhaust fans were added to bathrooms during renovations. There is not enough water flow through heating and cooling coil in Bldg 896 to heat or cool the building properly.

Recommendations:

1. I recommend that we clean air handler coils and blower scrolls. Clean drain pans and repair leaks in drain pans.
2. Re-insulate all chilled water and drain lines from air handlers to chase.
3. Install ductwork from filter grills to air handler so air handler does not have to pull air from above ceiling.
4. Replace circulating pump with larger unit to move more GPM's.
5. I believe the exhaust fans added to bathrooms have helped the the humidity problems but I agree with the LANTDIV study to provide a new outside air ventilation system to supply conditioned outside air directly to the conditioned space.



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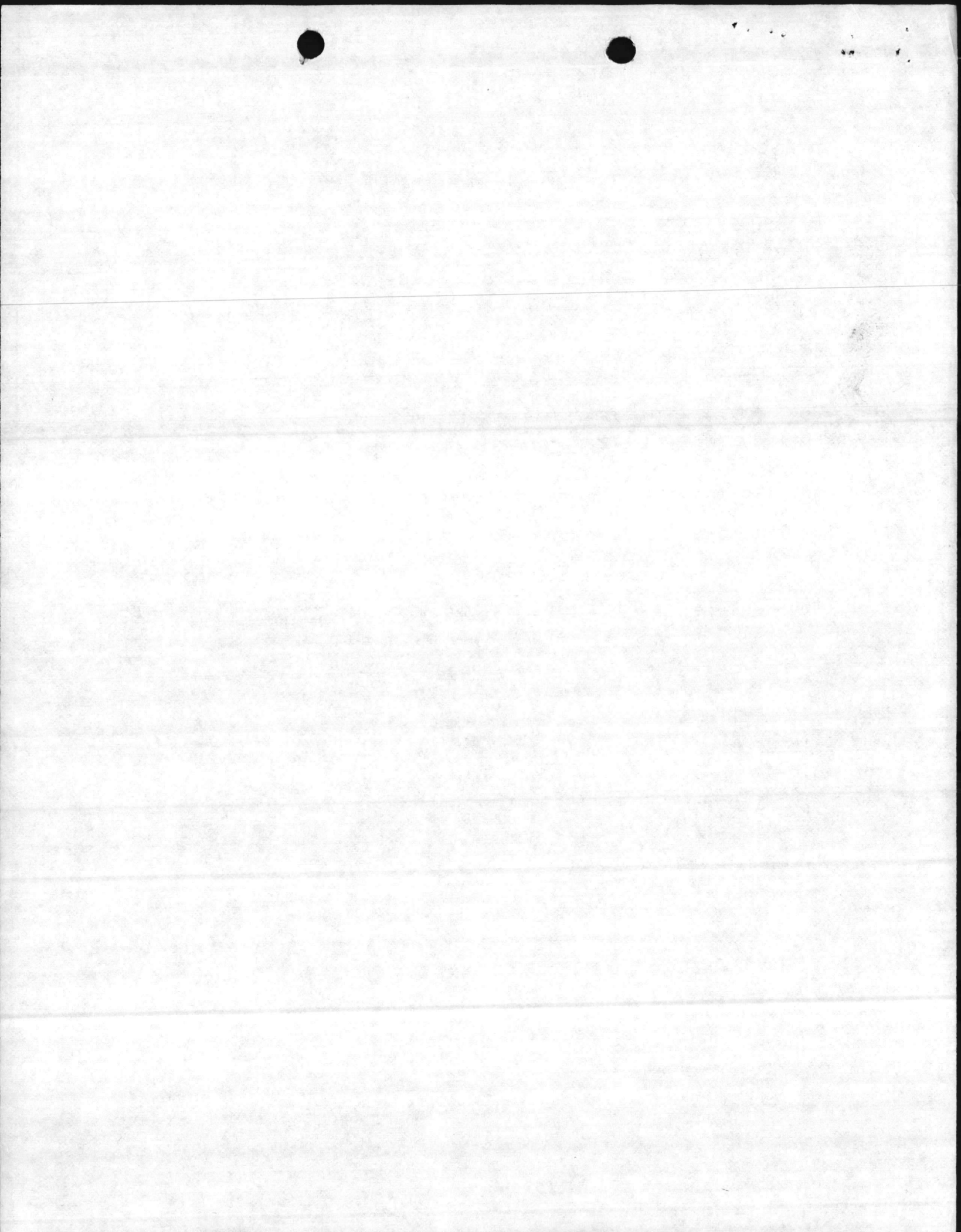


## Report on: High Humidity and Moisture Conditions Misc Bldgs

I visited several Bldgs At various locations at Camp Lejeune and found High Humidity and Moisture Conditions Exist in Sleeping Rooms and Bathrooms.

The Condition varied from room to room in the Bldgs and I think this can be attributed partially to the living habits of the people in the rooms, and partially to leaks and Exhaust fans not working.

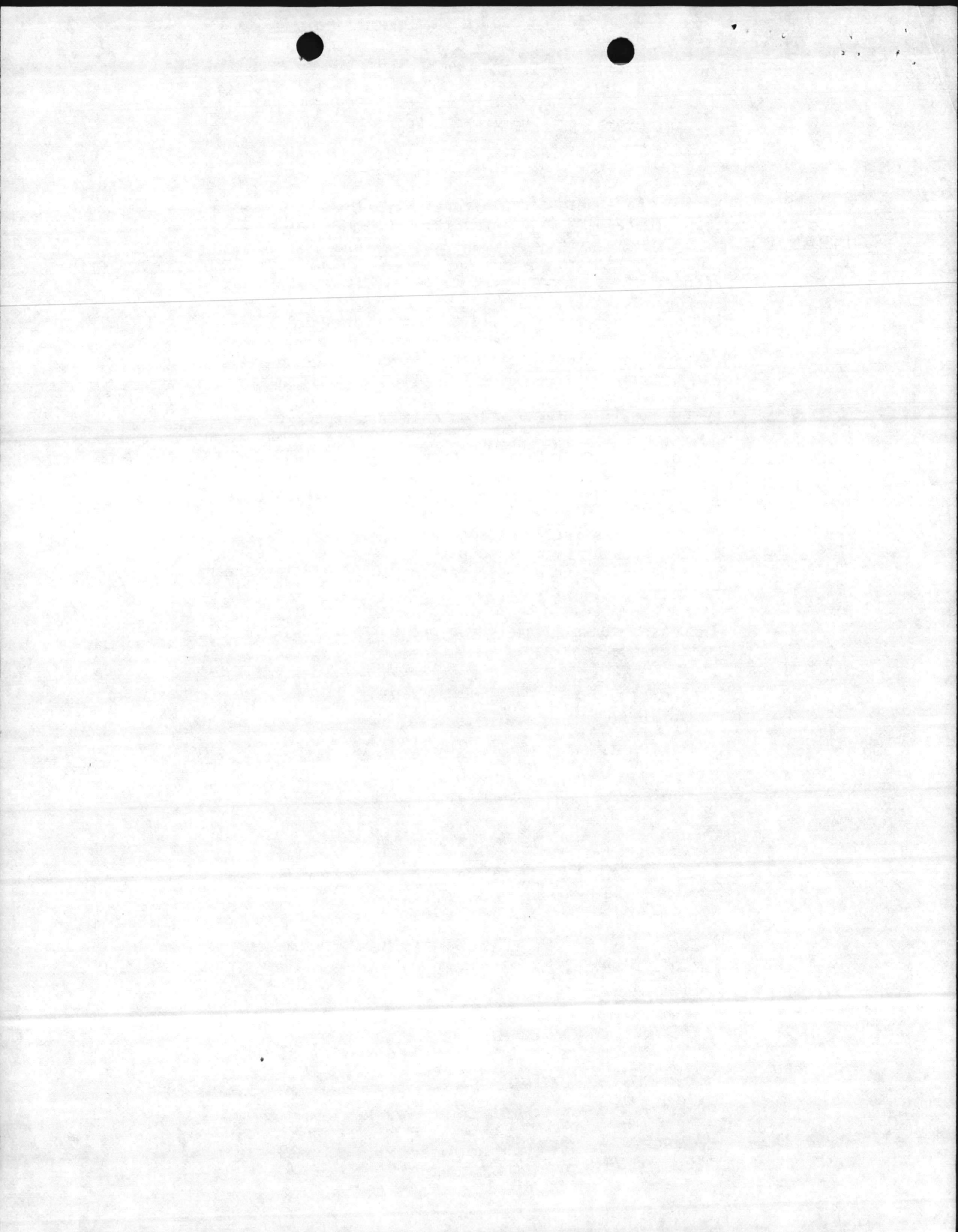
On page # 2 is a list of actions Base Maint. has taken in recent years to attempt to resolve mildew related Problems. However these things have not been totally successful because I found Exhaust fans not working, Dirty Coils, Dirty fan scrolls, Drain pans stopped up, and Fresh Air fans not working. I think we need to intensify our maint. work even more and in addition I recommend we make the changes outlined in Lawtdiv Study to Add Make up Air handlers to Condition Fresh Air induced into Rooms. And also the other Recommendations for Each Specific Bldg Type



## ACTIONS TO RESOLVE MILDEW PROBLEMS

The following actions have been taken by Base Maintenance in recent years in an attempt to resolve mildew-related problems in the new UEPH's:

1. Reduced domestic hot water temperature.
2. Intensified maintenance to exhaust fans and systems.
3. Repaired drain pans that were either misaligned or clogged.
4. Ensured filters are replaced on a set schedule.
5. Improved preventive maintenance to fan/coil units.
6. Reduced chilled water temperature on several buildings.
7. Published instruction to occupants to help prevent mildew growth (such as running space temperature fan on low, operating exhaust fan for 10-15 minutes after showers, etc.)
8. Increased surveillance for pipe leaks during cyclic maintenance repairs.



Bldg.

AS 4020

POC

Sgt. Thomas

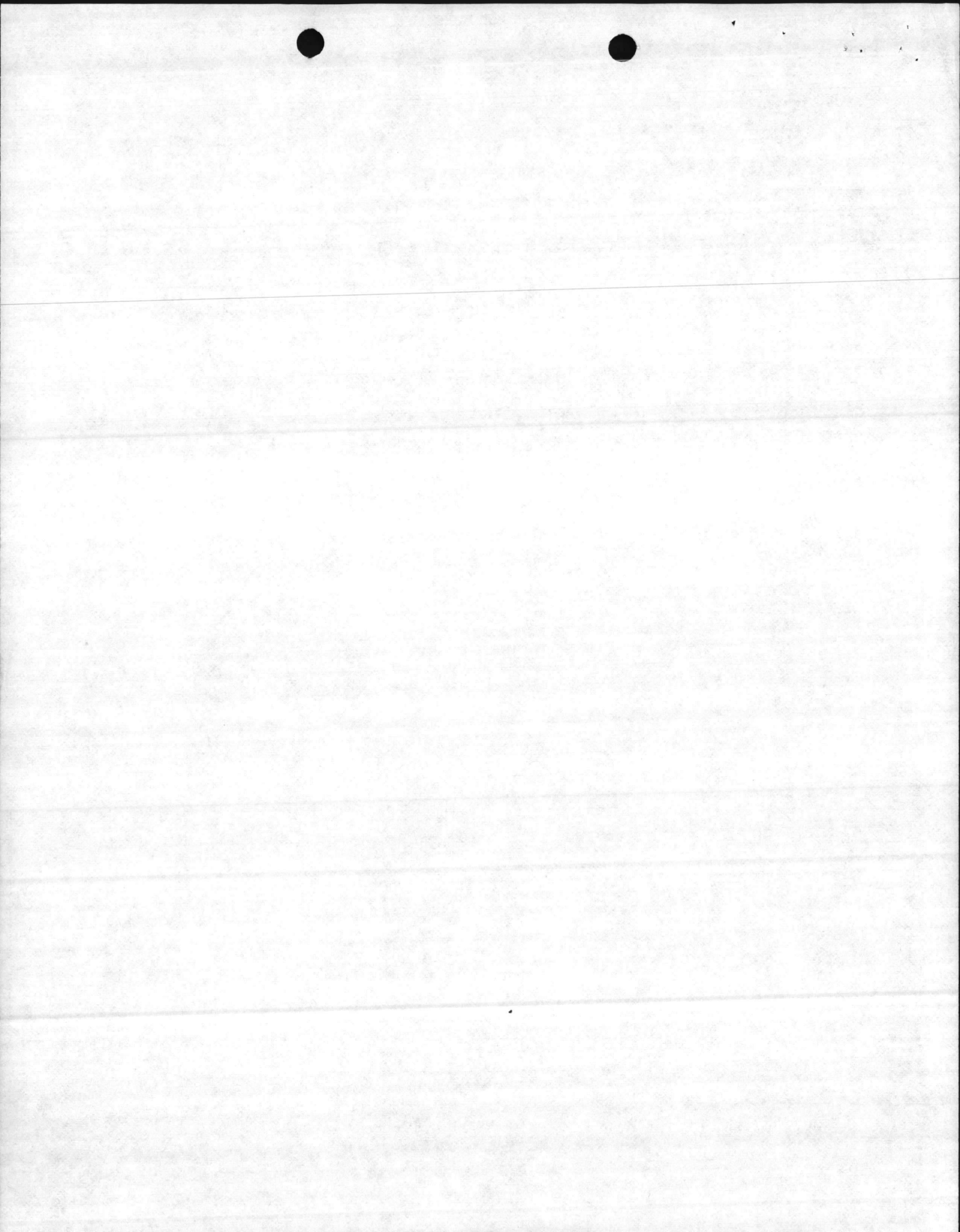
Observations

I went to AS 4020 on 8-29-84 and talked to the Police Sgt. We visited several rooms and found small amounts of mildew on ceiling of Bathrooms & on ceiling of sleeping rooms where air handlers had leaked. In Room 265 the wall by the sink is wet, apparently from a pipe leaking behind the wall. The exhaust vent in Bathroom was not removing any air. The exhaust fan apparently was not working. Room 234 did not have any visible signs of mildew but the humidity was excessively high. The duty room had mildew on ceiling where air handler had leaked.

Recommendations

I agree with all recommendations in Lantdiv study

# 126,200



Group 8

Bldg # AS 4015

POC

Sgt. James  
Cpl Terry

Observations

I visited AS 4015 on 8-29-84 and talked to the Police Sgt. We visited several rooms and found a small amount of mildew in one room.

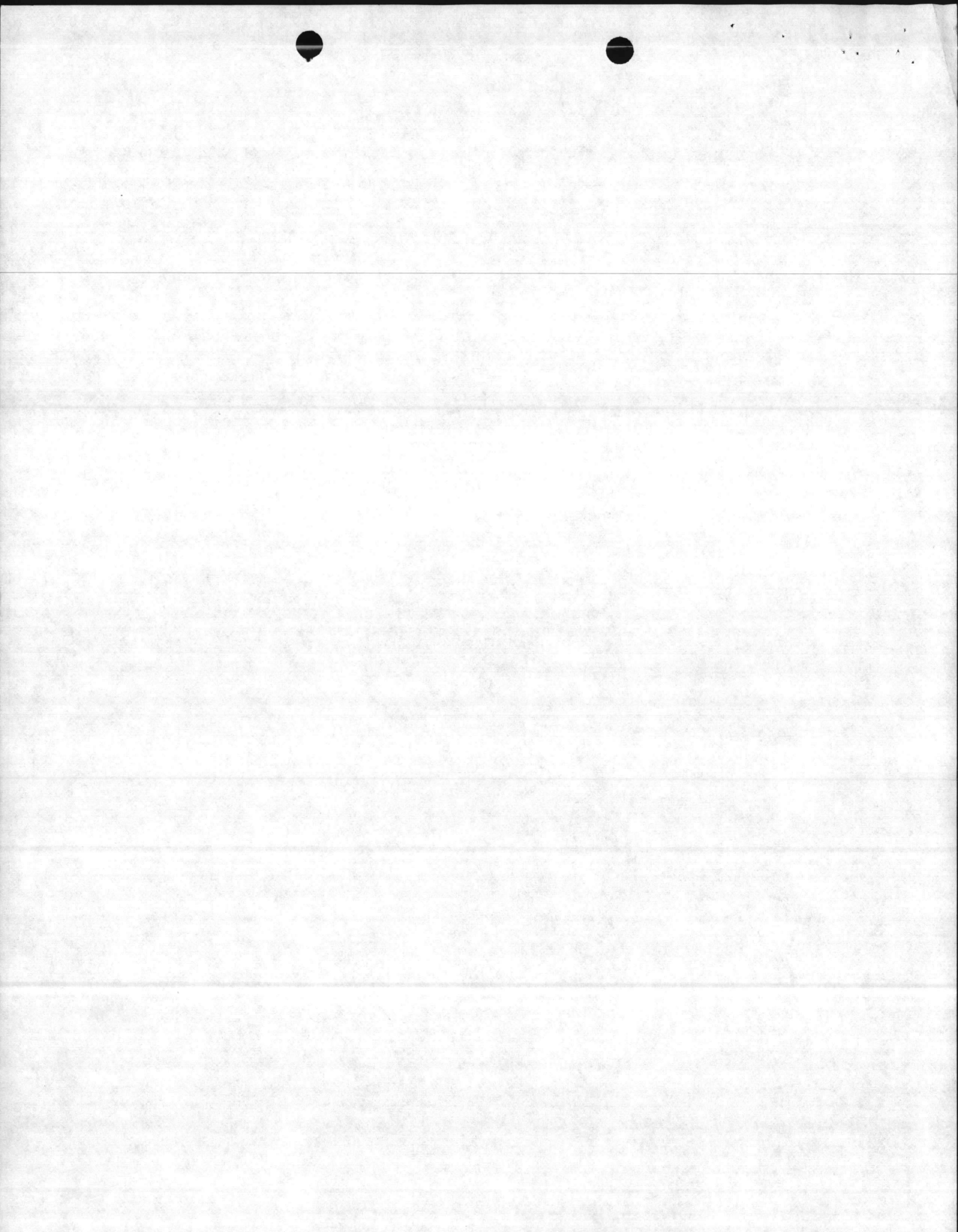
The central Bathrooms had small amounts of mildew on ceilings.

The lounge ceiling had plaster peeling from approximately 3' square area from apparent roof leak.

Recommendations

I agree with all recommendations in Lantdiv study

\$73,200.00





Group #5

Bldg # AS-4010

R.O.C.

Police Sgt. 1<sup>st</sup> Deck

McNeal

Police Sgt. 3<sup>rd</sup> Deck

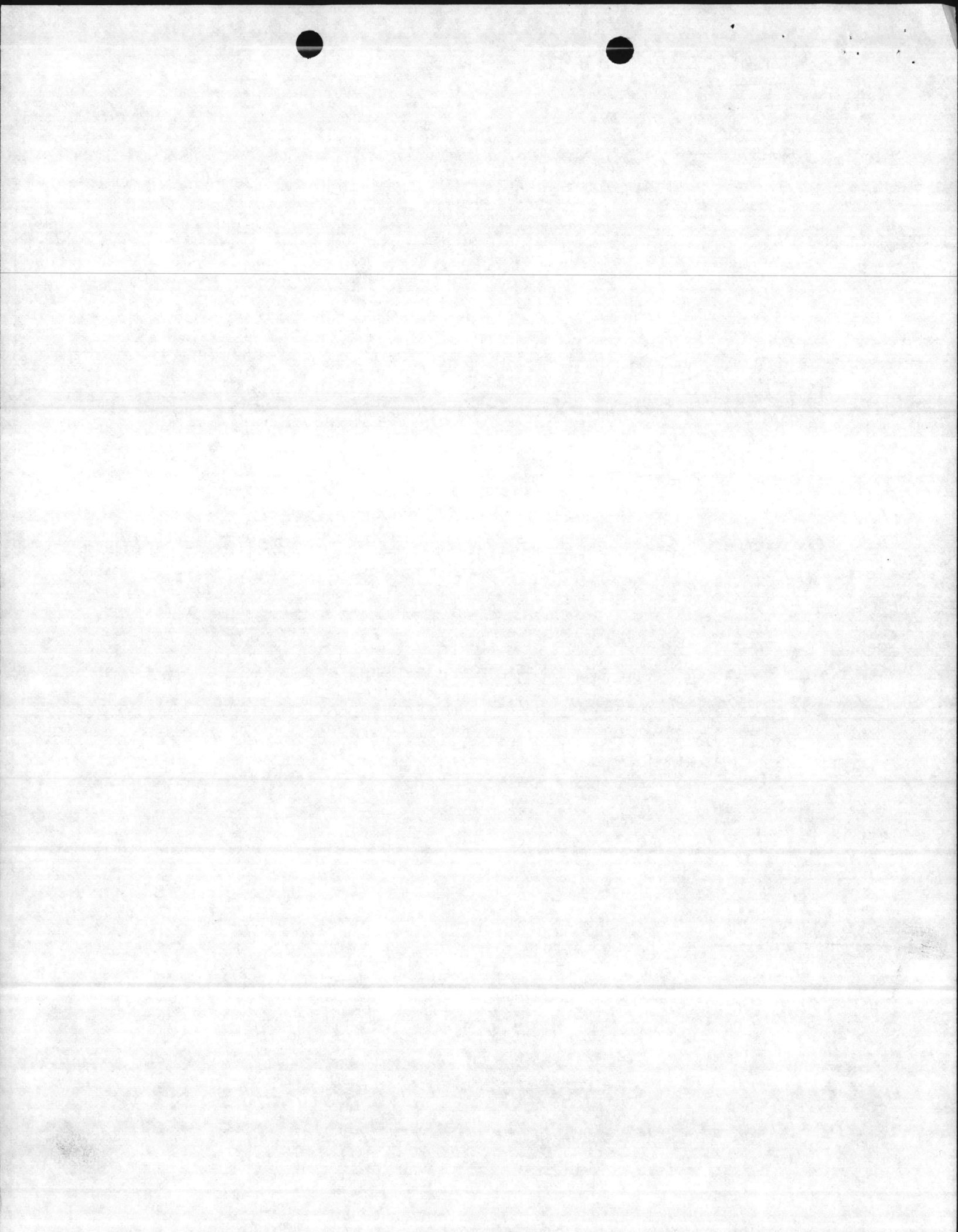
Huff

## Observations

I went to AS4010 on 8-21-84 and talked to the Police Sgts on First Deck & 3<sup>rd</sup> Deck. Neither of them knew of any mildew problem in any rooms, both said they had problems in the heads with mildew. The Air Cond. System was inoperative so I could not get any true humidity & temperature readings. I checked several rooms and found the blower scrolls & air handling coils needed cleaning. The drain pans also need cleaning. The filters in rooms 159 & 160 were removed from air handlers, this will cause coils & scrolls to stop up with dirt & lint in a short time. The 3<sup>rd</sup> floor air handlers do not have thermostats and there is no way to control the temperature in rooms other than cutting fan switch off.

## Recommendations

- ① I recommend that we clean Air Handler Coils & Blower scrolls and clean out drain pans & lines
- ② Add Thermostats to rooms that do have them to cycle units on and off to maintain a set point temperature

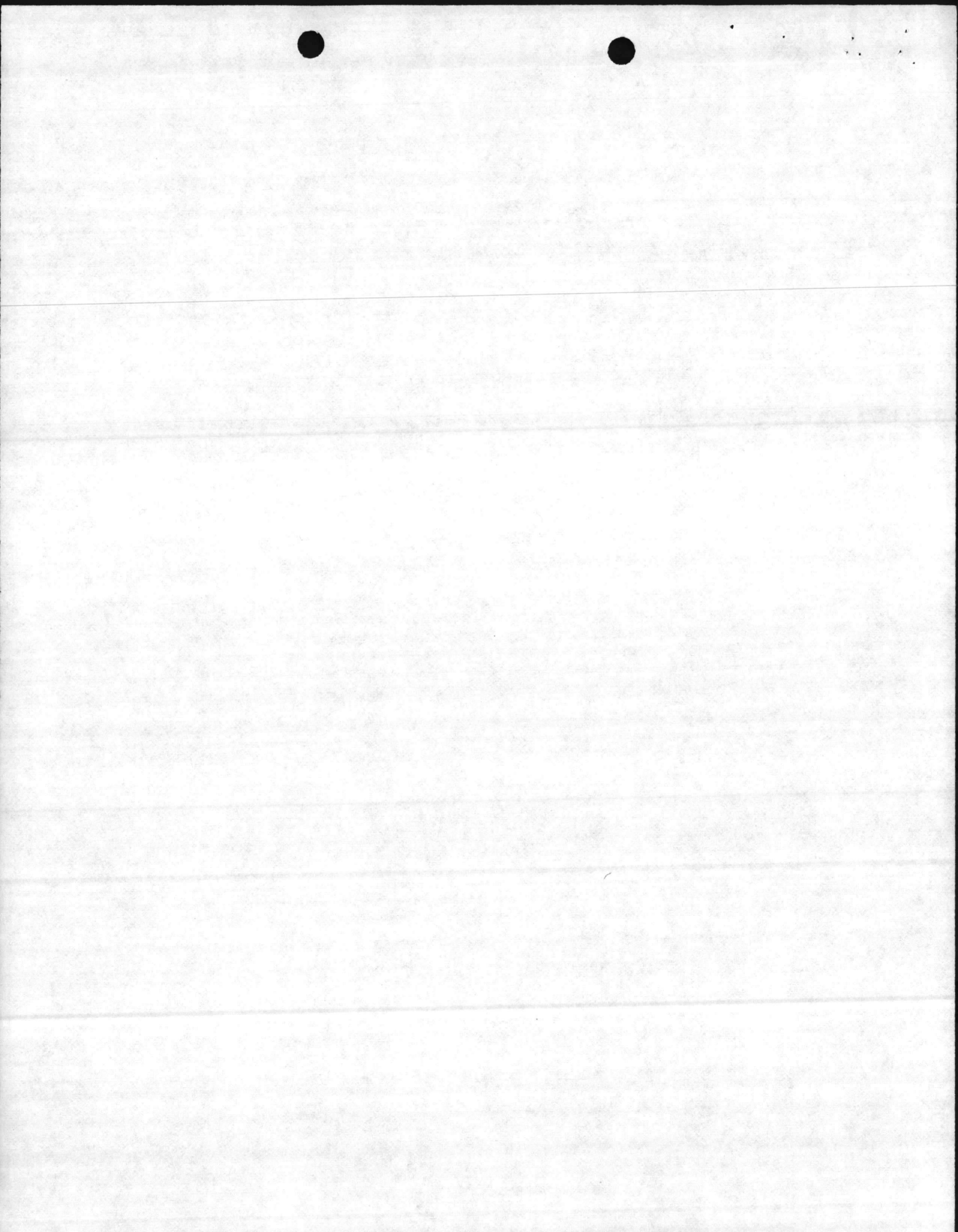


Bldg. # AS4010

Recommendations Cont.

- ③ Check & Service All Exhaust Fans From Toilet Areas and Keep Operational
- ④ Add make up Air handler with heat coils for winter operation to Toilet Areas
- ⑤ Keep Chillwater Temperatures Low Enough for Adequate Moisture Removal

Lantdiv Study Estimate \$115,200.00



Group # 2

Bldgs. # FC 414  
FC 415

POC. L.CPL. Roble  
POC L.CPL. Beaulieu

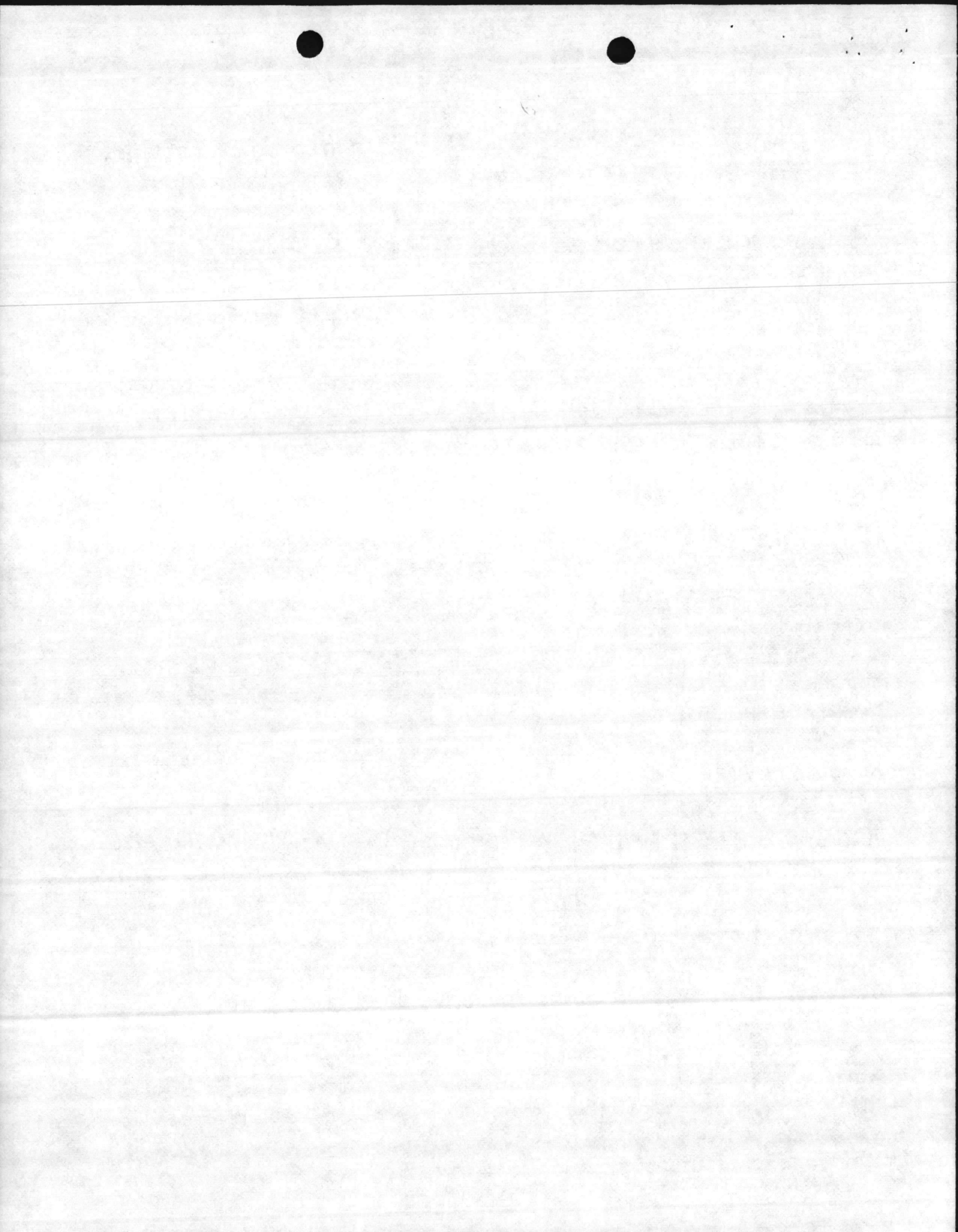
I went to FC 414 & 415 on 8-28-84 and talked to Police Sgts in each Bldg.

We visited Rooms 106 D & 106C in FC 415 and found the Blower screw & coil of Room Air handler stoped up with Lint & Dirt. The filter had been removed from unit. The Chill water Lines had Raged INSULATION and was Dripping on ceiling

There was small amount of mildew on ceiling of Bathrooms & on Suspended ceiling of Sleeping Rooms. The fresh air make up Air handlers were not working and several Exhaust fans were not running. I visited FC 414 and found same problems

### Recommendations

- ① Repair Exhaust fans for Bathrooms
- ② Repair & Place in Operation Fresh Air Make up Air handlers
- ③ IN Addition I Recommend we make Changes outlined in Landdiv Study  
\$48000.00



Group #1

Add Bldg 57 To This

Bldgs. HP 51 - HP 53 :-  
Bldg HP 55  
1140

POC Lt. Waldrop  
POC S-Sgt Spann

## Observations

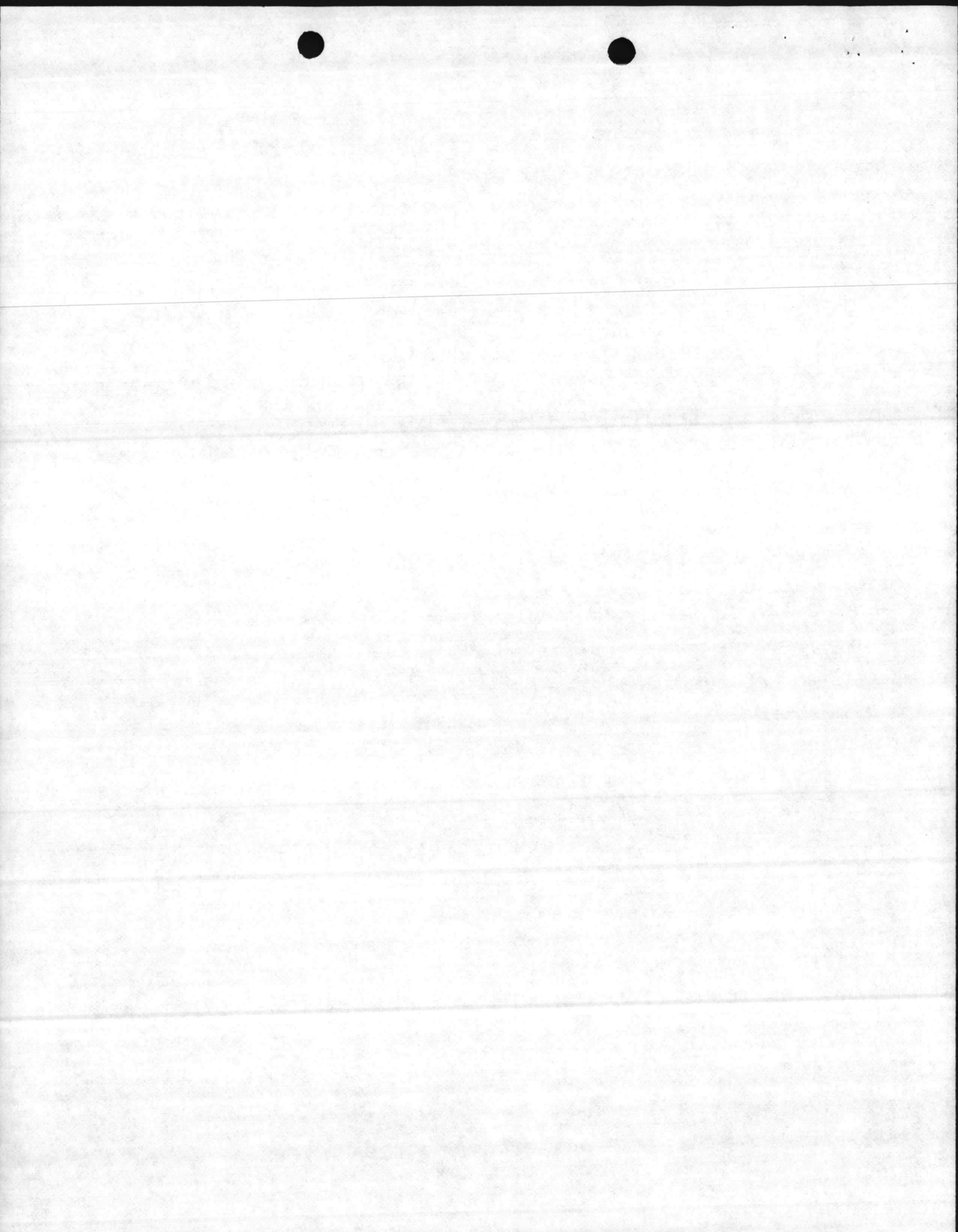
I went to Bldg. HP 51 & 53 on 8-22-84 and talked to the BEQ manager. We checked several rooms and found mildew on walls and ceiling of bathrooms and small amounts of mildew on ceiling below the air handling units, Room 103, 117, 226, 302. Need ceiling repair and insulation repair on chill water lines.

The exhaust systems for bathrooms are central ducted with 17 exhaust fans on roof. Some of these fans are not operating and several are not operating to capacity.

The make up air handlers on roof are not operating.

I went to Bldg. HP 55 on 8-23-84 and talked to S-Sgt. Spann. We visited rooms 112, 120, 122 and 119. The mildew problems were more prevalent than in Bldgs # HP 51 & 53. Only 2 of the 7 exhaust fans were working on roof and the fresh air make up fans were off.

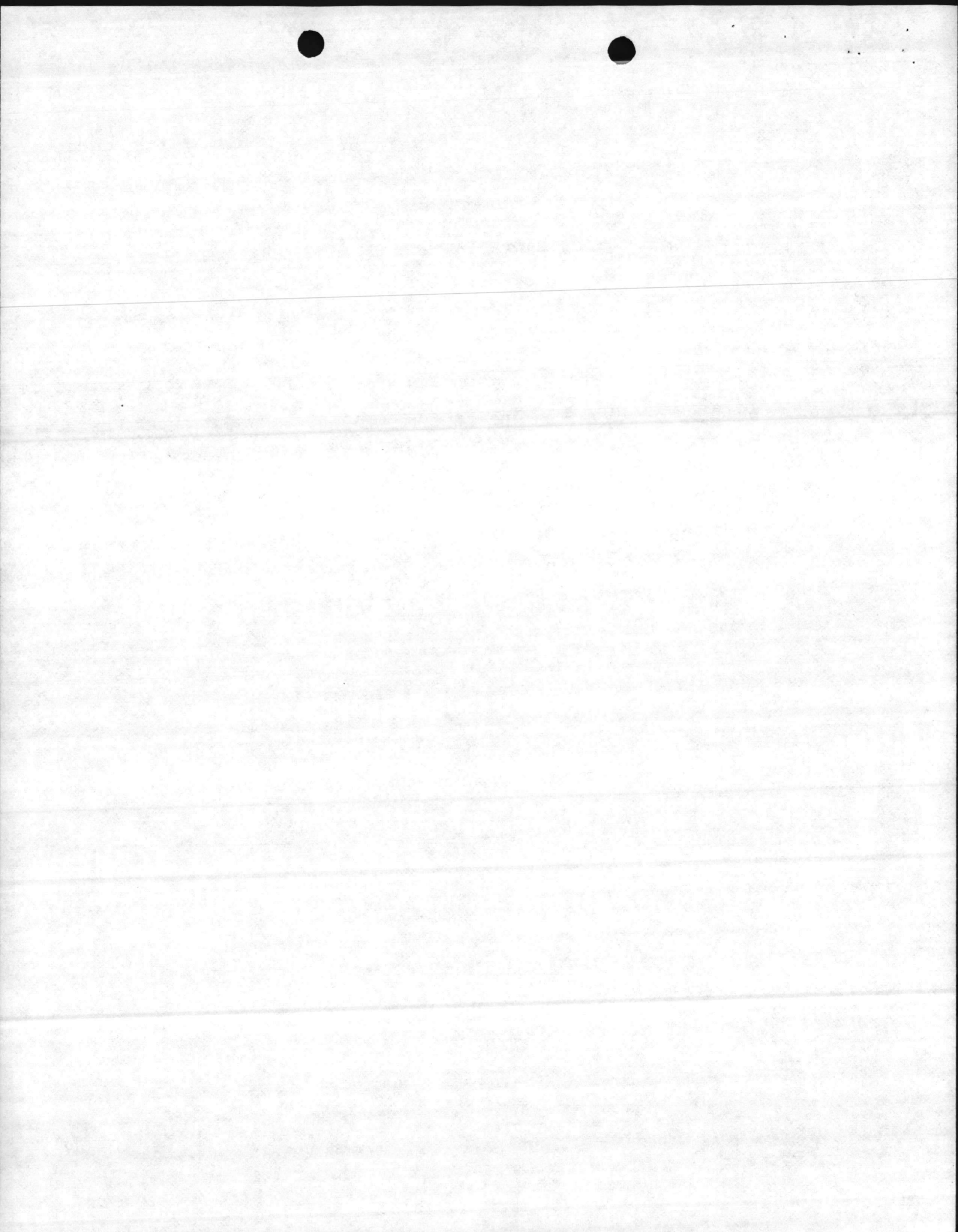
Bldg 1140 is designed the same as Bldg. 51 & has the same problems.





Recommendations - Bldg HP 51 - 53 - 55 - 57 & 1140

- 1- Repair Exhaust fans <sup>omit</sup> for Bathrooms and Adjust Air flow Cfm for Each Room
- 2- Repair and Place in <sup>omit</sup> Operation Fresh Air Make up Air handlers.
- 3- IN Addition I Recommend we make the changes outlined in Lantdiv Study - \$418,000.00
4. Ductwork Insulation <sup>omit</sup> on Roof Needs Repaired



Group #6

FC 311

POC Sgt Cuddeback

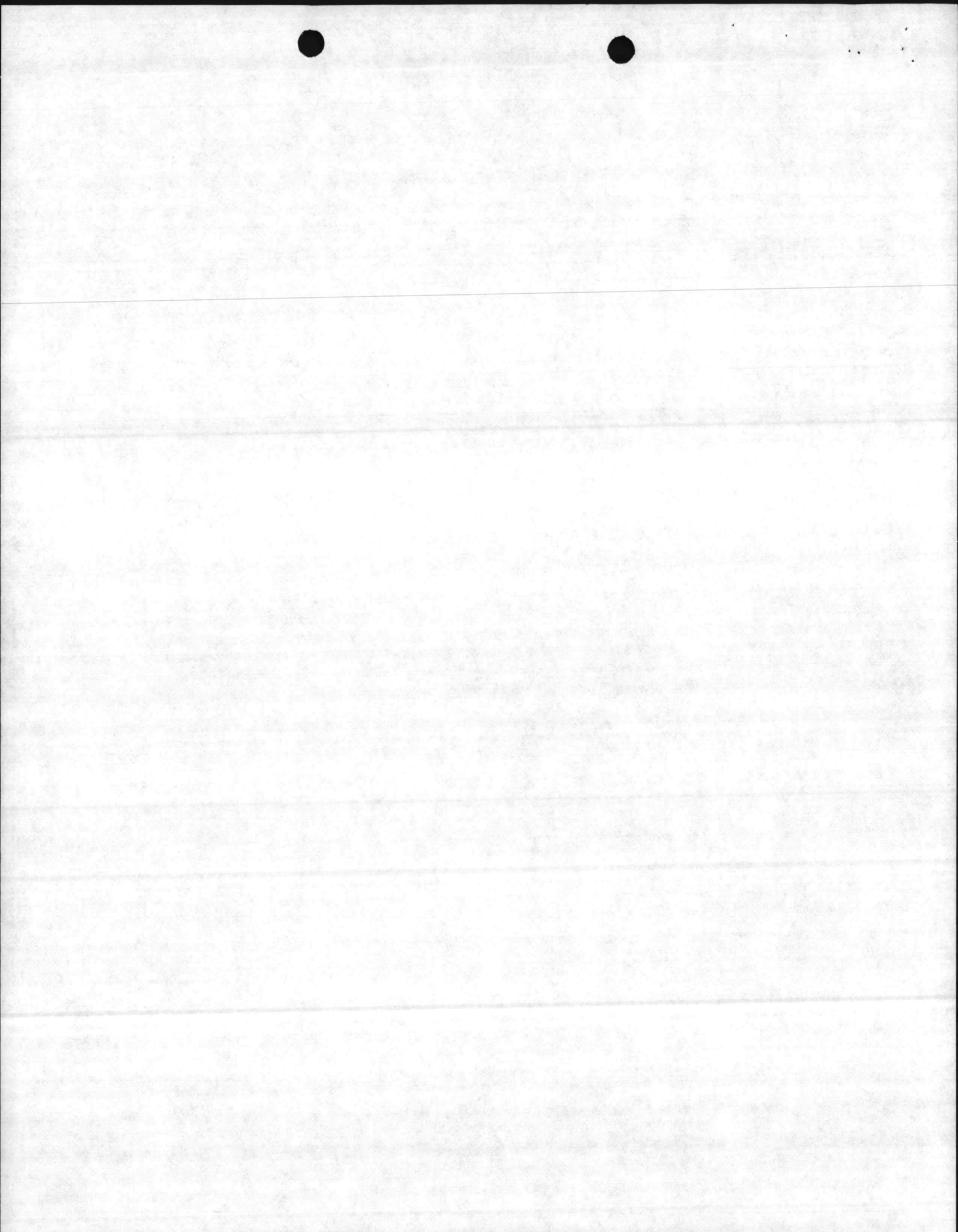
Observations

I visited Bldg FC 311 on 8-24-84 and talked to Sgt Cuddeback. This Bldg. has same design as FC 305 and has the same type problems

Recommendations

Same as FC.305

Do with maint. personnel



FC 309

POC Cpl. Travis  
First Deck

POC Cpl. Callicutt  
Second Deck

### Observations

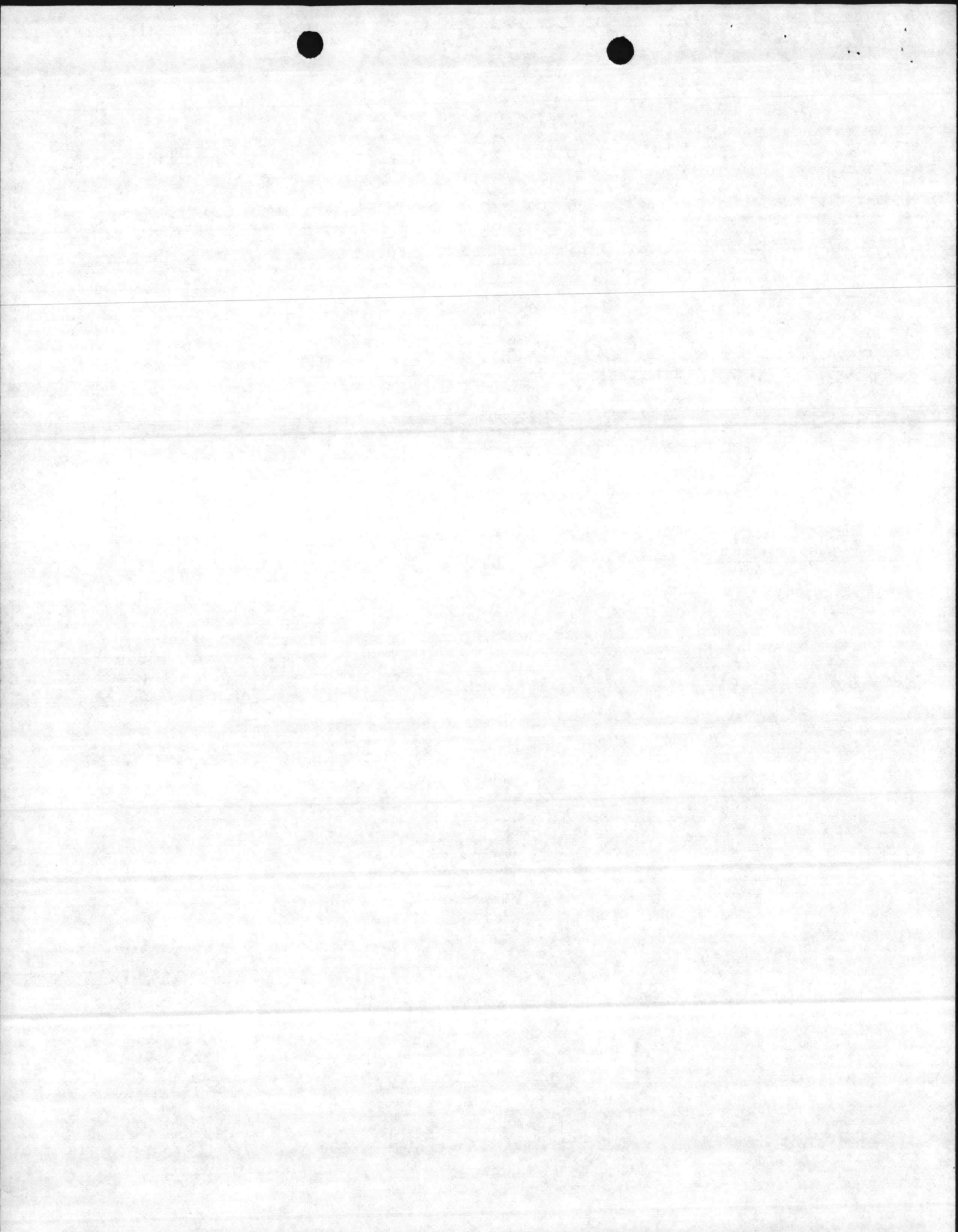
I visited Bldg. FC309 ON 8-24-84 and Talked to the Police Sgts. on First & Second Deck

This Bldg is of the Same Design as FC 305 and has The Same Type Problems

### Recommendations

Same as FC 305

Do with MAINT Personal



Bldg #  
FC 306

Poc Cpl. Gibson

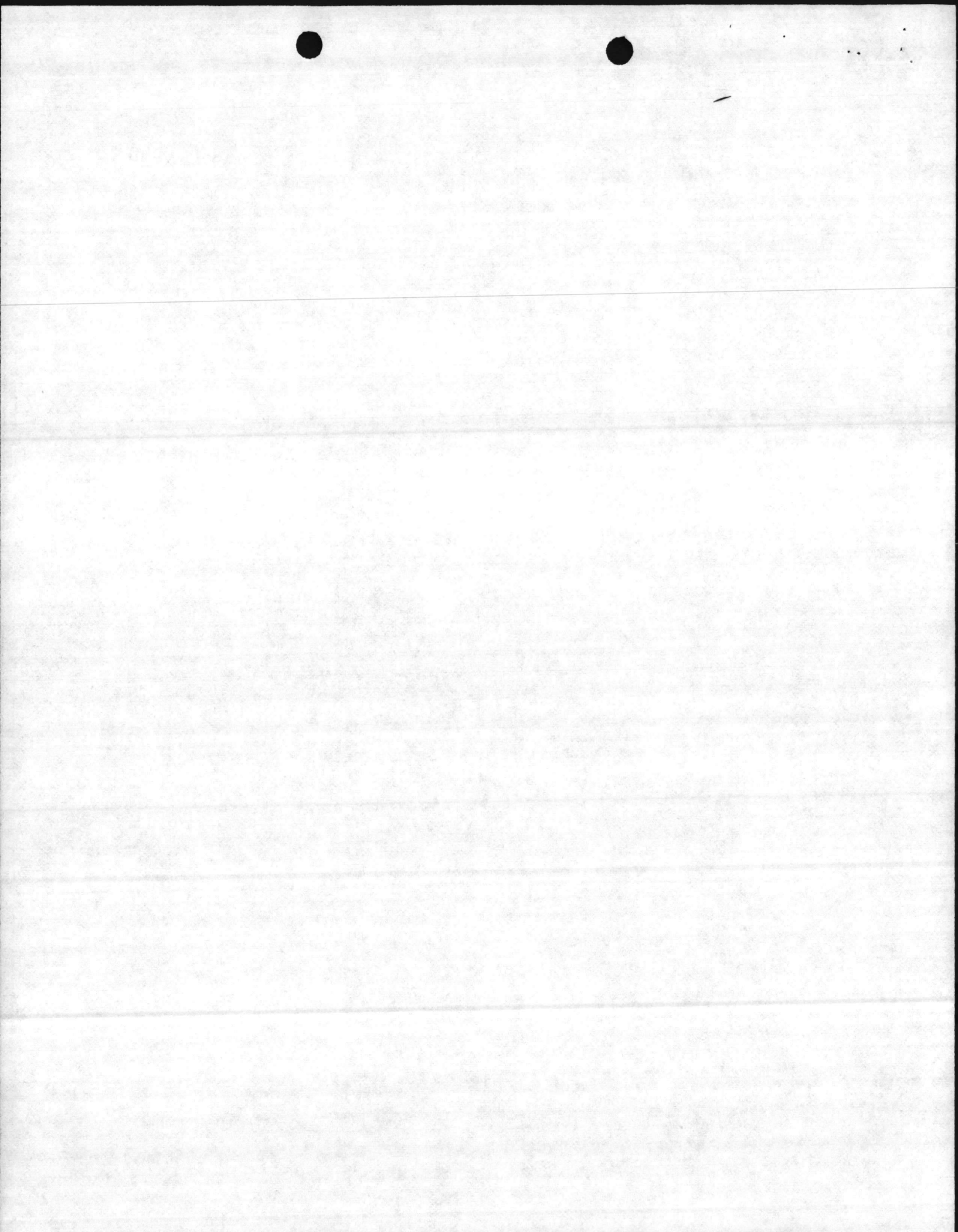
Observations

I visited FC 306 on 8-24-84 and talked to Cpl. Gibson and found the same problem as Bldg FC. 305

Recommendations

Same as F.C. 305.

Do with maint. personnel





FC 305

POC L-CPL D. Smith

### Observations

I visited Bldg. FC305 ON 8-24-84 and Talked to Police Sgt. L, Cpl Smith. He Said They had not had any Complaints of Mildew Problem in Sleeping Rooms With the exception of where Fan Coil unit had Leaked. I checked several Room & Saw no Evidence of mildew.

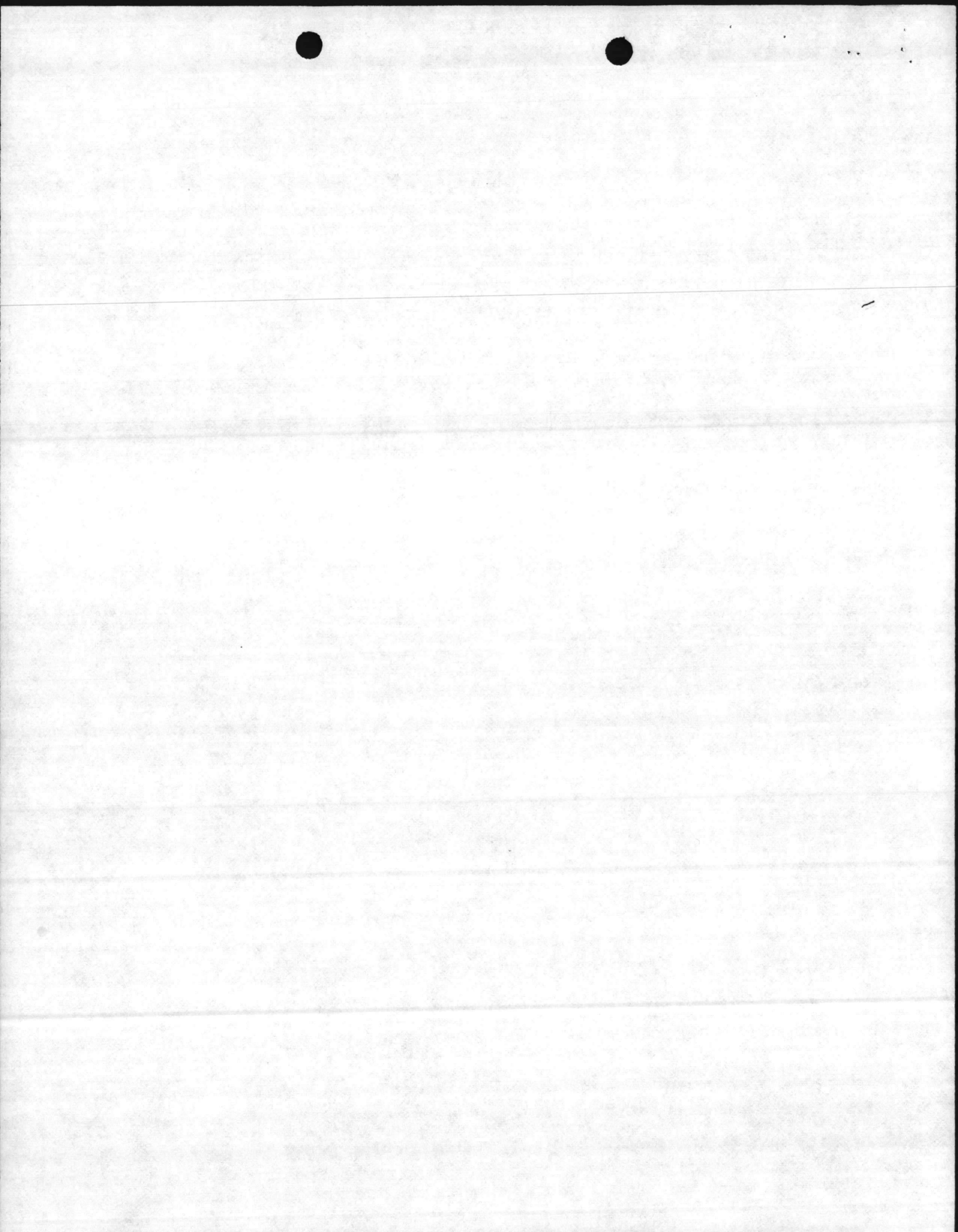
The Centrally Located Toilet & Shower areas had mildew in several locations on Ceilings & walls

### Recommendations

I Agree with Recommendations in Lautdiv Study To Repair Exhaust fans in Bathrooms and Rebalance Air flow.

I Also Recommend we set up a maintenance program to check & service Exhaust fans on a Regular Basis

Do with maintenance Personnel



Group #3

Bldg. # 1042

POC. S.Sgt. Downs

### Observations

I went to Bldg # 1042 on 8-23-84 and visited Rooms 113 - 114 and Room 116. I found no Evidence of mildew in Sleeping Rooms. The Bathrooms had Large Amounts on Ceiling & Walls.

Fresh Air. is Induced in Bldg Thru Ductwork from Outside to Each Room Fan Coil unit Return Air duct.

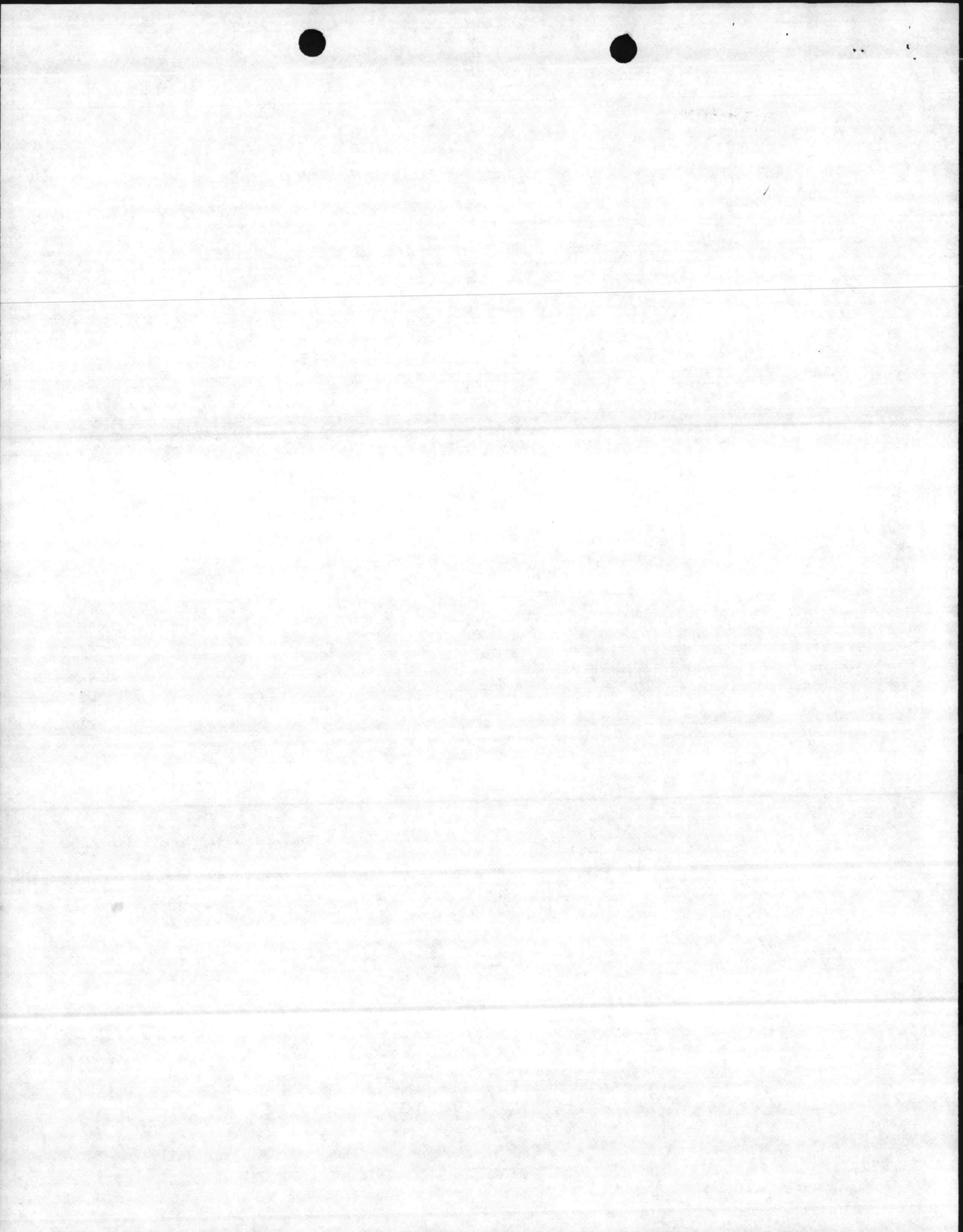
Exhaust Air from Each Bathroom Fan is Connected to a Common Duct Riser.

There is not a plumbing Chase in Bldg. The Dual Hot & Chill water lines Run Above Suspended Ceiling with Air handling units

### Recommendations

I Agree with Recommendations Outlined in Landdiv Study

\$42,900.00



... Group #3

Bldgs # ~~HP 550-560~~

FC 520 - 525 - 530 - 550 - 555 - 560

P.O.C. Gy. Sgt Palmer

I went to F.C. 520 on 8-27-84 and Talked to Gy Sgt Palmer, we visited several rooms and found small amounts of mildew on ceiling of Bathrooms & Sleeping Rooms. The Exhaust fans in Bathrooms are turned ON with light switch and are ducted to a common duct system in pipe chase, The make up Air for Exhaust System is by Infiltration.

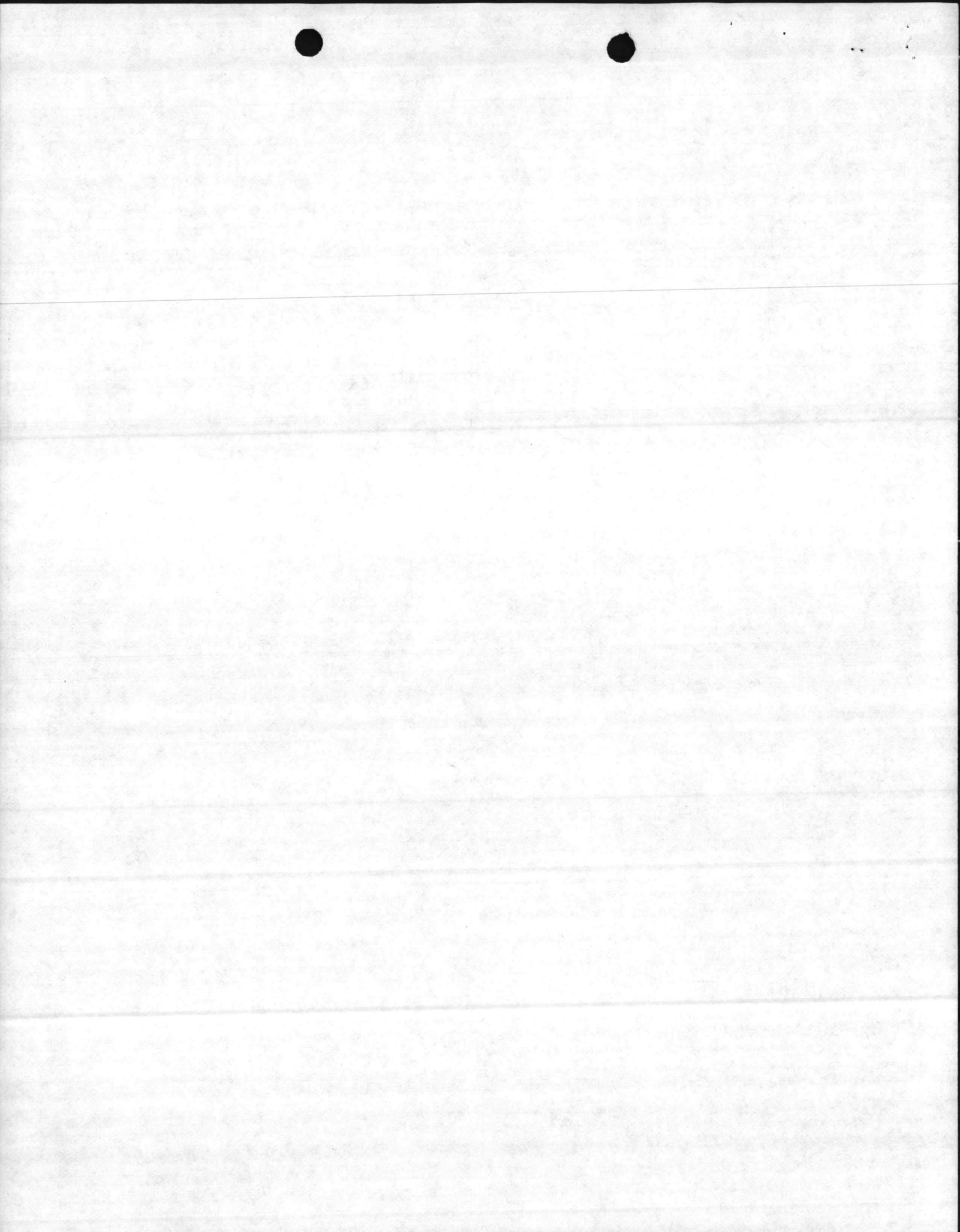
FC 525 - 530 - 550 555 & 560 are of identical construction and have the same problems

### Recommendations

- 1) I Recommend we Set up a P.M. Program to check Exhaust fans monthly
- 2) I Agree with the Recommendations suggested in Loutdiv Study

6 Bldgs at 42,900.00 Each

~~\$~~ 257,400.00



Group # 3

Bldg # HP 550

Bldg # HP 560

Observations

POC PFC Moody

POC L. Cpl Kath

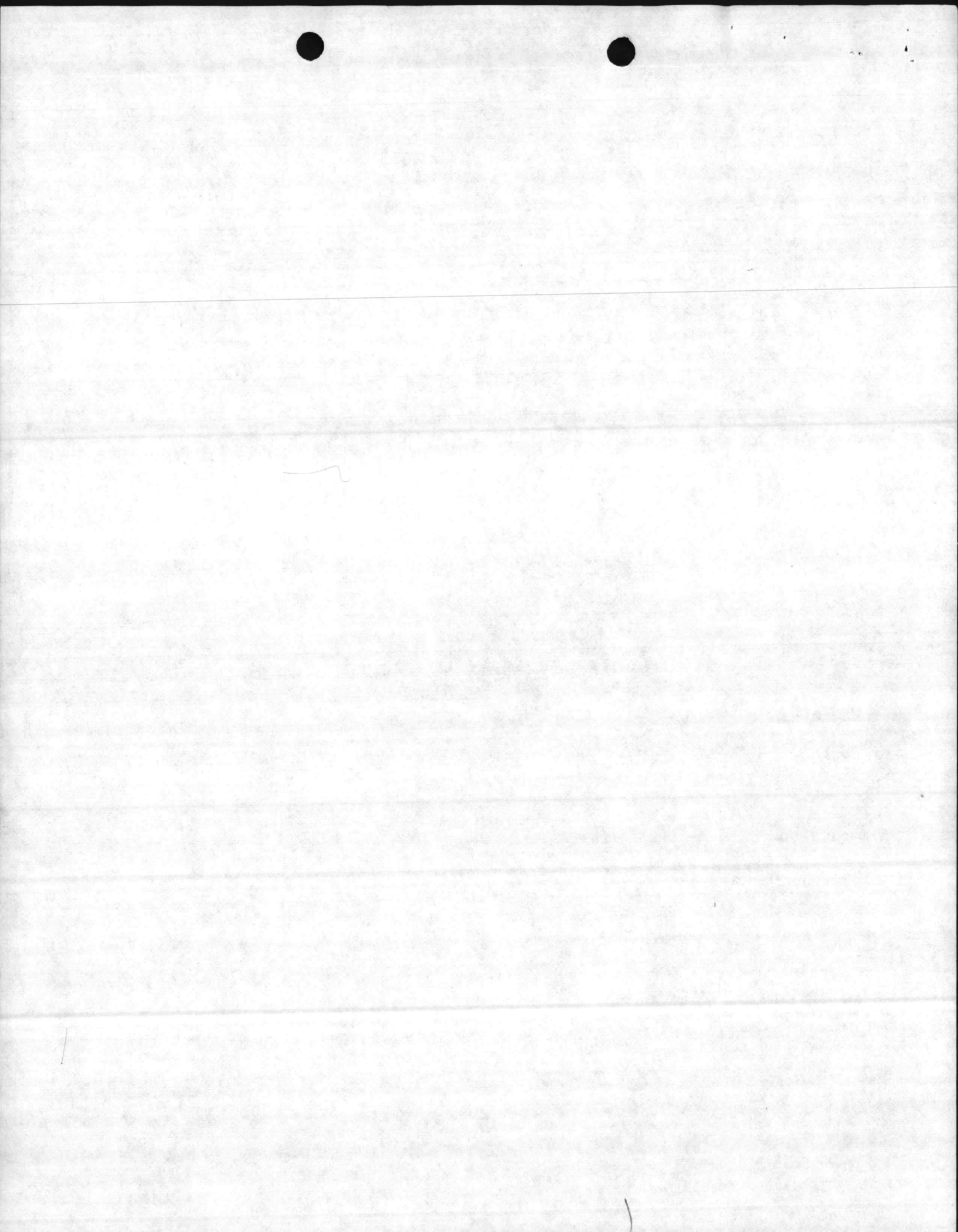
I visited HP 550 & 560 on 8-23-84 - and visited several rooms at each Bldg. I found evidence of mildew problems in rooms 105-104-130 at Bldg HP 550 and rooms 224-218-215 at Bldg HP 560, There was evidence of some water leaks from piping in several of the pipe chases. The bottom deck chase at HP 560 had water standing thro length of Bldg.

Recommendations

- ① I agree with all recommendations in lowtdiv study
- ② I also recommend we repair water leaks in pipe chase

2 Bldgs at \$42900.00 EA.

\$85800.00





Group # 9

Bldg # 896 - 897 - 898

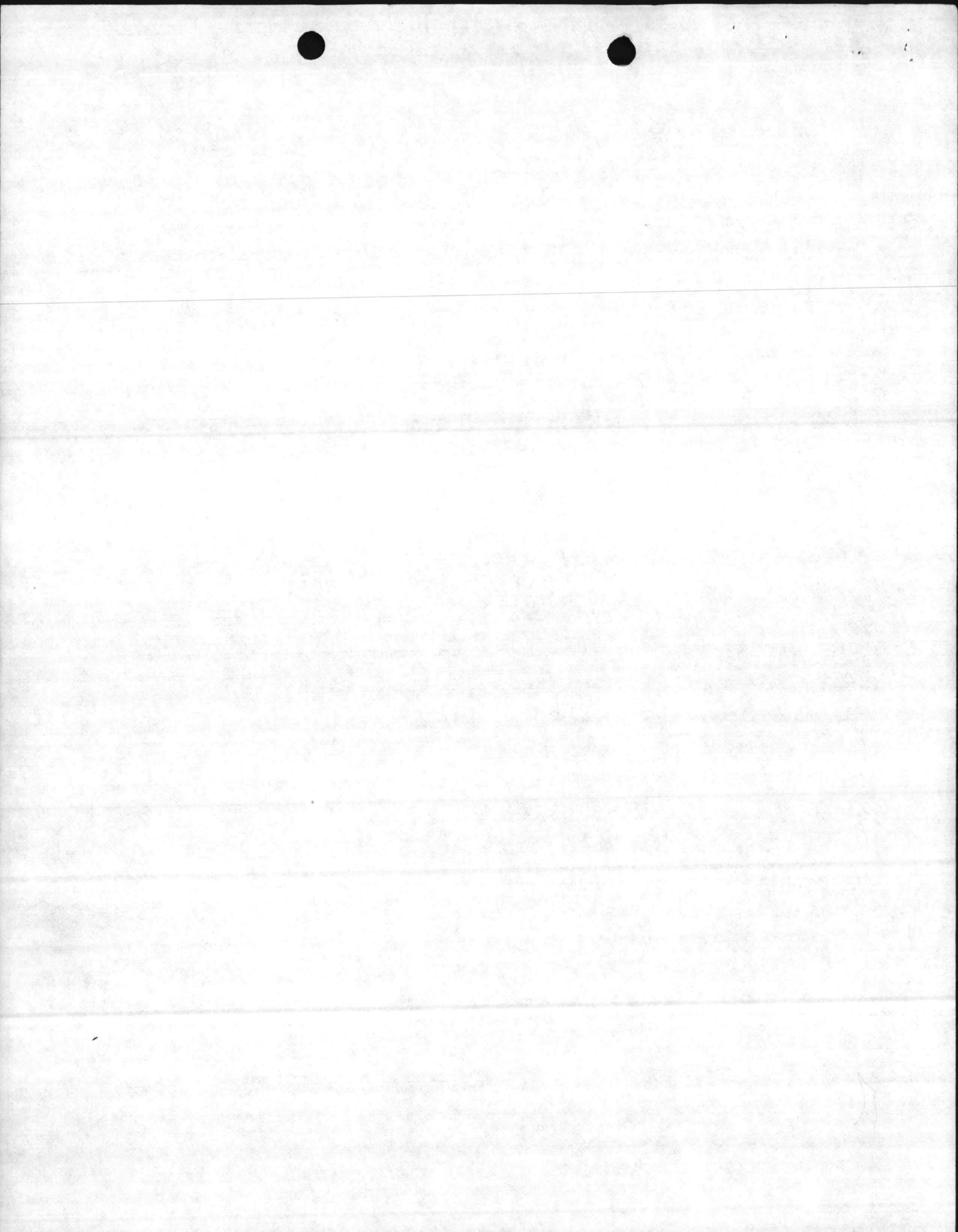
POC. Mrs Zihar  
Mr Kincaide

### Observations.

Went to Hostess house on 8-16-84 Talked to Mr Kincaide & Mrs Zihar, I did not notice any evidence of mildew or humidity problems in rooms, I did notice wet ceiling tiles in kitchen area where air handling units and chill water lines had been leaking. The drain pans were partially filled with algae, lint, & dirt. The fans & coils were dirty and needed cleaning. The insulation on drain lines and chill water lines were in bad shape and needed replacing. When the Bldgs. were renovated and ceiling was replaced in kitchen area with 2'x2' ceiling tiles in a suspended ceiling, the filter grills were installed in ceiling tiles and were not connected to return of air handlers. This leaves large cracks and openings above ceiling and does not permit all of the return air to be filtered.

Mr Kincaide said he had not noticed any of the windows sweating after exhaust fans had been added to bathrooms during renovations.

There is not enough water flow thru heating & cooling coil in Bldg. # 896 to heat or cool Bldg. properly



Bldg. # 896-897-898

### Reccomendations

- ① I Reccomend that we Clean Air handler Coils and Blower scrolls, And Clean Drain pans & Repair Leaks in Drain pans,
- ② ReInsulate all Chill water & Drain Lines From Air handlers to Chase.
- ③ Install Ductwork from filter Grills to Air handler so Air handler does not Pull Air from Above Ceiling
- ④ Replace Circulating pump with Larger Unit to Move more G.P.M.<sup>s</sup>
- ⑤ I Believe the exhaust fans Added to Bath Rooms have helped the Humidity Problems but I Agree with The Kantdiv Study to Provide A new Outside Air Ventilation System to Supply Conditioned Outside Air directly to the Conditioned Space.

Bldgs 897 & 898 = \$79700.00

Bldg. # 896 Group # 10 = \$600.00

