

Shippensburg University

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Telecommunications Renovation Feasibility Study

Project: SU-2004/14



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Final Submission

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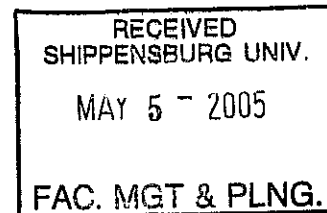
Attachment A: University Existing Manholes (Including Conduit Entry & Associated Photos)

Attachment B: University Existing Buildings (Including Conduit Entry & Associated Photos)

Attachment C: Detailed Cost Estimates

Drawing E-1 – Site Plan - Existing

Drawing E-2 – Site Plan - Proposed



EXECUTIVE SUMMARY

In order to maintain and improve the university telecommunications distribution system at Shippensburg University, Entech Engineering, Inc. was asked to study and review the telecommunications underground distribution system. As part of the study, Entech updated the university telecommunications site plan identifying the general location of manholes, building entrance areas, and ductbank routing between buildings and manholes. As part of the survey, existing manholes and individual building telecommunications equipment rooms were observed and documented.

As part of the study, the University master plan was reviewed. Development of new buildings and improvements to existing facilities were identified in order for the university to make proper decisions for routing future telecommunications systems.

In general, the telecommunications underground distribution system is in relatively good condition. Some manholes have drainage problems, while others have relatively no conduit spare capacity for future requirements. The overall distribution system appears to be maintained and upgraded as needed to provide adequate telecommunications support throughout the university.

However, there are some areas where upgrades to the underground distribution system can be made to enable the system to continue to meet the requirements of the University as the telecommunication system develops and grows.

The following table lists the underground distribution upgrade/improvement recommendations and the associated cost. These cost projections are in current dollars for the year 2005. Budgets developed utilizing this information should be increased to reflect the year in which the work will actually be completed.

UPGRADES/IMPROVEMENTS		ESTIMATED COST
1)	Manhole Upgrades Total (Including O&P, Professional Services, Contingency)	\$204,490
2)	Administration System Identification Upgrades Total (Including O&P, Professional Services, Contingency)	\$303,600
3)	New Telecommunication Manhole and Ductbank System Total (Including O&P, Professional Services, Contingency)	\$1,159,630
Total		\$1,667,720

INTRODUCTION

On September 23, 2004 Entech Engineering Inc. began work documenting the existing underground telecommunications distribution system at Shippensburg University. The purpose of this work was to develop an accurate telecommunications distribution site plan, along with a proposed telecommunications distribution site plan incorporating known future university additions provided from the University Master Plan. The following is a brief description of the existing distribution system along with recommendations for distribution system renovations and additions to better serve the university into the future.

SYSTEM DESCRIPTION

The telecommunications distribution system at Shippensburg University currently initiates from two separate buildings within the University. The distribution of the telephone system initiates from the Centrex Building, while the distribution of the data system initiates from the Mathematics Computer Technologies Center. Both systems are routed throughout the university via a manhole/ductbank system. Manholes have been strategically placed to accommodate conduit ductbanks routed from one building to another. Drawing E-1 represents the existing telecommunications distribution system layout including individual manholes & ductbanks routed between manholes and buildings throughout the University. Existing manholes are identified by a numerical value (Example: MH - #) as designated on the drawing. Cabling type & quantity as designated on the drawing (Example: C####, F##, & CO/C/F) was provided by the University, but was not verified as part of the telecommunications system renovation planning study.

Attachment "A" included with this report represents documentation of all the existing manholes located throughout the University that were surveyed as part of the telecommunications system renovation planning study. The manholes are sorted by a numerical value. Photographs, conduit entry & capacity within each manhole, and building proximity are identified for each manhole surveyed.

Attachment B included with this report is a listing of all existing University buildings that were surveyed as part of the telecommunications system renovation planning study. The buildings are sorted alphabetically by building name. Photographs, conduit entrance within each building, and telecommunications equipment rooms are identified for each building.

SYSTEM ASSESSMENT

Existing University Buildings & Manhole System & Administration System Identification

Based on the visual inspections conducted during Entech's site survey, the underground ductbank & manhole system and building telecommunication entrance equipment rooms appear to be in good condition. However, the following observations were made:

1. Manholes with water infiltration or flooding.
2. Manholes and ductbank systems with insufficient capacity to add or route future cabling.
3. Debris and/or Abandoned cabling within existing manholes and/or duct system.
4. Blocks added to throat of manhole to raise the manhole even with new paved road.
5. Inaccessibility of manholes or buildings during site survey.
6. Manholes that require concrete patching.
7. Inconsistent telecommunication administration system for the underground ductbank system and telecommunication equipment rooms located within each building.

In general most of the observations listed above are obvious; however, a consistent telecommunication administration system is essential. The administrative system although not obvious, it provides both operational and maintenance benefits as follows:

Operational: An effective administration system simplifies moves, additions, and modifications by allowing the work details to be determined in advance and then carried out with minimal guesswork. Labeling conduits and keeping updated records of conduit use greatly simplifies determining whether unused conduit capacity is available and, therefore, the best routing for new cables.

Maintenance: Maintenance is simplified because the components involved in the failed telecommunications channel can be easily and quickly identified during troubleshooting and repair activities.

Infrastructure administration requirements generally follow the recommendations of the administration standard ANSI/TIA/EIA-606. However, since the scope of ANSI/TIA/EIA-606 does not include equipment administration, the University should determine the best method of recordkeeping to identify the overall University telecommunications system.

The administrative system usually consists of three basic elements as listed below:

1. Labeling or other means of identifying the infrastructure components and equipment.
2. Computer or paper-based recordkeeping system, which tracks the location, use, and status of the infrastructure components and equipment.
3. An alphanumeric scheme (called linkages) used both in labeling and in the record system that defines the relationship and allows cross-referencing of the equipment and components.

In addition to the administration system issues listed above, Table 1 below lists these specific observations made at buildings and manholes during the site survey.

TABLE 1	
Area	Observations
Manholes: # 2,4,8,9,13,15,16,18,21,24,29,30,32,37A,46,49,50,51, 54,55,56,60,61	Water Infiltration or Flooding
Manholes: #22,23,35,37A,42	Manholes with Insufficient capacity to add or route future cabling
Manholes: #2,3,5,6,8,9,10,11,14,15,16,17,22,23,24,28,29,31, 33,34,35,37,38,43,44,45,46,50,51,52,53,54,55,56,58, 59,60,61	Debris and/or Abandoned Cabling
Manholes: #1,2,3	Blocks added to throat to raise manhole even with road
Manholes: #2,25,50A,37 (#57-not utilized) Buildings: Seth Grove Stadium, Bookstore, Instructional Arts Facility	Inaccessibility of manhole or buildings during site survey
Manholes: #3,4,6,15,17,22,23,29,32,37A,41,46,47,52,53,54,55, 56,59,62	Manholes that require concrete patching and/or sealing around exterior of conduits.

New Manhole & Ductbank System - Future Expansion

The University has plans for the following future additions to the Campus:

1. A new 82,200ft² Instructional Arts Facility.
2. A 34,000ft² addition to the Heiges Field House.
3. A 10,500ft² addition to the Ezra Memorial Library.
4. A 30,000 ft² addition to the Cumberland Student Union.
5. A new 63,500 ft² Recreation Center.

Based on the visual inspections conducted during Entech's survey of the existing underground distribution system, provisions for additional manholes and conduit ductbank systems are needed to accommodate the future building additions & expansions proposed by the University. Attached drawing E-2 (Site Plan – Proposed) indicates known future University building additions & expansions, and also indicates proposed new manholes & routing for new underground conduit ductbanks.

The University also has projects that are currently in the feasibility phase that could impact the current telecommunication distribution system. These items are listed below:

The University has a project currently under design which will add two four inch conduits to provide additional services to Rowland Hall and Shearer Hall. The conduit pathway will be routed from the Centrex Building through manholes #12, #13, #14, & #16, ending at manhole #17 located adjacent to Shearer Hall. The project construction will start in the fall of 2005.

The University is currently reviewing a feasibility study to renovate and possibly expand Reisner Dining Hall. The expansion size and exact location of the expansion have not been determined. The expansion in all probability will be directed southeast toward Naugle Hall. Attached drawing E-2 (Site Plan – Proposed) indicates proposed new manholes & routing for new underground conduit ductbanks to Reisner Dining Hall, but does not show the size of the building expansion, since it is still not determined. The new conduit ductbank to Resiner Dining Hall shall be connected to the new manhole adjacent to Ezra Lehman Library, and then routed via existing manhole #33 to a new manhole #32 located outside of the building expansion. Existing manhole #32 would have to be removed as part of the building expansion. New manhole #32 would have to be provided and the actual location of the manhole would have to be coordinated with the building expansion layout.

RECOMMENDATIONS

The following recommendations are based on Entech's survey and assessment of the existing telecommunications distribution system. Included with each recommendation is an estimate of probable construction cost. Detailed cost estimates are included in Attachment C of this report.

Existing University Buildings & Manhole System

The following should be completed to improve performance of the manhole and ductbank distribution system:

1. Eliminate water infiltration and flooding in existing manholes.
2. Remove Debris and Abandoned cabling from existing manholes and/or duct system.
3. Patch concrete and/or seal around conduits in existing manholes where indicated.

The approximate cost to implement these corrections is \$204,490.

Administration System Identification

As part of the site survey work, a visual administrative system assessment of the existing telecommunications cabling routed within the underground ductbank distribution system and each building telecommunication equipment room was performed. There appears to be an inconsistent administrative documentation system utilized throughout the University. A new more effective and operational administrative system would benefit the University for present and future requirements. Cabling type, quantity, and routing was not verified as part of this study, but is a critical part of the documentation system.

The approximate cost for the telecommunications Administrative System documentation would be \$303,600.

New Manhole & Ductbank System – Future Expansion

Based on the University's future plans for additions to the Campus, drawing E-2 (Site Plan – Proposed) was developed to show proposed telecommunications distribution system pathways to accommodate the future buildings and renovations to existing buildings. New manholes & ductbanks are shown along with utilization of existing manholes to supply adequate underground pathways for proposed and future desires.

The approximate cost for the new telecommunications distribution system would be \$1,159,630.

Cost associated with Rowland Hall & Shearer Hall additional services conduit pathway routing is part of another project and has not been included in the new telecommunications distribution system cost estimate.

Cost associated with the possible expansion of Reisner Dining Hall has been included in the new telecommunications distribution system cost listed above.

Construction Phasing Plan

To facilitate implementation the recommendations within the Telecommunications Renovation Feasibility Study, the University should complete the proposed installations and upgrades in phases. The allocation of money for upgrading the existing distribution system & implementation of the proposed new ductbank system may be extended over time. The proposed phasing of work is based upon immediate and future requirements as follows:

Phase 1

Route new manholes & underground ductbanks between the Centrex Building and existing manhole #39. The work consists of five new manholes and various new underground ductbanks between these manholes. Refer to Phase 1 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 2

Install an underground ductbank routed between existing manhole #39 and the new manhole located adjacent to Recreation Center. The work consists of a new underground ductbank routed between the existing and new manhole containing six 4" conduits. Refer to Phase 2 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 3

Installation of new manholes & underground ductbanks routed between the new manhole located adjacent to the Cumberland Union Building and new manhole #32. The work consists of various new underground ductbanks between the new & existing manholes. Refer to Phase 3 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 4

Provide new manholes & underground ductbanks routed between the new manhole located adjacent to Mathematics/Computing Technologies Center and existing manhole #50 and Mathematics/Computing Technologies Center. The work consists of various new underground ductbanks between the existing manholes. Refer to Phase 4 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 5

Route new underground ductbank from the new manhole located adjacent to Ezra Lehman Library to the future building addition of the Ezra Lehman Library. The work consists of a new underground ductbank routed between the new manhole and the building addition containing four 4" conduits. Refer to Phase 5 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 6

Install a new underground ductbank from the new manhole located adjacent to Cumberland Union Building to the future building addition of the Cumberland Union Building. The work consists of a new underground ductbank routed between the new manhole and the building addition containing four 4" conduits. Refer to Phase 6 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 7

Provide a new underground ductbank from the new manhole located adjacent to Recreation Center to the future building addition of the Heiges Field House. The work consists of a new underground ductbank routed between the new manhole and the building addition containing four 4" conduits. Refer to Phase 7 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 8

Route a new underground ductbank from the new manhole located adjacent to Recreation Center to the future Recreation Center. The work consists of a new underground ductbank routed between the new manhole and the Recreation Center containing four 4" conduits. Refer to Phase 8 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 9

Install a new underground ductbank from the new manhole located adjacent to Reisner Dining Facility to the future building addition of the Reisner Dining Facility. The work consists of a new underground ductbank routed between the new manhole #32 and the Reisner Dining Facility containing four 4" conduits. Refer to Phase 9 New Manholes/Ducts cost estimate in attachment "C" for additional information.

Phase 10

This work consists of the administration system identification and manhole upgrades for the existing telecommunication distribution system. The actual work involved within individual manholes or buildings may be included within any other phase of construction, or may be provided as its own phase of construction. The work consists of the following: 1) Administration identification for individual building equipment room distribution and telecommunication cabling routed within the underground ductbank distribution system 2) Removal of debris and/or abandoned cabling within the existing manholes 3) Installation of sump pumps within manholes with Water infiltration/flooding 4) Concrete patching for existing manholes that require maintenance. Refer to Administration System Identification & Manhole Upgrades cost estimates in attachment "C" for additional information.

Conclusion

The total cost for system upgrades and additions mentioned above is roughly \$1,667,720. With these improvements, the system should be capable of meeting the need of the growing University well into the future. In addition the telecommunication system routed throughout the University should be completely documented to facilitate future system additions. However, as the University is expanded, care should be taken to provide distribution systems with adequate capacity to handle most any change that may be required.

References

Along with review of existing site drawings, the 1997 Manhole & Conduit survey, and the telecommunications building floor plans manual, the following University Personnel assisted with gathering information for this study:

Terry L. Starr, Assoc. Dir./Planning, Design & Construction

Michael F. Bonafair, Director of Telecommunications

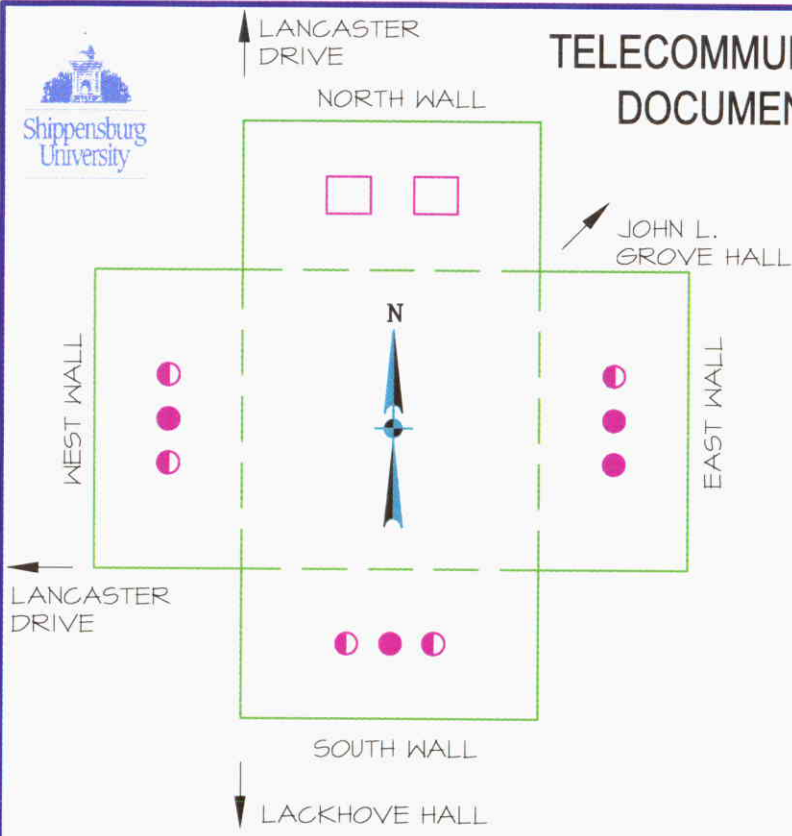
Kevin L. Oakes, Electrical/Electronics Supervisor

The information provided by the University Personnel was critical for completing this study.

ATTACHMENT A



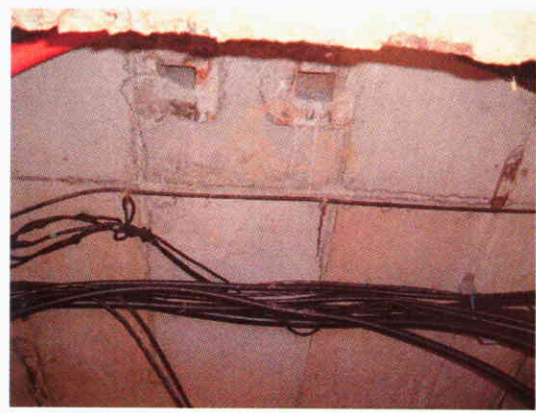
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #1

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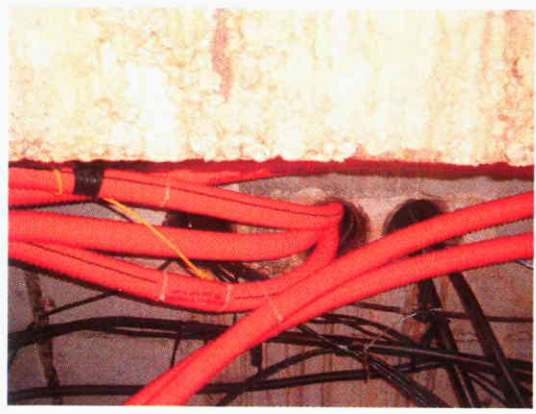
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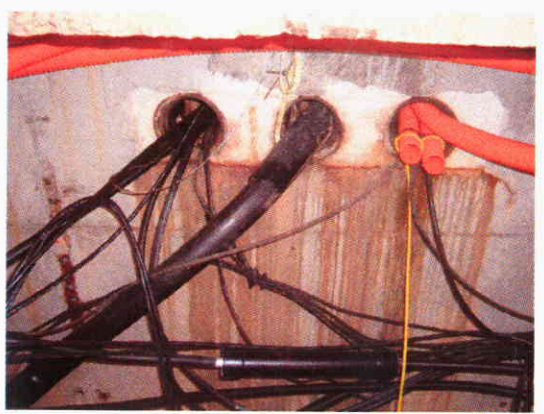
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EAST WALL



SOUTH WALL

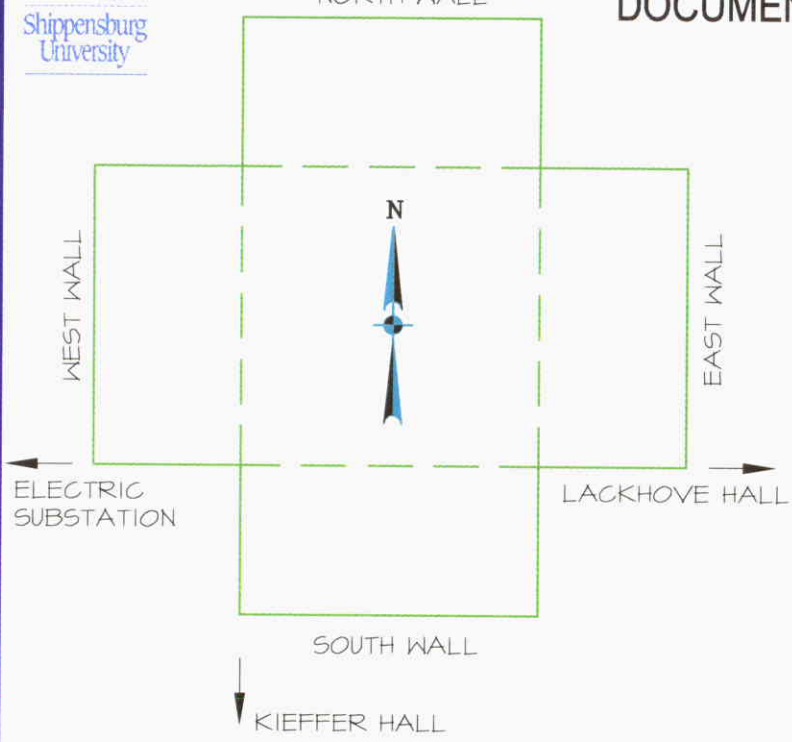


WEST WALL



LANCASTER DRIVE

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



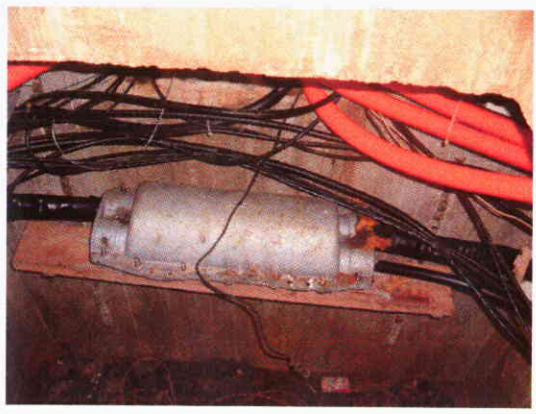
MANHOLE #2

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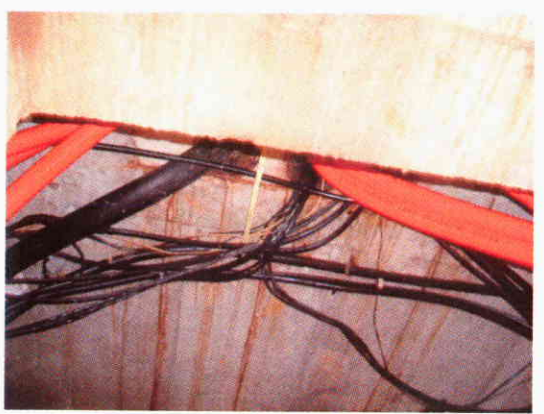
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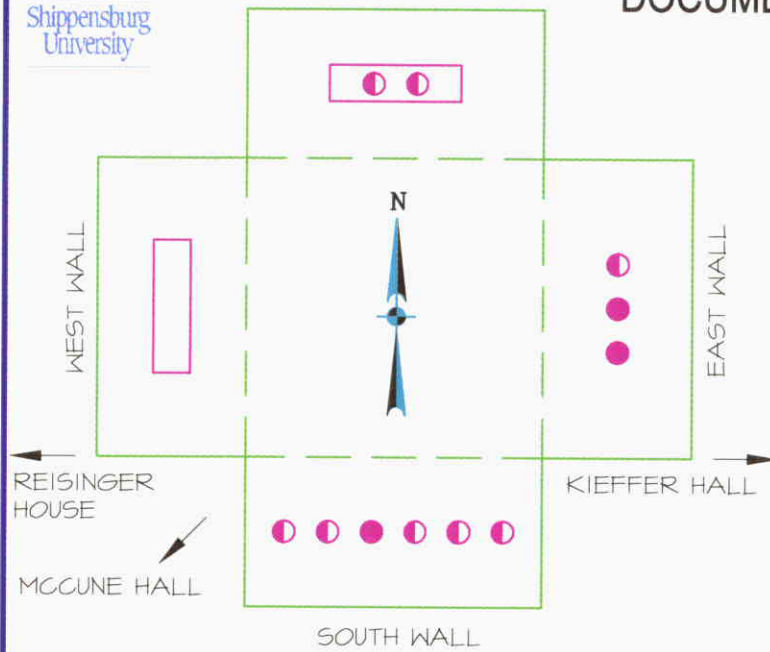
EAST WALL



SOUTH WALL



WEST WALL



MANHOLE #3

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



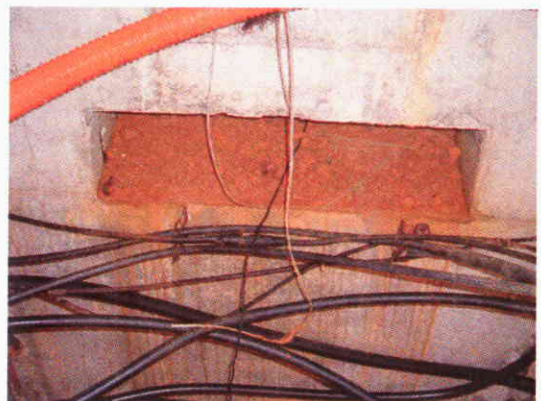
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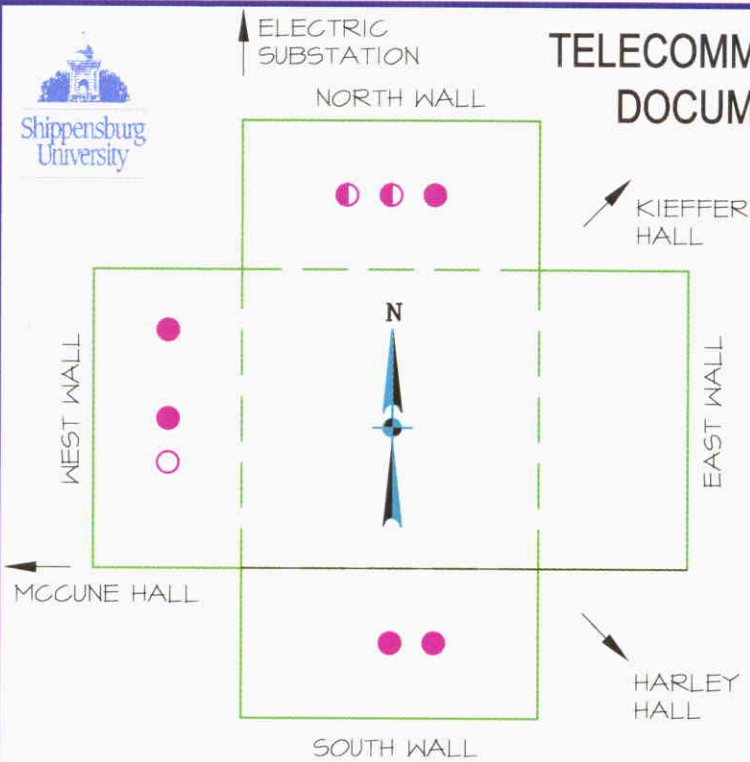
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SOUTH WALL



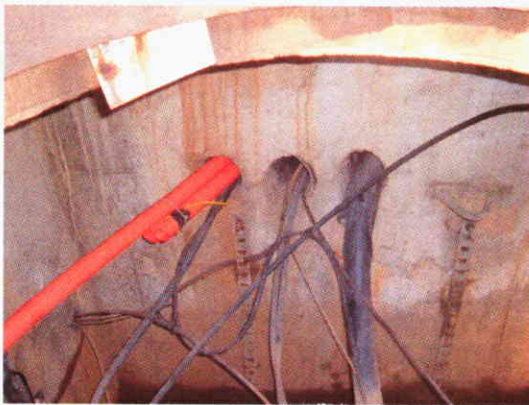
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MANHOLE #4

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-  SPACE AVAILABLE
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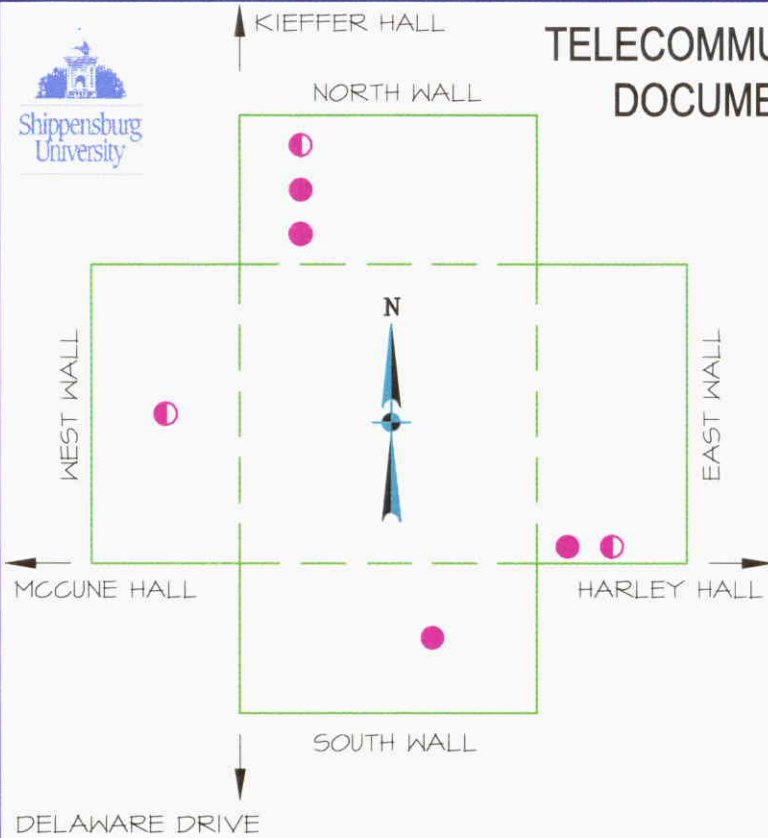
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SOUTH WALL



WEST WALL



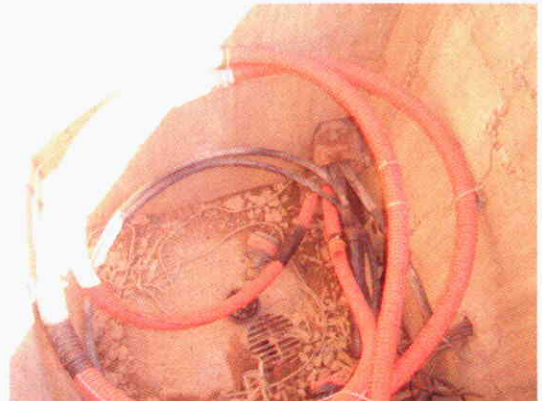
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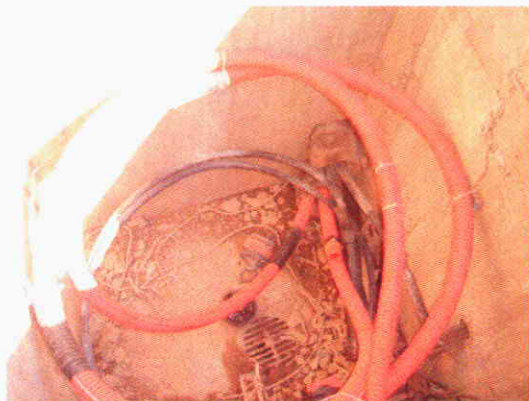
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NORTH WALL



EAST WALL



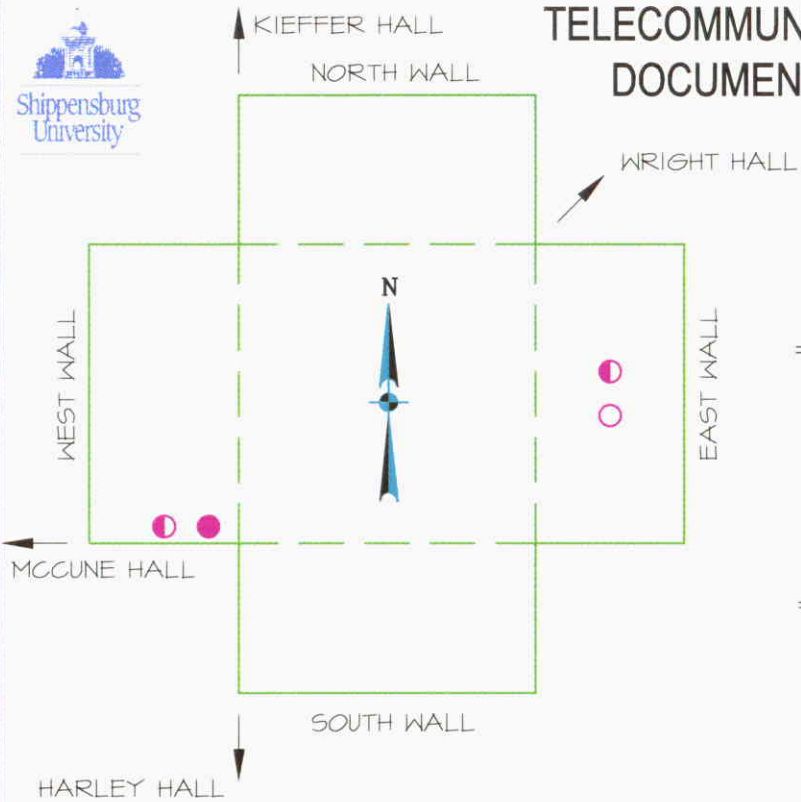
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WEST WALL



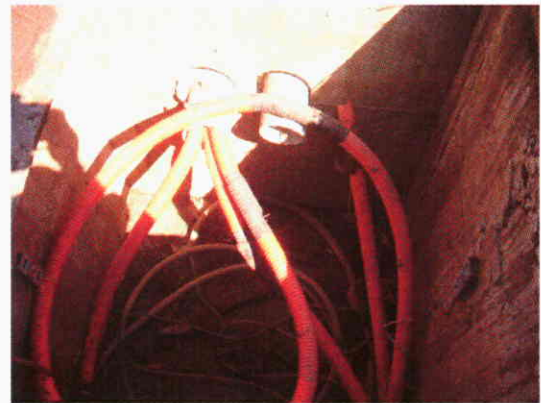
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #6

LEGEND:

-  SPARE
-  SPACE AVAILABLE
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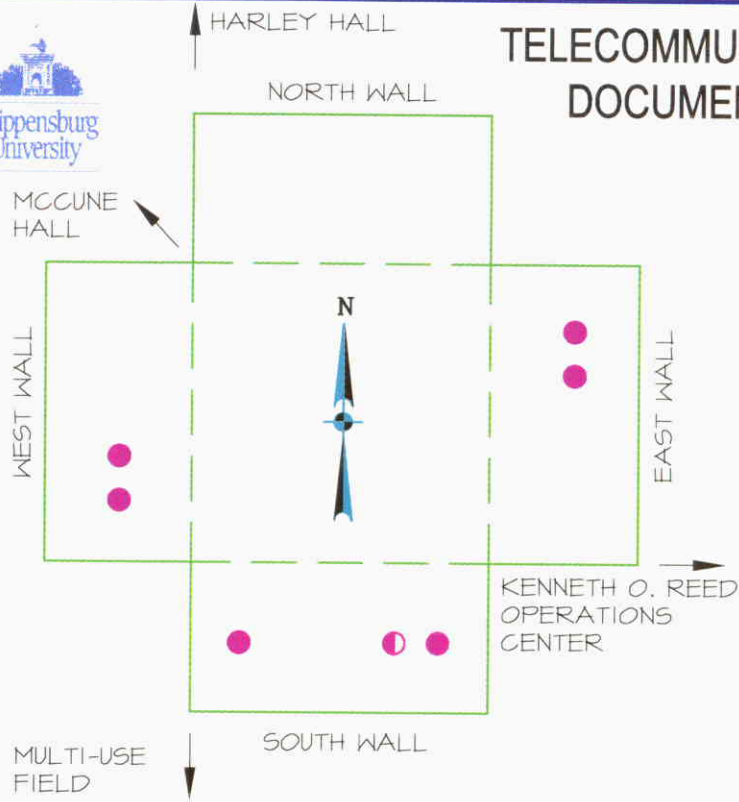
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WEST WALL



TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



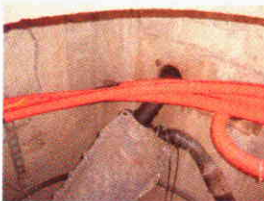
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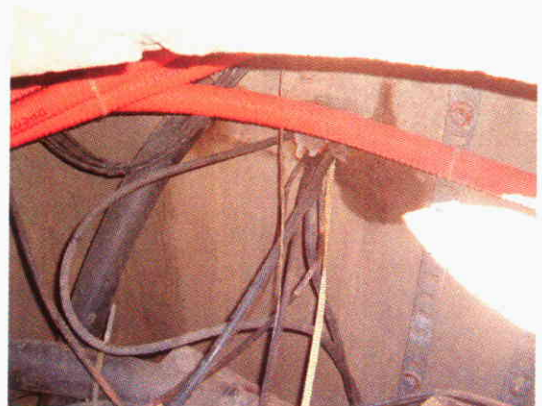
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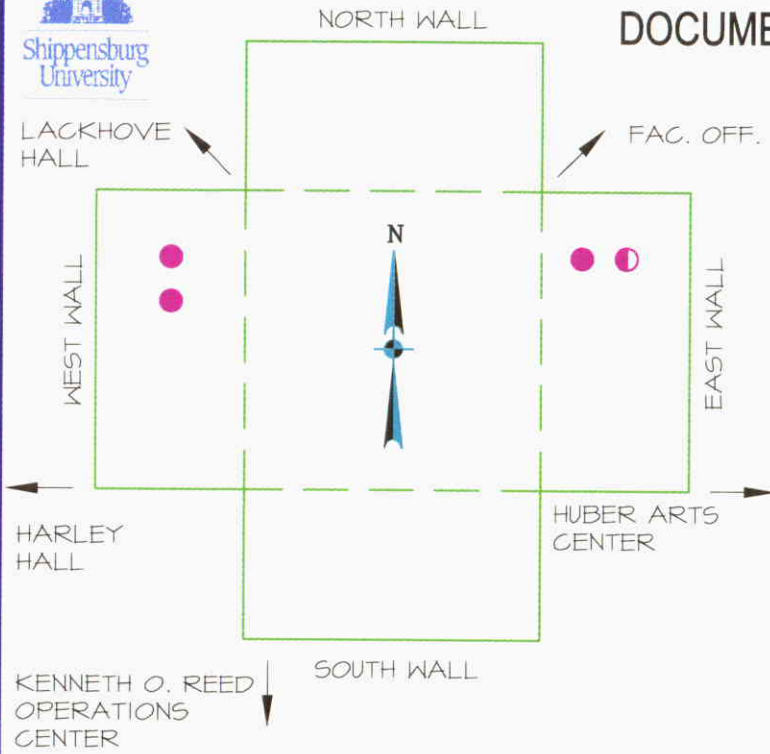
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SOUTH WALL



WEST WALL



MANHOLE #8

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



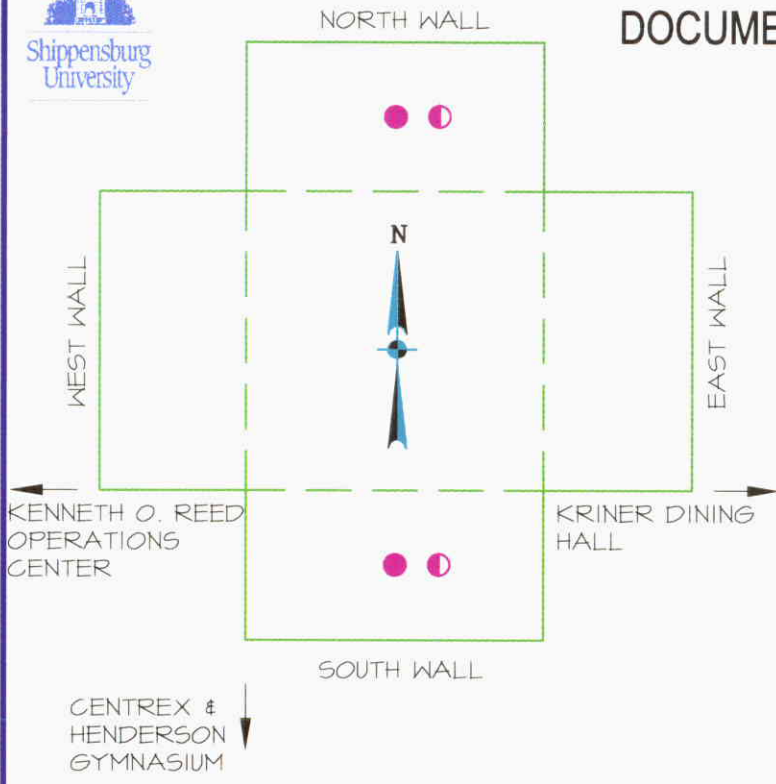
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SOUTH WALL



WEST WALL



MANHOLE #9

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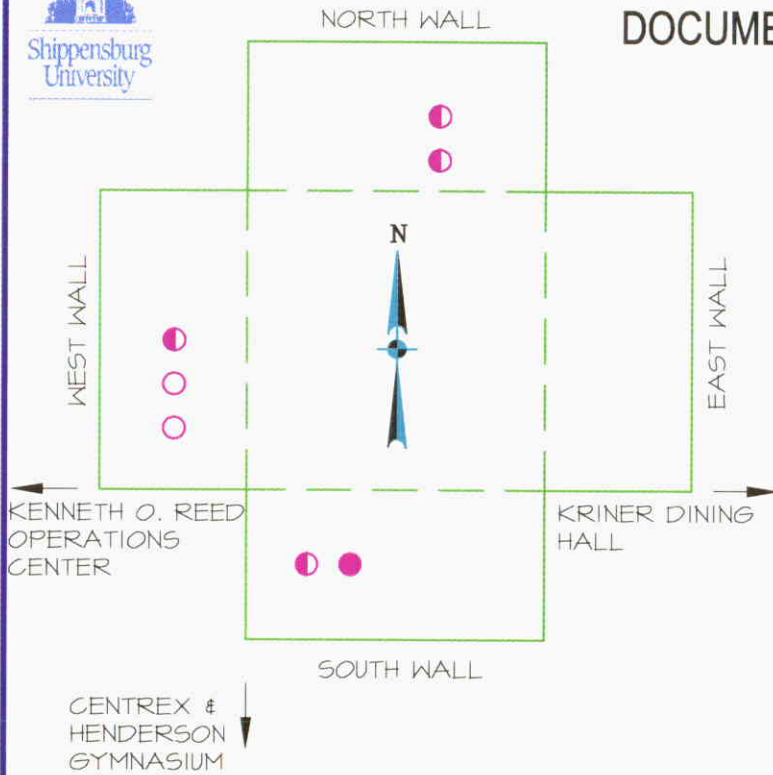
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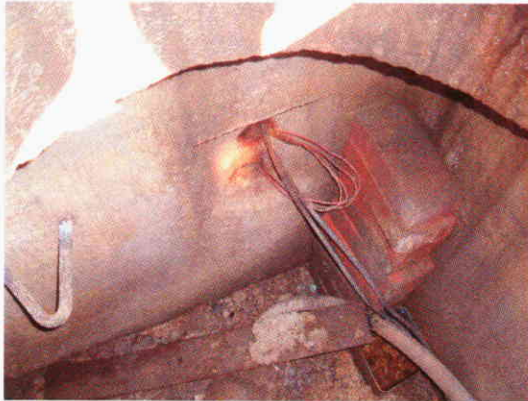
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MANHOLE #10

LEGEND:

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- ◐ SPACE AVAILABLE
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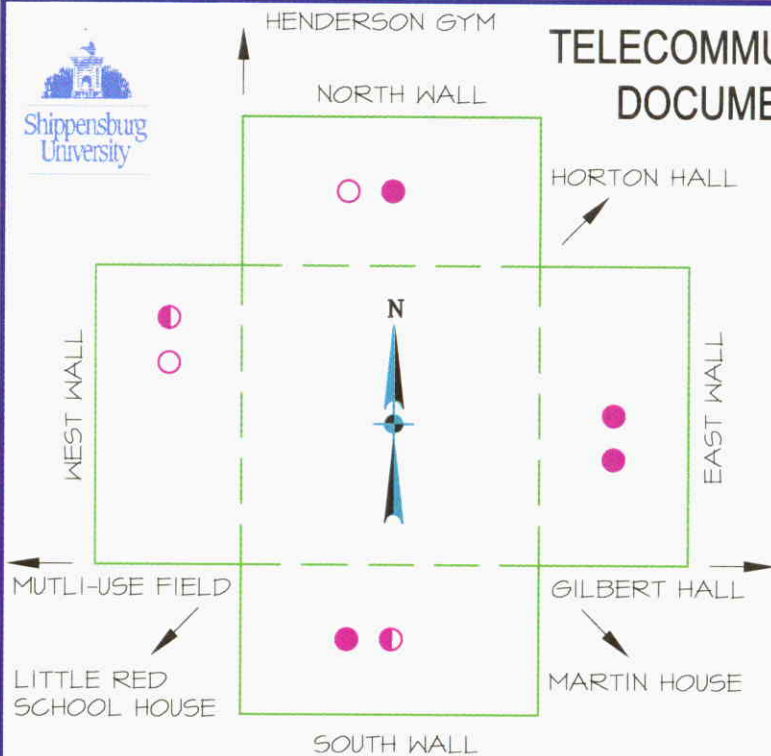
NORTH WALL



SOUTH WALL



WEST WALL



MANHOLE #11

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



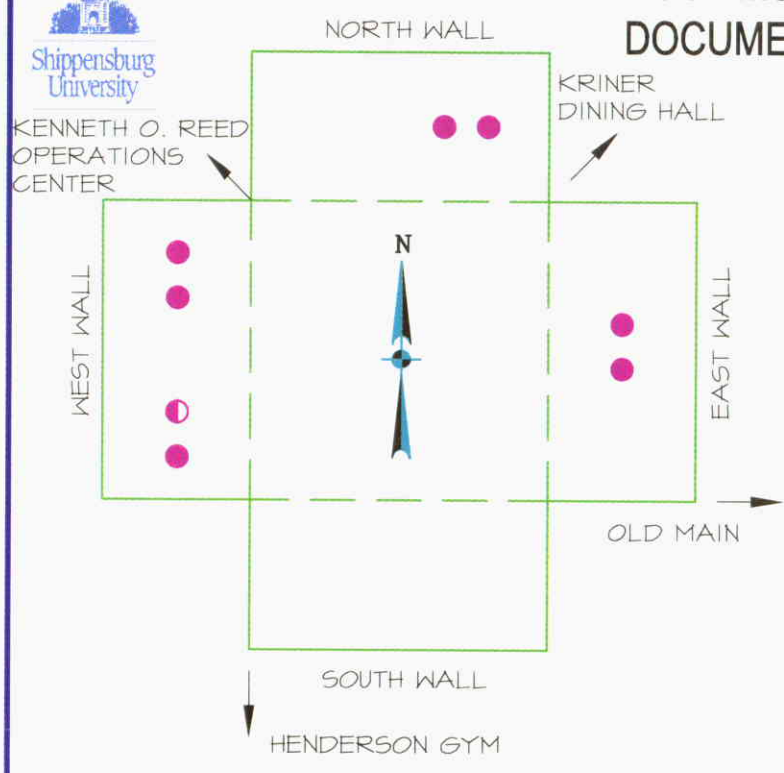
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SOUTH WALL



WEST WALL



MANHOLE #12

LEGEND:

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-  SPACE AVAILABLE
-  FULL



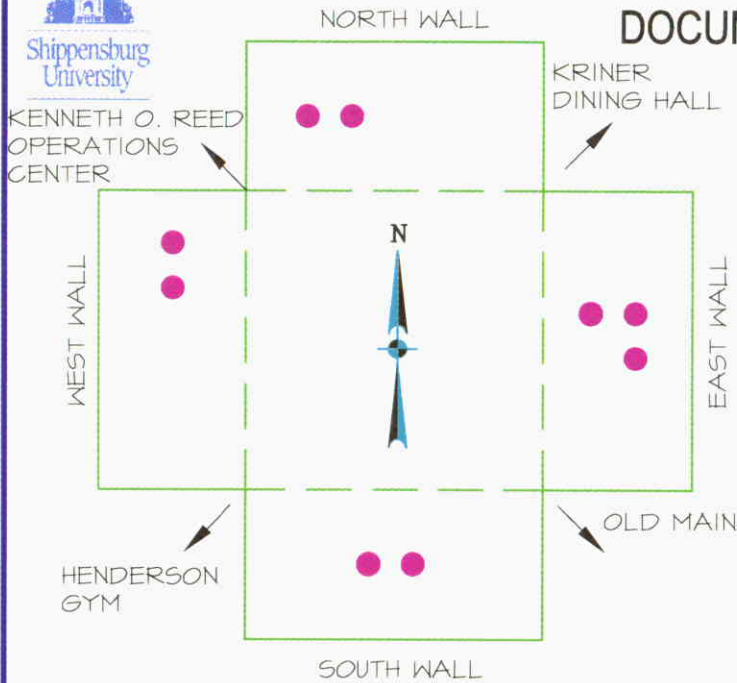
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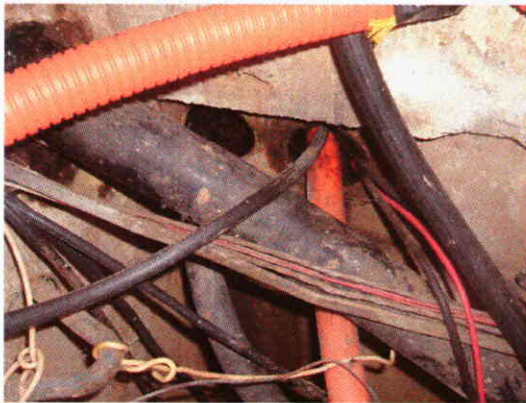
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MANHOLE #13

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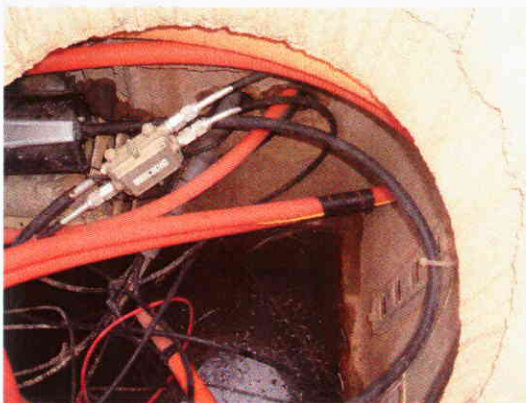
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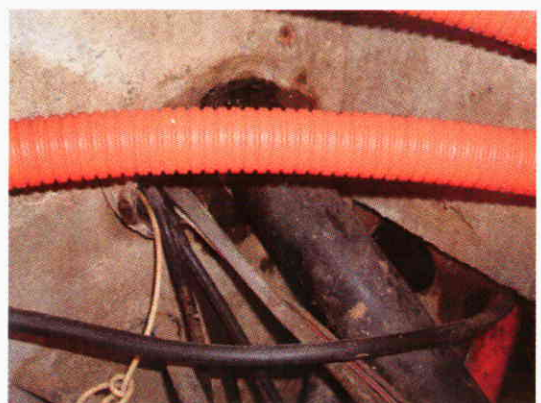
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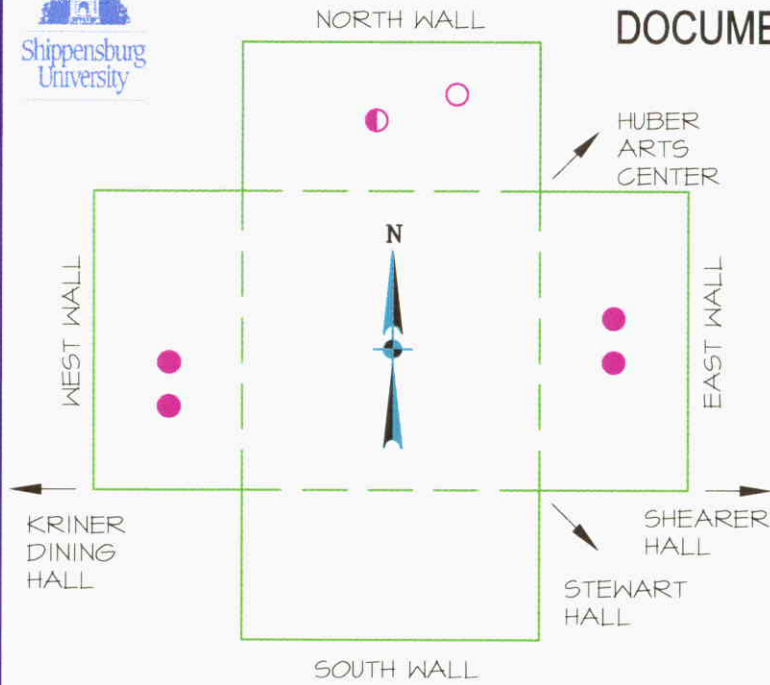
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WEST WALL



MANHOLE #14

LEGEND:

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- FULL



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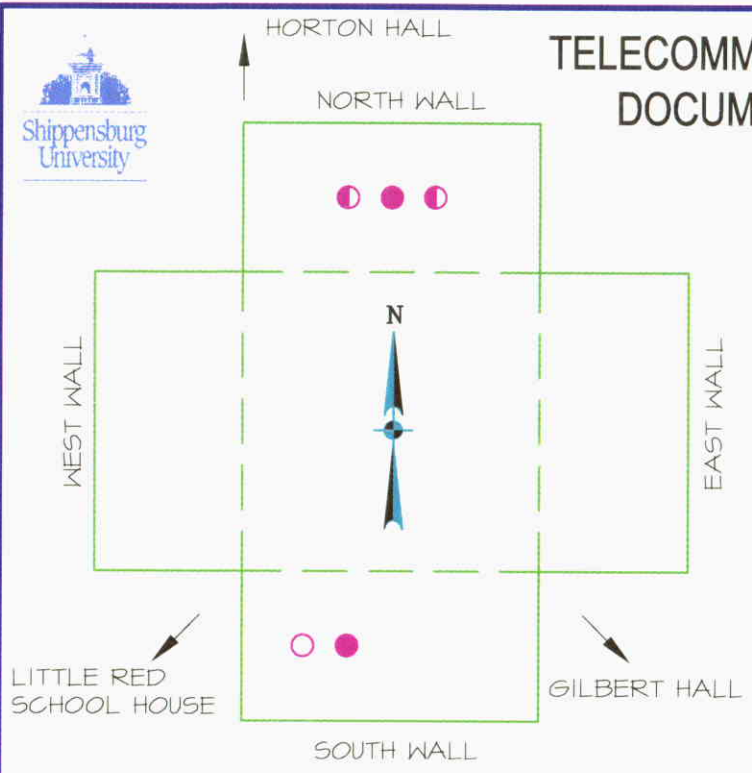
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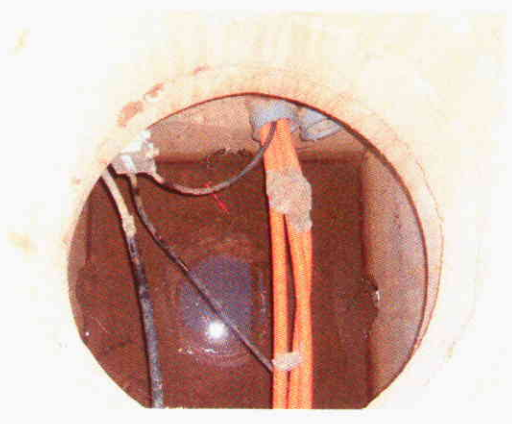
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #15

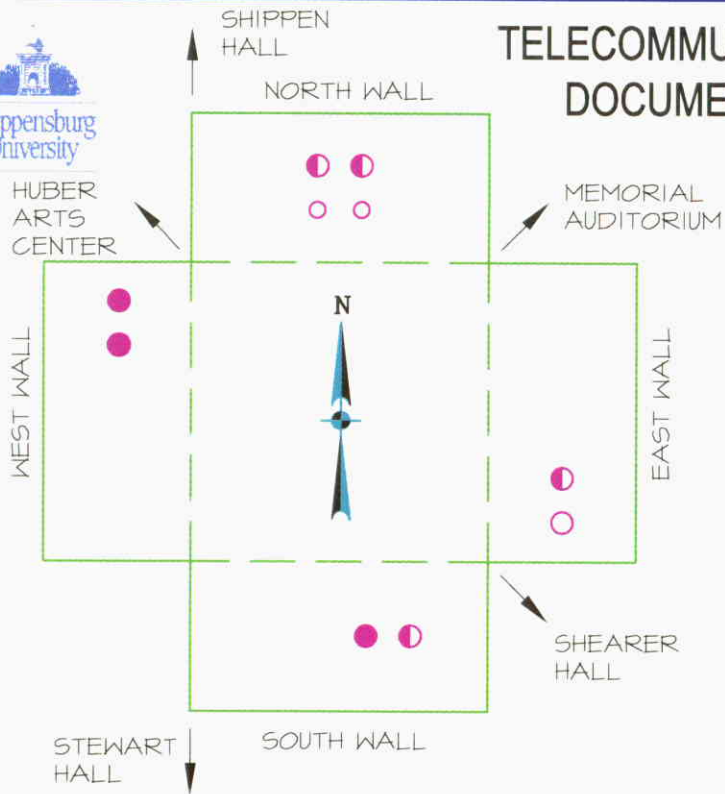


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SOUTH WALL

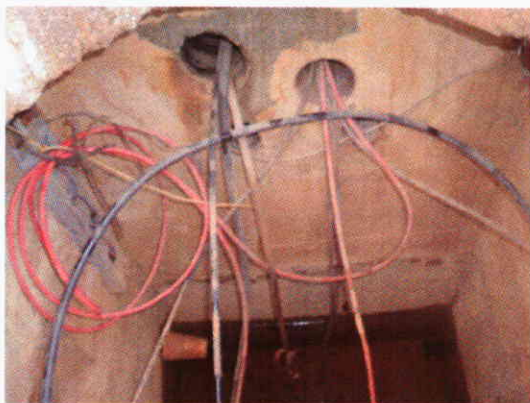
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #16

LEGEND:

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- ◐ SPACE AVAILABLE
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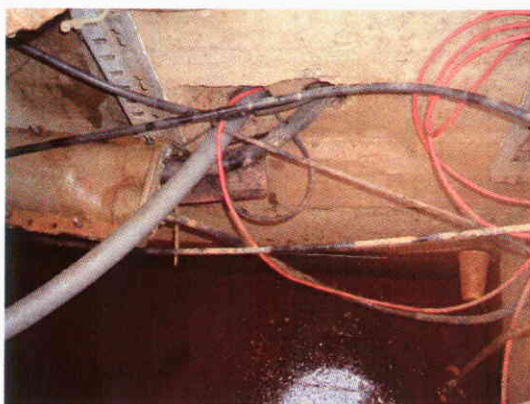
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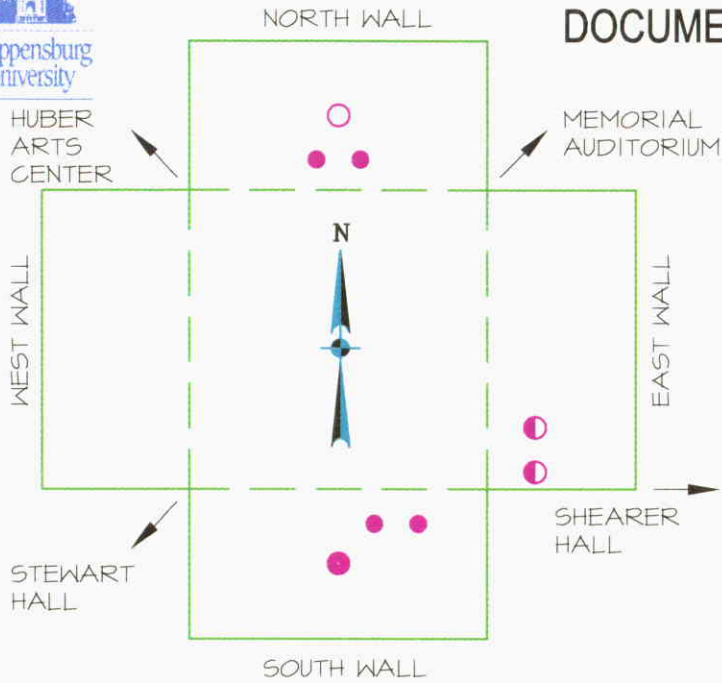


SOUTH WALL



WEST WALL

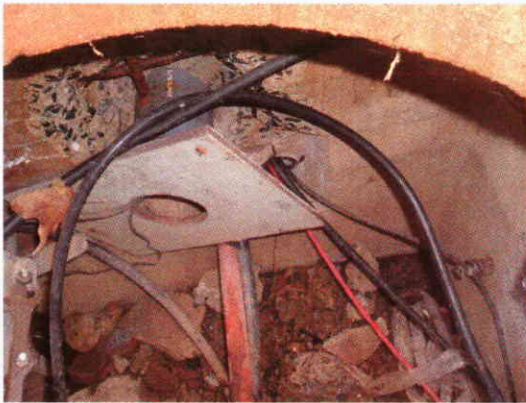
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #17

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



EAST WALL



SOUTH WALL



MEMORIAL AUDITORIUM

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



NORTH WALL

WEST WALL

EAST WALL

HUBER ARTS CENTER

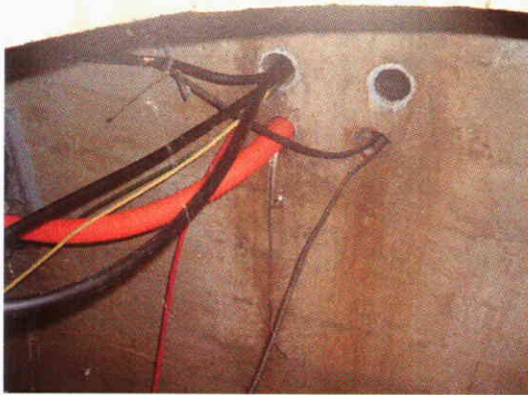
SHEARER HALL

SOUTH WALL

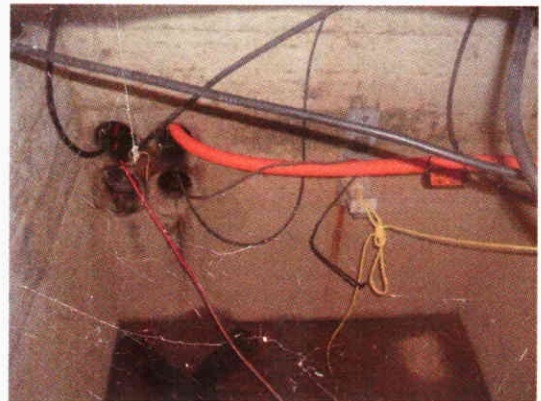
MANHOLE #18

LEGEND:

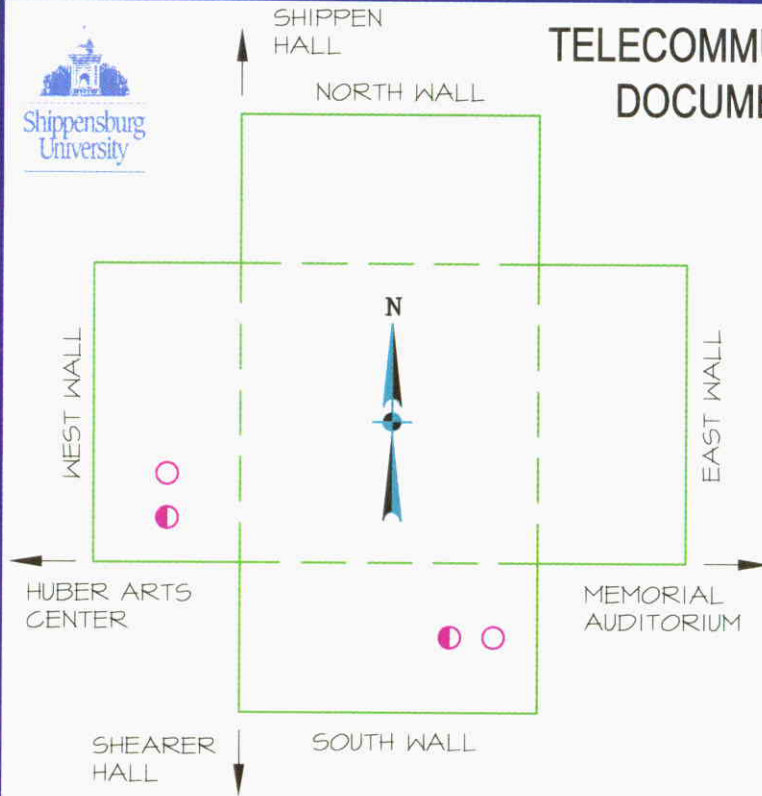
- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



WEST WALL



MANHOLE #19

LEGEND:

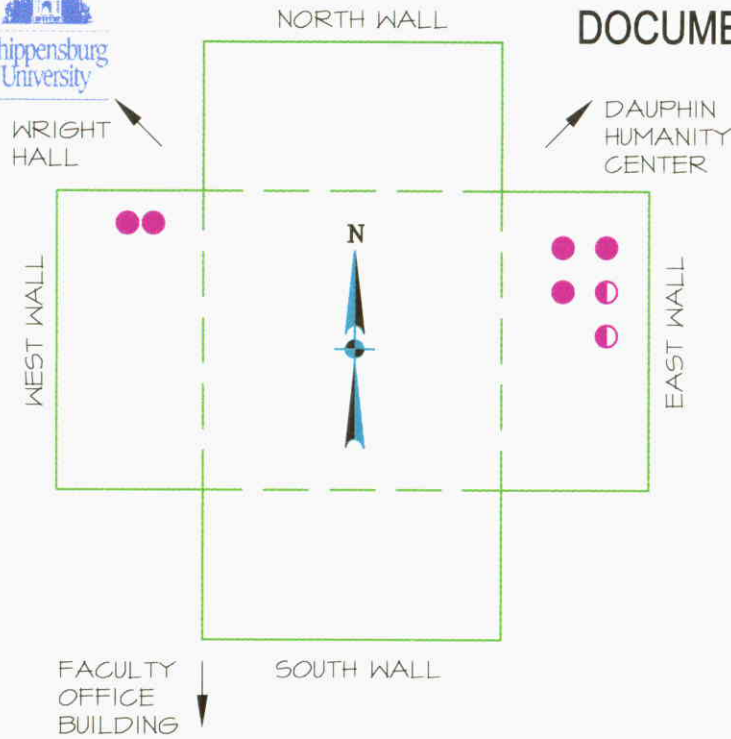
- SPARE
- ◐ SPACE AVAILABLE
- FULL



SOUTH WALL



WEST WALL



MANHOLE #20

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL

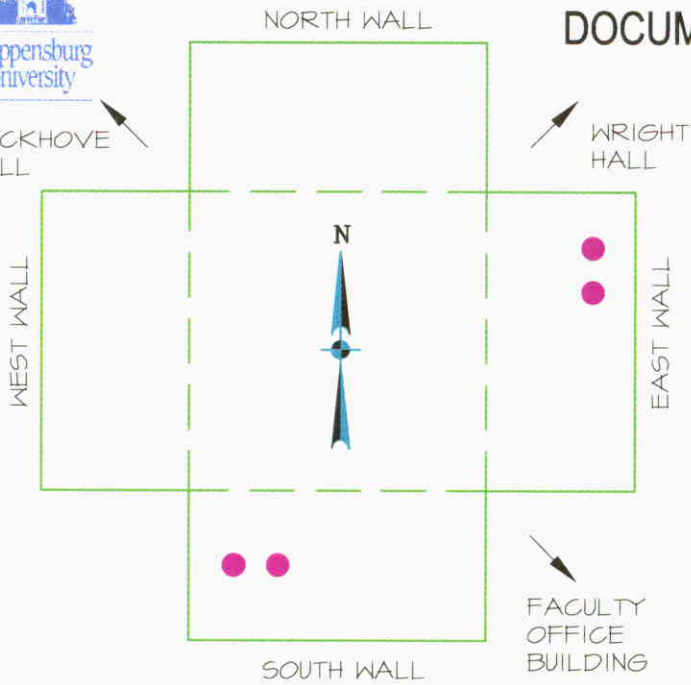


WEST WALL



LACKHOVE HALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



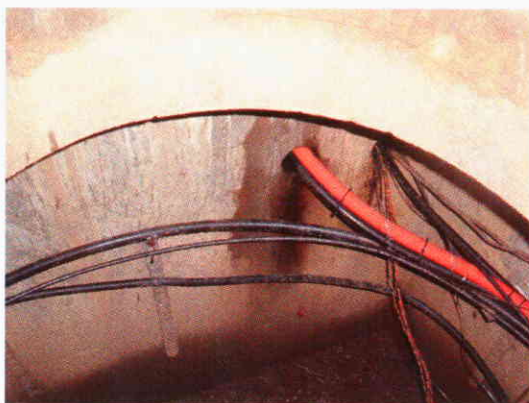
MANHOLE #21

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL



SOUTH WALL



TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



WRIGHT HALL

NORTH WALL

MATHMATICS
COMPUTING
TECHNOLOGIES
CENTER

WEST WALL

N

EAST WALL

MANHOLE #22

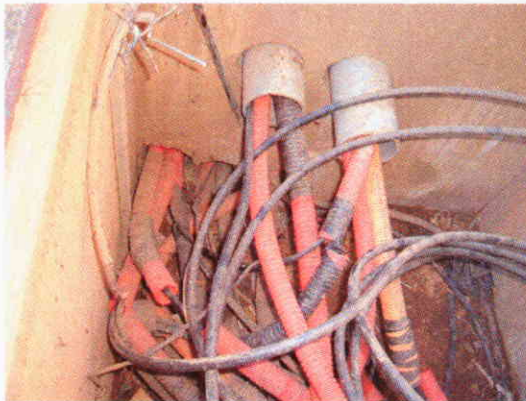
FACULTY
OFFICE
BUILDING

SOUTH WALL

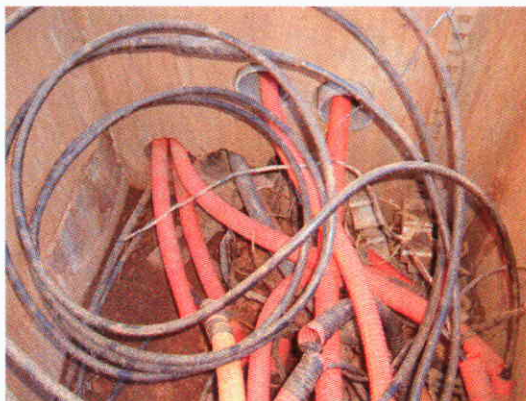
DAUPHIN
HUMANITY CENTER

LEGEND:

- SPARE
- SPACE AVAILABLE
- FULL



NORTH WALL



SOUTH WALL

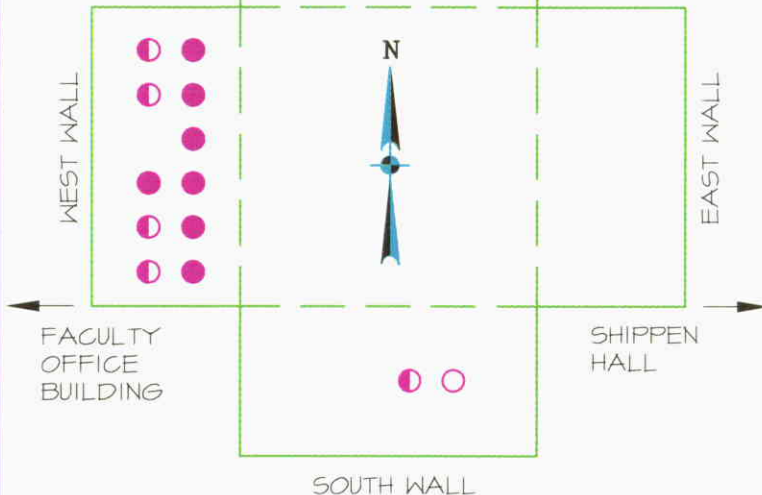


DAUPHIN HUMANITY CENTER
NORTH WALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



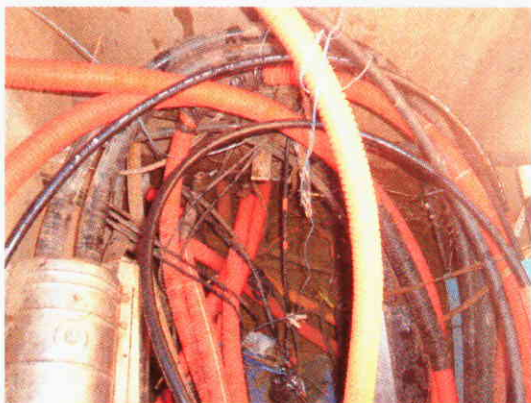
WRIGHT HALL



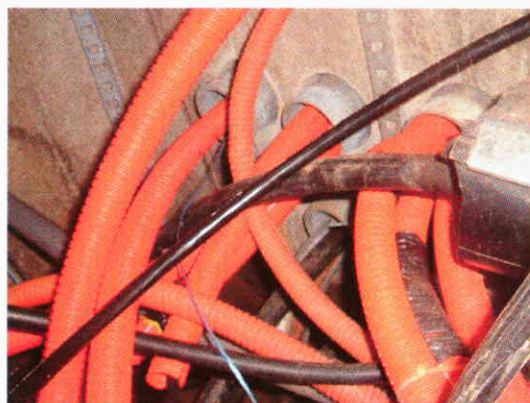
MANHOLE #23

LEGEND:

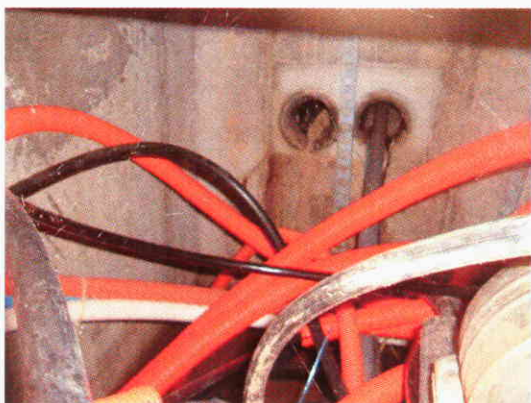
- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



WEST WALL



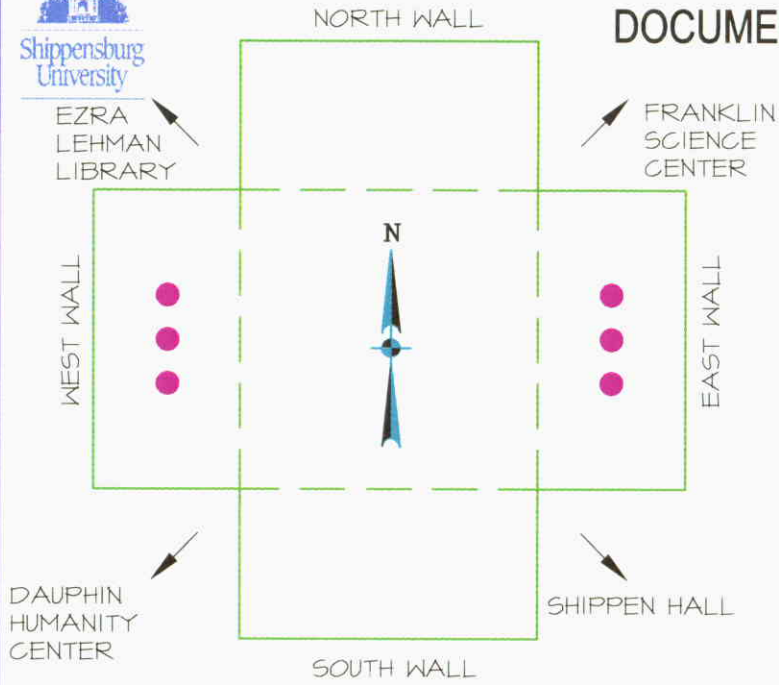
SOUTH WALL



WEST WALL



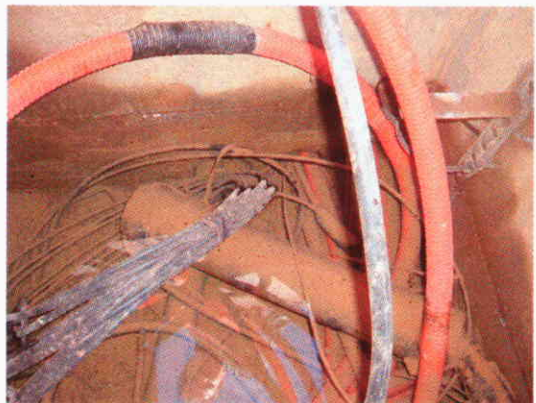
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



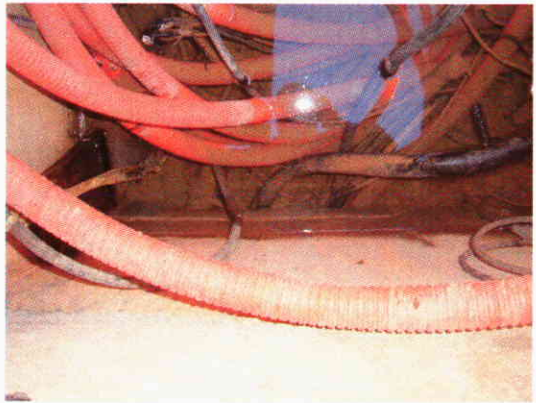
MANHOLE #24

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL

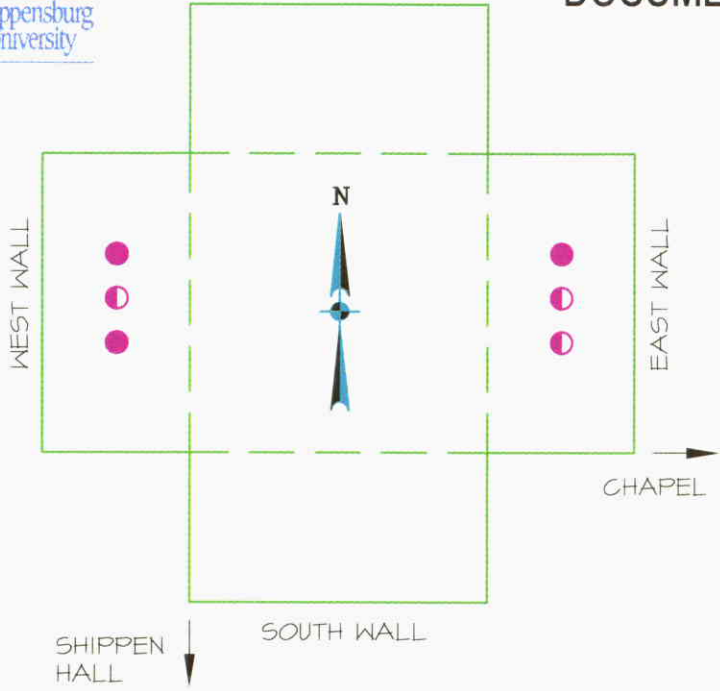


WEST WALL



FRANKLIN
SCIENCE CENTER
NORTH WALL

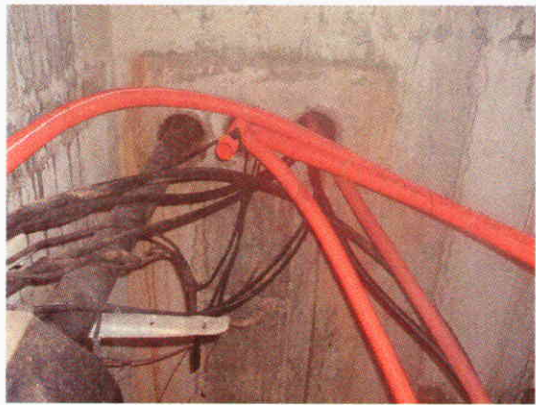
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



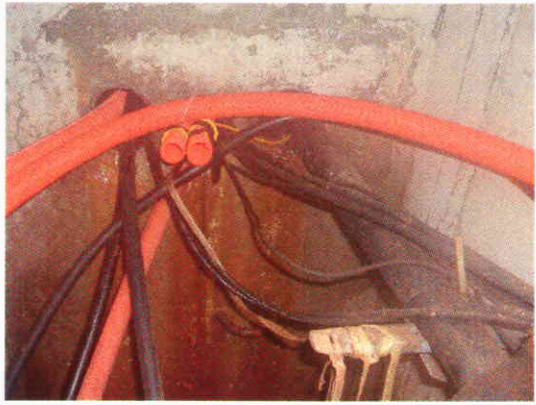
MANHOLE #26

LEGEND:

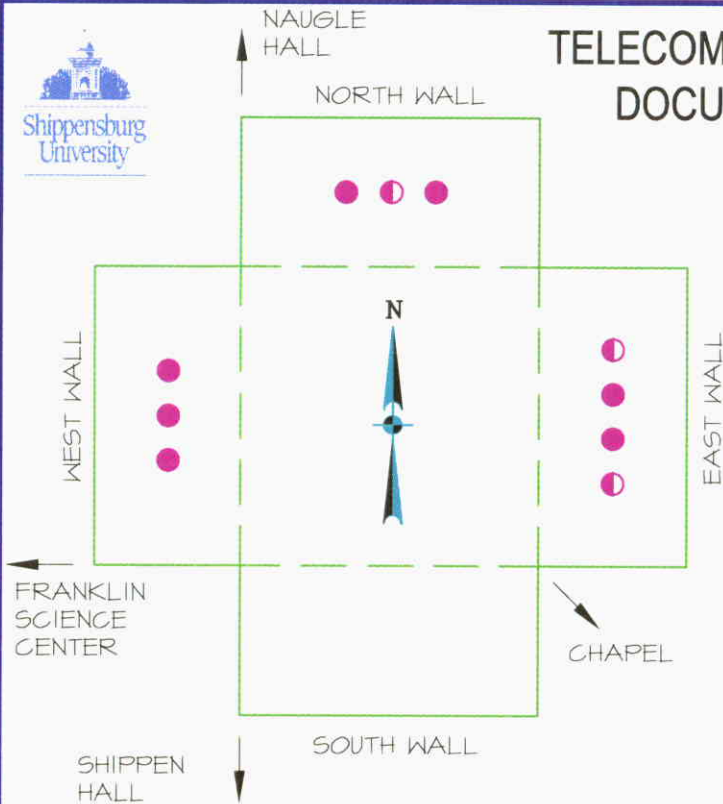
- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL



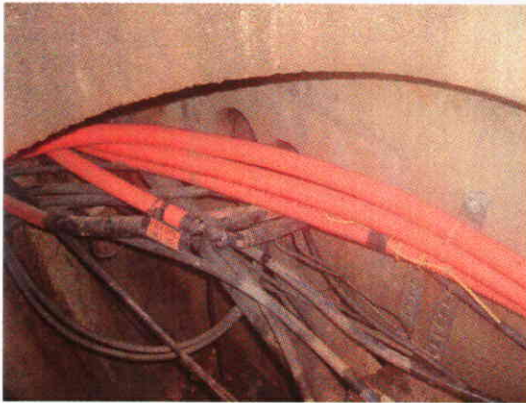
WEST WALL



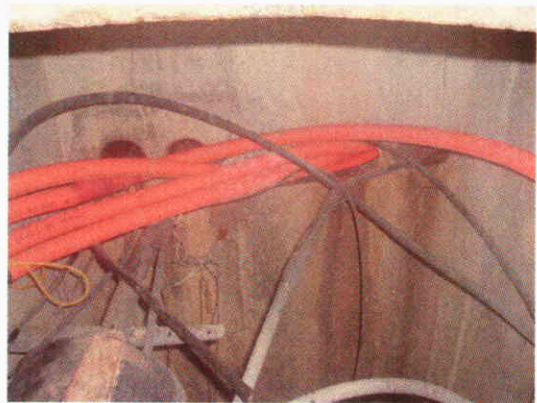
MANHOLE #27

LEGEND:

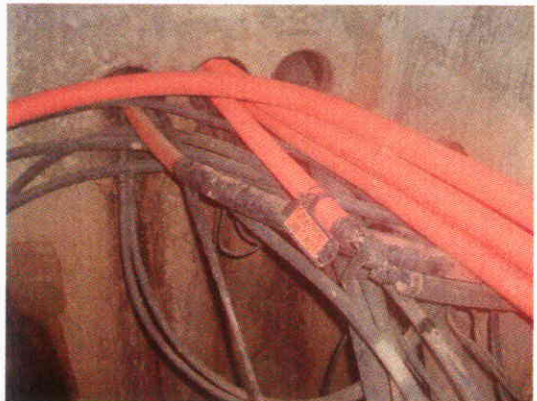
-  SPARE
-  SPACE AVAILABLE
-  FULL



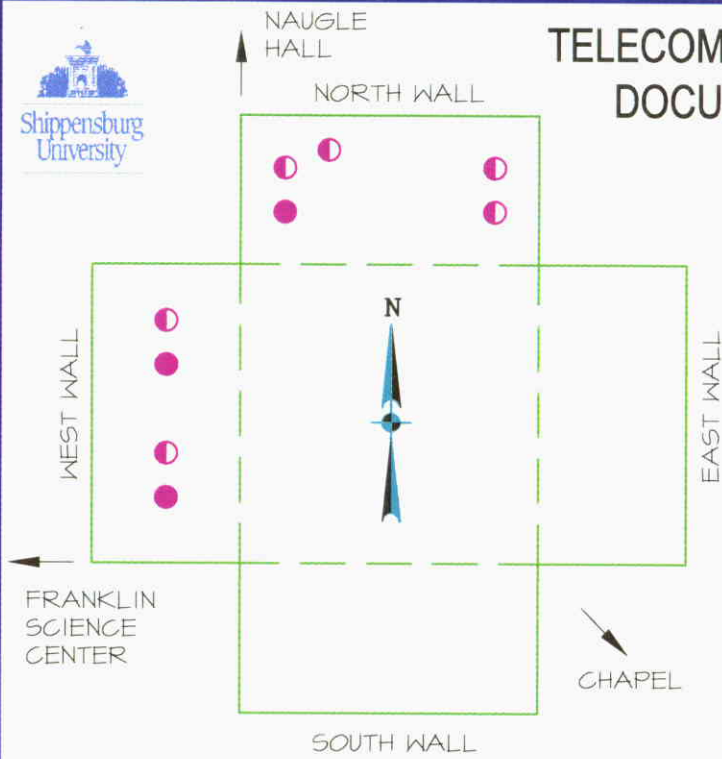
NORTH WALL



EAST WALL



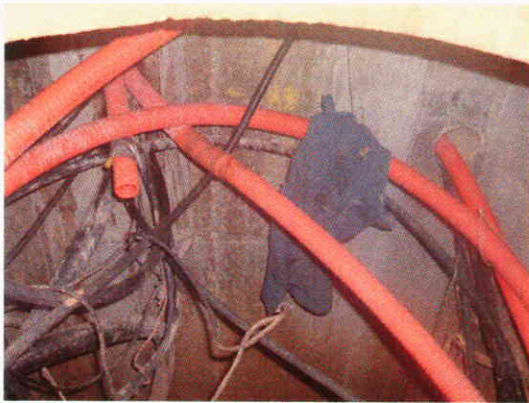
WEST WALL



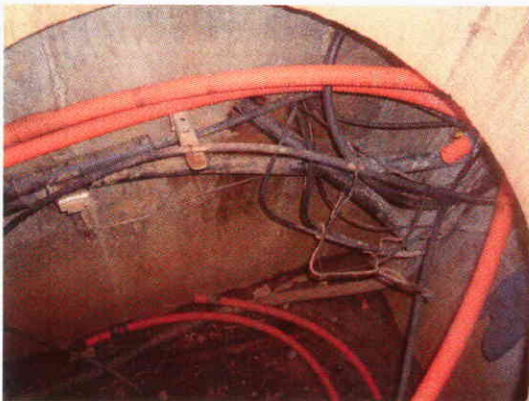
MANHOLE #28

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



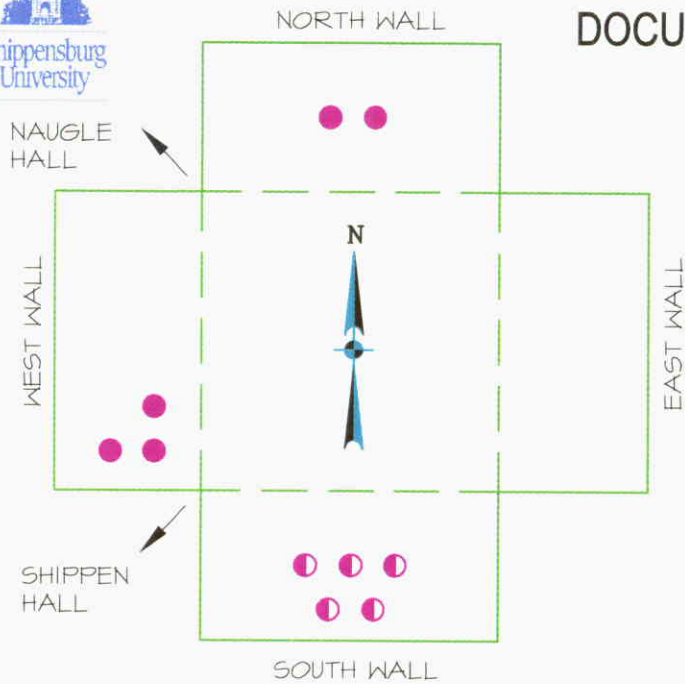
NORTH WALL



WEST WALL



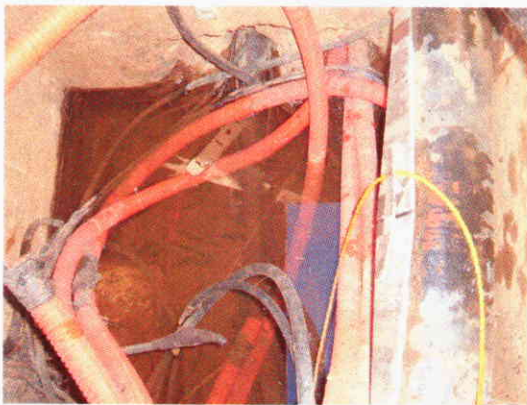
WEST WALL



MANHOLE #29

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



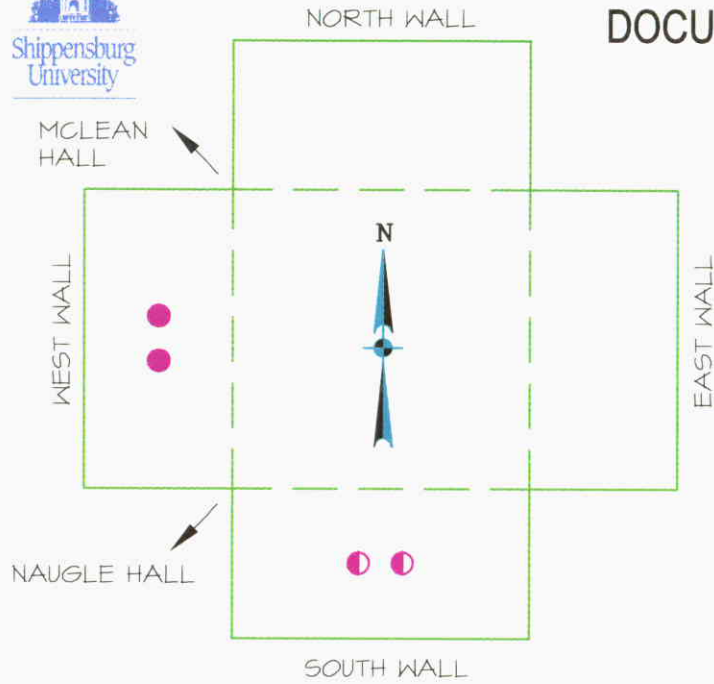
NORTH WALL



SOUTH WALL



WEST WALL



MANHOLE #30

LEGEND:

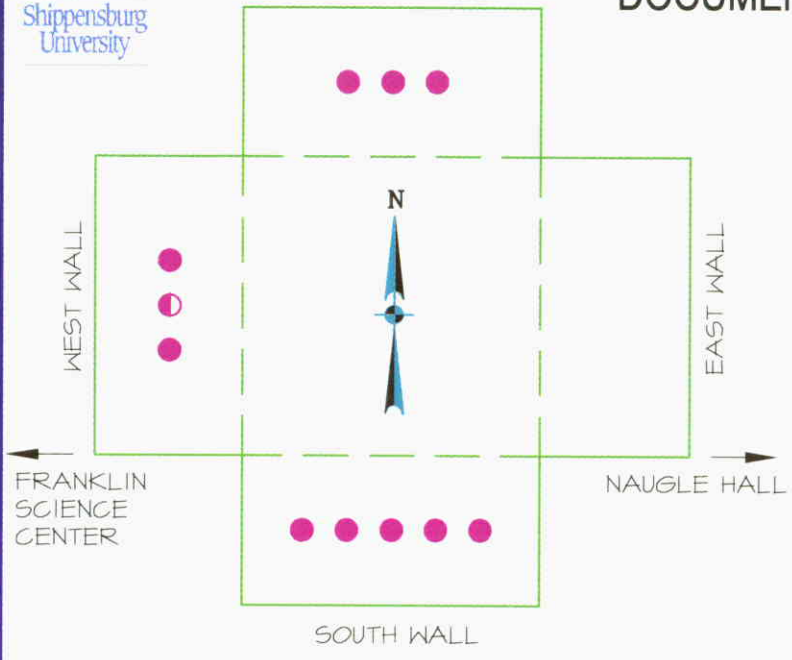
- SPARE
- ◐ SPACE AVAILABLE
- FULL



SOUTH WALL



WEST WALL



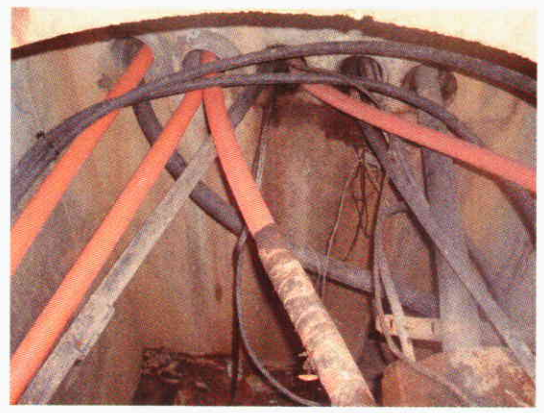
MANHOLE #31

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



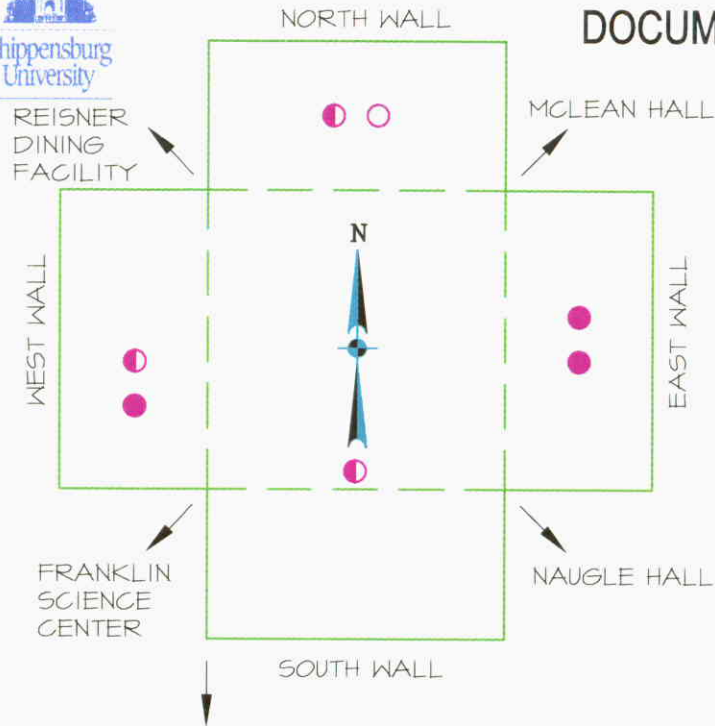
NORTH WALL



SOUTH WALL



WEST WALL



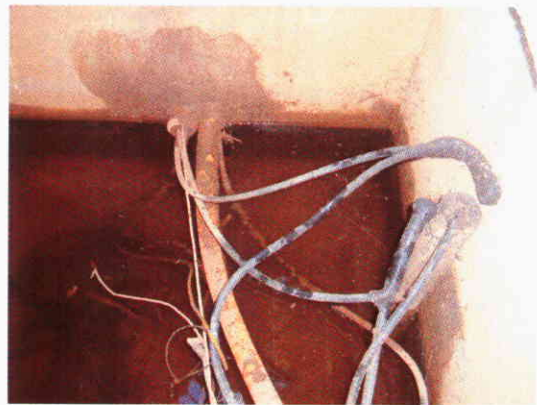
MANHOLE #32

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



EAST WALL



WEST WALL



CUMBERLAND UNION BLDG.

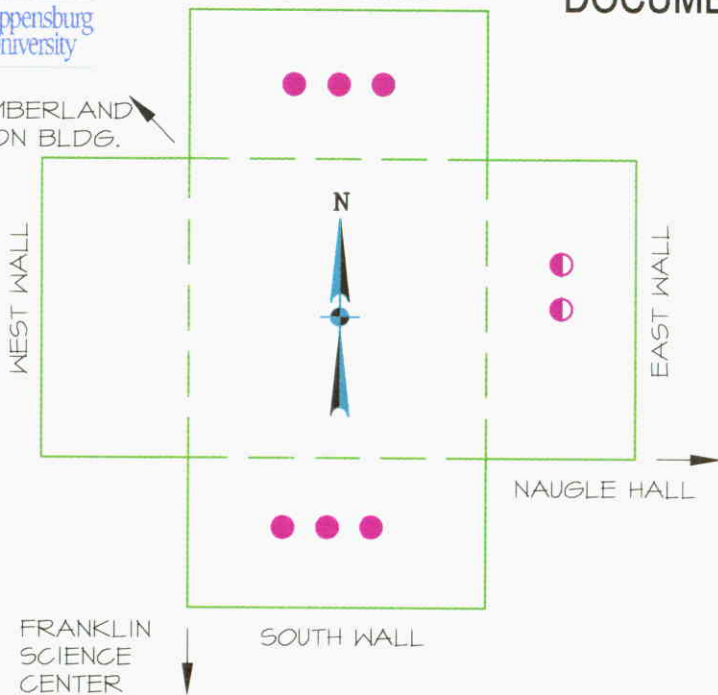
REISNER DINING FACILITY

NORTH WALL

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MANHOLE #33

LEGEND:

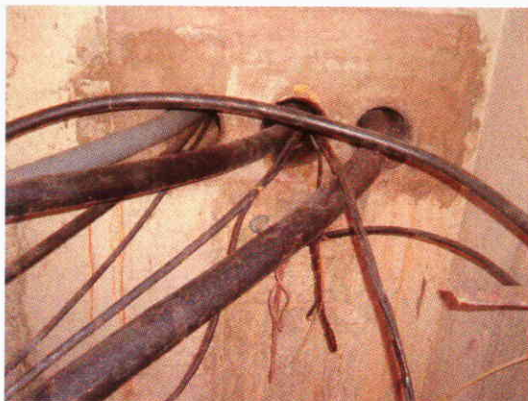
- SPARE
- SPACE AVAILABLE
- FULL



NORTH WALL



EAST WALL



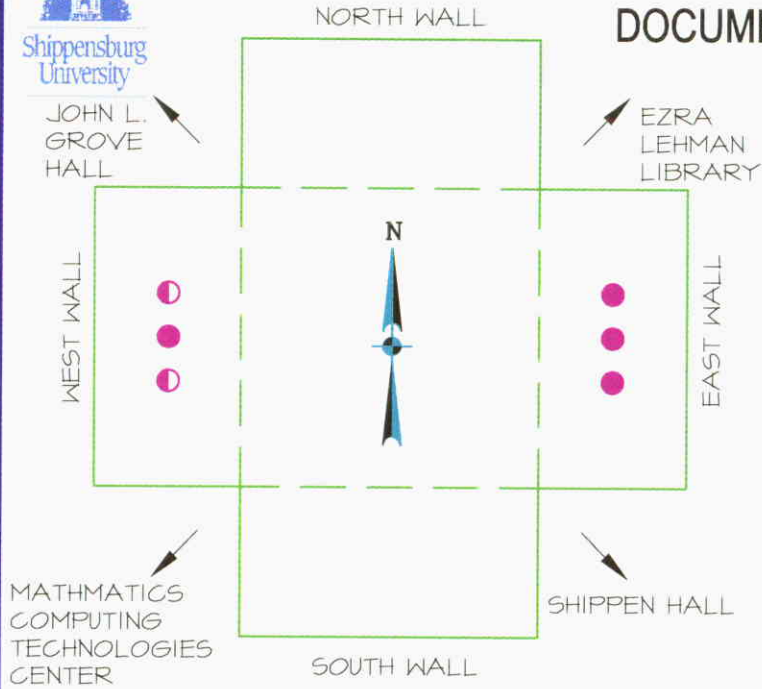
SOUTH WALL



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MANHOLE #34

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL



WEST WALL



JOHN L. GROVE HALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



Entech Engineering Inc.
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NORTH WALL

EZRA LEHMAN LIBRARY

WEST WALL

EAST WALL

MANHOLE #35

LANCASTER DRIVE

LACKHOVE HALL

MATHMATICS/
COMPUTING
TECHNOLOGIES
CENTER

SOUTH WALL

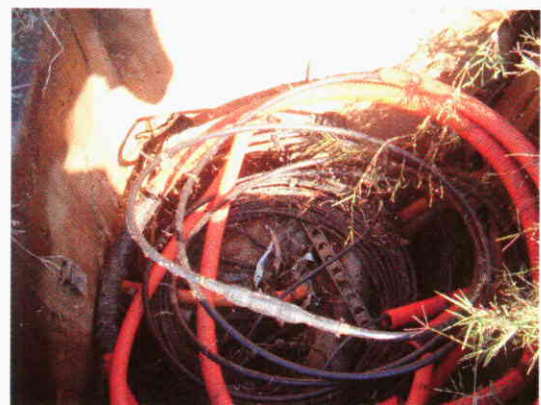
WRIGHT HALL

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



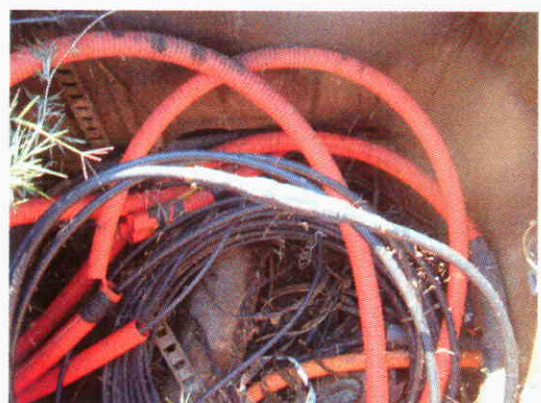
NORTH WALL



EAST WALL



SOUTH WALL



WEST WALL

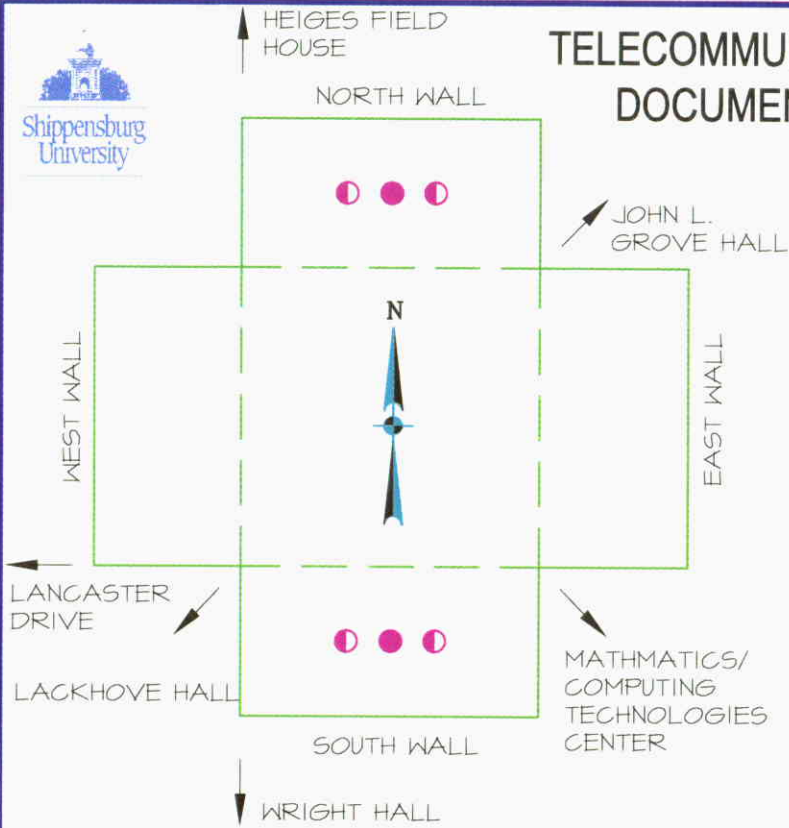


↑ HEIGES FIELD HOUSE

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



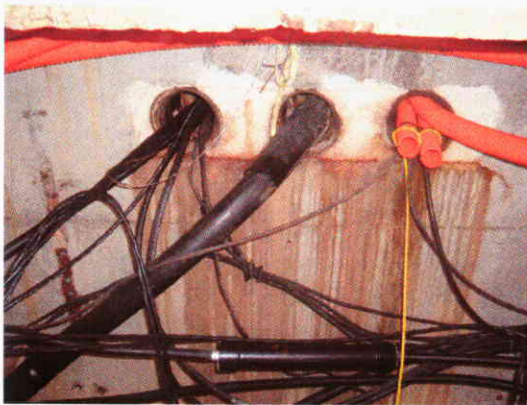
Entech Engineering Inc.
www.entecheng.com



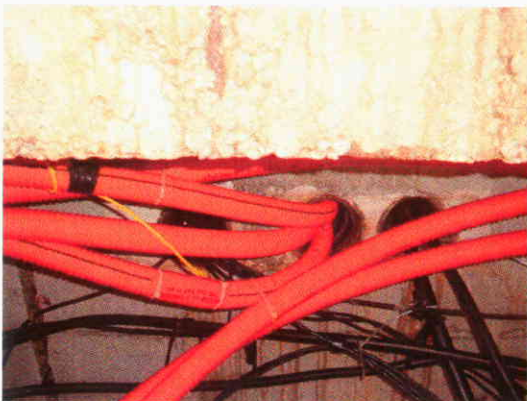
MANHOLE #36

LEGEND:

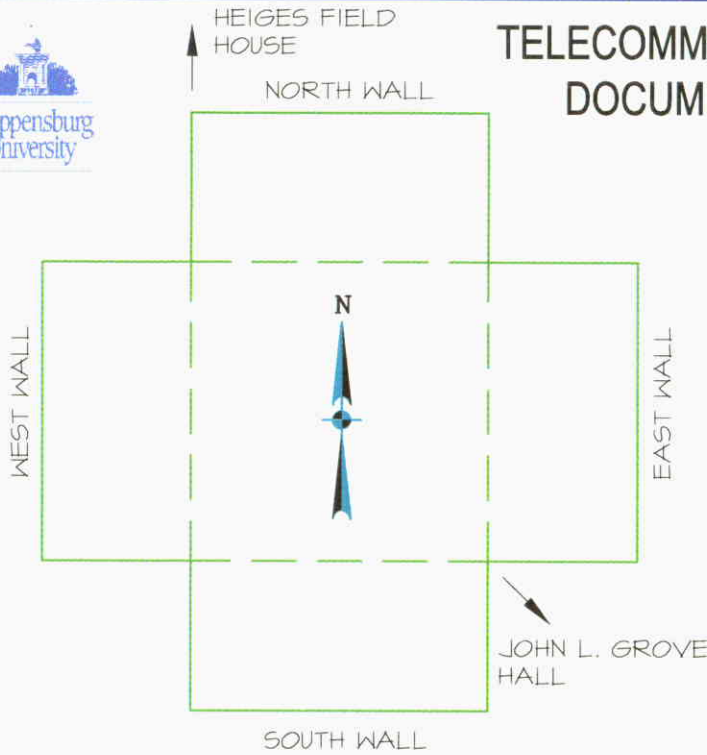
- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



SOUTH WALL



MANHOLE #37

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



SOUTH WALL



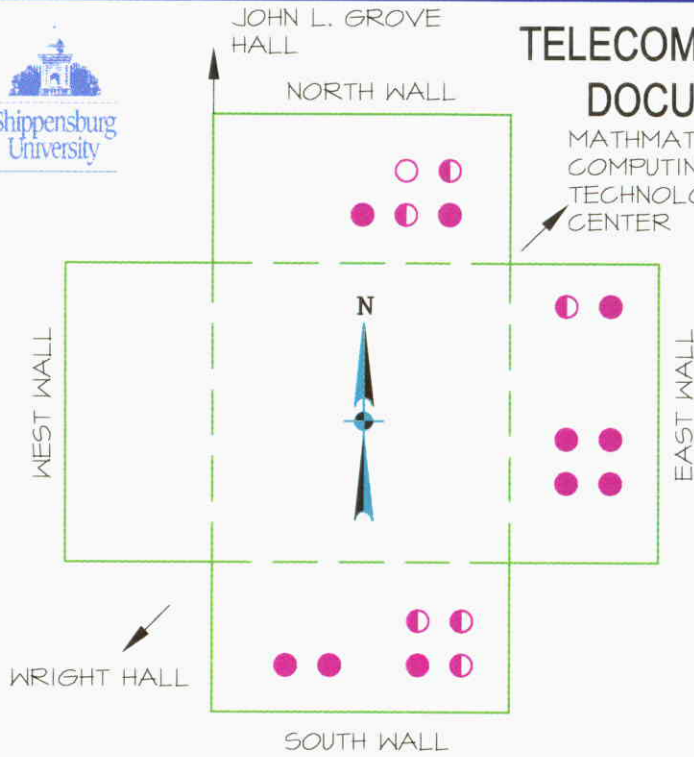
JOHN L. GROVE HALL

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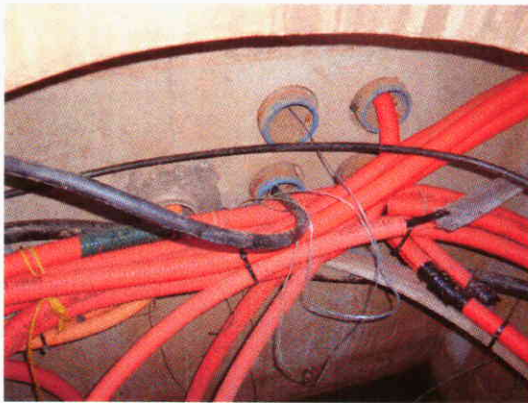
MATHEMATICS
COMPUTING
TECHNOLOGIES
CENTER



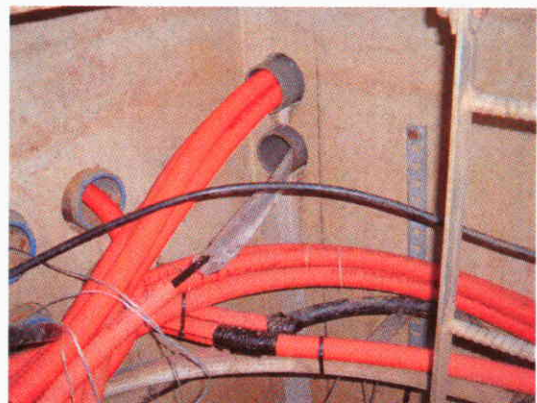
MANHOLE #37A

LEGEND:

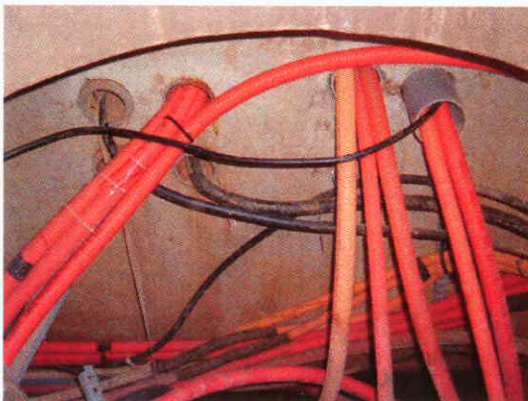
- SPARE
- ◐ SPACE AVAILABLE
- FULL



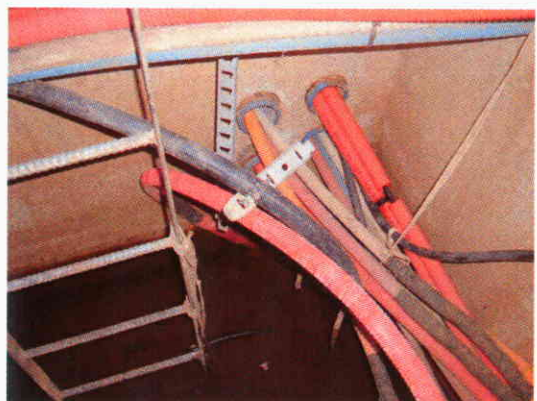
NORTH WALL



EAST WALL



SOUTH WALL

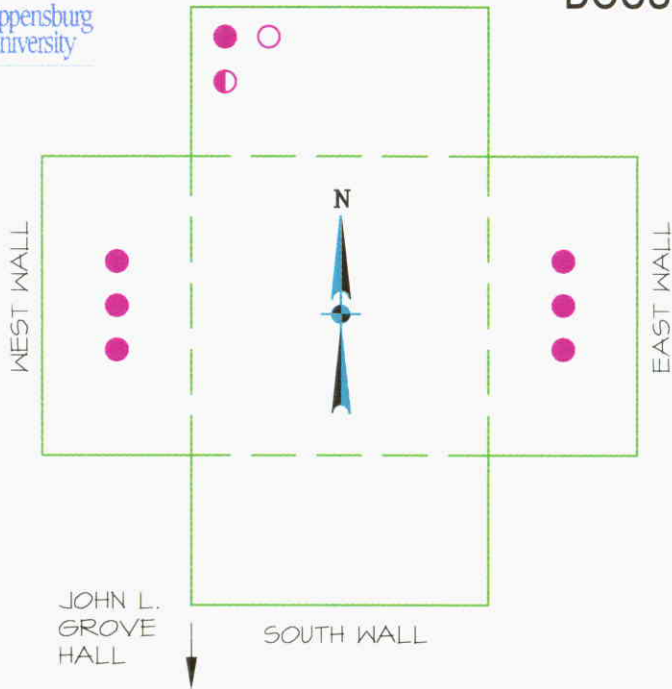


EAST WALL



HEIGES
FIELD HOUSE
NORTH WALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #38

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



NORTH WALL



EAST WALL



WEST WALL



INSTRUCTIONAL
ARTS FACILITY
NORTH WALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY

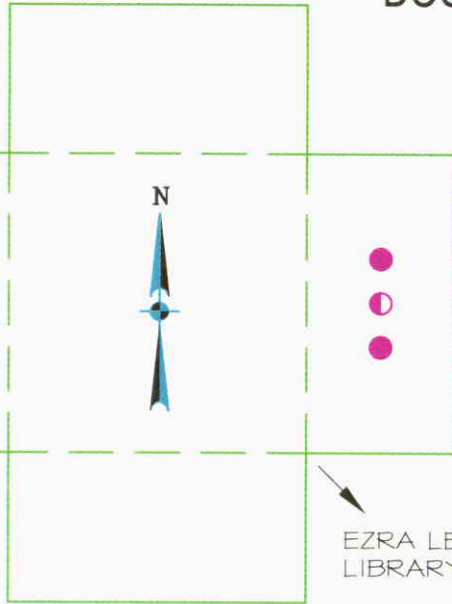


HEIGES
FIELD
HOUSE

WEST WALL

JOHN L.
GROVE
HALL

SOUTH WALL



MANHOLE #39

CUMBERLAND
UNION
BUILDING

EZRA LEHMAN
LIBRARY

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



EAST WALL

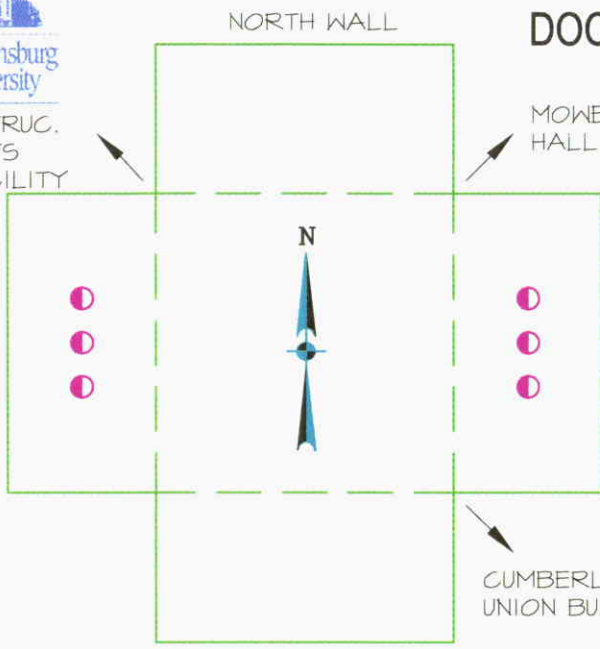


WEST WALL



INSTRUC.
ARTS
FACILITY

WEST WALL



NORTH WALL

N

MOWERY
HALL

EAST WALL

CUMBERLAND
UNION BUILDING

SOUTH WALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #40

LEGEND:

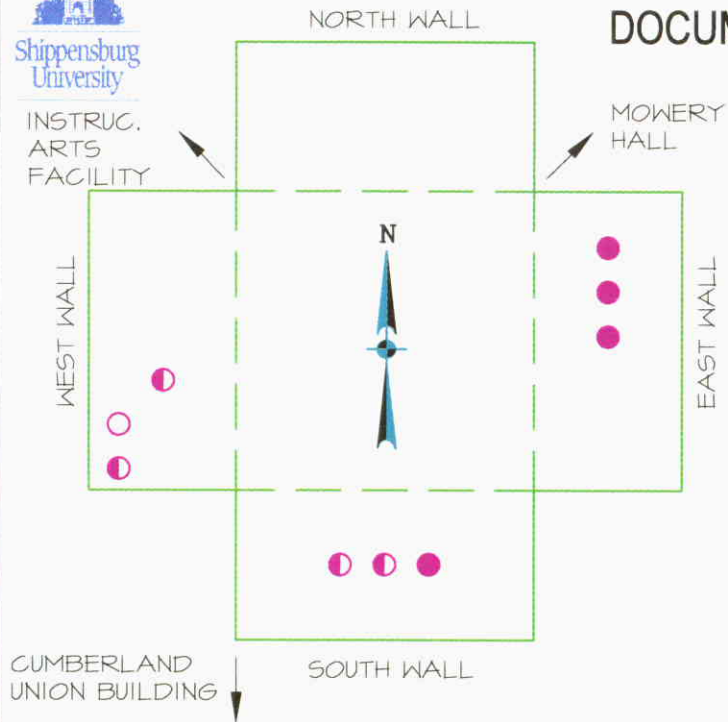
- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL



WEST WALL



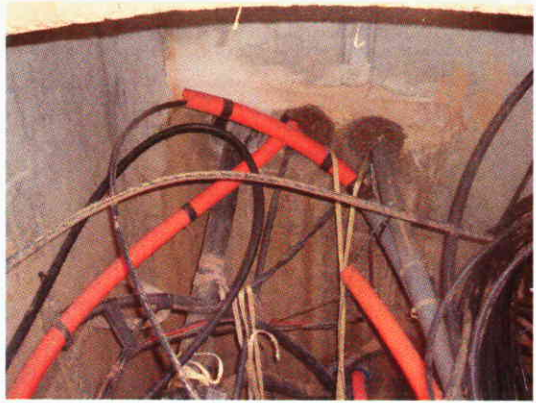
MANHOLE #41

LEGEND:

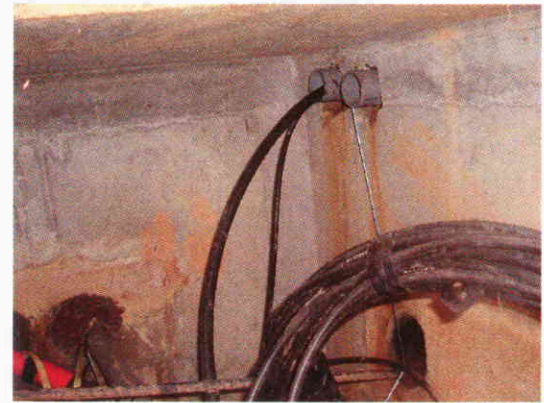
- SPARE
- ◐ SPACE AVAILABLE
- FULL



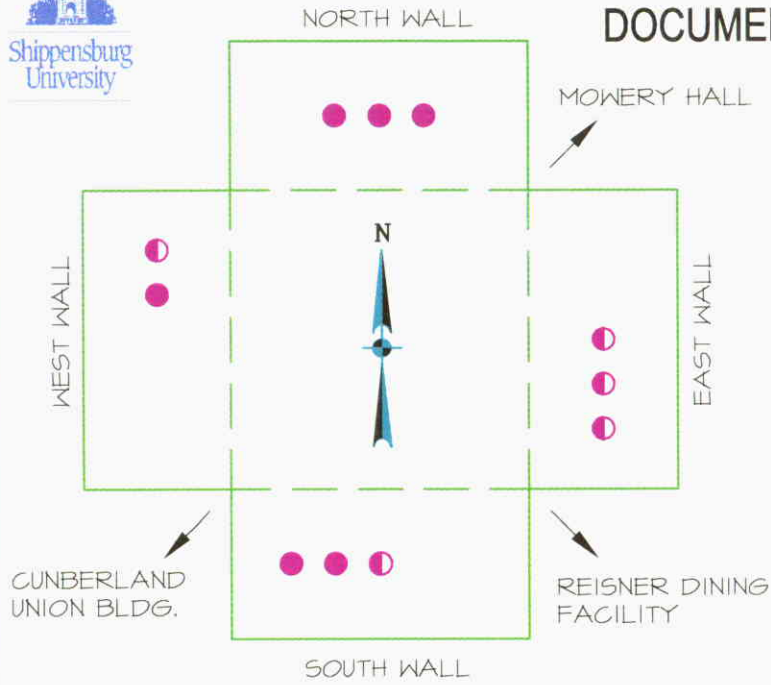
EAST WALL



SOUTH WALL



WEST WALL



MANHOLE #42

LEGEND:

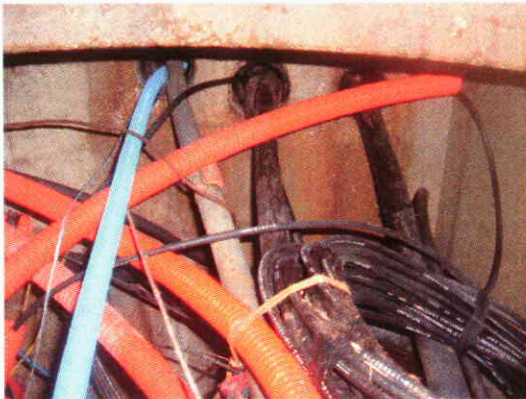
- SPARE
- SPACE AVAILABLE
- FULL



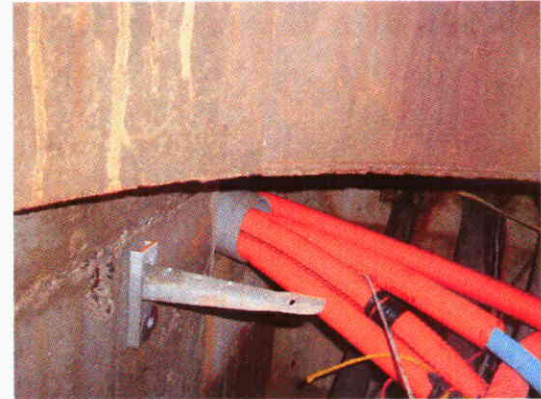
NORTH WALL



EAST WALL



SOUTH WALL



WEST WALL

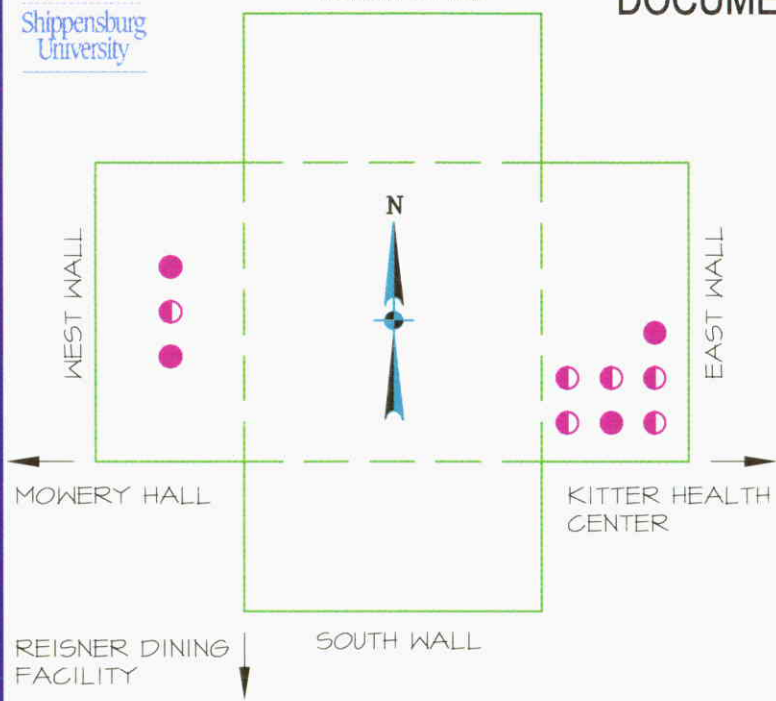


SEAVERS APARTMENTS

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



NORTH WALL



MANHOLE #43

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL



WEST WALL



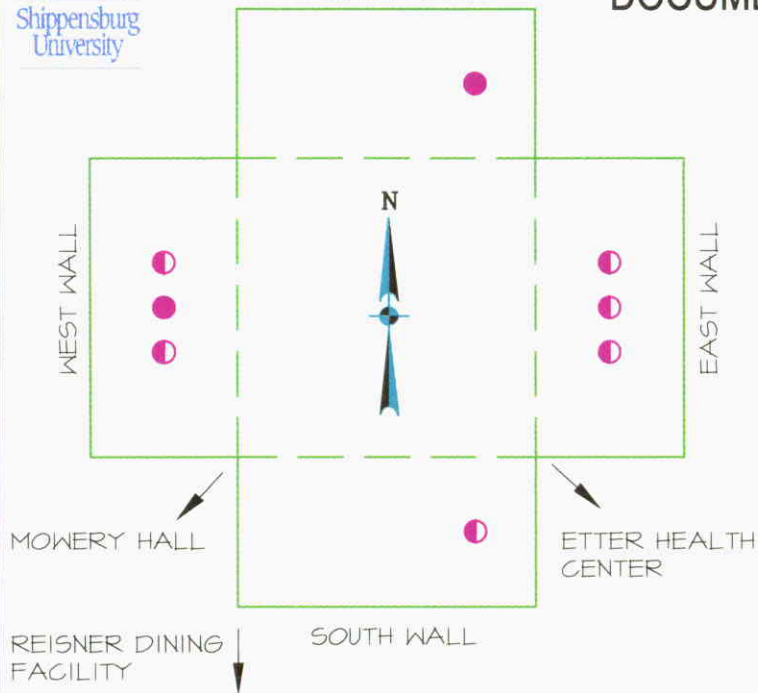
SEEVERS APARTMENTS

NORTH WALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



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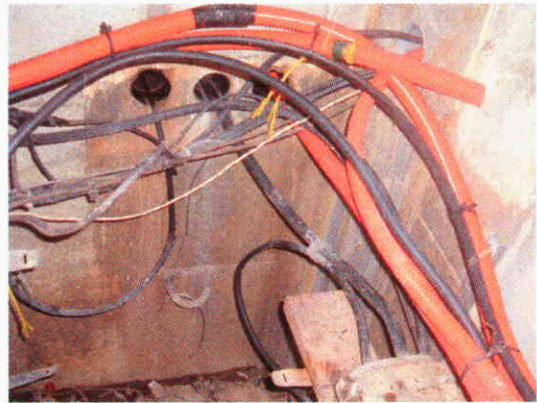
MANHOLE #44

LEGEND:

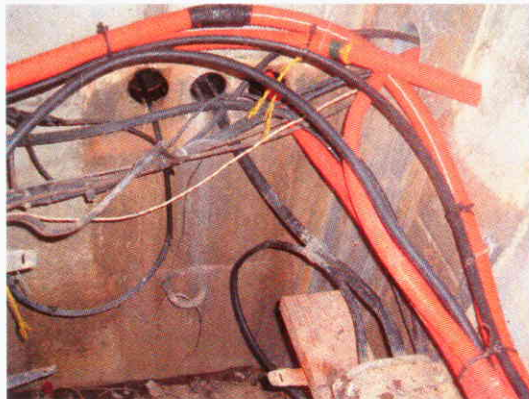
- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



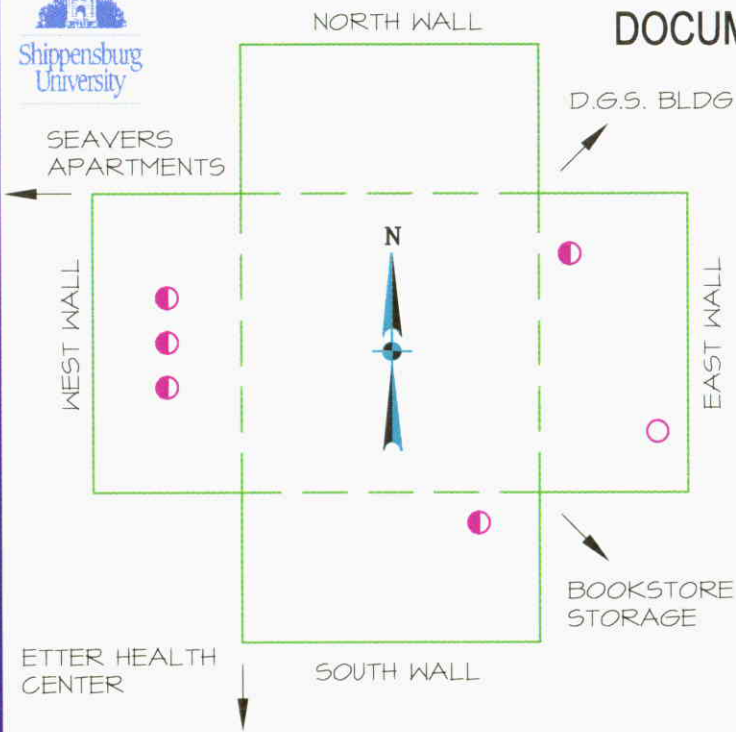
EAST WALL



SOUTH WALL



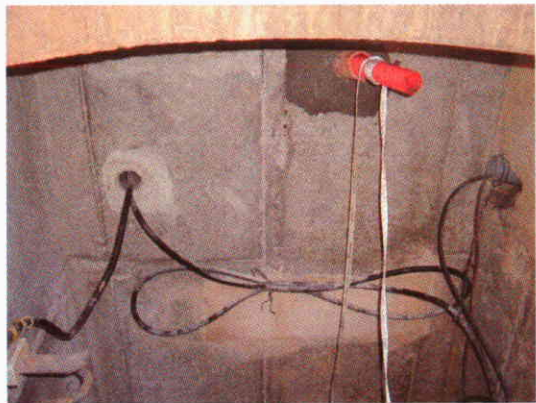
WEST WALL



MANHOLE #45

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



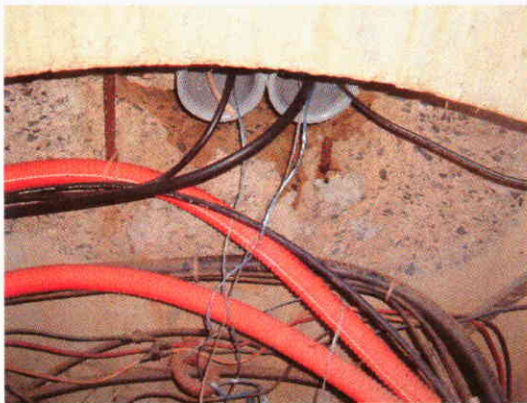
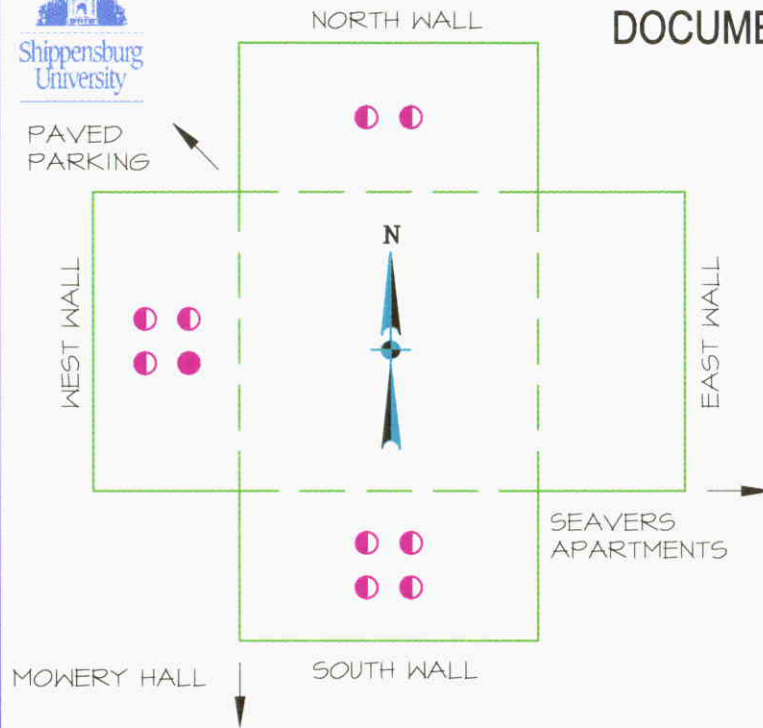
EAST WALL



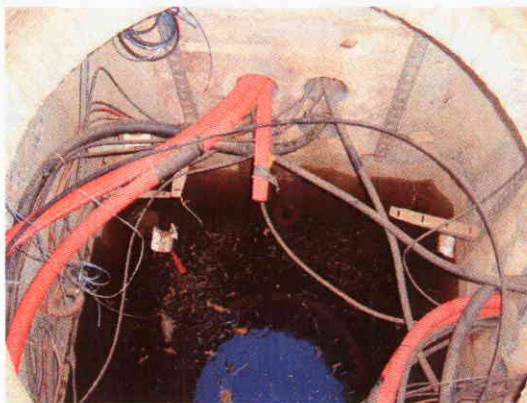
SOUTH WALL



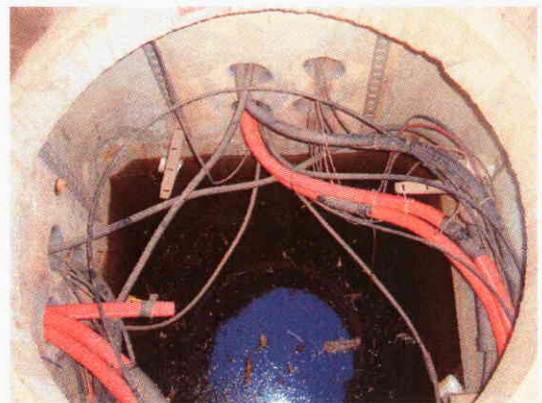
WEST WALL



NORTH WALL



SOUTH WALL



WEST WALL

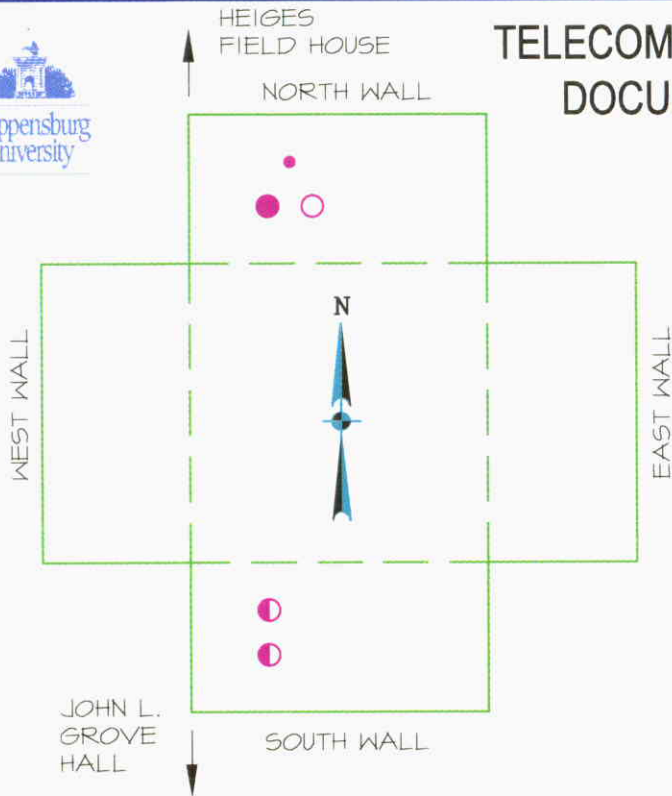


HEIGES
FIELD HOUSE

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



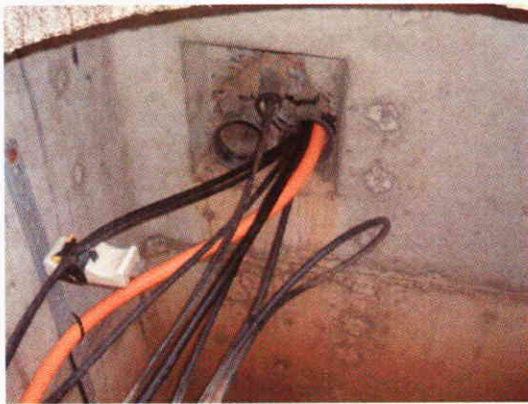
Entech Engineering Inc.
www.entecheng.com



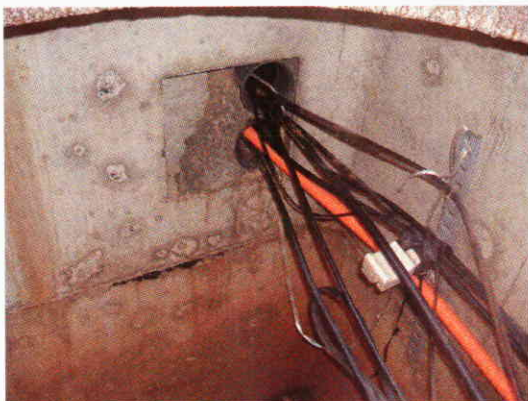
MANHOLE #47

LEGEND:

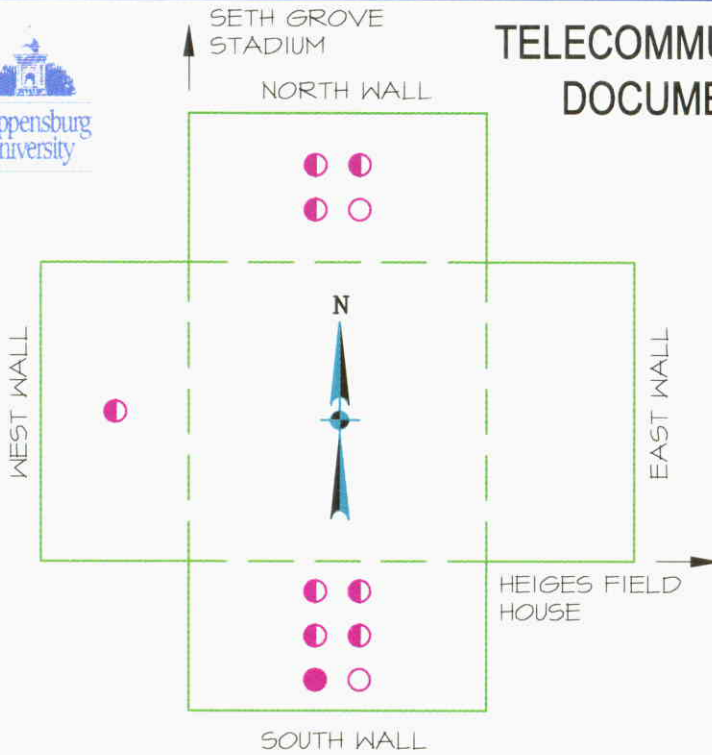
-  SPARE
-  SPACE AVAILABLE
-  FULL



NORTH WALL



SOUTH WALL



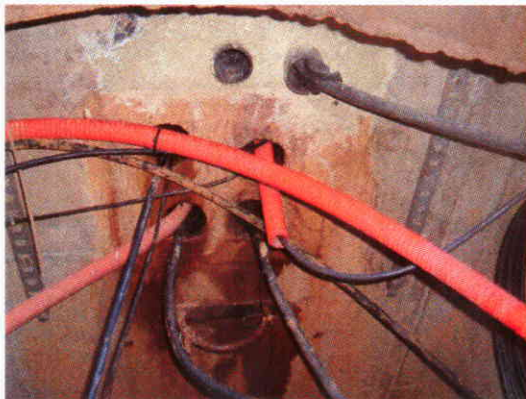
MANHOLE #48

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



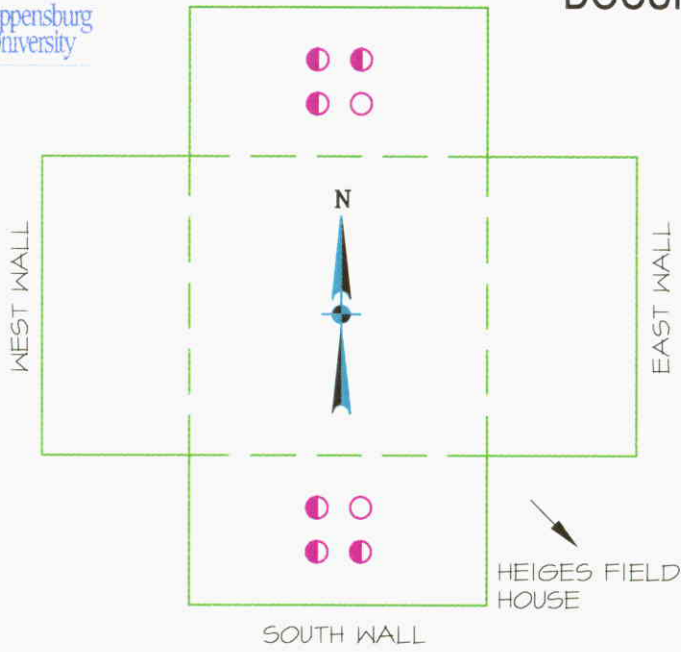
NORTH WALL



SOUTH WALL



WEST WALL



MANHOLE #49

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



NORTH WALL

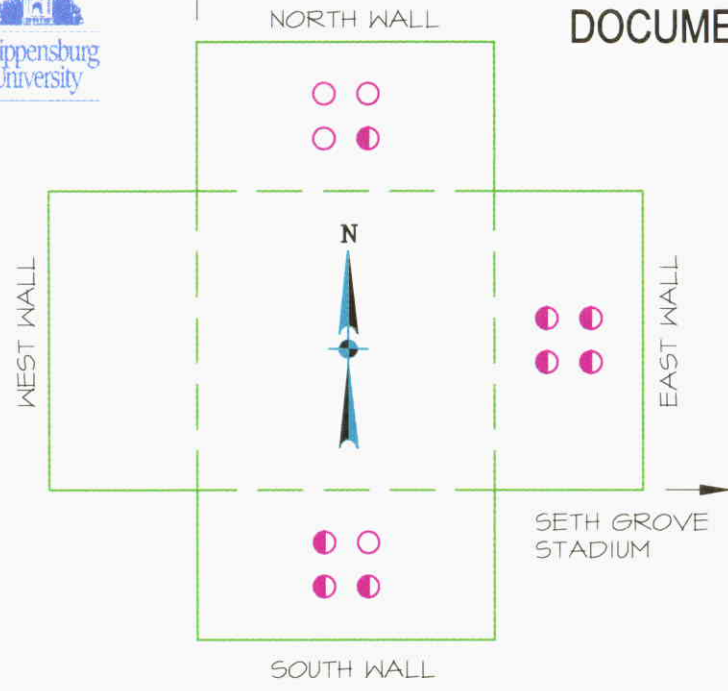


SOUTH WALL



PRACTICE FIELD

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #50

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



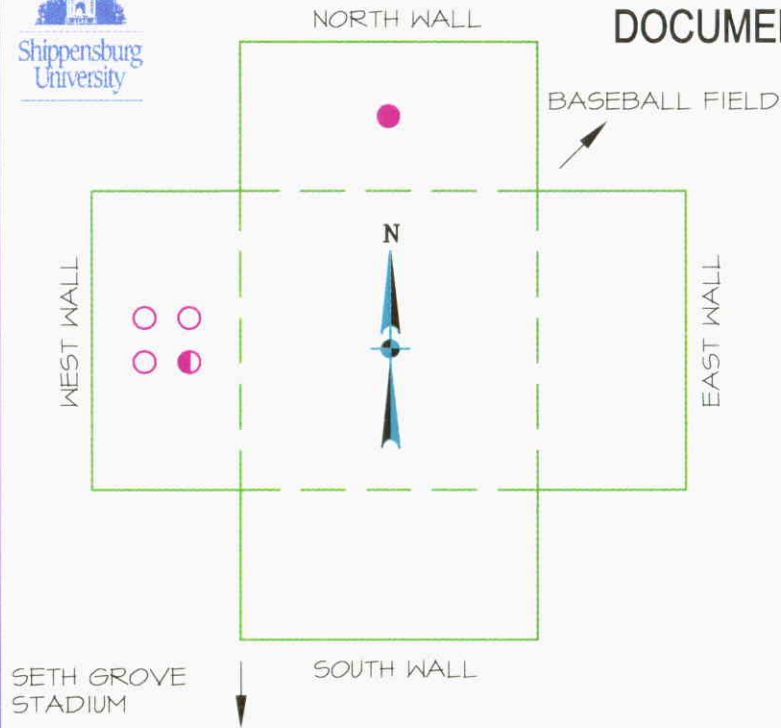
NORTH WALL



EAST WALL



SOUTH WALL



MANHOLE #51

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



EAST WALL



WEST WALL



REISINGER HOUSE

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



NEWBURG ROAD

MCCUNE HALL

WEST WALL

NORTH WALL

N

EAST WALL

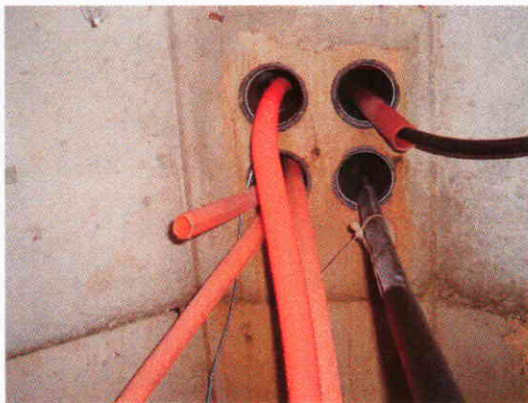
SOUTH WALL

TENNIS COURTS

MANHOLE #52

LEGEND:

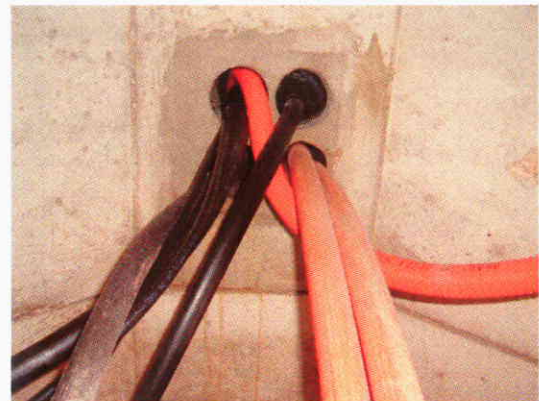
-  SPARE
-  SPACE AVAILABLE
-  FULL



EAST WALL



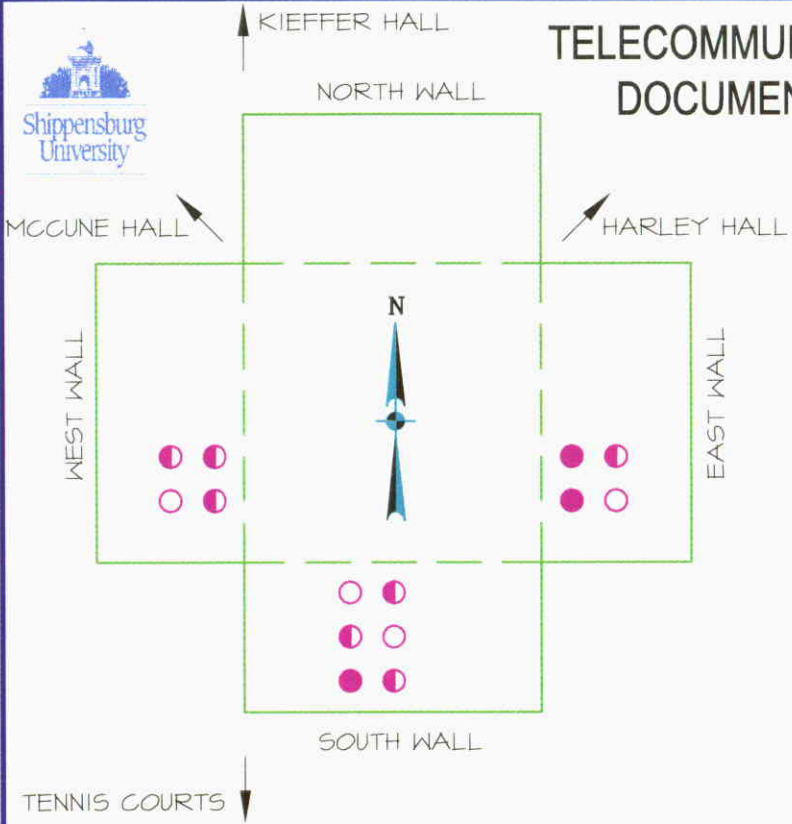
EAST WALL



WEST WALL



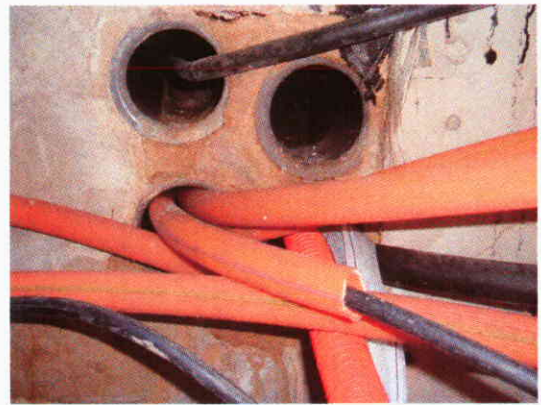
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



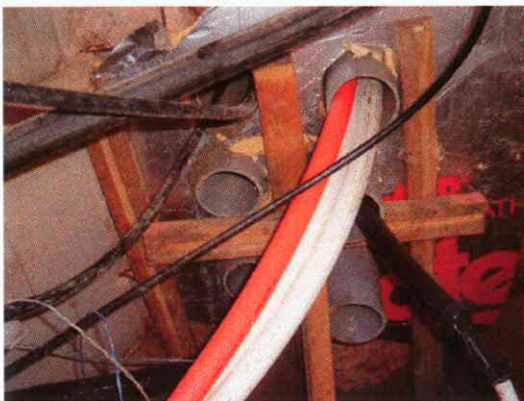
MANHOLE #53

LEGEND:

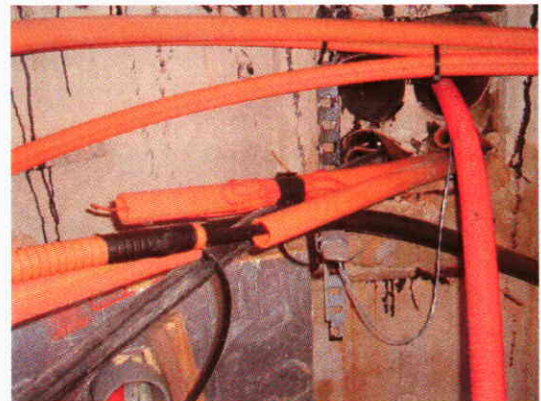
- SPARE
- SPACE AVAILABLE
- FULL



EAST WALL



SOUTH WALL

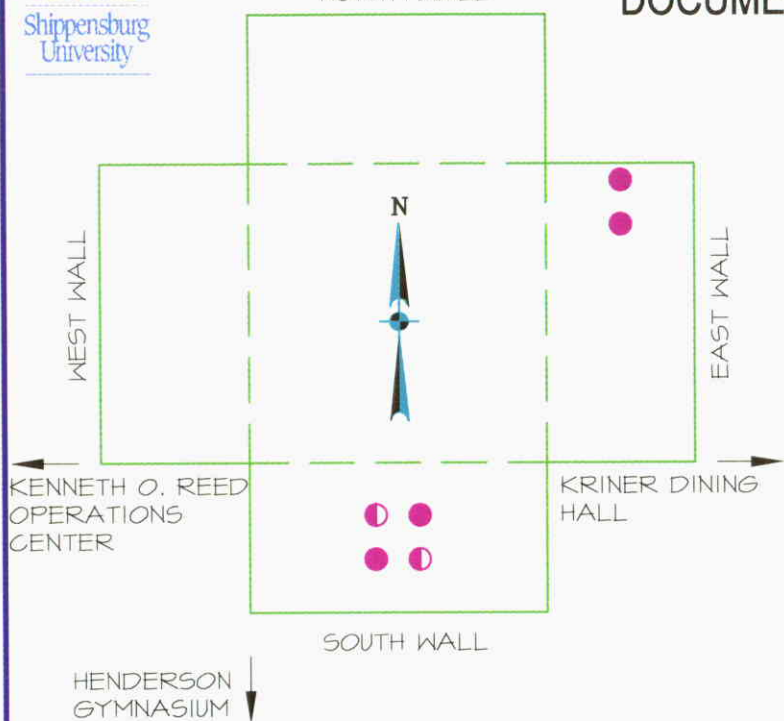


WEST WALL



FAC. OFF. BLDG.

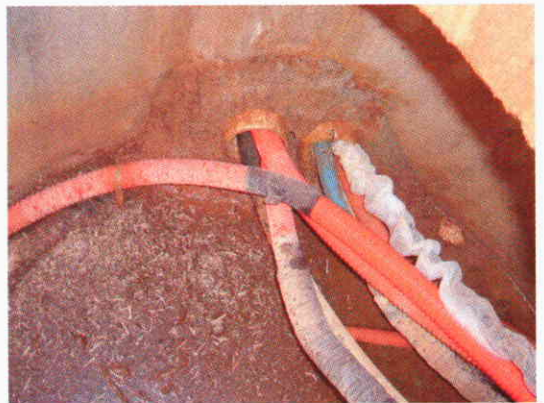
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #54

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



EAST WALL

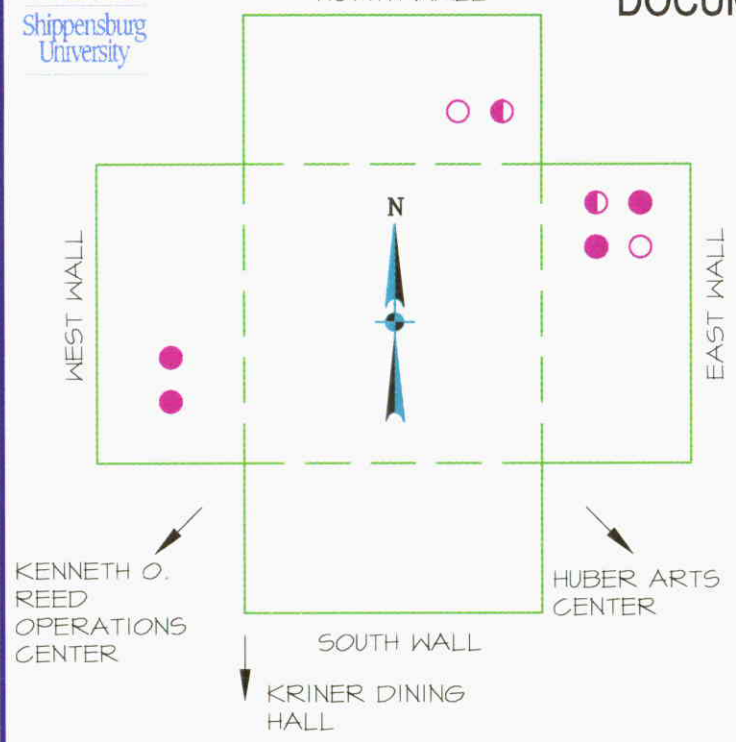


SOUTH WALL



FACULTY OFFICE BUILDING

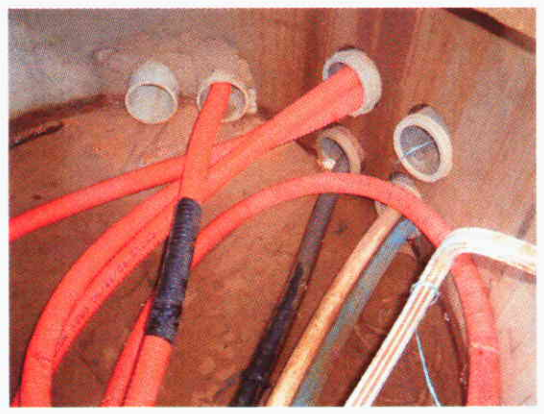
TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



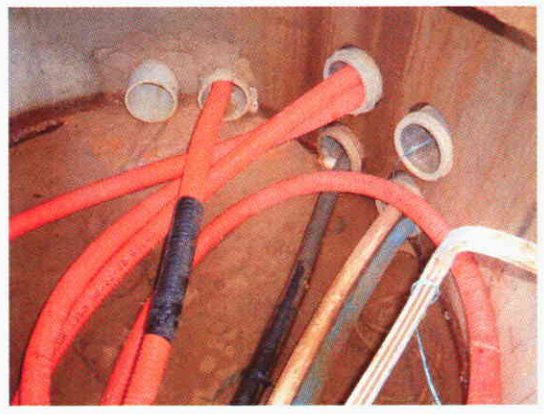
MANHOLE #55

LEGEND:

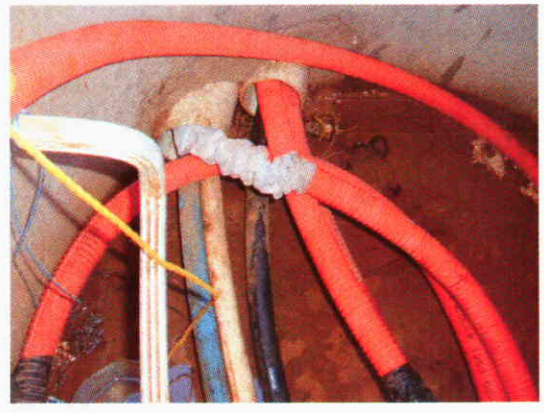
- SPARE
- ◐ SPACE AVAILABLE
- FULL



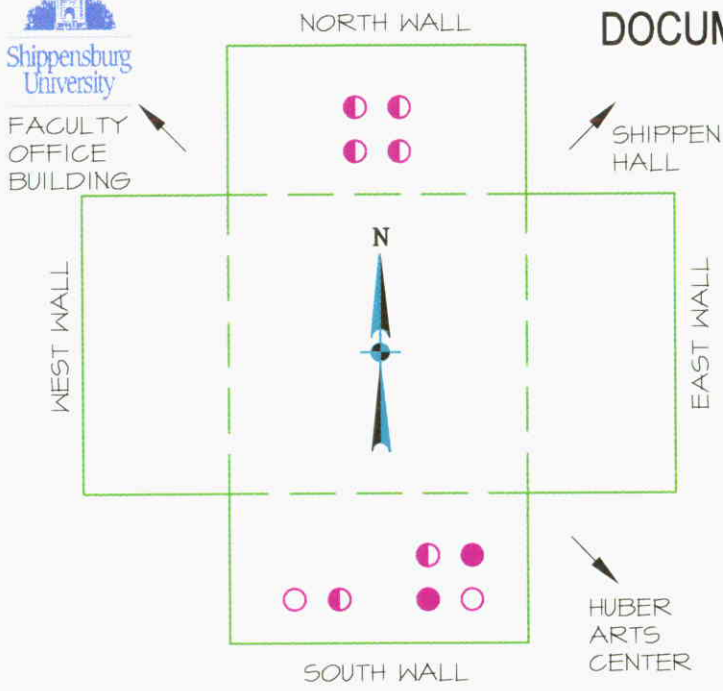
NORTH WALL



EAST WALL



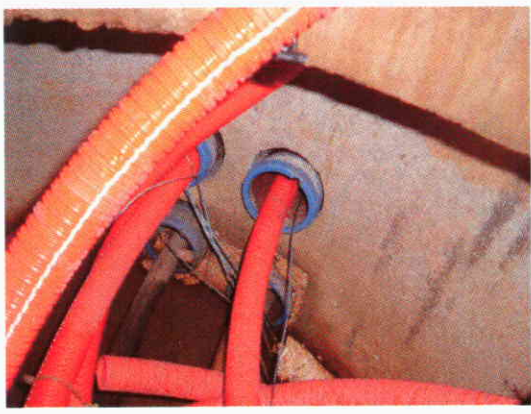
WEST WALL



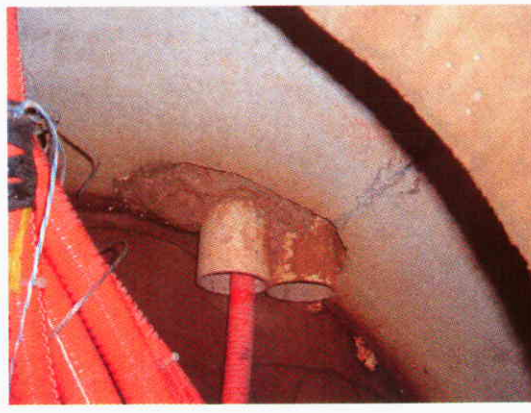
MANHOLE #56

LEGEND:

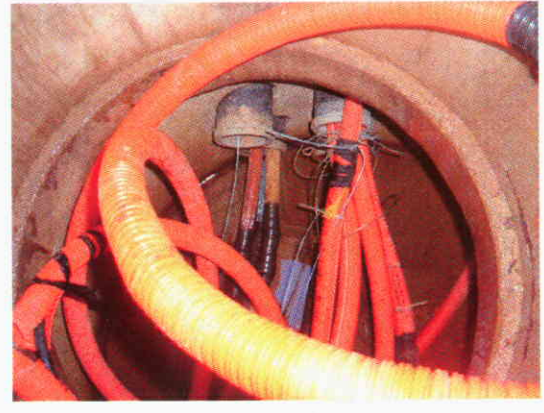
- SPARE
- ◐ SPACE AVAILABLE
- FULL



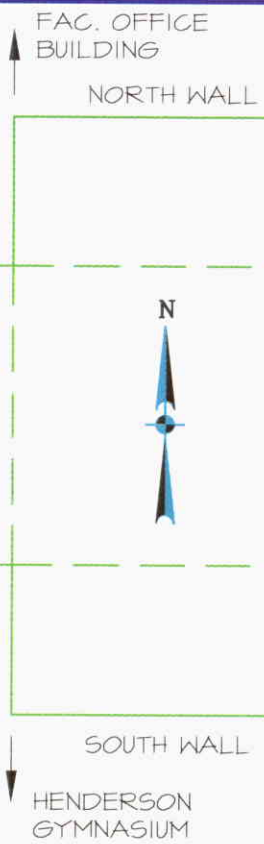
NORTH WALL



SOUTH WALL



SOUTH WALL



TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #58

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL

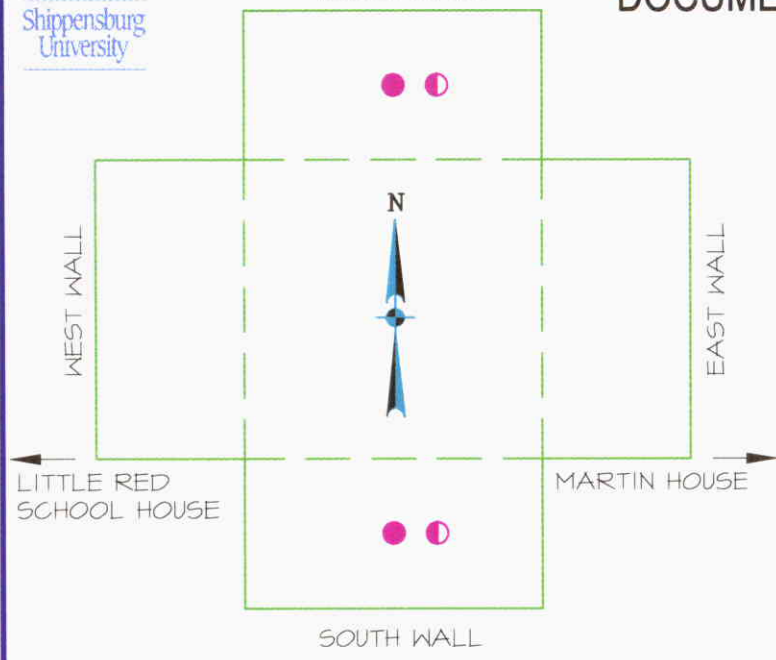


WEST WALL



GILBERT HALL

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY



MANHOLE #59

LEGEND:

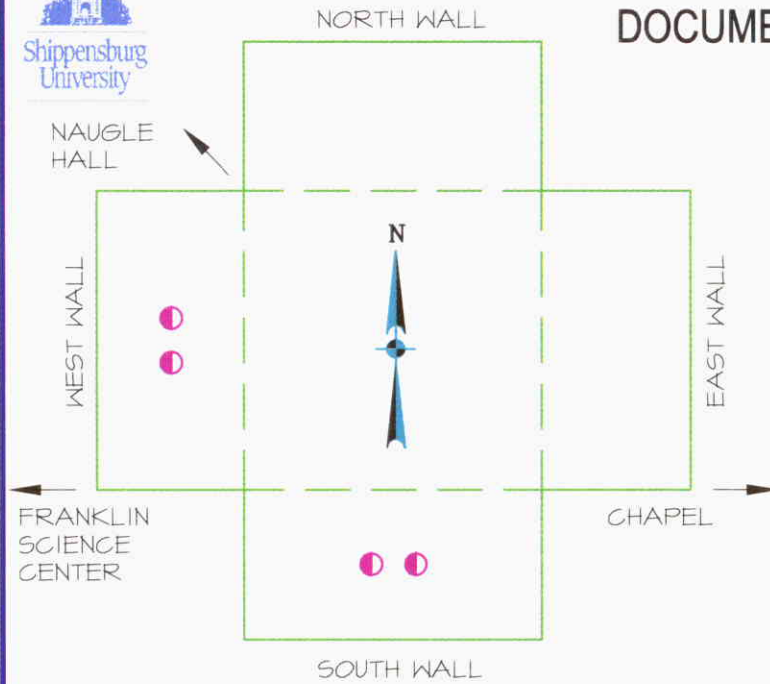
- SPARE
- SPACE AVAILABLE
- FULL



NORTH WALL



SOUTH WALL



MANHOLE #60

LEGEND:

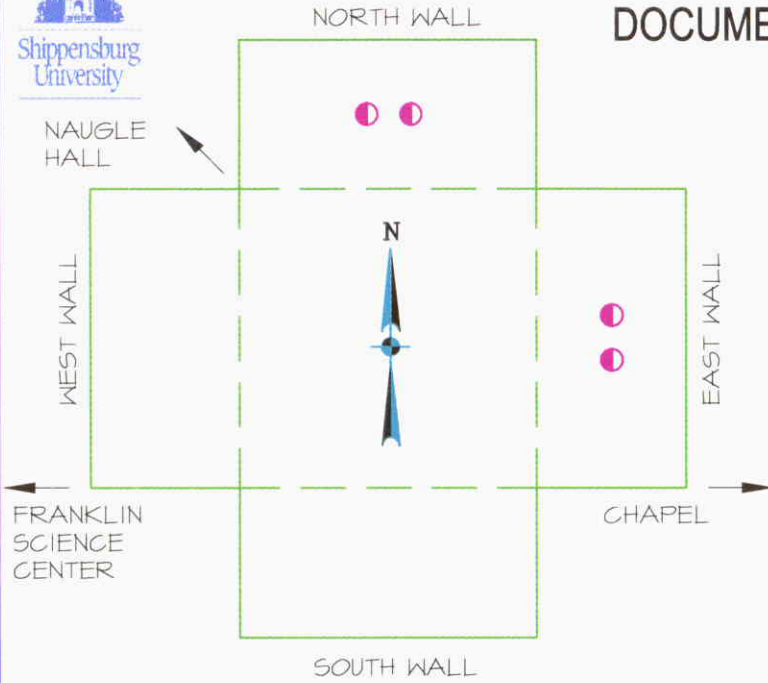
-  SPARE
-  SPACE AVAILABLE
-  FULL



SOUTH WALL



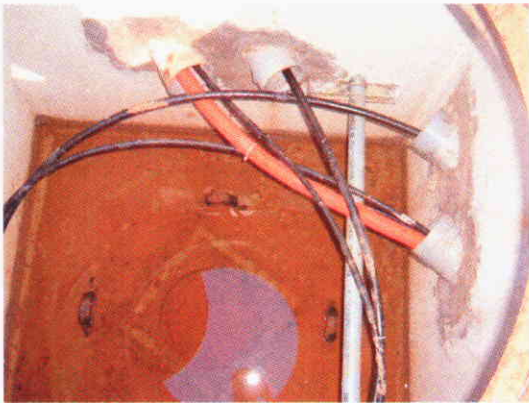
WEST WALL



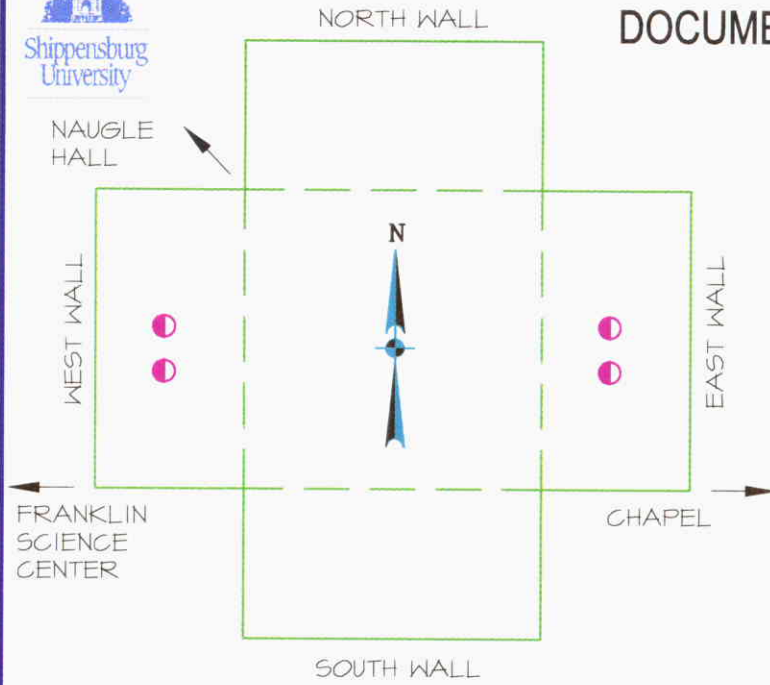
MANHOLE #61

LEGEND:

-  SPARE
-  SPACE AVAILABLE
-  FULL



NORTH WALL



MANHOLE #62

LEGEND:

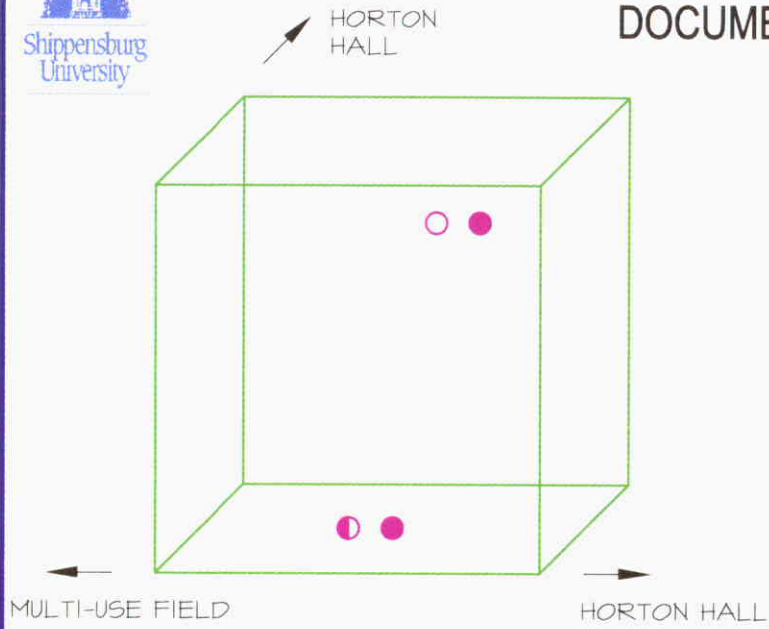
-  SPARE
-  SPACE AVAILABLE
-  FULL



EAST WALL



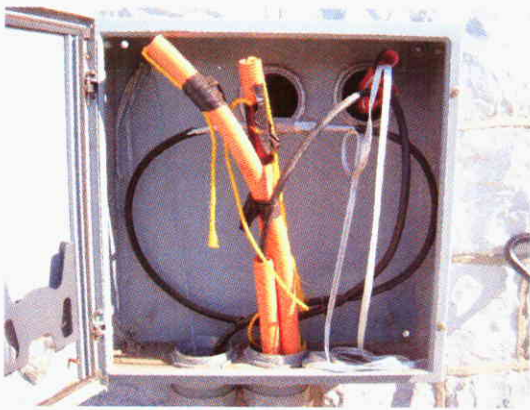
WEST WALL



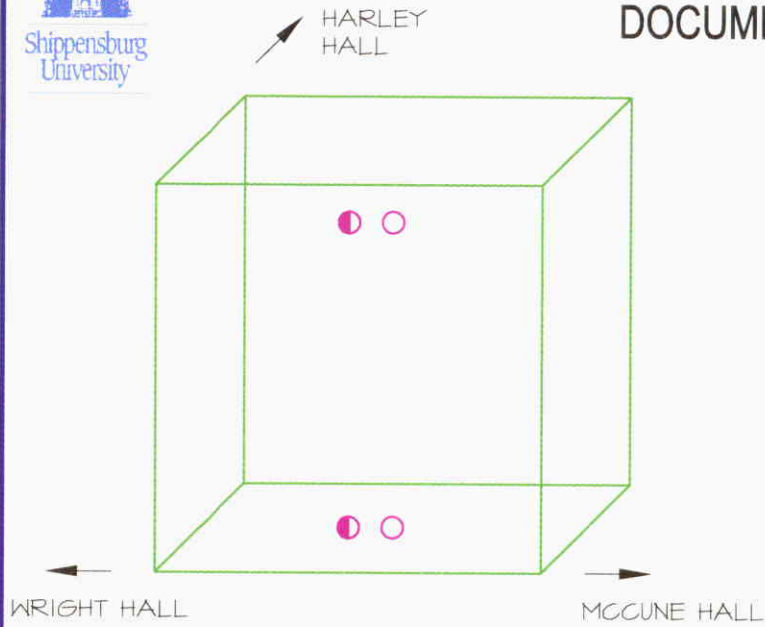
PULLBOX #1

LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL



PULLBOX #2

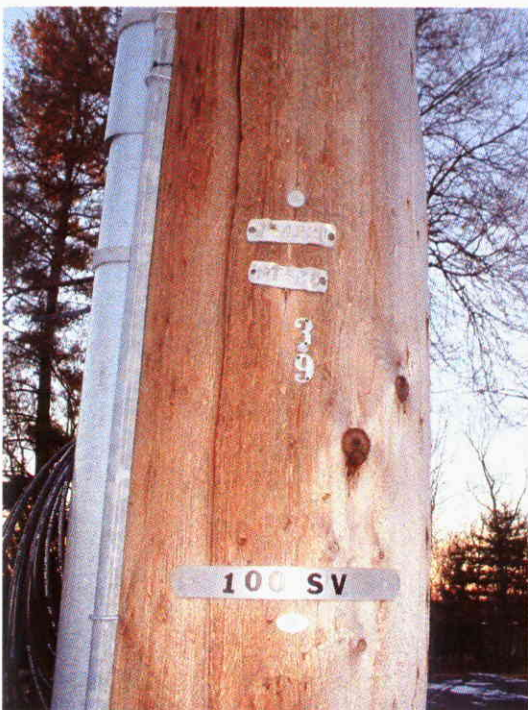
LEGEND:

- SPARE
- ◐ SPACE AVAILABLE
- FULL



NORTH WALL

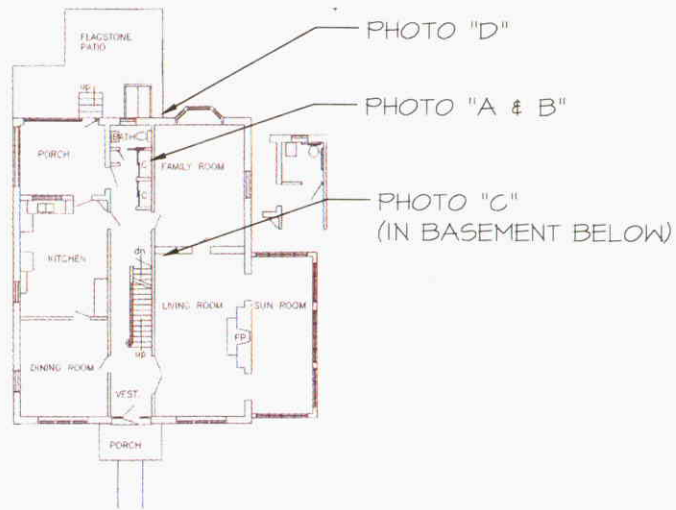
UTILITY POLE (SOUTHWEST END OF UNIVERSITY)



UTILITY POLE (NORTHEAST END OF UNIVERSITY)



ATTACHMENT B



ALUMNI HOUSE - FIRST FLOOR



PHOTO "A"



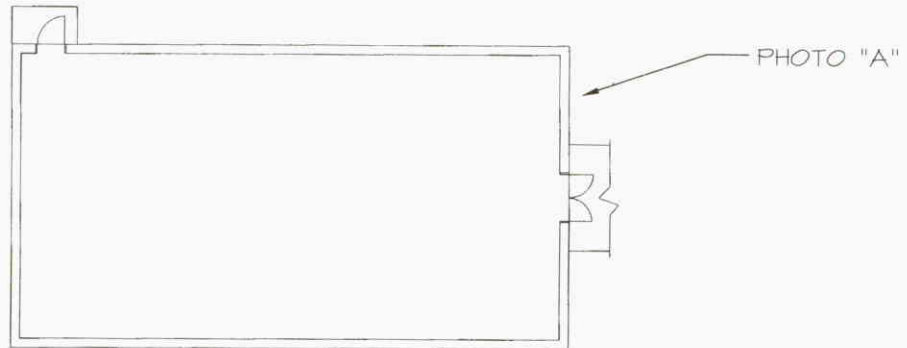
PHOTO "B"



"PHOTO "C"



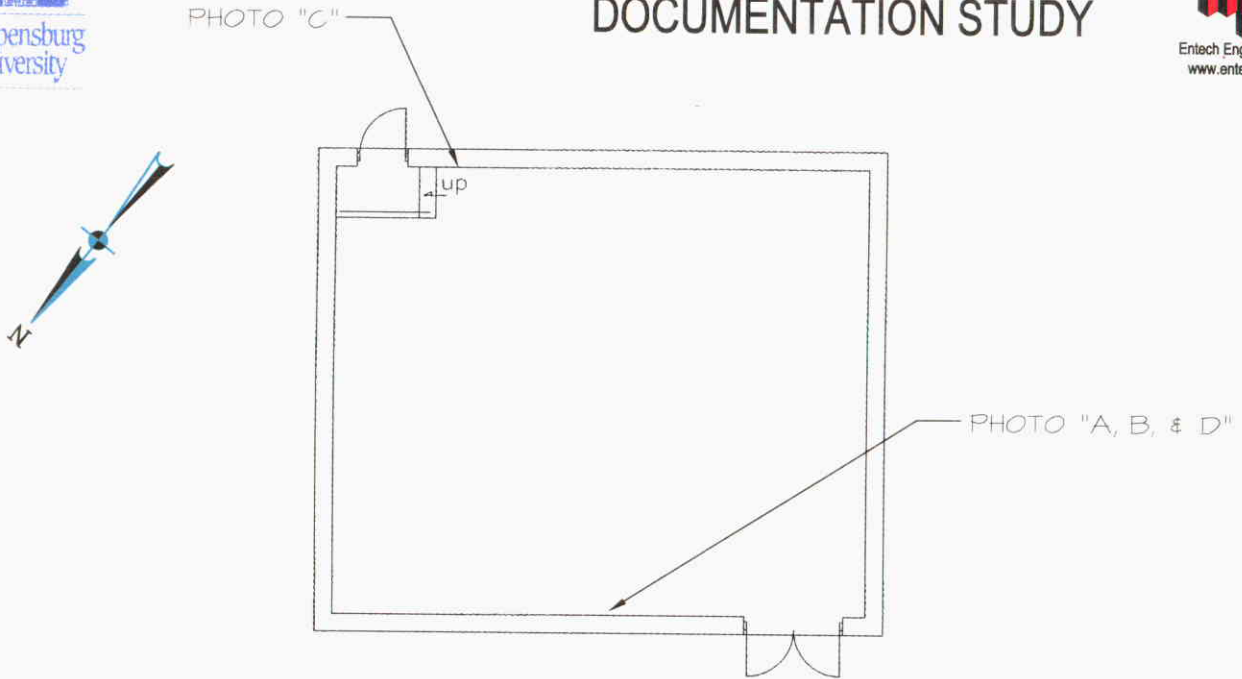
PHOTO "D"



BOOKSTORE STORAGE - FIRST FLOOR



PHOTO "A"



CENTREX BUILDING - FIRST FLOOR

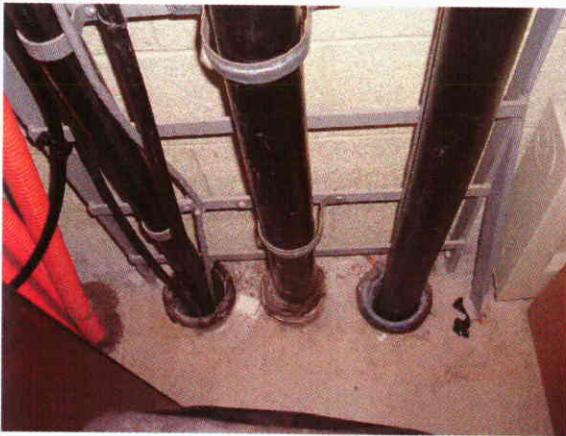
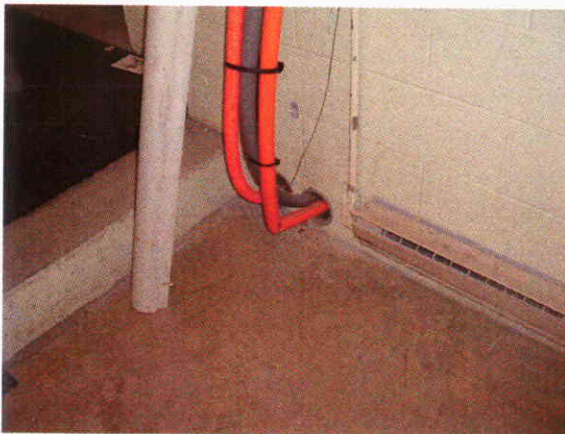


PHOTO "A"



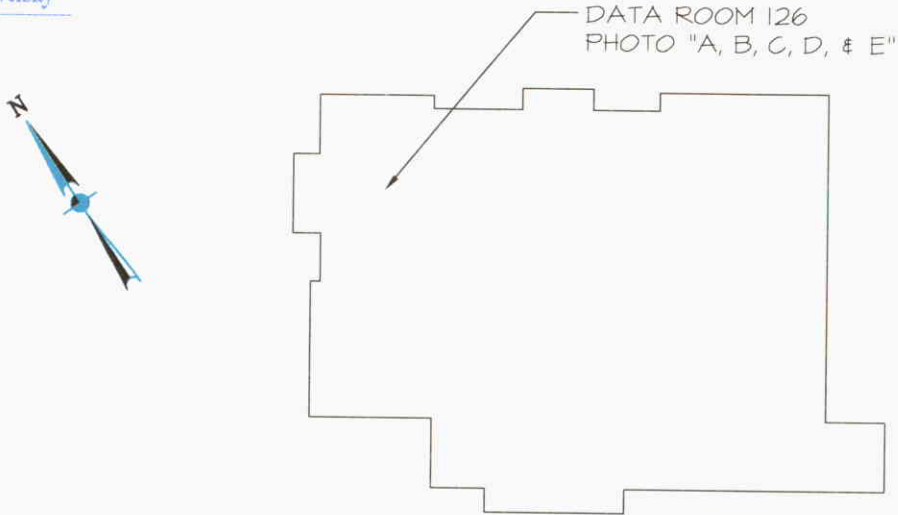
PHOTO "B"



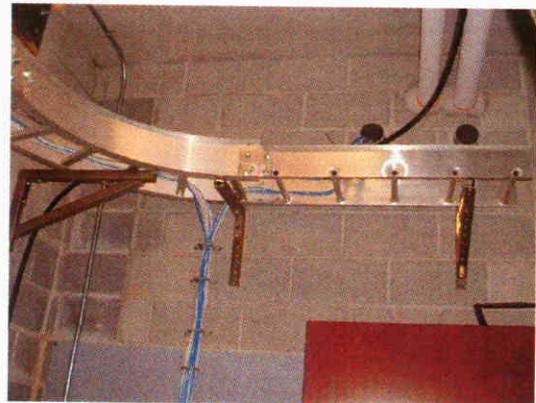
"PHOTO "C"

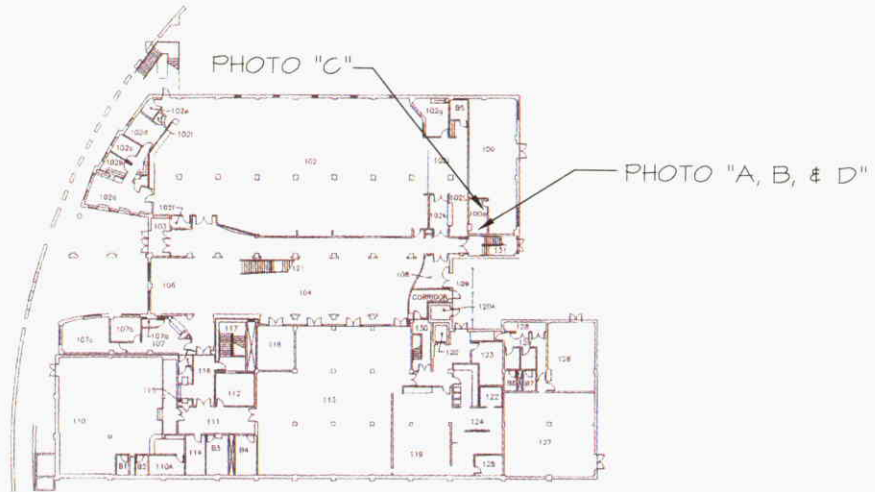


PHOTO "D"



CHAPEL - FIRST FLOOR





CUMBERLAND UNION BUILDING - GROUND FLOOR

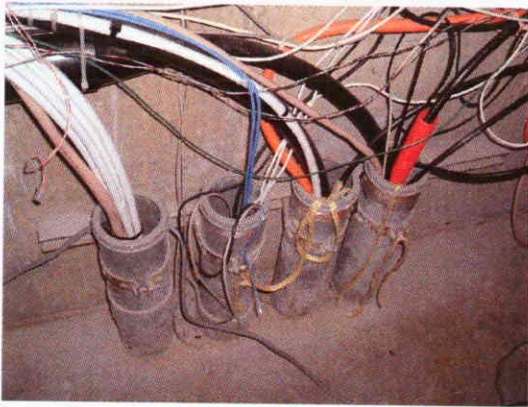


PHOTO "A"

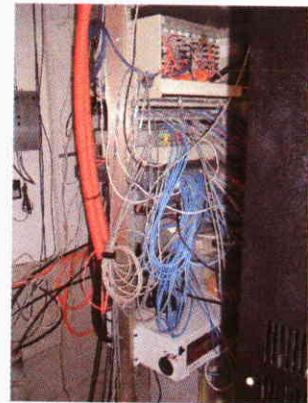


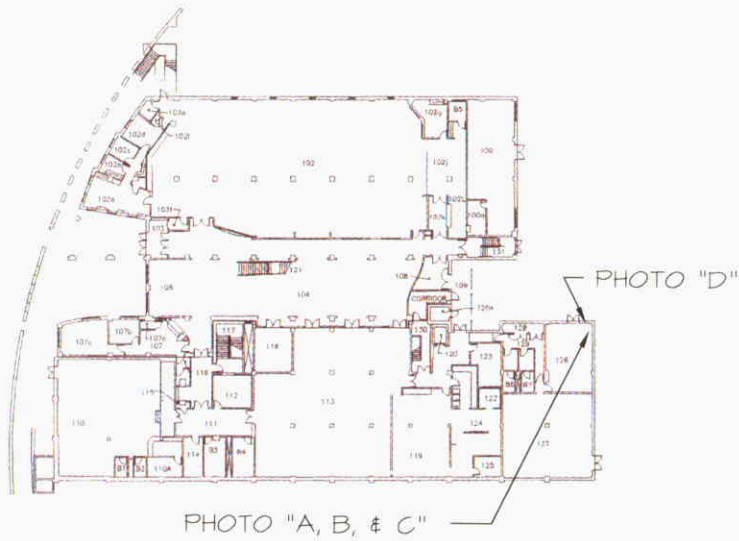
PHOTO "B"



"PHOTO "C"



PHOTO "D"



CUMBERLAND UNION BUILDING - GROUND FLOOR



PHOTO "A"

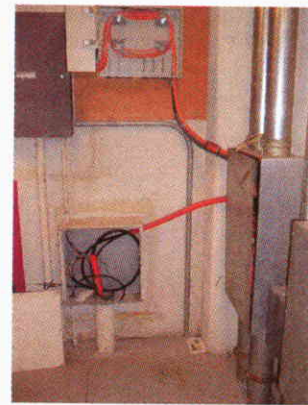
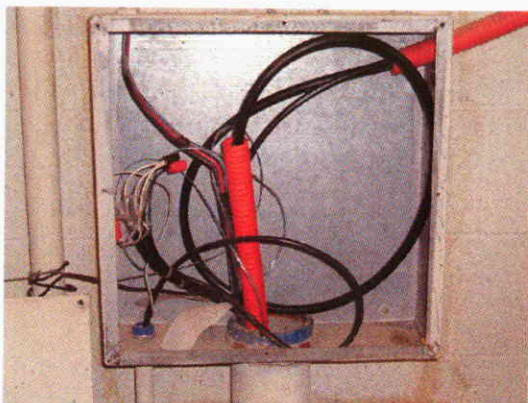


PHOTO "B"



"PHOTO "C"

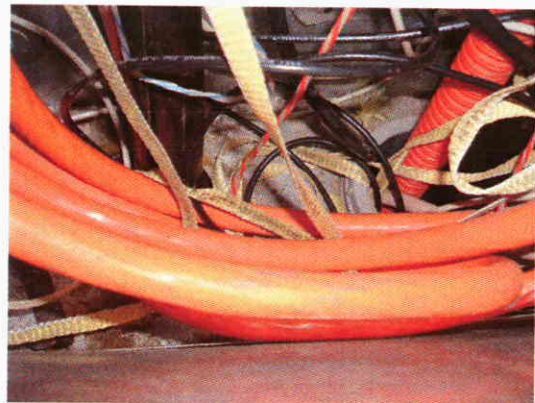


PHOTO "D"

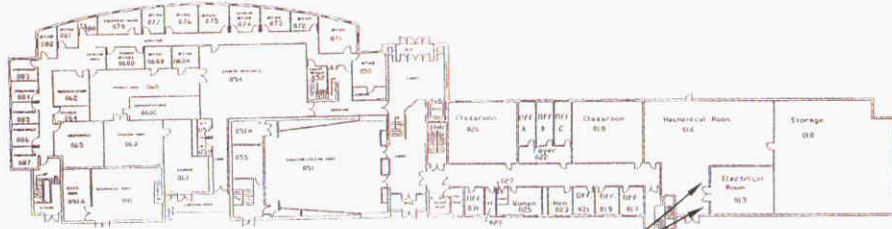
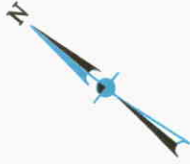


PHOTO "A, B, C, & D"

DAUPHIN HUMANITY CENTER - GROUND FLOOR



PHOTO "A"



PHOTO "B"



"PHOTO "C"

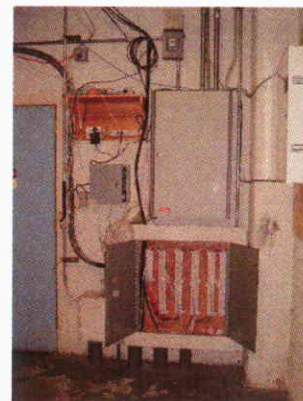
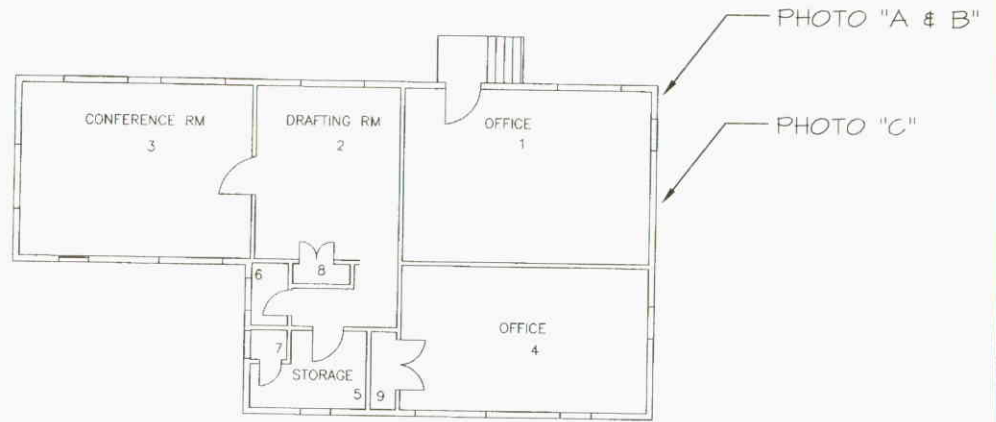


PHOTO "D"



D.G.S. BUILDING - FIRST FLOOR



PHOTO "A"

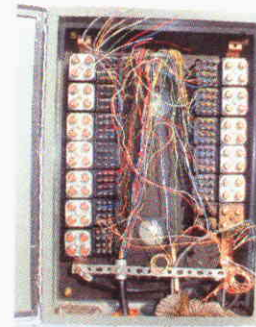


PHOTO "B"



"PHOTO "C"



PHOTO "A, B, C, & D"



ETTER HEALTH CENTER - FIRST FLOOR

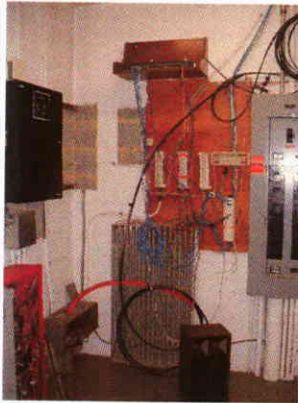


PHOTO "A"

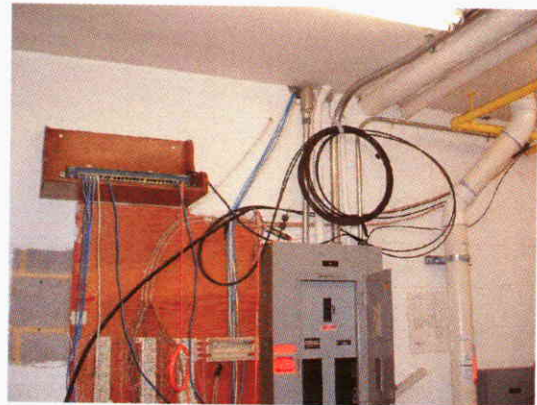
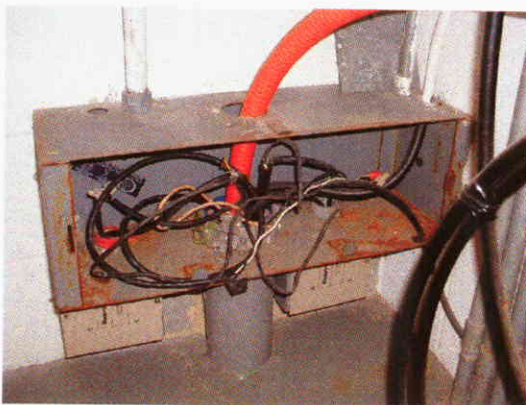


PHOTO "B"



"PHOTO "C"

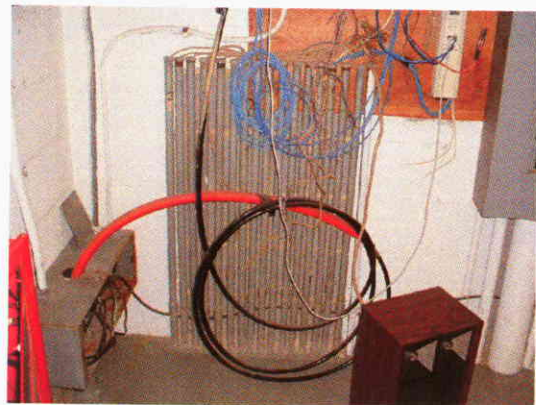
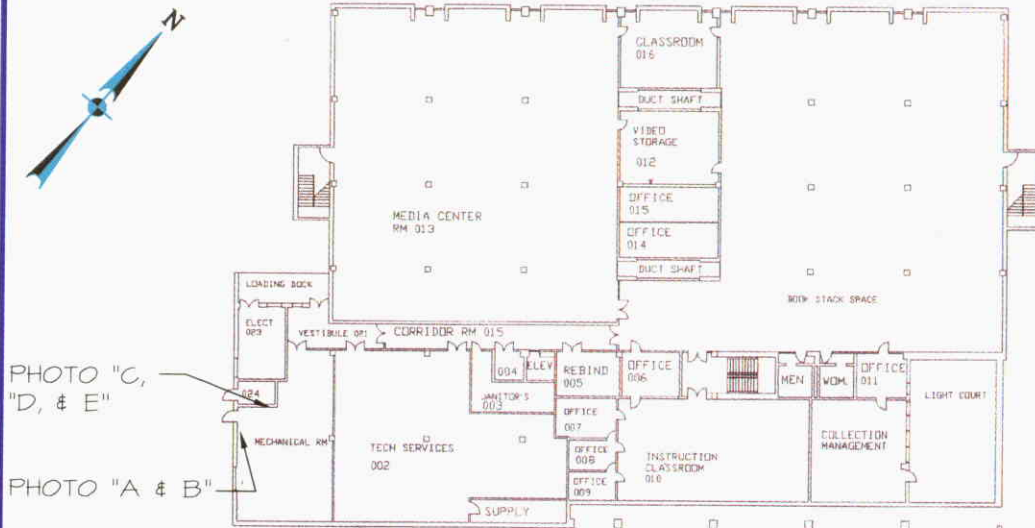
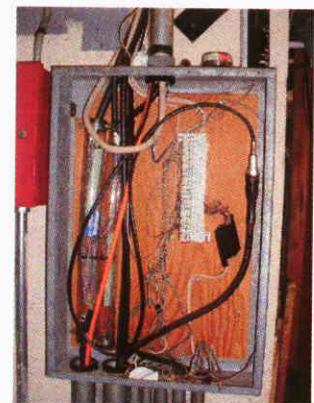
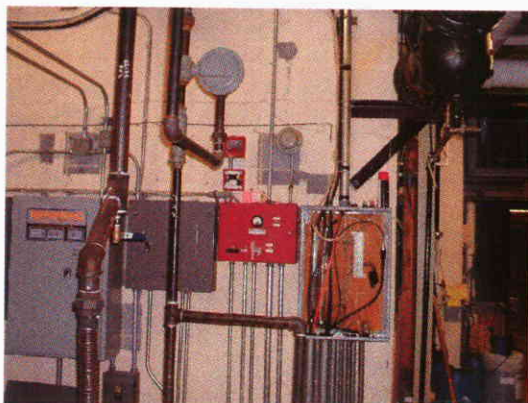
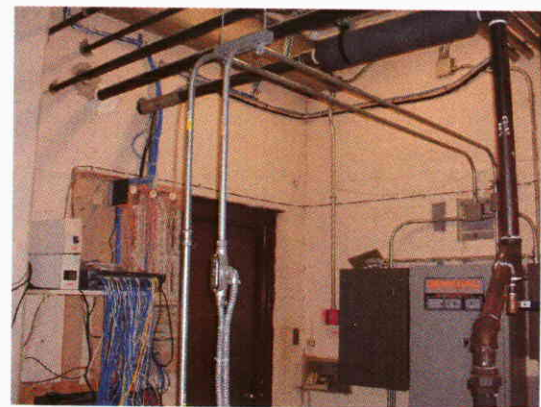
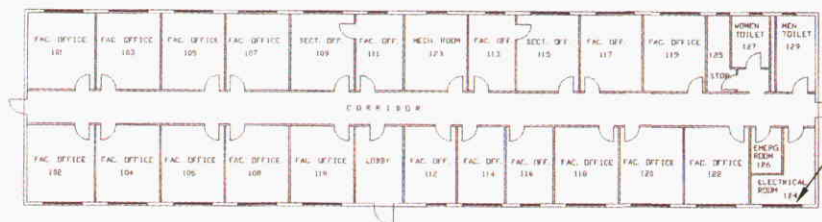


PHOTO "D"



EZRA LEHMAN LIBRARY - GROUND FLOOR





FAC. OFFICE BUILDING - FIRST FLOOR



PHOTO "A"



PHOTO "B"



"PHOTO "C"

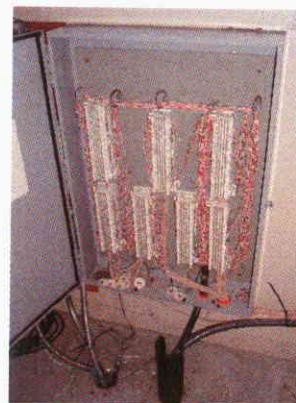
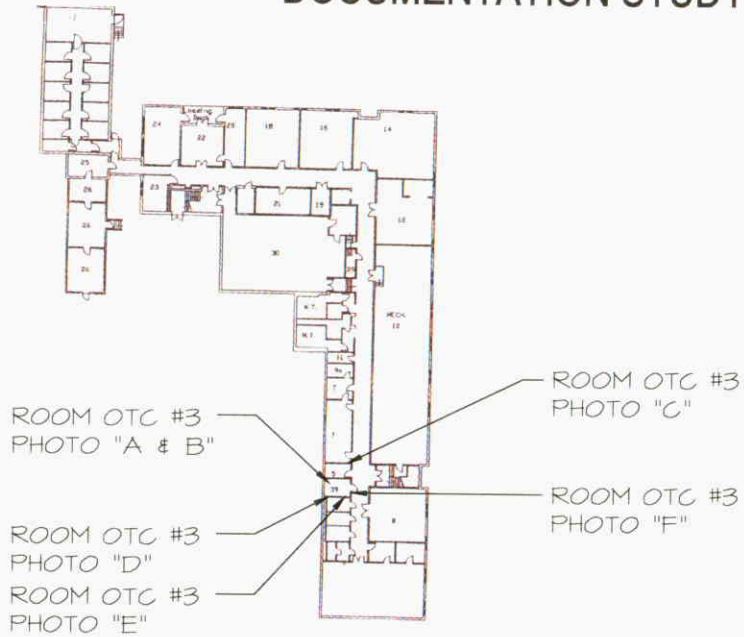


PHOTO "D"



FRANKLIN SCIENCE CENTER - BASEMENT FLOOR



PHOTO "A"



PHOTO "B"

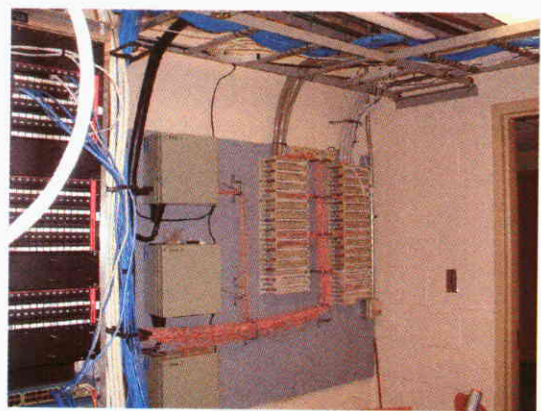


PHOTO "C"



"PHOTO "D"



"PHOTO "E"



PHOTO "F"

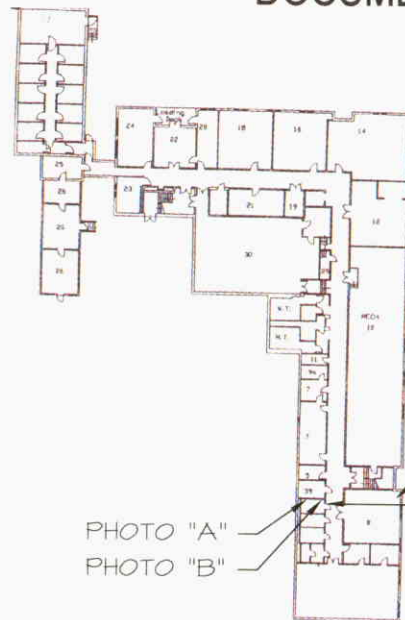


PHOTO "A"
PHOTO "B"
PHOTO "C"
PHOTO "D, E, & F"

FRANKLIN SCIENCE CENTER - BASEMENT FLOOR



PHOTO "A"



PHOTO "B"



PHOTO "C"



PHOTO "D"

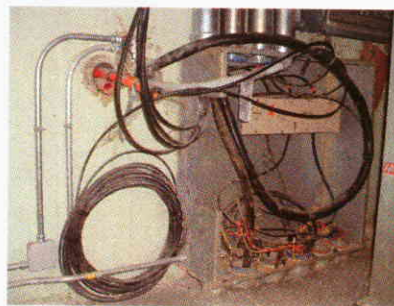


PHOTO "E"

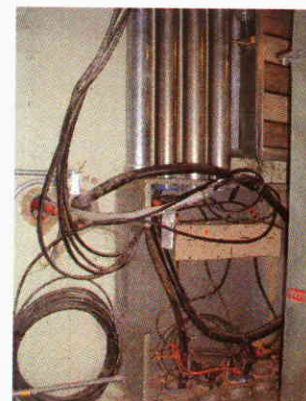
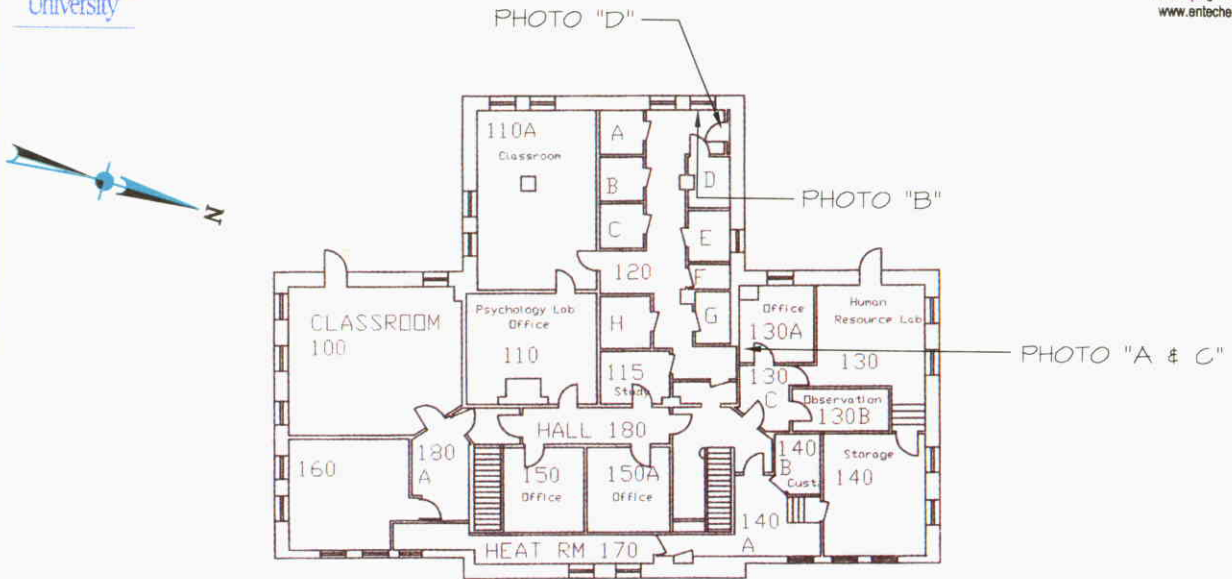


PHOTO "F"



GILBERT HALL - BASEMENT FLOOR

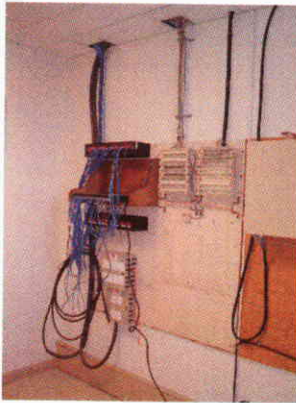


PHOTO "A"



PHOTO "B"

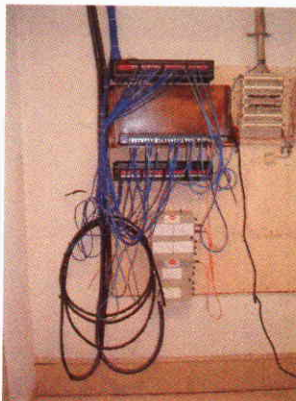
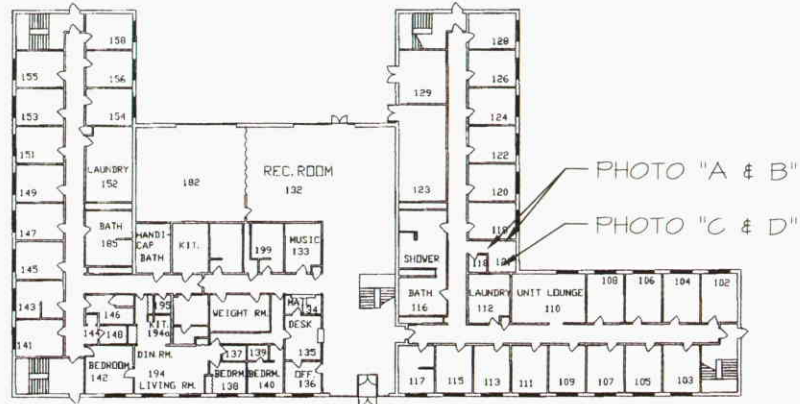


PHOTO "C"



PHOTO "D"



HARLEY HALL - FIRST FLOOR PLAN

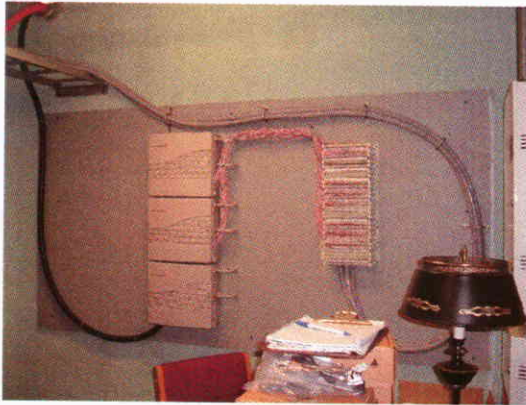


PHOTO "A"

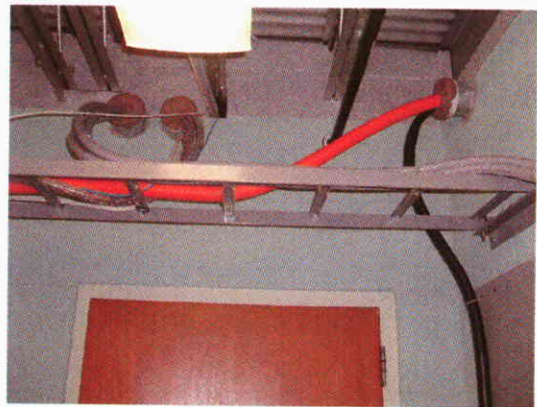
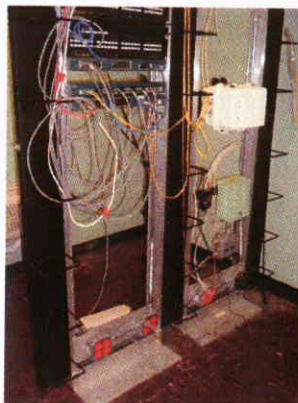


PHOTO "B"



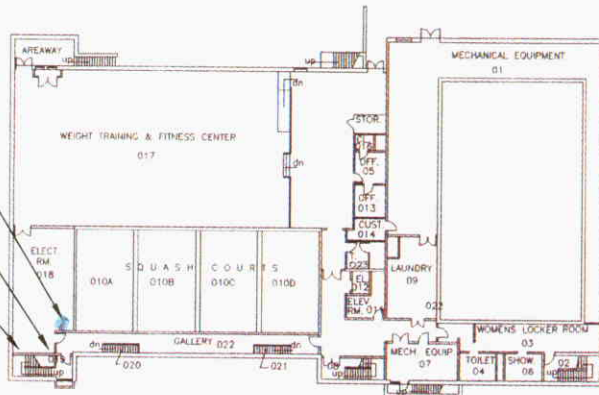
"PHOTO "C"



PHOTO "D"



PHOTO "A"
PHOTO "C"
PHOTO "B & D"



HEIGES FIELD HOUSE - GROUND FLOOR PLAN



PHOTO "A"

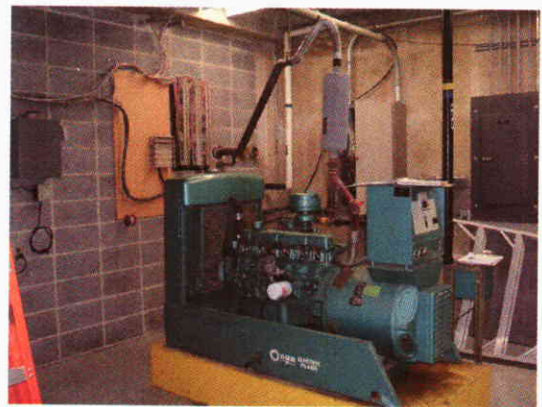
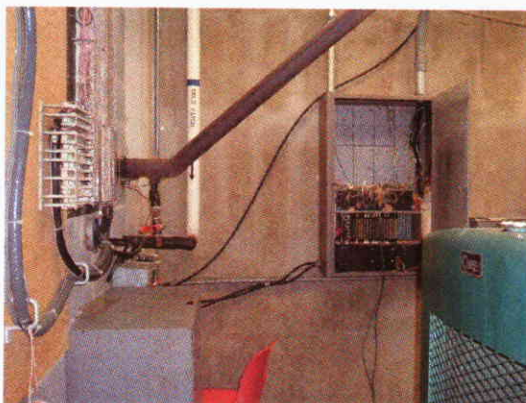


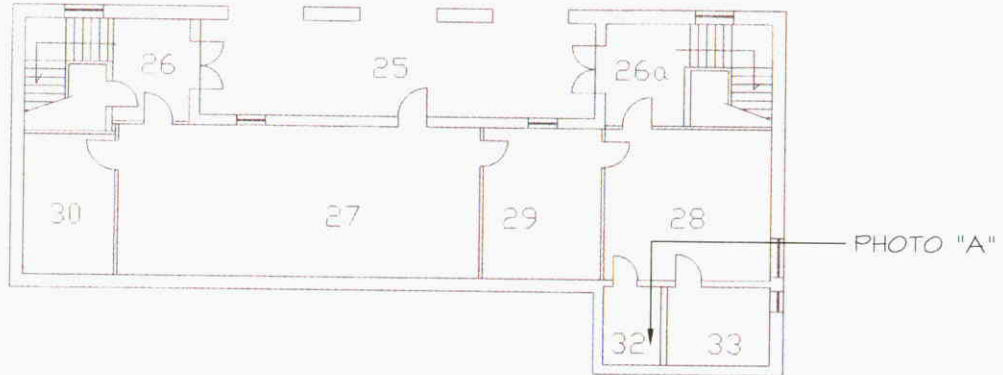
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"PHOTO "C"



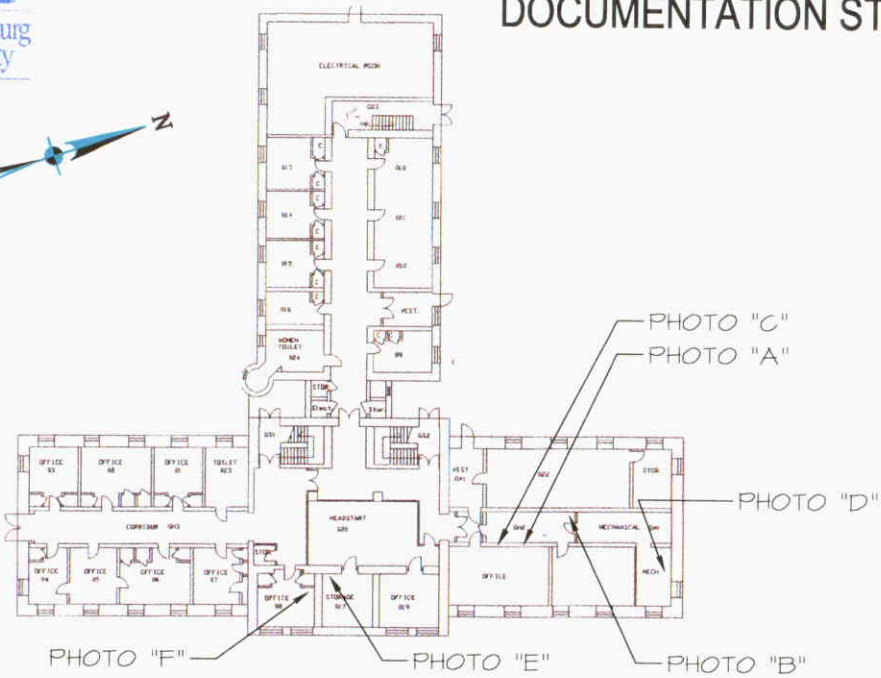
PHOTO "D"



HENDERSON GYMNASIUM - SUB-BASEMENT FLOOR



PHOTO "A"



HORTON HALL - BASEMENT FLOOR



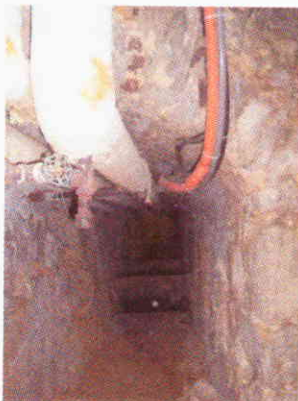
PHOTO "A"



PHOTO "B"



PHOTO "C"



"PHOTO "D"



"PHOTO "E"



PHOTO "F"

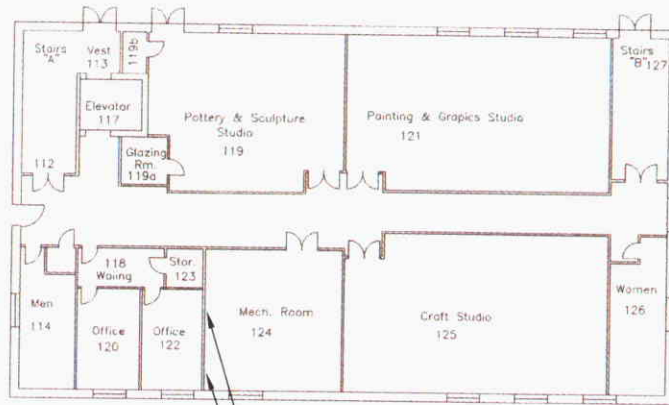


PHOTO "B & C"

PHOTO "A"

HUBER ARTS CENTER - GROUND FLOOR

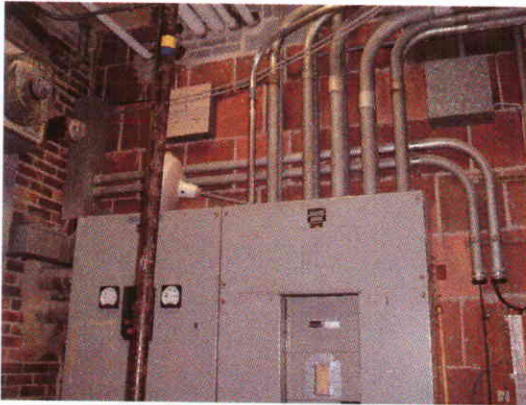


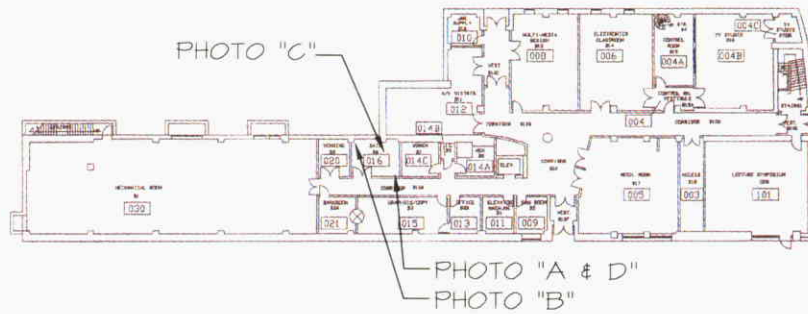
PHOTO "A"



PHOTO "B"



"PHOTO "C"



JOHN L. GROVE HALL - BASEMENT FLOOR PLAN



PHOTO "A"



PHOTO "B"



"PHOTO "C"



PHOTO "D"

TELECOMMUNICATIONS SYSTEM DOCUMENTATION STUDY

PHOTO "C & D"
(IN BASEMENT BELOW)

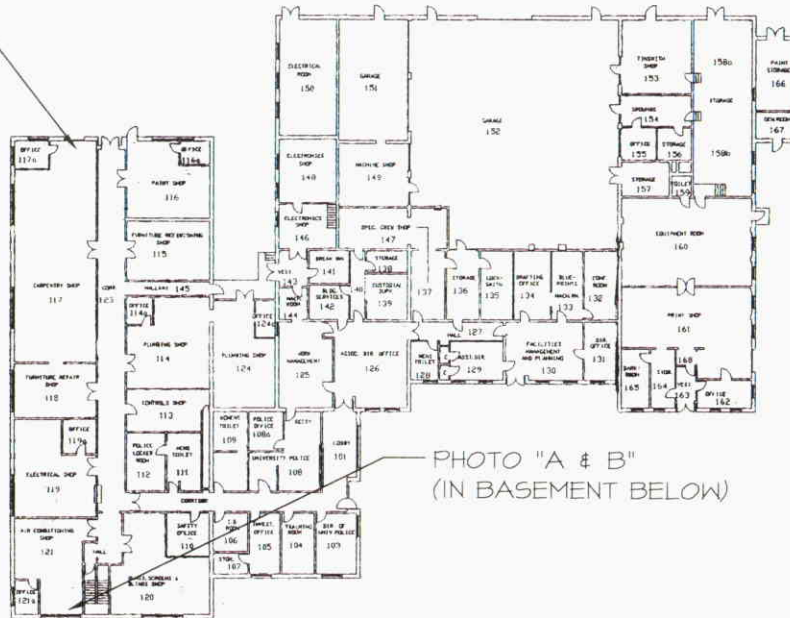
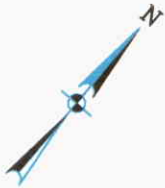


PHOTO "A & B"
(IN BASEMENT BELOW)

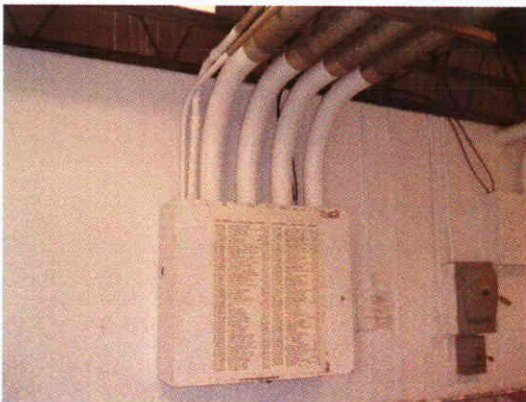
KENNETH O. REED OPERATIONS CENTER - BASEMENT FLOOR



PHOTO "A"



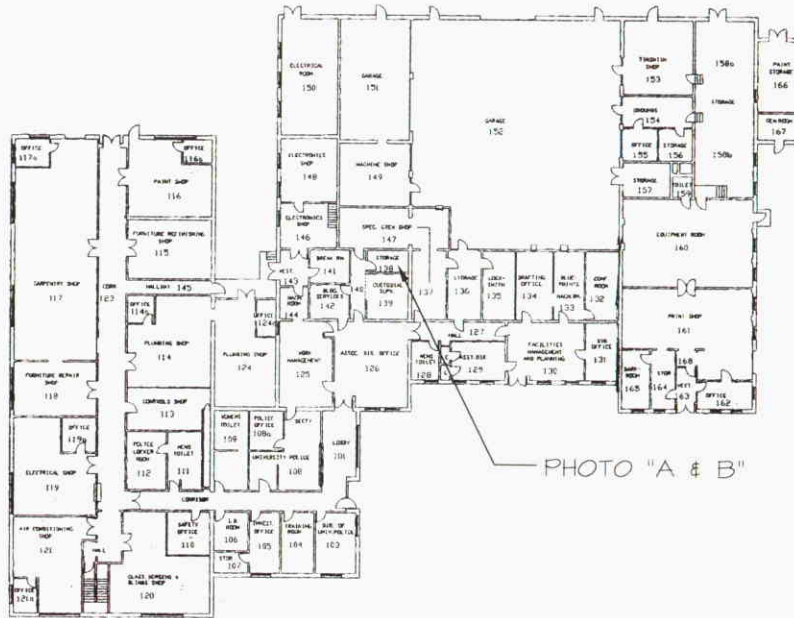
PHOTO "B"



"PHOTO "C"



PHOTO "D" PROJECT: SU-2004/14



KENNETH O. REED OPERATIONS CENTER - FIRST FLOOR

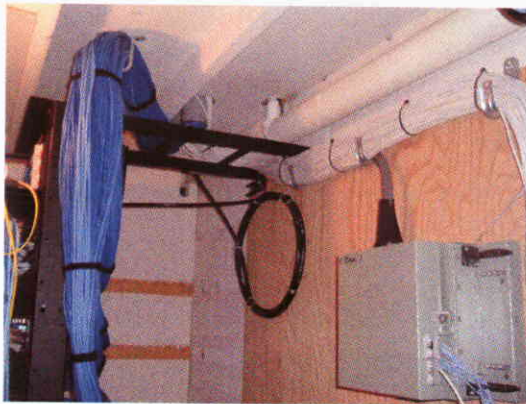


PHOTO "A"

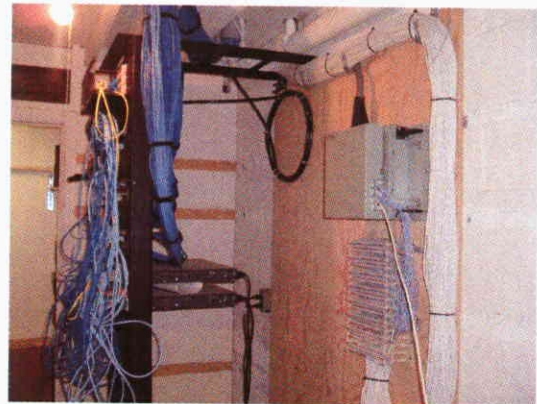
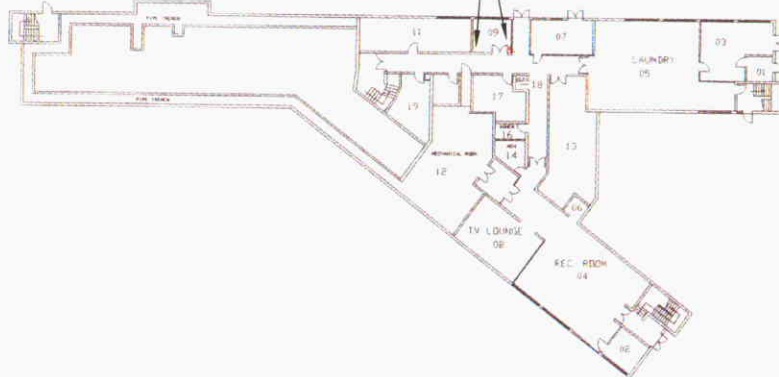


PHOTO "B"



PHOTO "A, B, C & D"



KIEFFER HALL - GROUND FLOOR

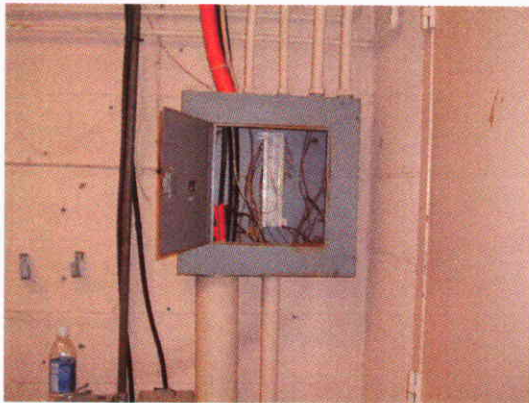
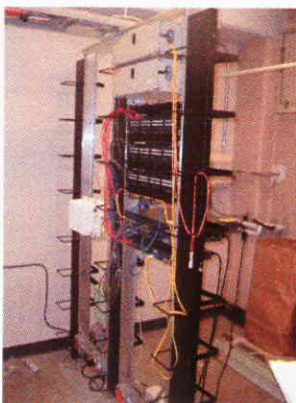


PHOTO "A"



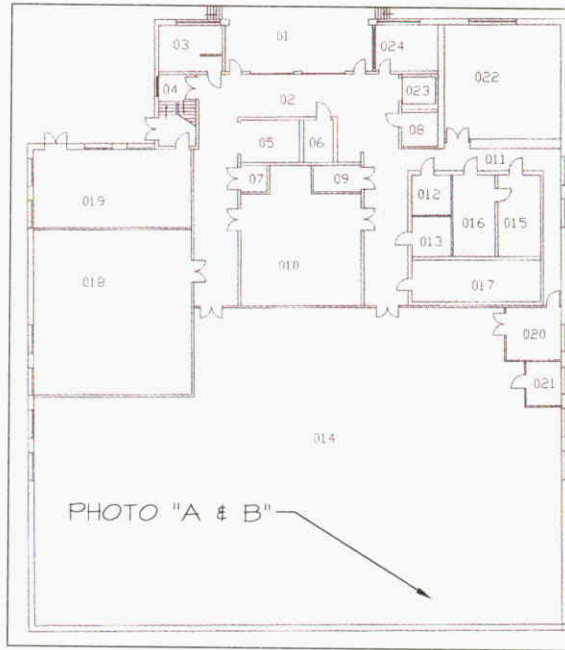
PHOTO "B"



"PHOTO "C"



PHOTO "D"



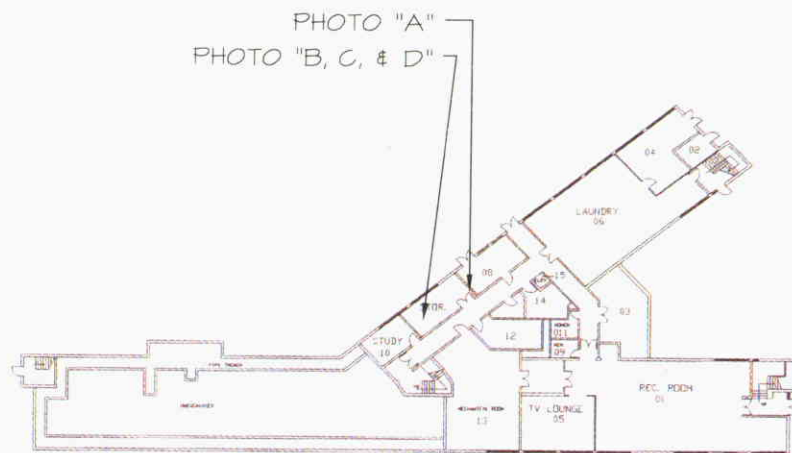
KRINER DINING HALL - GROUND FLOOR



PHOTO "A"



PHOTO "B"



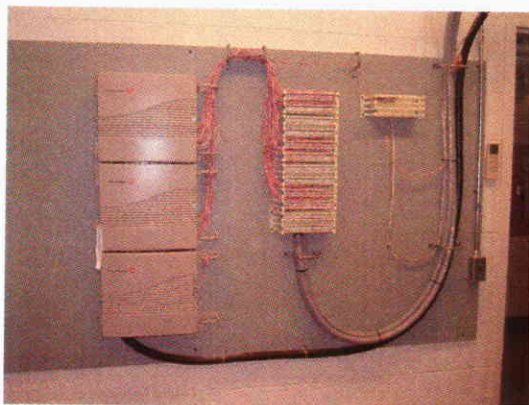
LACKHOVE HALL - GROUND FLOOR



PHOTO "A"



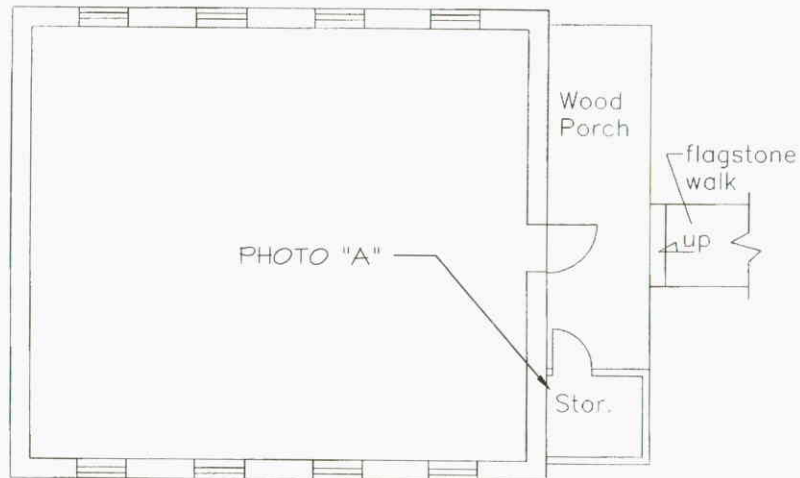
PHOTO "B"



"PHOTO "C"



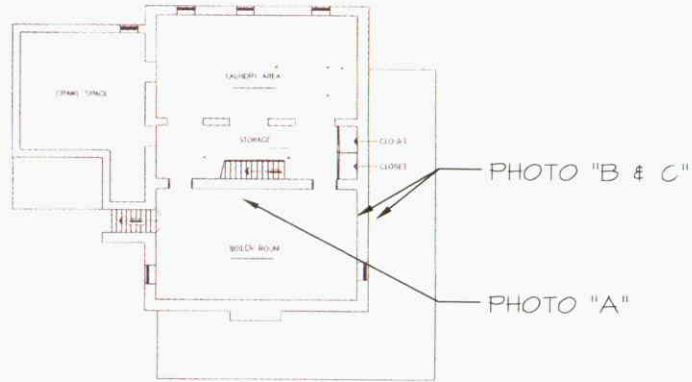
PHOTO "D"



LITTLE RED SCHOOL HOUSE - FIRST FLOOR



PHOTO "A"



MARTIN HOUSE - BASEMENT FLOOR

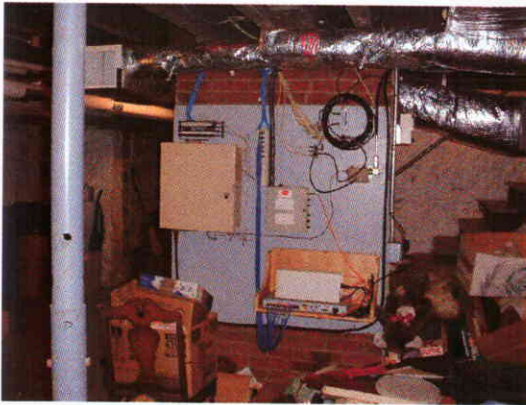


PHOTO "A"

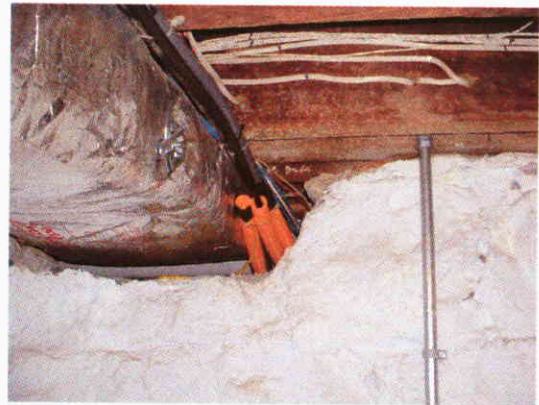
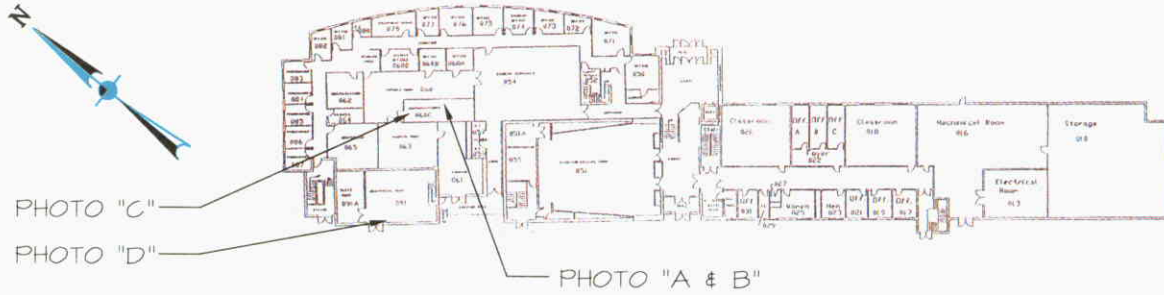


PHOTO "B"



"PHOTO "C"



MATHEMATICS COMPUTING TECHNOLOGIES CENTER - GROUND FLOOR



PHOTO "A"



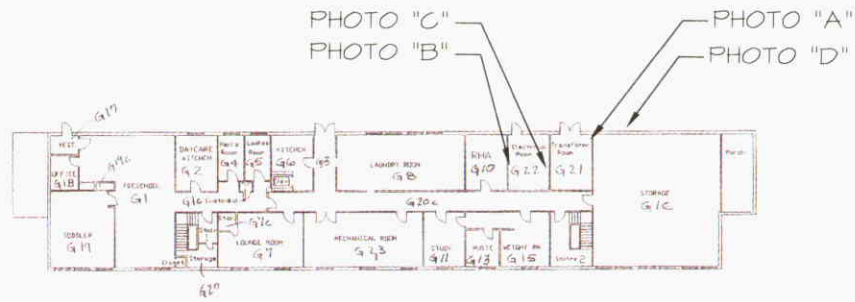
PHOTO "B"



"PHOTO "C"



PHOTO "D"



MCCUNE HALL - BASEMENT FLOOR



PHOTO "A"

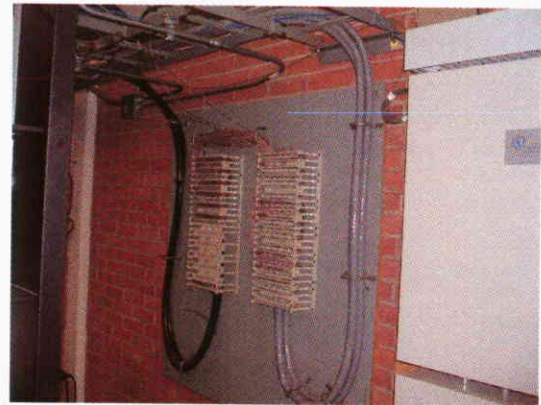
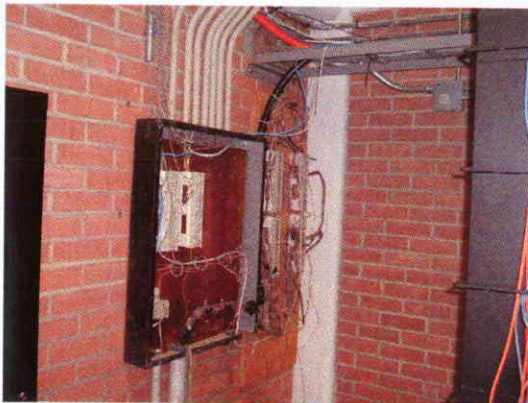


PHOTO "B"



"PHOTO "C"



PHOTO "D"

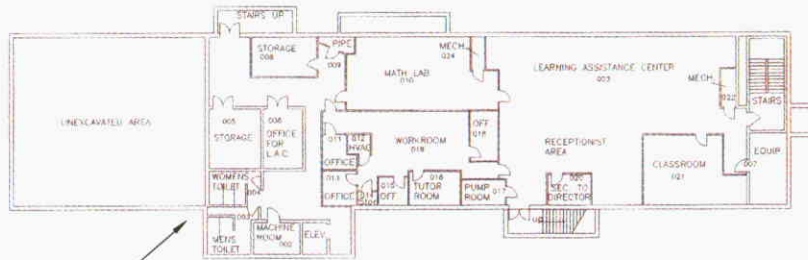


PHOTO "A, B, C, & D"
(LOCATED ON FIRST
FLOOR ABOVE THIS AREA)

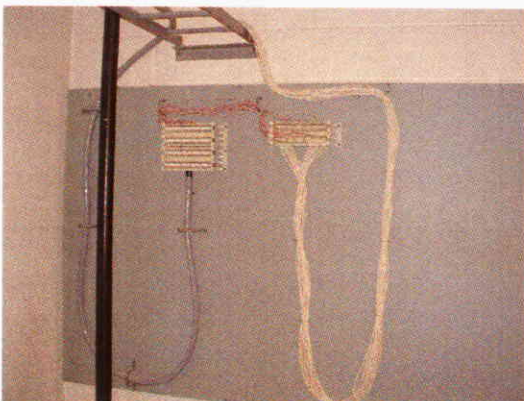
MCLEAN HALL - BASEMENT FLOOR



PHOTO "A"



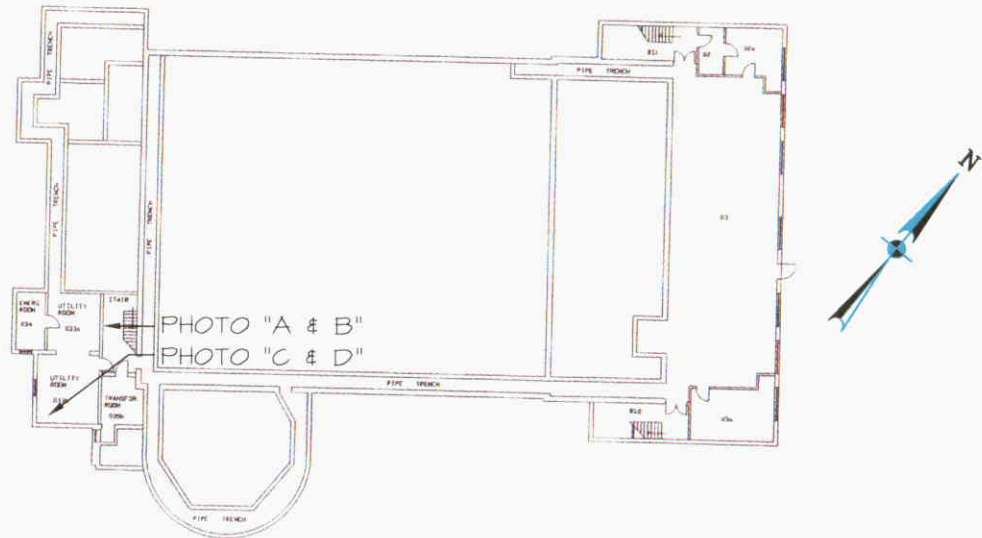
PHOTO "B"



"PHOTO "C"



PHOTO "D"



MEMORIAL AUDITORIUM - BASEMENT FLOOR

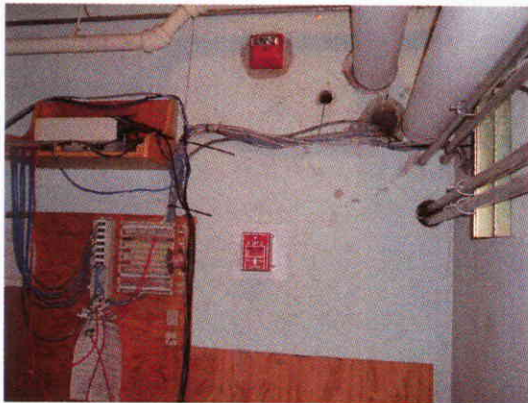


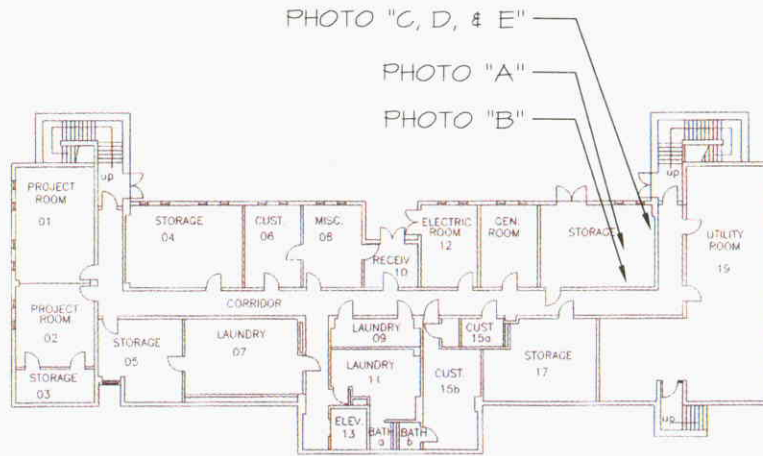
PHOTO "A"



PHOTO "B"

"PHOTO "C"

PHOTO "D"



MOWERY HALL - GROUND FLOOR

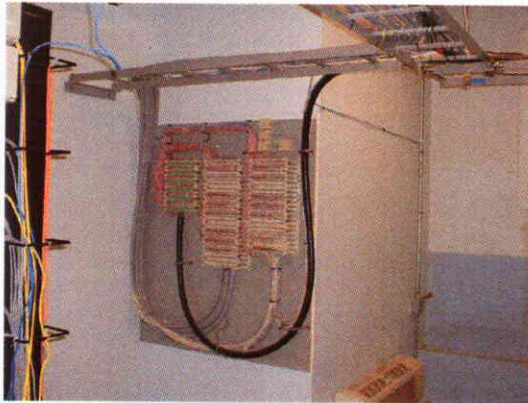


PHOTO "A"



PHOTO "B"



"PHOTO "C"

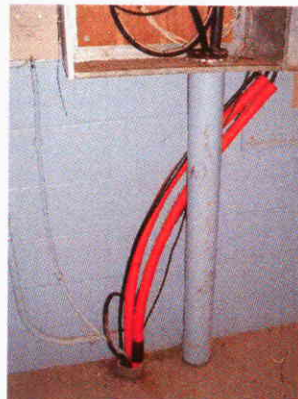
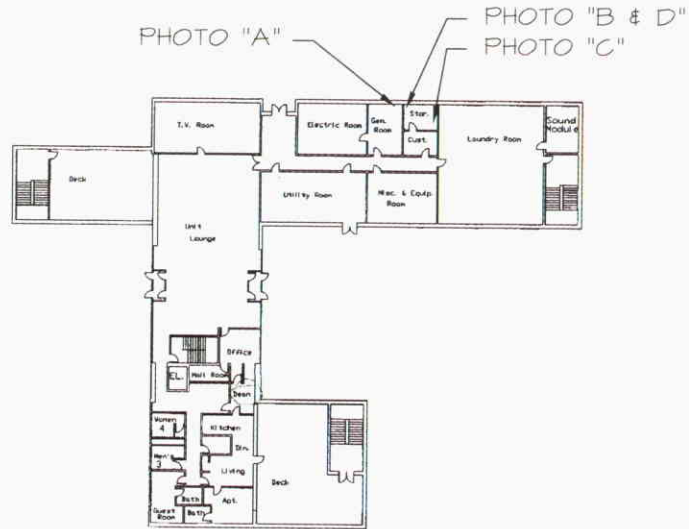


PHOTO "D"



PHOTO "E"



NAUGLE HALL - FIRST FLOOR



PHOTO "A"

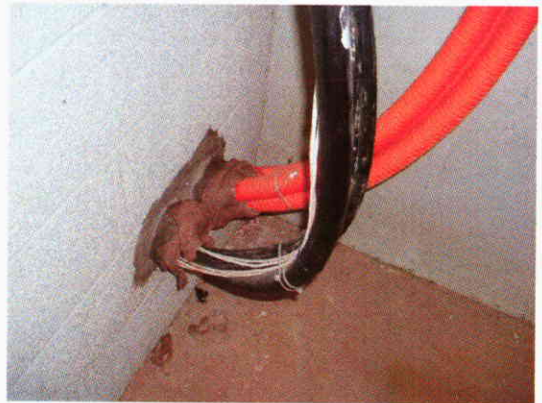
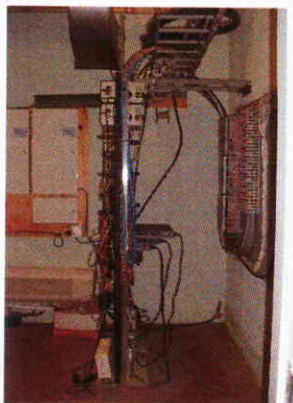


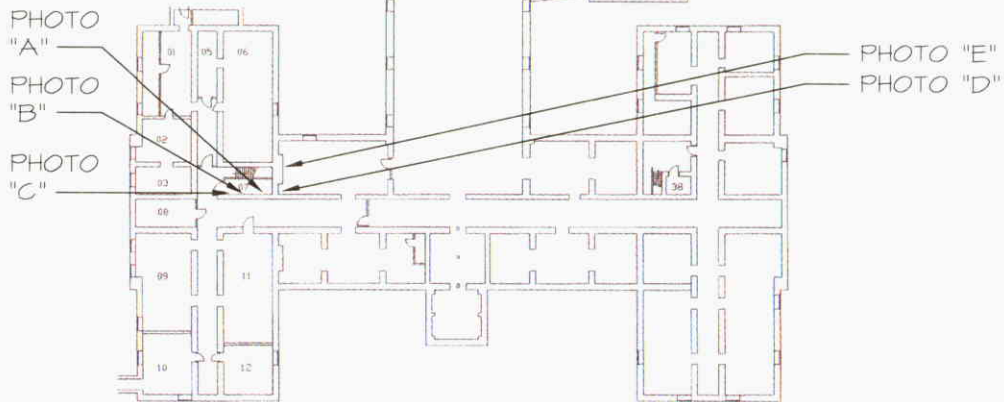
PHOTO "B"



"PHOTO "C"



PHOTO "D"



OLD MAIN - BASEMENT FLOOR

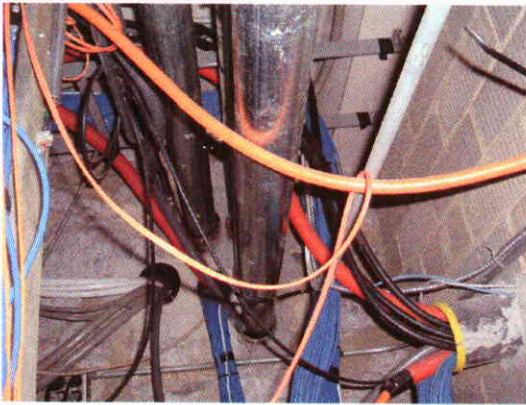


PHOTO "A"

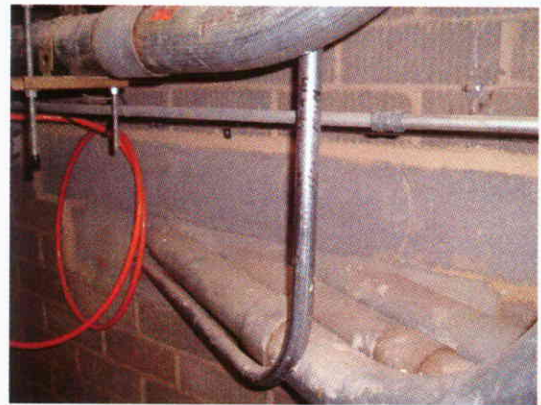


PHOTO "B"



"PHOTO "C"



PHOTO "D"

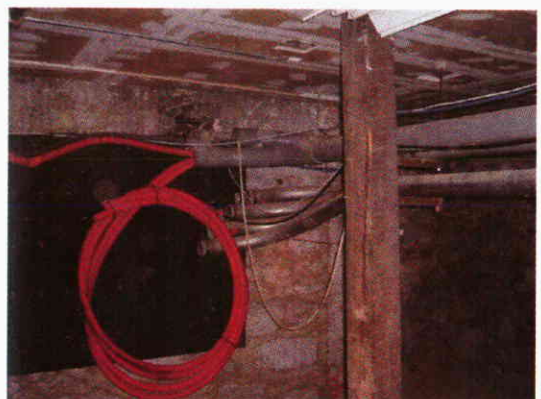
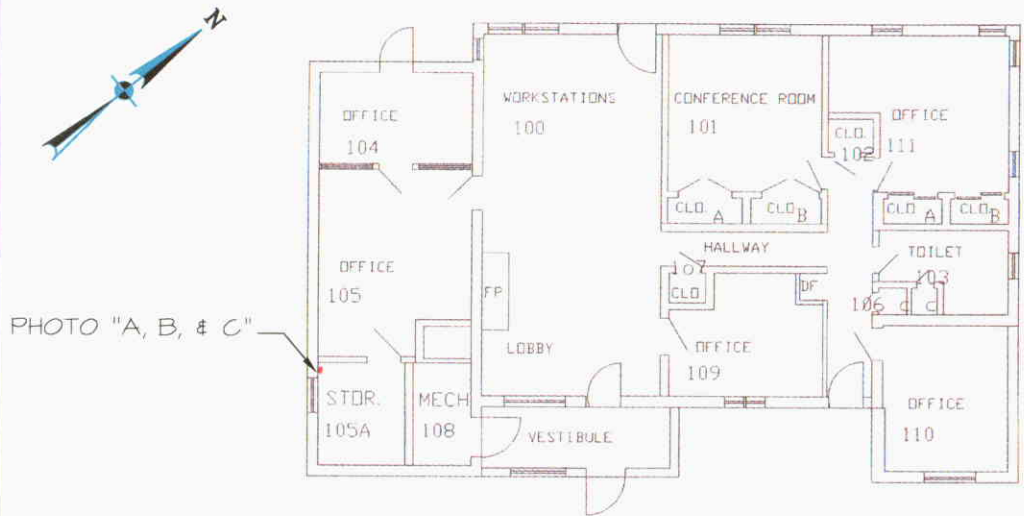


PHOTO "E"



REISINGER HOUSE - FIRST FLOOR

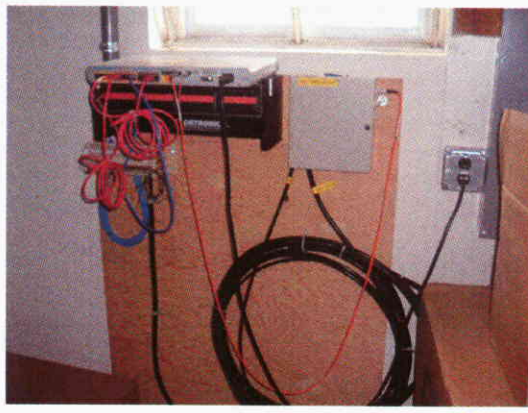


PHOTO "A"



PHOTO "B"



"PHOTO "C"

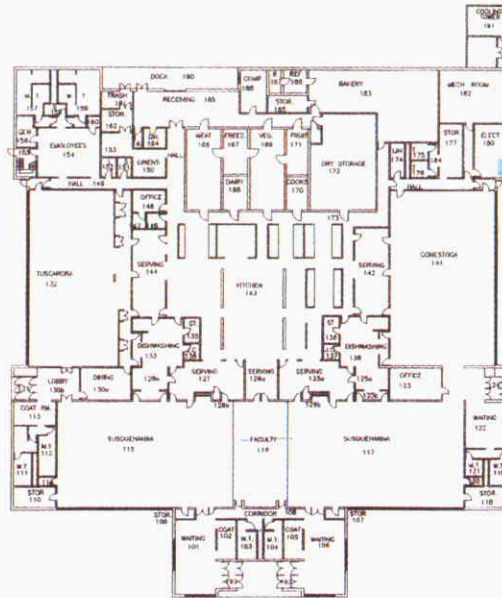


PHOTO "A, B, & C"

PHOTO "D"

REISNER DINING FACILITY - FIRST FLOOR

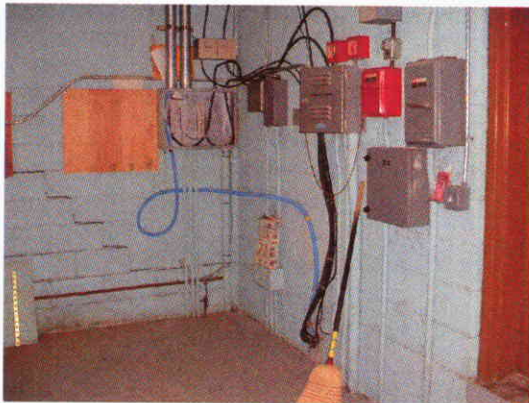


PHOTO "A"



PHOTO "B"



"PHOTO "C"

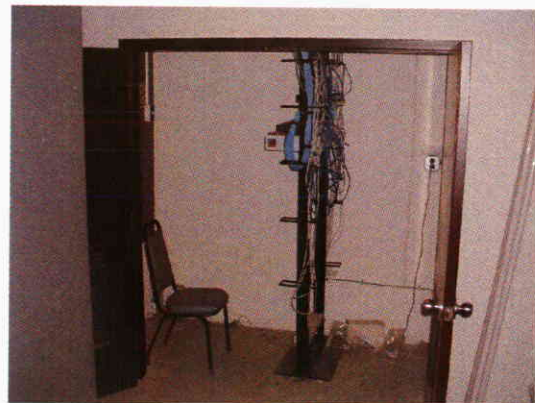
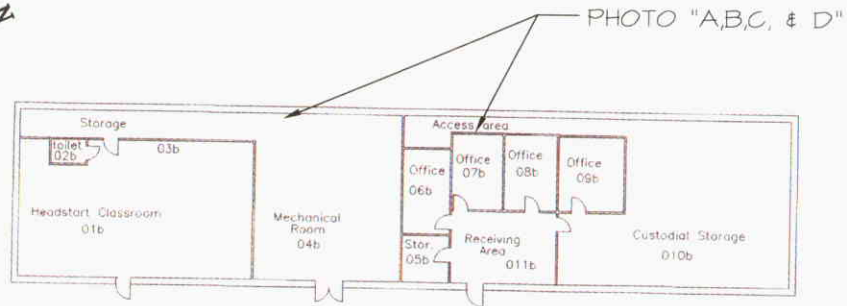


PHOTO "D"



ROWLAND HALL - BASEMENT FLOOR



PHOTO "A"

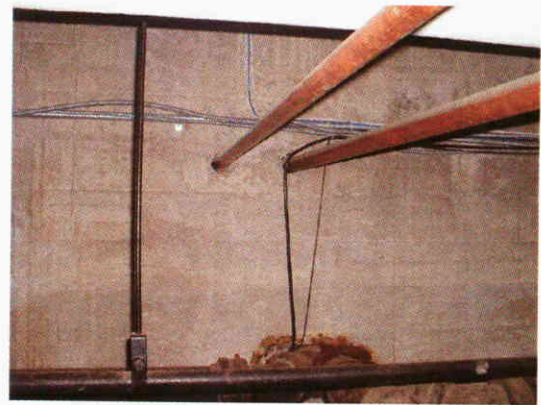
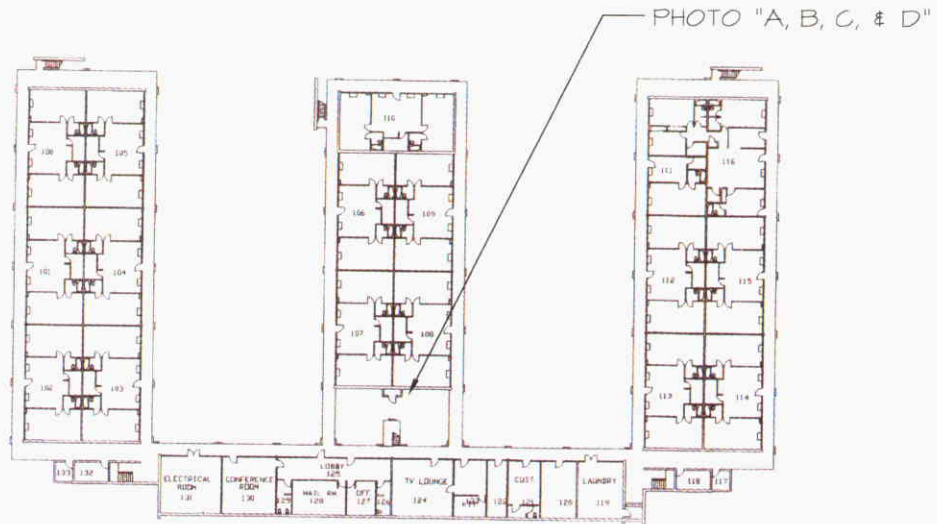


PHOTO "B"



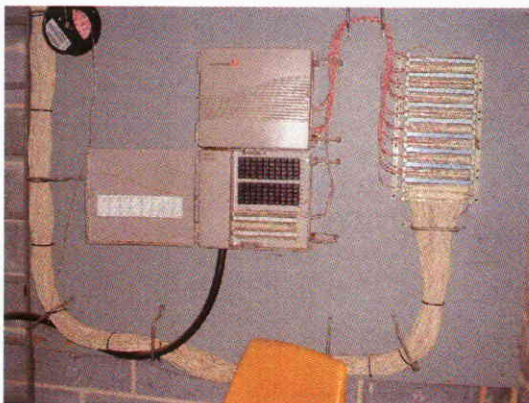
SEAVER APARTMENTS - GROUND FLOOR



PHOTO "A"



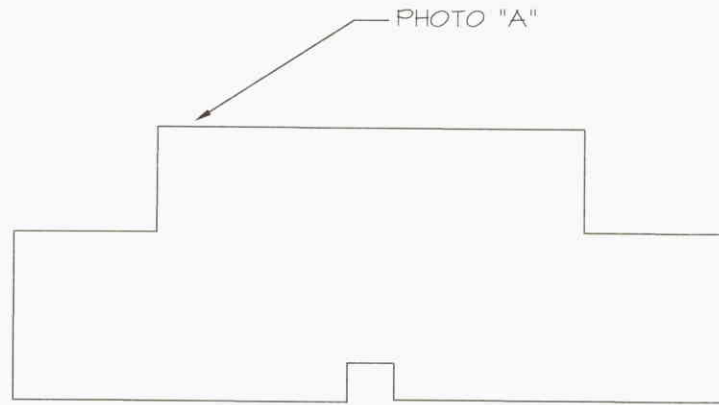
PHOTO "B"



"PHOTO "C"



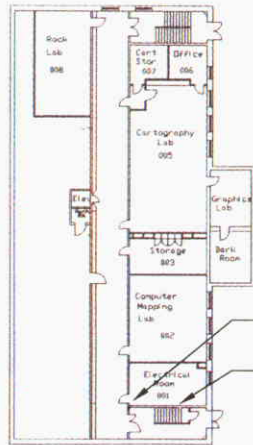
PHOTO "D"



SETH GROVE STADIUM - GROUND FLOOR



SETH GROVE STADIUM WAS NOT REVIEWED DURING SITE SURVEY.
(BUILDING WAS INACCESSIBLE WITHOUT AUTHORIZED PERSONNEL)



SHEARER HALL TELECOM. FEEDS ROWLAND HALL TELECOM.

PHOTO "C"

PHOTO "A & B"

SHEARER HALL - BASEMENT FLOOR

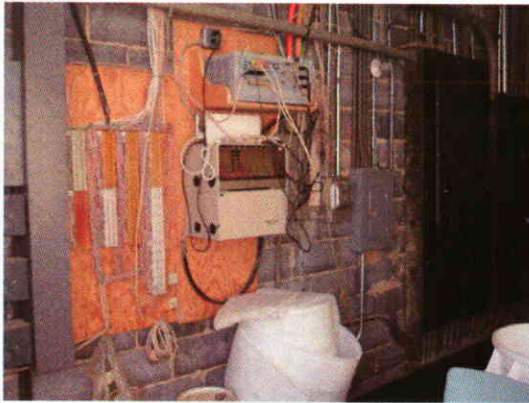


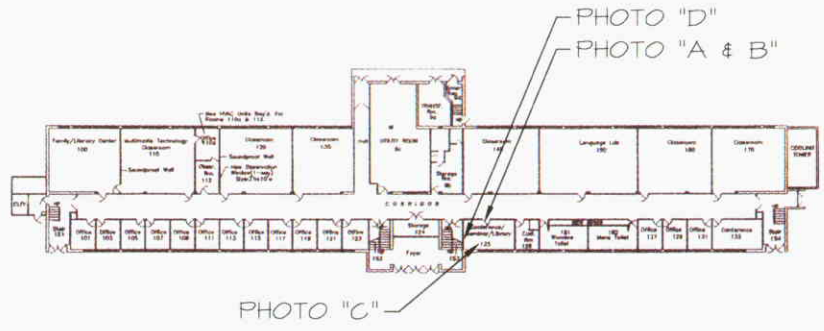
PHOTO "A"



PHOTO "B"



"PHOTO "C"



SHIPPEN HALL - FIRST FLOOR RM #1



PHOTO "A"

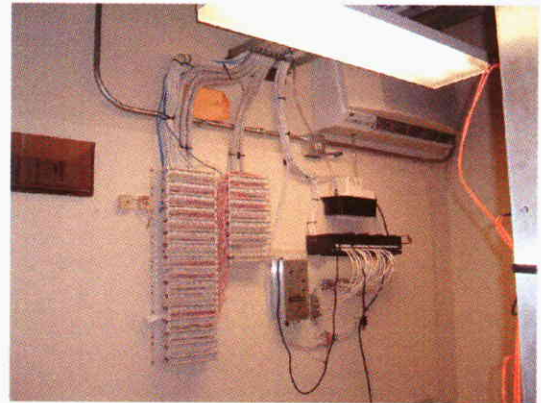
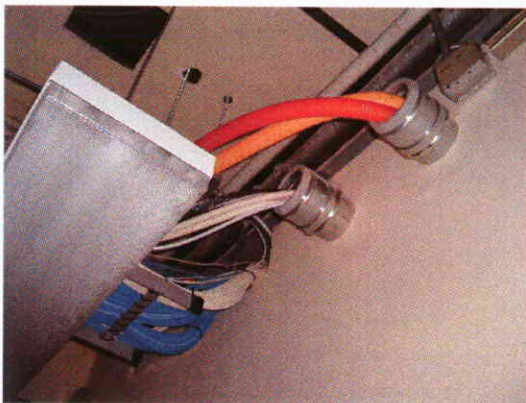


PHOTO "B"



"PHOTO "C"



PHOTO "D"



PHOTO "A, B, & C"



SHIPPEN HALL - FIRST FLOOR RM #2



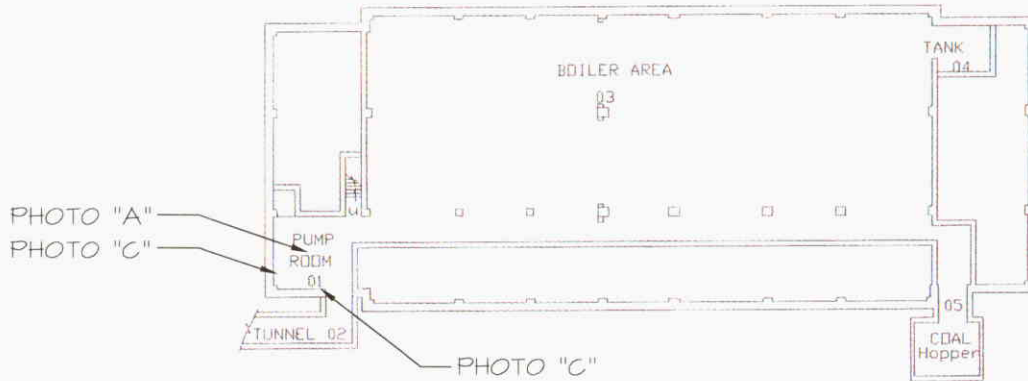
PHOTO "A"



PHOTO "B"



"PHOTO "C"



STEAM PLANT - BASEMENT FLOOR

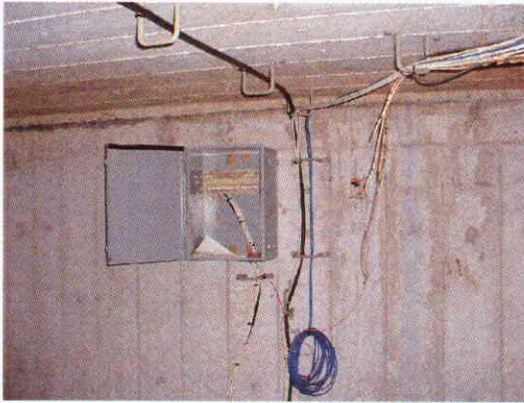


PHOTO "A"



PHOTO "B"



"PHOTO "C"

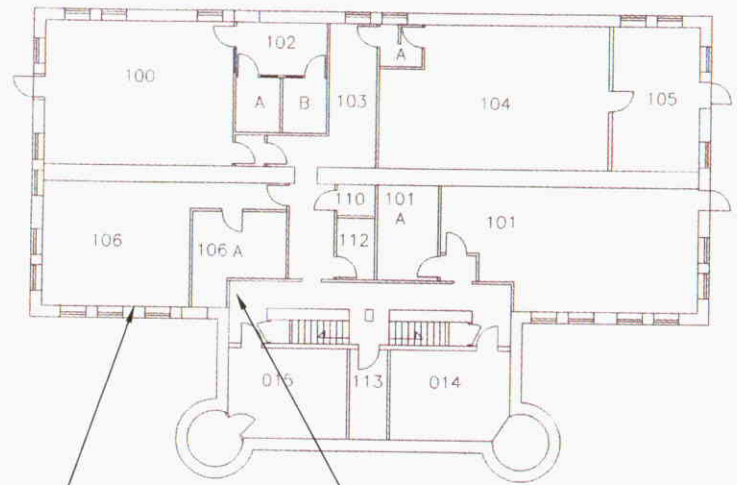


PHOTO "D & E"

PHOTO "A, B, & C"

STEWART HALL - BASEMENT FLOOR



PHOTO "A"



PHOTO "B"



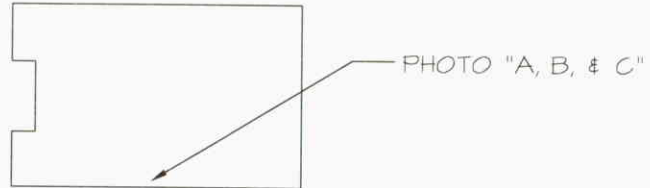
"PHOTO "C"



"PHOTO "D"



"PHOTO "E"



STUDENT RECREATION FACILITIES - FIRST FLOOR

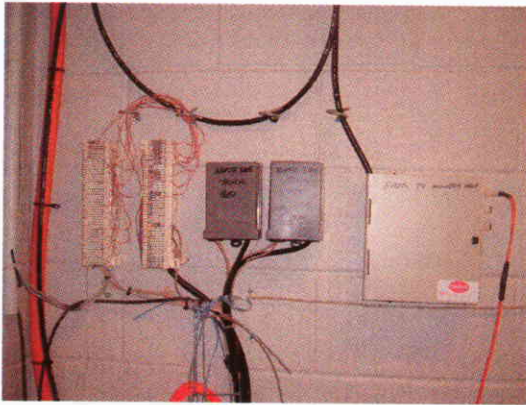


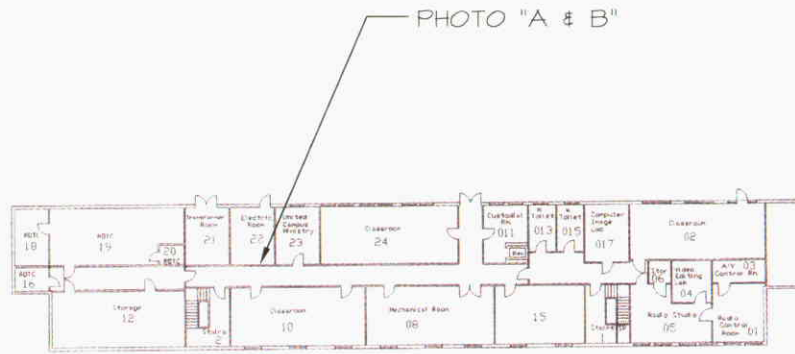
PHOTO "A"



PHOTO "B"



"PHOTO "C"



WRIGHT HALL - BASEMENT FLOOR



PHOTO "A"



PHOTO "B"

ATTACHMENT C

Opinion of Probable Construction Cost

Entech Engineering, Inc.		Date: 28-Apr-05	Page 2 of 12
Project Number:	2184.25	Estimate Type:	New Manholes/Ducts
Project Name:	Telecom. System Renovation Planning	Estimate Phase:	Final Phase 1
Project Location:	Shippensburg University	Drawing Numbers:	E-2
Estimator:	SCH	G:\Projects\2184.25\wp\telecom report\	
Checked by:	PLK	Filename:	New Manholes & Ductbanks.xls

Description	# of Units	Unit Measure	Material Cost		Labor Cost		Total Cost
			\$/Unit	Cost	\$/Unit	Cost	
PHASE I							
Centrex to MH #7							
Ductbank (Six 5" conduits)	300	LF	\$70.00	\$21,000	\$70.00	\$21,000	\$42,000
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
MH #7 to MH #5							
Ductbank (Six 5" conduits)	200	LF	\$70.00	\$14,000	\$70.00	\$14,000	\$28,000
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
MH #5 to MH #6							
Ductbank (Six 5" conduits)	120	LF	\$70.00	\$8,400	\$70.00	\$8,400	\$16,800
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
MH #6 to Kieffer MH							
Ductbank (Six 5" conduits)	225	LF	\$70.00	\$15,750	\$70.00	\$15,750	\$31,500
New Manhole Kieffer Hall	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
Kieffer MH to Lackhove MH							
Ductbank (Six 5" conduits)	230	LF	\$70.00	\$16,100	\$70.00	\$16,100	\$32,200
New Manhole Lackhove Hall	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
Lackhove MH to Math MH							
Ductbank (Six 5" conduits)	235	LF	\$70.00	\$16,450	\$70.00	\$16,450	\$32,900
New Manhole Math Bldg.	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
Math MH to Ezra Lib. MH							
Ductbank (Six 5" conduits)	325	LF	\$70.00	\$22,750	\$70.00	\$22,750	\$45,500
New Manhole Ezra Library	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
Ezra Lib. MH to CUB MH							
Ductbank (Six 5" conduits)	190	LF	\$70.00	\$13,300	\$70.00	\$13,300	\$26,600
New Manhole CUB	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
CUB MH to MH #39							
Ductbank (Six 5" conduits)	125	LF	\$70.00	\$8,750	\$70.00	\$8,750	\$17,500
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
OSHA Compliant Entry	1	LOT				\$28,961	\$28,961
Overhead & Profit							
20%	1	LS	\$63,713.10	\$63,713		\$0	\$63,713
Professional Services							
Engineering (10%)	1	LS	\$38,227.86	\$38,228		\$0	\$38,228
Subtotal							
				\$248,896		\$171,611	\$420,506
15% Contingency							
				\$37,334		\$25,742	\$63,076
TOTAL ELECTRICAL							
				\$286,230		\$197,350	\$483,580

Opinion of Probable Construction Cost

Entech Engineering, Inc.

Date: 28-Apr-05

Page 3 of 12

Project Number:	2184.25	Estimate Type:	New Manholes/Ducts
Project Name:	Telecom. System Renovation Planning	Estimate Phase:	Final Phase 2
Project Location:	Shippensburg University	Drawing Numbers:	E-2
Estimator:	SCH	G:\Projects\2184.25\wp\telecom report\	
Checked by:	PLK	Filename:	New Manholes & Ductbanks.xls

Description	# of Units	Unit Measure	Material Cost		Labor Cost		Total Cost
			\$/Unit	Cost	\$/Unit	Cost	
PHASE 2							
MH #39 to Recreation MH							
Ductbank (Six 5" conduits)	490	LF	\$70.00	\$34,300	\$70.00	\$34,300	\$68,600
New Manhole Recreation Cen.	1	EA	\$2,091.00	\$2,091	\$690.00	\$690	\$2,781
Manhole Access	1	EA	\$0.00	\$0	\$300.00	\$300	\$300
OSHA Compliant Entry	1	LOT				\$3,529	\$3,529
Overhead & Profit							
20%	1	LS	\$15,042.00	\$15,042		\$0	\$15,042
Professional Services							
Engineering (10%)	1	LS	\$9,025.20	\$9,025		\$0	\$9,025
Subtotal				\$60,458		\$38,819	\$99,277
15% Contingency				\$9,069		\$5,823	\$14,892
TOTAL ELECTRICAL				\$69,530		\$44,640	\$114,170

Opinion of Probable Construction Cost

Entech Engineering, Inc.

Date: 28-Apr-05

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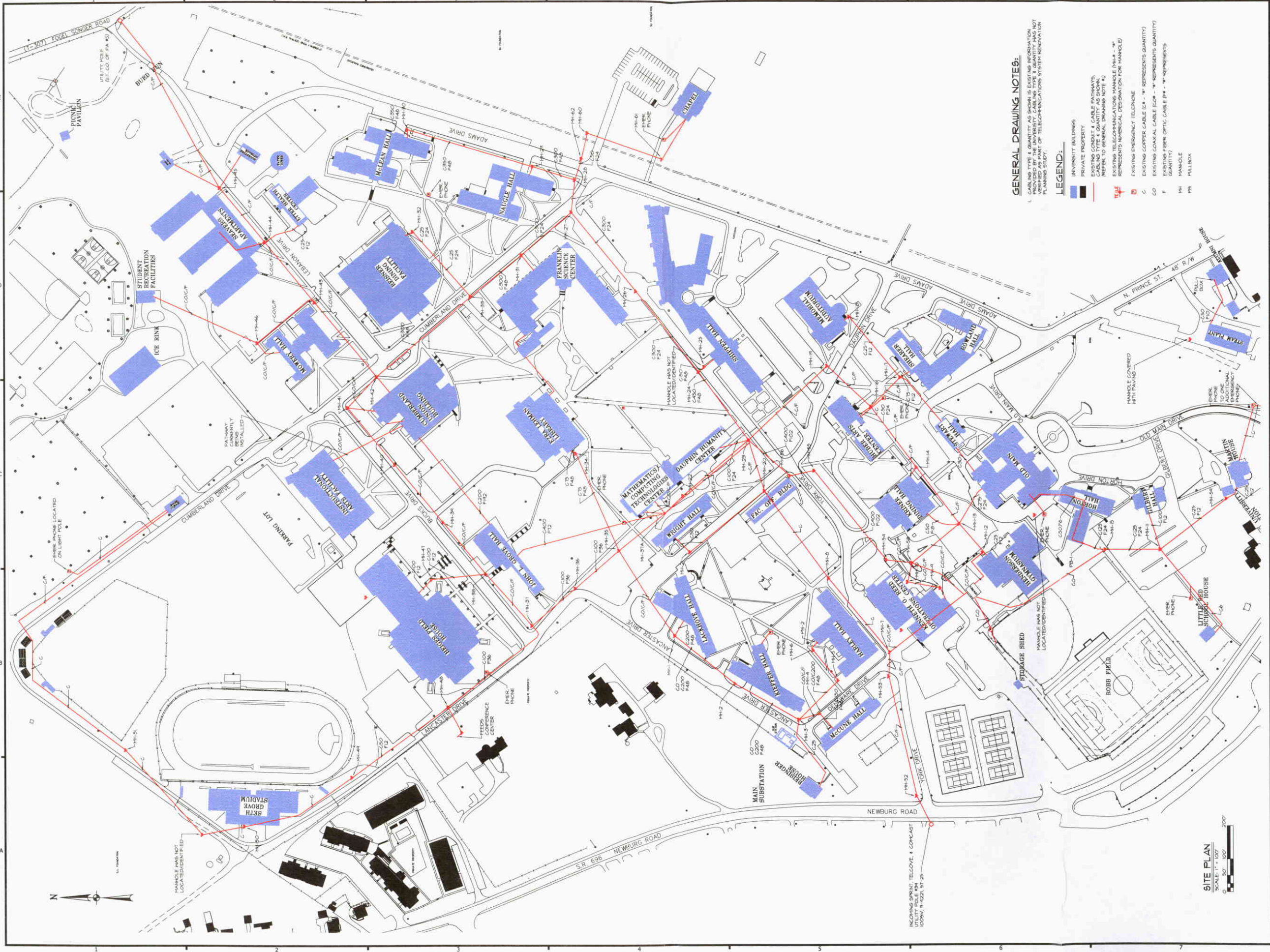
Project Number:	2184.25	Estimate Type:	New Manholes/Ducts
Project Name:	Telecom. System Renovation Planning	Estimate Phase:	Final Phase 4
Project Location:	Shippensburg University	Drawing Numbers:	E-2
Estimator:	SCH	G:\Projects\2184.25\wp\telecom report\	
Checked by:	PLK	Filename:	New Manholes & Ductbanks.xls

Description	# of Units	Unit Measure	Material Cost		Labor Cost		Total Cost
			\$/Unit	Cost	\$/Unit	Cost	
PHASE 4							
Math Bldg. to Math MH							
Ductbank (Eight 5" conduits)	135	LF	\$90.00	\$12,150	\$90.00	\$12,150	\$24,300
Math MH to MH #36							
Ductbank (Six 5" conduits)	135	LF	\$70.00	\$9,450	\$70.00	\$9,450	\$18,900
MH #36 to MH #37							
Ductbank (Six 5" conduits)	173	LF	\$70.00	\$12,110	\$70.00	\$12,110	\$24,220
MH #37 to MH #48							
Ductbank (Six 5" conduits)	400	LF	\$70.00	\$28,000	\$70.00	\$28,000	\$56,000
MH #48 to MH #49							
Ductbank (Six 5" conduits)	210	LF	\$70.00	\$14,700	\$70.00	\$14,700	\$29,400
MH #49 to MH #50							
Ductbank (Six 5" conduits)	365	LF	\$70.00	\$25,550	\$70.00	\$25,550	\$51,100
OSHA Compliant Entry	1	LS				\$10,196	\$10,196
Overhead & Profit							
20%	1	LS	\$42,823.20	\$42,823		\$0	\$42,823
Professional Services							
Engineering (10%)	1	LS	\$25,693.92	\$25,694		\$0	\$25,694
Subtotal				\$170,477		\$112,156	\$282,633
15% Contingency				\$25,572		\$16,823	\$42,395
TOTAL ELECTRICAL				\$196,050		\$128,980	\$325,030

Opinion of Probable Construction Cost

Entech Engineering, Inc.		Date: 28-Jan-05	Page 12 of 12
Project Number:	2184.25	Estimate Type:	Manhole Upgrades
Project Name:	Telecom. System Renovation Planning	Estimate Phase:	Final Phase 10
Project Location:	Shippensburg University	Drawing Numbers:	E-1
Estimator:	SCH	G:\Projects\2184.25\wp\telecom report\	
Checked by:	PLK	Filename:	Manhole Upgrades.xls

Description	# of Units	Unit Measure	Material Cost		Labor Cost		Total Cost
			\$/Unit	Cost	\$/Unit	Cost	
Demolition							
Remove Debris and/or Abandoned Cabling within Manholes: # 2,3,5,6,8,9,10,11, 14,15,16,17,22,23,24,28,29,31, 33,34,35,37,38,43,44,45,46,50 51,52, 53,54,55,56,58,59,60,61	1	LS			\$6,100.00	\$6,100	\$6,100
New Work							
Manholes with water Infiltration or Flooding Install sump pump & connect to adjacent Bldg. power Manholes: # 2,4,8,9,13,15,16, 18,21,24,29,30,32,37A,46,49 50,51,54,55,56,60,61	1	LS	\$92,000.00	\$92,000	\$23,000.00	\$23,000	\$115,000
Manholes that require concrete patching Manholes: #3,4,6,15,17,22,23 29,32,37A,41,46,47,52,53,54, 55,56,59,62	1	LS	\$3,000.00	\$3,000	\$7,000.00	\$7,000	\$10,000
OSHA Compliant Entry	1	LOT				\$3,610	\$3,610
Overhead & Profit							
20%	1	LS	\$26,942.00	\$26,942		\$0	\$26,942
Professional Services							
Engineering (10%)	1	LS	\$16,165.20	\$16,165		\$0	\$16,165
Subtotal							
				\$138,107		\$39,710	\$177,817
15% Contingency							
				\$20,716		\$5,957	\$26,673
TOTAL ELECTRICAL							
				\$158,820		\$45,670	\$204,490



GENERAL DRAWING NOTES:
 1. CABLING TYPE & QUANTITY AS SHOWN IS EXISTING INFORMATION PROVIDED BY THE UNIVERSITY. CABLING TYPE & QUANTITY HAS NOT BEEN VERIFIED BY THE CONSULTANT. TELECOMMUNICATIONS SYSTEM RENOVATION PLANNING STUDY.

LEGEND:
 UNIVERSITY BUILDINGS
 PRIVATE PROPERTY
 EXISTING CONDUIT & CABLE PATHWAYS
 CABLING TYPE & QUANTITY AS SHOWN
 REFER TO GENERAL DRAWING NOTE 1
 EXISTING TELECOMMUNICATIONS HANDLE (H#-#-#)
 REPRESENTS NUMERICAL DESIGNATION FOR HANDLE
 EXISTING TELEPHONE
 EXISTING COPPER CABLE (C# - #) REPRESENTS QUANTITY
 EXISTING COAXIAL CABLE (CO# - #) REPRESENTS QUANTITY
 EXISTING FIBER OPTIC CABLE (F# - #) REPRESENTS QUANTITY
 QUANTITY
 HANDLE
 PULLBOX

SITE PLAN
 SCALE: 1" = 100'
 0' 50' 100' 200'

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 ENTECH ENGINEERING, INC.
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 FX: 610.373.5577
 WWW.ENTECHINC.COM



NO.	DATE	REV.	ISSUED FOR	BY
1	1/28/05	0	ISSUED FOR CLIENT REVIEW	JCE
2	4/28/05	1	PRE-FINAL SUBMISSION	JCE
3	4/28/05	2	FINAL SUBMISSION	JCE
4			ISSUED FOR REVISED	APP

SHIPPENSBURG UNIVERSITY
 SHIPPENSBURG TOWNSHIP, CUMBERLAND COUNTY, PA
TELECOMMUNICATIONS SYSTEM RENOVATION PLANNING STUDY
 TELECOMMUNICATIONS
 SITE PLAN - EXISTING
 PROJECT: SU-2004/14

SCALE: 1" = 100'
 DRAWING NO. **E-1**
 SHEET 1 OF 2



GENERAL DRAWING NOTES:

1. CLASS THIS QUANTITY AS SHOWN IS BASED ON INFORMATION PROVIDED BY THE UNIVERSITY. CLASS THIS INFORMATION NOT VERIFIED AS PART OF TELECOMMUNICATIONS SYSTEM RENOVATION PLANNING STUDY.

KEYED DRAWING NOTES:

1. PROVIDE SIX NEW 4" SPARE TELECOMMUNICATIONS CONDUITS.
2. PROVIDE FOUR NEW 4" SPARE TELECOMMUNICATIONS CONDUITS.
3. PROVIDE EIGHT NEW 4" SPARE TELECOMMUNICATIONS CONDUITS.

LEGEND:

- UNIVERSITY BUILDINGS
- PRIVATE PROPERTY
- EXISTING TELEPHONE CABLE PATHWAYS
- CABLE TYPE & QUANTITY AS SHOWN
- REFER TO GENERAL DRAWING NOTE #1
- PROPOSED SPARE CONDUIT PATHWAYS
- EXISTING TELECOMMUNICATIONS HANDLE (H#.# - "N" REPRESENTS NUMERICAL DESIGNATION FOR HANDLE)
- PROPOSED TELECOMMUNICATIONS HANDLE
- EXISTING TELECOMMUNICATIONS TELEPHONE
- EXISTING COAXIAL CABLE (C#.# - "N" REPRESENTS QUANTITY)
- EXISTING FIBER OPTIC CABLE (F#.# - "N" REPRESENTS QUANTITY)
- EXISTING FIBER OPTIC CABLE (F#.# - "N" REPRESENTS QUANTITY)
- HANDLE
- PULLBOX

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NO.	DATE	REV.	BY	CHKD.
1	1/22/05	0		
2	4/22/05	1		
3	1/22/05	0		
4	1/22/05	0		
5	1/22/05	0		

SHIPPENSBURG UNIVERSITY
 SHIPPENSBURG TOWNSHIP, CUMBERLAND COUNTY, PA
TELECOMMUNICATIONS SYSTEM RENOVATION PLANNING STUDY
 TELECOMMUNICATIONS ROUTING
 SITE PLAN - PROPOSED

SCALE: 1" = 100'
 DRAWING NO. **E-2**
 SHEET 2 OF 2