SPACE PLANNING AND COST ESTIMATE
FOR THE CONSOLIDATION OF
THE UMH ACCOUNTS RECEIVABLE DIVISION

Client: Thomas Biggs, Assistant Director of Finance

Project Coordinator: Neal Gilbert, Senior Engineer Management Systems

Project Staff: Mike Cantrell, Jeneen Hill
Mark Steffes, Charles Webb
and Scott Wellens
Grades

Tom Biggs  C
Neal Gilbert  C

Facts are B
Process is at least a D.
Overall Neil would have considered a D.
Did not buy in the client. They did not manage the client.

R. Calley's Report 8.2
Several statements made, with little rationale presented as to why.
Insufficient quantitative analysis.
Identified options well.
No savings estimates
Executive Summary:

- It is the conclusion of this report that the consolidation of the A/R department at an off-site commercial location will be extremely beneficial to the hospital. Within this report are many of these benefits. Additionally, this report addresses the feasibility of the move. The answer being, yes, A/R will be able to meet all of its present needs at an off-site commercial location. Enclosed in this report are many of the needs of A/R (with respect to the relocation), that we foresee. Specifically, we project a net space requirement of 20,686 to 26,774 sq ft (see Appendix E for a further breakdown). Additionally, we estimate a cost range incurred by A/R in the first year of the relocation of $412,448 to $897,672 (see Appendix E for further cost breakdown and estimations).

Introduction:

- The origin of this project was the desire of the Accounts Receivables department to improve customer servicing of billings/collections through the consolidation of Accounts Receivable functions within a single commercial location. With respect to this objective, our group (in conjunction with I.O.E. 481, professor Richard Coffey) has conducted a study to provide the necessary information, plans, and desired outcomes of this effort.

Purpose of Study:

- Determine the feasibility, reasoning, space required, and a gross cost estimate, for the consolidation of the Accounts Receivables department within a single, contiguous, commercial location.
Background:

- Presently, the Accounts Receivables department is located in two separate general locations. Patient Accounts is located in the Main Hospital outside Mott's Children's Hospital. Billings and Third Party Collections is located on the 7th floor of the North Ingalls building. Because of the distance between the functions of this department, problems have occurred. The excessive mailing time between divisions has hampered the ability to work together. Needed interaction (between functions) is lost in the time required to communicate. This defines the present situation.
**Scope of the Project**

The scope of this project was first generally stated to be determining the feasibility of the consolidation and move to a new, commercial location of Accounts Receivable. This was further narrowed down so that the concentration would be on:

- Developing a space and cost estimate for a consolidated division at a commercial location within a five mile radius of the UMH.

- The assessment of workstation configurations of modular furniture in regards to gross space and cost requirements and the additional benefits associated with implementing modular furniture into the Accounts Receivable environment.

- Determining if the present mail requirements can be met at an off-site commercial location, and also possible alternatives or improvements to the present system in order to decrease the length of time records and other materials spend in the mail.

- Determining if the division's computer operations will be affected (adversely) by moving to an off-site commercial location.

**Beyond the Scope of This Project**

Additional considerations needing to be addressed before the move takes place, which have already been acknowledged as future studies, but are beyond the scope of this project are:

- Job analysis or job redesign within the Accounts Receivable division, for instance, creating work teams that process a record from beginning to end.

- Determination of relationships between Accounts Receivable functions in regards to priority relationships (i.e. Function A needs to work closely or communicate frequently with Function B) in order to design a layout that considers this flow of information and processing. (For both the new location and the 18 Patient Accounts employees staying at the University Hospital.)

- The aid of a computer consultant for determination and coordination of exactly what are Accounts Receivable's off site computer needs.

- The cost and time plan for the physical move of the division.
• The commercial space should be open to bidding by all Realtors.

• Before commitment to an identical workstation configuration for all functions, consult with an expert such as an Industrial Engineer or an ergonomist (a person who specializes in determining the exact space requirements of people performing specific functions, for example, what they need at an arms length away or how much counter space they need for the particular type of terminal they use) for specifically tailored workstations in regards to the workstations functional use.

• A study of employee acceptance to the consolidation, the move, and the new environment.
APPROACH AND METHODOLOGY

• We approached this project by generating a set of criteria based on the idea of creating an environment which serves to open communications.

• This criteria was used for the evaluation and comparison of alternative factors involved in the consolidation of Accounts Receivables.

• Criteria for evaluating factors to promote an environment which opens communication

  - The smaller the size of the area in which the division operates, the more open communications will be; although the size can be determined to be too small.

  - The more open and barrier free the area that the division and specific functions are located in, the more direct the lines of communication can be, encouraging more open communication.

  - The better the transfer of information between individuals and or functions, the more open communications can become. It is made up of the following factors:

    • accuracy  • formality  • speed
    • availability • method  • type
    • disinformation • privacy

  - The relationship between the functions should directly influence the layout. The layout should be used to promote open communications by providing an interface and increasing proximity between interacting departments, and be constructed so that a direct line of communications will be obtained.
By the consolidation and relocation of the Accounts Receivable Department the following benefits could occur:

- Cost considerations and cost incurred compared to the cost reductions of the move.
- Better customer service and customer relationship would occur.
- Increase employee production.

The relationship between the functions should directly influence the layout. The layout should be used to promote open communications by providing an interface and increasing proximity between interacting departments, and be constructed so that a direct line of communications will be attained.
Mailing and Deliveries

Current Situation

One of the most important facets involved in the relocation and consolidation of the A/R department is Mail. Approximately 75% of all mail related to A/R is shuffled between its current two locations. Approximately 14% of the 670,000 transactions initially remitted and/or acted upon by Finance results in interfile transfer, write-off or B/AR adjustment. A loss of at least 1 working day is incurred for 11% of billings. (* These figures are a result of a study done by Neal E. Gilbert, Senior Management Engineer, Subject: Incoming Accounts Receivable-Related Mail Management Post Script, February 7, 1989)

Through the relocation and consolidation of A/R these problems will be overcome. The main focus of this study was to determine if relocation will cause any other problems with mailing and deliveries.

Alternatives

• Suggested possible flow charts for the A/R mailing system are presented in Appendix A.

• Types of Delivery Modes which may be utilized:
  - Finance Messenger Runner
  - Finance Mail Tray Service
  - Finance Bank Box Service
  - Material Management Messenger
  - The Mail Shop
  - Pony (or Federal) Express

• In coordination with other off site U.M.H. departments, it may be cost effective for material management to begin deliveries to the new A/R area.

• Do to the large decrease in mail produced by the consolidation, it may be possible for an employee on his/her way to work to become involved in the A/R mail acquisition.

• With the possible proposed renovation of the A/R computer system E-mail may be utilized to its fullest extent, reducing written mail demands further.
Conclusions

• A/R will greatly cut down on its present mailing volume by moving to a consolidated location and greatly reduce its processing times.

• Mail delivery to an off site A/R department will not be a problem.

• The cost incurred, with respect to mailing and deliveries, by moving to an off site location will be minimal in comparison to the benefit.
Computers:

Findings

HIS Network Connection:

- Connection to the HIS Network will not be a problem at an off site commercial location. Although it will take longer to exchange data with the HIS Network due to the reduced Baud capacity (increased uploading and downloading times) when going through phone ports, Accounts Receivable has adapted to this disadvantage in the past.

Recommended Alternatives

- Employment of a computer specialist consultant to analyze the situation and present solutions before consolidation occurs. This would cost approximately $100,000 for a local consultant and $150-$200,000 for a big 8 firm.

- A possible suggestion a computer consultant would make, would be the utilization of an A/R mini computer to upload and download information.

- Moving to a P.C. oriented system would be another possible recommendation. This would help A/R move to a paperless environment. This would cost approximately $3,000 per workstation, with 118 terminals this would produce a cost of $354,000. Additional cost considerations would include employee training, (changing File clerks into Data Staff).

- For the immediate future, A/R should look into paying for the cost of getting an off site location hard wired (as they recently had N.I.) to the HIS Network. This option could produce the same computer data requisition and entry that A/R presently has. Additionally, the cost could be justified by coordination of other Hospital Departments (i.e in the Briarwood area) into the same facility, and thus providing the Computer Benefits for multiple departments.
Layout:

Findings

Layout is a key issue in the consolidation of Accounts Receivables. The right layout can have a tremendous impact on creating a desired environment. By consolidating at a new, less restricted location, inherent barriers (such as the ones that exists in NIB) will be eliminated.

Recommendations

In order to get the right environment for you and your staff, we recommend you do the following:

• Create a relationship table. This will determine the present relations between various A/R functions. The use of work flow charts will be especially helpful in accomplishing this.

• Through analytical evaluation, numerous layouts with different advantages will be created. Reorganization of function groupings and work flow redesigns will also be beneficial alternatives presented by this process.

Benefits

• Better customer service, thru the consolidation and possible job redesign in conjunction with layout, A/R will be able to provide
  - quicker service
  - improved handling of customer problems (trouble shooting)
  - more personalized care
  - better access to client history

• Increased employee productivity, layout will make employee's jobs easier with an environment tailored to their needs.

• Increased employee productivity could allow for staff reduction through attrition.

• Through the increase in speed of A/R functions large cost benefits can be obtained through the hospital getting its money faster, and thus getting otherwise lost interest.
If an open office configuration is chosen, there will be significant improvement in flexibility (if a job redesign takes place after the initial move) and reduction in renovation costs. Additionally open offices also have the following benefits:

- Improved Communications
- Improved Supervision
- Better access to common files and equipment
- Easier to light, heat, air condition, and ventilate
- Reduced maintenance costs
- Because there are fewer obstructions, space requirements are less than for closed offices.
MODULAR FURNITURE

It was requested that a study be done on integrating modular furniture into the workplace of the consolidated division. The alternatives looked into were:

Alternatives

1. A rectangular configuration of four workstations, which is presently being proposed to Billings and Third Party Collections by the Interior Design department of UMH;

2. Workstations interconnected by other than 90 degree (right) angles, which will be referred to as multi-angular workstations.

Findings

1. Rectilinear (Rectangular) Configuration

• As was alluded to above, Billings and Third Party Collections, which makes up 62 of the 104 staff members that would be in these workstations, will most likely be implementing a configuration proposed by Interior Design.

• The rectilinear configuration costs $3500 per workstation, of which there are four per configuration. This price is available through a discount that the UMH receives on Steelcase furniture.

• Because 62 of the 104 workstations will have been purchased already, only an additional 42 workstations would have to be purchased for Patient Accounts (if it is desired they all use the same furniture) for the consolidation. The total cost would be $147,000.

• The net area per configuration is 203 sq.ft., and the gross area is 213.87 sq.ft.

• The total net area for 26 configurations (104 workstations) is 5,278 sq.ft. and the total gross area is 5,560.67 sq.ft.

• This configuration requires 1,230 sq.ft. less than is currently used by the staff.

• A diagram of the purposed workstation can be found in Appendix D. It is important to note that the top, center chair represents a third computer terminal location and is only a transient workstation. The actual workstations are located in each of corners of the configuration. Also important to note is
the fact that the perimeter walls of the configuration are 4' high.

2. Multi-angular Configuration

- Through use of an example of multi-angular configurations (DYNAMIX, by Rosemount) it was determined that, on average, 14% more workstations will fit in the same gross area than a rectilinear set up.

- The total gross area required for 104 multi-angular workstations is 4,859 sq.ft. (approx.). The calculations performed to determine this area can be found in Appendix D.

- The average cost of a DYNAMIX multi-angular workstation was estimated by Coordinated Industries Inc. to be $6000.

- The total cost of providing 104 workstations of this type would be $624,000.

- For a general example of a layout using DYNAMIX furniture, refer to Appendix D.

Conclusions

- Because of the "sunk" cost of the purchased rectilinear furniture, the rectilinear furniture will be 76% less expensive to provide in the consolidated location than the multi-angular. The savings would be $477,000.

- Because the multi-angular furniture takes up 700.70 sq.ft less than the rectilinear, its implementation would save $11,211 per year in leased space (assuming rent is $16/sq.ft./year).

- Therefore, the break-even point between the savings of the rectilinear furniture over the multi-angular furniture is 42.5 years, indicating that in 42.5 years the savings by using multi-angular modular furniture will equal that of the rectilinear.

- Note: The break-even point was calculated assuming that rent for the leased space is $16 and does not change over the course of time. Since it would be unreasonable to make this assumption, the break-even point will actually be earlier than 42.5 years, depending on the price of leased space.

Recommendation

We recommend the implementation of the rectilinear configuration, or unit, proposed by Interior Design for
the consolidation of the division. In addition to its cost advantages and benefits, it also provides benefits such as promoting better customer service and increased employee productivity.

Benefits

• The layout of the individual rectilinear configurations promotes an open communications environment between teams of four staff members. This should enable employees to solve problems easier and quicker than currently since everyone will be in closer proximity, and in turn will increase the employee productivity.

• Each rectilinear unit can be easily fit adjacent to the next unit, thus enabling the overall layout to be easily fit together.

• With each rectilinear unit fitting easily to the next and the division between the two being a short, 4' wall, functions can easily be placed in relation to each other in order to provide an open communication environment that will increase the productivity and in turn provide better customer service due to the quicker service because of increased proximity and better accuracy of information transferred.

• The layout of the division can achieve a sense of formality, if desired, due to ability to form functional blocks with the rectilinear units. The functions can still be somewhat separate from the others yet still be close enough for easy interaction.

• Each unit, although promoting open communications, also allows some individual privacy because the backs of the employees are all to the center of the unit. This allows for phone conversations with patients to remain private if necessary.

• Information can travel faster because there is less space to cover in the retrieval of it and there will not be the need for inter-divisional written mail.

• The space created using the rectilinear units can also serve as an area for small meetings between employees and the supervisor and/or manager, thus decreasing the need for conference room space. It also provides a setting for spontaneous information sharing between groups since the need for getting a conference room is decreased.

• The multi-angular configurations provide most of the same benefits as the rectilinear, with the addition of work teams as large as six members around one of the
center shapes and a less formal structure, if desired, can be achieved using this type of furniture. But because it was shown in the cost analysis to be more costly than the rectilinear in this case, the benefits associated with the multi-angular configurations will not be considered in detail.
Space Requirements

Space Requirements are dependent variables based on the layout configuration you choose to utilize. In the scope of this project they are very important, as most of the cost incurred by A/R in the consolidation and relocation will be for renting space. Because your spacial needs will vary depending on many decisions you make, were going to try to make it easier for you. In determining your space needs we faced many alternatives. These alternatives are presented here. They were factored into our cost estimates, thus producing a cost range (Table 1).

Conference Rooms: Will they be needed?

Alternatives

• Conference rooms are an important venue for transferal of information. However, in an open environment this form of information exchange may not be necessary, because conferences could be held in the open areas of the office.

• Since the form of a conference meeting is always available the need for conference rooms is reduced.

• For private communications dealing with small numbers of employees, conferences can be held in you and your managers offices.

• If an all hands meeting is necessary (i.e training purposes), renting an area is a possibility in certain locations.

• If you do decide to have conference rooms you have quite a few options:
  -> 2, 400 sq ft rooms that could be divided via movable walls, into 4, 200 sq ft rooms
  -> 1, 400 sq ft room and an additional 200 sq ft room once again utilizing movable walls (curtain walls)
  -> 2, 200 sq ft rooms, curtain walls are beneficial for any decision

Benefits

• By having a department conference room(s) group meetings can be held at anytime without interception, scheduling problems, renting cost or travel time.
• Better control over information access (i.e. who you invite to the meeting)

• Dual Purpose:
  -> By utilizing conference rooms as breakrooms, two needs can be fulfilled at the same time.
  -> Reduction of disinformation (i.e. employees on break have somewhere to congregate and not disrupt working employees.)
  -> Provides an atmosphere where productive information exchange may take place while employees are on break (i.e. posting or projecting A/R information in the breakroom)

Conclusions

• In the final analysis the decision of conference room space allocation will come down to you.

• We have accounted for various alternatives in our space estimates (Table 1), 0-800 sq ft.

• The decision may become easier after certain layout decisions are made.

Additional Space Requirements

• Computer Room (0-350 sq ft)
  A computer room may be needed at your new location based on decisions you make in the near future on your computer system. A computer room will require special environmental controls (i.e. temperature, static free floors). A computer room will cut back on space needed for business records, however, hardcopy backups will always be needed for some things.

• Business Records (0-1131 sq ft, gross)
  Immediate reductions in space requirements for records will occur with the consolidation. Unnecessary, duplicate records can be eliminated, combined with the use of space savers will bring about reductions. Alternatives regarding record location will also affect space (i.e. will a specific file room be needed).

Alternatives

• Centralized Records
  + Reduced time through better organization
  + Better accessibility through organization
  + Employee adaptability will be high, (i.e. its a standard system and therefore easier to learn)
Proximity of files would be optimized by having the files centralized, the same distance from everyone.

Forces more employee interaction, thus increasing information exchange.

An inconvenience for an employee who needs limited access to records.

- **Departmental Records**
  - Reduced time through having necessary records for specific functions located in their respective areas.
  - People within departments will be familiar with the location of their records, therefore it won't be too difficult for other functions to gain access (not as good as centralized in the aspect of access but better than individual).

- **Individual Records**
  - Information would be processed much quicker by having necessary records right at the workstation. (i.e. employee dealing with accounts A-C records located at workstation)
  - Less interaction among A/R employees (i.e. the right hand doesn't know what the left hand is doing)
  - Makes it difficult for employees to get information from other employees, due to the format

**Recommendations**

- It depends on if you decide to restructure A/R or not. Additionally the type of employees you have (i.e. work better in teams, extroverted, introverted)

- Centralized Records have the best advantages for opening communications within your department.

- **Mail Room** (possible 75% reduction from present based on estimated mail reduction)
  
The mail room can be reduced in size at your new location due to the elimination of much inner office mail. It too should be centralized for optimal distribution.

- **Office Supplies** (0-300 sq ft)
  -> Through the use of modular furniture, most office supplies can be stored right at the workstation.
A small storage area that is frequently stocked could accommodate A/R needs. Additional cabinet storage could be used in halls thus utilizing otherwise wasted space (must stay in fire code).

- **Reception Area/Information Desk** (0-297 sq ft)
  This will provide better availability of information to customers/clients, and aid in the direction of A/R calls to representatives, thus improving customer service. Additionally, with the consolidation, separate reception areas may no be needed.

- **Copy Room(s)** (126-240 sq ft)
  Copy rooms will grow at the new location with the addition of such things as fax machines, laser printers, and multi-function copiers.

- **Corridors** (variable)
  Corridors will be greatly reduced due to the incredibly effective, optimal, and beneficial layout I am sure you will create.
COMMERCIAL LEASING

In order for a consolidation and relocation of Accounts Receivables Department, a thorough study on off-site commercial leasing opportunities was done to accommodate their needs, the following criteria needed to be met:

Criteria for new building

1. Amount of floor space

   • The new location must have enough open space on the same floor for the entire department. If this does not occur, a barrier could arise, thus ineffective open communications would result.

2. Shape of the floor

   • As a general rule, the more direct the lines are, the better the open communications will be. If the shape of the floor does not provide direct lines between employees requiring it, open communications will be hampered. For example, if two employees have to communicate, a barrier in the shape of the building, such as a wall, would effect it. On the other hand, if your work flow function are as such as only a few employees need to communicate with each other, than barriers do not have to be considered. These employees can be accommodate by having work stations next to each other.

3. Windows

   • Many people would like them, and they seem to be plentiful on buildings, however they create glare on computer screens, which would slow down communications. Anti-glare screens do not work very effectively, so shades or window treatment will be needed. Of the buildings I looked at, shades were provided, but this defeats the purpose of having windows. Window treatment (i.e. window tinting) costs money, but allows the use of windows.

4. Expansion

   • When looking for a new commercial location, consider a place which gives you an option to lease additional space. Thus, if expansion should be needed, then Accounts Receivable will be able to accommodate the additional employees.
Alternatives

1. 777 Eisenhower Plaza, which is located at I-94 and State Street on Eisenhower Parkway.

2. 1000 Campus Drive, which is located in the Briarwood area.

3. Research has been done by Mr. McKenney, in which he has currently found at least eight buildings in Ann Arbor that could meet the needs of Accounts Receivable. In addition, he also mentioned the possibility that a developer would be willing to build a building exclusively for Accounts Receivable, or with Accounts Receivable as an anchor tenant.

Findings

1. 777 Building
   - More than enough free parking was available.
   - 24 hour access to security.
   - Handicap facilities were available.
   - 26,000 square feet, which would be able to put all of your employees on one single contiguous floor.
   - It is in a U shape form.
   - Windows are located all around the building.
   - Cafeteria was available.
   - A mail dock was provided.
   - Conference rooms were attainable through rent ( $15.00/hour)
   - The price for leasing for one year was $16.50/square foot + electric.
2. 1000 Campus Drive Building
   • Ample free parking.
   • 24 hour access to security.
   • Handicap facilities were available.
   • Approximately 14,000 square foot per floor.
   • The design is in a curve (phone) form.
   • Windows primarily facing the East.
   • The cost per square foot is $16.50 + electric.

3. The eight locations researched by Mr. McKenney
   • Price range quoted was as follows:
     - $16.60 + electric with a $6 expense stop.
     - $17.95 Gross (all other expenses paid by landlord.)
     - $18.50 + electric with a $5.00 expense stop.
Recommendation

• Some realtors will want to suggest construction of a new building with a developer either as an anchor tenant or personal building. Although an appealing deal may be negotiated, now is not the time to consider a move this drastic. Accounts Receivable Department needs to adjust to a place which will have the flexibility in shape and size to satisfy future needs along with finding the optimal work flow function that will best utilize open communications. In summary, a leased space will give more flexibility to move to different locations to meet required sizes and shapes for the desired communication environment.

• When looking for a lease, put your best negotiator on the deal, this will ensure you are getting the most for your money.

• Look for a location similar to the environment of 777 Building.

• Look for a single contiguous barrier free location that will accommodate all your employees on one floor, this is one of the most important criteria in promoting effective open communications.

• Look for commercial location which will fulfill current needs, as well as future needs.

• When looking for the most optimal shape, find a location with as few barriers as possible, in that way a more direct line of communication will be possible.

• Look for an area which has the most benefits for employees (i.e. cafeteria, adequate storage space, close to other commercial stores) this will increase employee morale which would enhance productivity.

• When analyzing the frequency of using space (i.e. conference rooms), look over other options, such as renting a conference room in the building, this way you are not paying for wasted space.
• Keep handicap facilities in mind when looking for new location.

• Look for a location that will provide 24 hour access to security.

• Look for a location that provides free parking, this will also increase the morale of the workers.

Benefits

• 777 Building has 26,000 square feet per floor, which would be more than enough space to locate all of your employees in one single location, thus increasing communications. This building has windows located all around the building, which the employees would enjoy. This building also provides a cafeteria, mail dock, and rentable conference rooms. This location is in the other commercial locations, which will provide employees access to commercial stores (i.e. Meijers), which your employees would like. This location is near the highway, which would increase employee satisfaction, because they could avoid Ann Arbor's downtown traffic.

• 1000 Campus Drive Building has a curved (phone) shape design to it. This design would increase open communications better than any other type of design.

• Both locations provide the following:
  - Ample free parking.
  - 24 hour security access.
  - Handicap considerations.

• By building a new location (though not recommended) many of the above needs would also be attainable.

• As a side note, an additional benefit to the relocation will be the space made available in the N.I. building.
ALTERNATIVE 1

MAIL DELIVERED BETWEEN UMH AND NEW LOCATION THROUGH AN E-MAIL SYSTEM, FAX MACHINES AND EITHER AN OUTSIDE COURIER OR AN EMPLOYEE OF FINANCIAL SERVICES.

1. MAIL DELIVERED BY AN OUTSIDE COURIER (eg. MAIL SHOPPE)
2. MAIL DELIVERED BY AN OUTSIDE COURIER (eg. MAIL SHOPPE)
3. MAIL DELIVERED BY MATERIEL MANAGEMENT
ALTERNATIVE 2

1 - MAIL DELIVERED BY MATERIEL MANAGEMENT

2 - MAIL DELIVERED BETWEEN UMH AND NEW LOCATION THROUGH AN E-MAIL SYSTEM, FAX MACHINES AND EITHER AN OUTSIDE COURIER OR AN EMPLOYEE OF FINANCIAL SERVICES.
ALTERNATIVE 3

1 - MAIL DELIVERED BY AN OUTSIDE COURIER

2 - MAIL DELIVERED BETWEEN UMH AND NEW LOCATION THROUGH AN E-MAIL SYSTEM, FAX MACHINES AND EITHER AN OUTSIDE COURIER OR AN EMPLOYEE OF FINANCIAL SERVICES.
RECOMMENDATION FOR MAIL SYSTEM

1. - MAIL SHOPPE

2. - MAIL DELIVERED BETWEEN NEW LOCATION AND UMH WILL BE DONE THROUGH AN E-MAIL SYSTEM, FAX MACHINES AND BY A FINANCIAL SERVICES WORKER
APPENDIX B
(COMPUTERS)

The following is a list of people consulted during this study in conjunction with computers. However, the two local computer consultants listed can be used as starting points but not for bidding purposes until more contractors have been considered.

- Northern Telecom, Inc.
  Box 202048
  Dallas, TX 75220
  ph: 1-800-328-8800

- Jim Bigwood (HIS) in conjunction with Gary Dean
  Taudmen Center B1240
  ph: 936-4900

- Elan Systems Inc.
  Computer Consultant
  Leo Dijulis
  ph: 668-6738

- Heney Systems Inc.
  Computer Consultant
  Michael Heney
  ph: 995-4014
APPENDIX C
(LAYOUT)

In this Appendix are some examples of questionnaires that will be helpful in generating a relationship chart. It is additionally recommended that this be done as a future I.E team project, or possibly by a starving I.E intern.

Text:
Facilities Planning
James A. Tompkins   John A. White
1984
COMMUNICATIONS SURVEY

Name | Department | Title | Phone | Location | Date
---|---|---|---|---|---

Instructions: Please complete the above information. Record the persons, departments, and activities either within or outside of the office with which you often communicate down the left-hand column. Answer each of the following six questions for personal, written, or telephone communications and record one of the following answers:

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<th>Questions</th>
<th>Answers</th>
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<tr>
<td>1. Rate the importance of your communications with this person, department, or activity.</td>
<td>1. Low</td>
</tr>
<tr>
<td>2. Rate the level of interaction with this person, department or activity.</td>
<td>2. Very low</td>
</tr>
<tr>
<td>3. Rate the amount of control you have over this person, department, or activity.</td>
<td>3. Average</td>
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<td>4. Rate the amount of control this person, department, or activity has over you.</td>
<td>4. High</td>
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<tr>
<td>5. Rate the criticality to your job that you communicate with this person, department, or activity.</td>
<td>5. Very high</td>
</tr>
<tr>
<td>6. Rate the criticality to the job of this person, department, or activity of your communications.</td>
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List the persons, departments, and activities with which you often communicate

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</tbody>
</table>

Figure 12.1 A questionnaire used to determine the interaction between an employee and others.
## SPACE REQUIREMENTS SURVEY

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Title</th>
<th>Phone</th>
<th>Date</th>
</tr>
</thead>
</table>

**Instructions:** Please complete the above information and answer the following questions.

### Questions

1. What percentage of your time during an average week do you spend doing the following:
   - A. Writing on $8\frac{1}{2} \times 11$" paper
   - B. Writing on ledgers or computer printouts
   - C. Drawing on large charts, maps, or prints
   - D. Preparing reports from several reference documents
   - E. Reading $8\frac{1}{2} \times 11$" reports
   - F. Reading from ledgers or computer printouts
   - G. Reading large charts, maps, or prints
   - H. Using a calculator
   - I. Using a typewriter
   - J. Sorting or collating papers
   - K. Talking on the telephone
   - L. Talking with one person sitting at your desk
   - M. Talking with two persons sitting at your desk
   - N. Talking with more than two persons sitting at your desk
   - O. Being away from your desk
   - P. Other—please state
   - Q. Other—please state
   - R. Other—please state

2. Record the answers to the following questions for the requirements within your work area.
   - A. How many standard file drawers for material frequently referred to?
   - B. How many legal-sized file drawers for material frequently referred to?
   - C. How many standard file drawers for material which is seldom referred to?
   - D. How many legal-sized file drawers for material which is seldom referred to?
   - E. How many feet from the floor is the height of computer printouts?
   - F. How many boxes of computer cards need to be stored?
   - G. How many linear feet of bookshelves are required?
   - H. How many standard-sized desk drawers do you fully utilize?
   - I. Other—please state.
   - J. Other—please state.
   - K. Other—please state.

---

Figure 12.2 A questionnaire used to determine the space requirements for an employee.
DEVELOPING ALTERNATIVES: FUNCTIONS

MANAGERIAL INTERVIEW QUESTIONNAIRE

Person Interviewed  Title  Department  Phone  Location

Interviewer  Date

1. Who is your direct supervisor? What is the supervisor's title?
2. Who do you supervise? What are their titles?
3. What do you do?
4. What do the people you supervise do?
5. What is your opinion of the area requirements sent to you based on the space requirements survey? Are the figures accurate?
6. What is your opinion of the interrelationships sent to you based on the communications survey? Are there any relationships that are incorrect or missing?
7. What is your department's need for additional storage space?
8. What is your department's need for additional office equipment?
9. What changes are going to take place in your department in the next year? Three years? Five years?
10. What clerical services or other general services does your department or should your department utilize?
11. If you could make changes in the existing office facility, what would they be?
12. What else should be known about your department or for that matter, the entire office facility that should be known when planning the new facility?

Figure 12.4 A managerial interview questionnaire that may be useful in structuring management reviews of data collected from employee questionnaires.
APPENDIX D

Most of the information regarding modular furniture was collected and coordinated by Jeneen Hill. If there are any questions regarding this section of the project, please direct them to Jeneen, at #665-9456 until July 1990, or to one of the following references.

References

The references used to collect information regarding the modular furniture were:

• Helen Bennett, Interior Design Department, UMH
  - Interacted through phone conversations; provided the rectilinear diagram and a budget estimate for that project; involved in the NIB Finance Project.

• John Ballew, Interior Design Department, UMH
  - Spoke with him in person once to clarify the number of workstations per configuration; involved in the NIB Finance project.

• Coordinated Industries Inc., Business Interiors
  30625 West Eight Mile Road
  Livonia, MI 48152
  313/476-0396
  - Contacted by phone requesting information on multi-angular modular furniture; they sent information including the DYNAMIX brochure; contacted again for pricing of the average DYNAMIX workstation (by Charles Webb).

Estimation of Gross Area for DYNAMIX Workstations

• DYNAMIX can provide 14% more workstations than a rectilinear set up in the same gross area. This was taken from the brochure by:

  Total number of Square Feet: 6,997
  Total number of Rectilinear Workstations: 55
  Total number of DYNAMIX Workstations: 64

  \[1 - \left(\frac{55 \text{ workstations}}{64 \text{ workstations}}\right)\] x 100% = 14%

• 104 rectilinear workstations in 5,561 sq.ft.
  = [104 x 114% = ] 119 (118.56) workstations in 5,561 sq.ft.

• Average Gross Area/ DYNAMIX workstation = 119 workstations/5,561 sq.ft. = 46.73 sq. ft
- Total Gross Area = 46.73 sq.ft. x 104 workstations
  = 4,859.92 sq.ft.
2. Entry - Don't pec.

If you go deep work areas leave outlet

The location of the workstations

173" + 12" = 185.0". 15" reduce setbacks to 30"

Formation 179" + 12" = 191.0" would

2 Rooms - 2 terminals
"Since its introduction, Series 9000 has undergone a continual evolutionary process."

STEELCASE SYSTEM FURNITURE
PROPOSED TYPICAL CONFIGURATION
IN MOVEABLE WALLS SYSTEM
1 WORKSTATION

FINANCE
N13
3/27/90

University of Michigan Medical Center

University of Michigan Hospitals
Department of Facilities

ONEOK, Inc., Tulsa, Oklahoma
APPENDIX E
(SPACE REQUIREMENTS)

Tom Brubaker
Computer Systems Specialist
Facilities Information/Archives
ph: 764-6324

Tables 1 and 2 in this appendix project ranges for gross and net space needed by A/R.

Simple measurements and reference materials were also used in compiling this report.
Table 1. a Total Estimated Cost for a Three Year Lease at $16/sq.ft./year.

<table>
<thead>
<tr>
<th>Leased Space (25,778 sq.ft. total)</th>
<th>Per Month</th>
<th>Per 1st Year</th>
<th>Per 3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LESS:</strong> Modular Furniture (space savings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Conference Room</td>
<td>699</td>
<td>8,384</td>
<td>25,152</td>
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<tr>
<td>Office Supplies</td>
<td>400</td>
<td>4,800</td>
<td>14,400</td>
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<tr>
<td>Reception Area</td>
<td>396</td>
<td>4,752</td>
<td>14,256</td>
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<tr>
<td>Business Records</td>
<td>697</td>
<td>8,368</td>
<td>25,104</td>
</tr>
<tr>
<td>Salaries</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td><strong>PLUS:</strong> Modular Furniture (purchase)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Conference Room</td>
<td>368</td>
<td>4,416</td>
<td>13,248</td>
</tr>
<tr>
<td>Coat Room</td>
<td>133</td>
<td>1,600</td>
<td>4,800</td>
</tr>
<tr>
<td>Computer Room</td>
<td>467</td>
<td>5,600</td>
<td>13,284</td>
</tr>
<tr>
<td>Copier Room</td>
<td>320</td>
<td>3,840</td>
<td>11,520</td>
</tr>
<tr>
<td>Personal Computers</td>
<td>19,667</td>
<td>236,000</td>
<td>236,000</td>
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<tr>
<td>Computer Consultant</td>
<td>8,333</td>
<td>100,000</td>
<td>100,000</td>
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<tr>
<td>Mini Computer</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Utilities</td>
<td>2,196</td>
<td>26,352</td>
<td>79,056</td>
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<tr>
<td><strong>TOTALS</strong></td>
<td>74,806</td>
<td>897,672</td>
<td>1,723,500</td>
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</tbody>
</table>

* An average cost for conference rooms used in computation.
Space Requirements:

Table 1. Estimates of the Range of Gross Area Required by Accounts Receivable.

<table>
<thead>
<tr>
<th>Variables</th>
<th>LOW*</th>
<th>HIGH**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conf. Rm./Brk. Rm.</td>
<td>-524 to +276</td>
<td>-524 to +276</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>-300 to 0</td>
<td>-300 to 0</td>
</tr>
<tr>
<td>Reception Area</td>
<td>-297 to 0</td>
<td>-297 to 0</td>
</tr>
<tr>
<td>Coat Room</td>
<td>0 to +100</td>
<td>0 to +100</td>
</tr>
<tr>
<td>Computer Room</td>
<td>0 to +350</td>
<td>0 to +350</td>
</tr>
<tr>
<td>Copier Room</td>
<td>+126 to +240</td>
<td>+126 to +240</td>
</tr>
<tr>
<td>Business Records</td>
<td>-1131 to 0</td>
<td>-1131 to 0</td>
</tr>
<tr>
<td>Corridors</td>
<td>-1209 to 0</td>
<td>-1209 to 0</td>
</tr>
<tr>
<td>Stairwells</td>
<td>-592</td>
<td>-592</td>
</tr>
<tr>
<td><strong>Final Range</strong></td>
<td><strong>24,302</strong></td>
<td><strong>33,043</strong></td>
</tr>
</tbody>
</table>

* Present gross space in square feet minus recommended modular furniture.

** Present gross space in square feet with additional 10% expansion.
Table 2. Estimates of the Range of Net Area required by Accounts Receivable.

<table>
<thead>
<tr>
<th>Variables</th>
<th>LOW*</th>
<th>HIGH**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conf. Rm./Brk. Rm.</td>
<td>-524 to +276</td>
<td>-524 to +276</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>-300 to 0</td>
<td>-300 to 0</td>
</tr>
<tr>
<td>Reception Area</td>
<td>-297 to 0</td>
<td>-297 to 0</td>
</tr>
<tr>
<td>Coat Room</td>
<td>0 to +100</td>
<td>0 to +100</td>
</tr>
<tr>
<td>Computer Room</td>
<td>0 to +350</td>
<td>0 to +350</td>
</tr>
<tr>
<td>Copier Room</td>
<td>+126 to +240</td>
<td>+126 to +240</td>
</tr>
<tr>
<td>Business Records</td>
<td>-523 to 0</td>
<td>-523 to 0</td>
</tr>
<tr>
<td>Final Range</td>
<td>20,686</td>
<td>26,774</td>
</tr>
</tbody>
</table>

* Present net space in square feet minus recommended modular furniture.
** Present net space in square feet with additional 10% expansion.
APPENDIX F

Most of the information regarding off-site leasing was collected and coordinated by Chuck Webb. If there are any questions regarding this section of the project, please direct them to Chuck, at #996-4188 until July 1990, or to one of the following references:

References

The references used to collect information regarding the modular furniture were:

- Frank E. McKenney, Commercial Realtor Group Four, Inc., 400 E. Eisenhower Pkwy., Suite L Williamsburg Square Ann Arbor, MI 48108 (313) 994-4444
  - Contacted by phone requesting information on commercial leasing in Ann Arbor. Frank sent me cost estimates on at least five buildings in Ann Arbor that could accommodate Accounts Receivables needs.

- Eric Yale Lutz & Associates 777 Eisenhower Plaza Suite 130 Ann Arbor, MI 48108 (313) 994-7000 (313) 540-8444
  - Contacted by phone and in person requesting information on 777 Eisenhower Plaza. They sent a brochure regarding information on the 777 Eisenhower Plaza.