

A COMPUTER SALES AND MANUFACTURING DISTRIBUTION
CENTER,
IN SUPPORT OF A COMMUNITY.
LUBBOCK, TEXAS

A THESIS
IN
ARCHITECTURE
BY

MARK A. KOHL

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Programming Instructor (Arch 4395) & Design Critic (Arch 4631):

[REDACTED]
Professor: David Driskill

[REDACTED]
Professor: Marc Giaccardo, Advisor

[REDACTED]
Advisor & Dean, College of Architecture
Dr. Martin Harnes

Accepted: May, 1994

***A COMPUTER SALES AND MANUFACTURING
DISTRIBUTION CENTER.***

ARCHITECTURAL PROGRAM

12-08-93

Mark A. Kohl

Prof. David Driskill.

Acknowledgement:

To my Father and Mother, for the continual support, knowledge and information, without whom this would not have been possible.

I Love You.

To a wonderful life and success.

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Abstract:

The major goal of this publication is to explore the paradox of sustainability in support of a community. Then applying this knowledge and understanding in the making of a large scale computer sales and distributing center designed to support and sustain a future developed community. The overall design for this facility will be developed and organized around sustaining it self and this new community. The intangible qualities that determine the essence of a community will be recognized and transferred to the building. Therefore, the Lubbock computer sales and distribution center will be made a "high-tech high-touch" atmosphere within the community it supports.

Introduction.

A great building, in my opinion, must begin with the unmeasurable, must go through measurable means when it is being designed, and in the end must be unmeasurable. The only way you can build, the only way you can get the building into being, is through the measurable. You must follow the laws of nature and its quantities of brick, methods of construction, and engineering. But in the end, when the building becomes part of living, it evokes unmeasurable qualities, and the spirit of its existence takes over.

Louis Kahn, *Between Silence and Light*.

A building can serve and protect our needs; moreover the building must extend past the obvious and help participate in the current issues and problems. These issues and problems call for our immediate care of all environmental resources, they help form the groundwork for sustainability within architecture.

"At the heart of suburban development is a critical paradox. As any suburban increases its popularity, by providing people with the more informal, low-density setting that they seem to want, its very popularity destroys the features that first made the place appealing."

Stephen Friedman, *City Moves*.

If every act transcends thought, then every design must transcend process. The process of designing a sustainable piece of architecture to support a community must follow through a thought process of design. This process then produces a sustainable model that will represent the context of the area as well as the community.

Thesis Statement.

I think the key to improve and understand our community is through the understanding that not much has changed, but things are vastly different. The creation of architecture is better understood when it helps itself. **Therefore I think that an appropriate process for the designing of architecture is through sustainability.** Sustainability would offer the opportunity to see architecture transform itself into a self- supporting community. This will help us take steps towards a consensus on an environmental agenda.

Thesis Issues.

Design Responce.

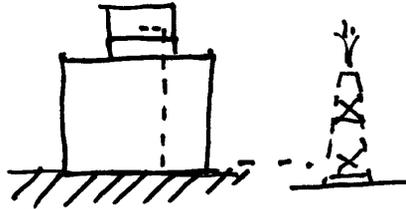
"Quite frankly environmental buildings can look like anything. It has not so much to do with the form of the building as it has to do the way the building performs." (Branch, Mark, 1993, P 94) When measuring performance of a building you need something to measure against. This is why a sustainable model will be produced to measure against. " While a purely green building may be impossible to achieve, architects must help the industry, their clients, and the public reach a consensus what realistically constitutes an environmentally sensitive design." (Diekner, D. K., 1993, p.135) The main goal of the project is to produce a sustainable large scale computer sales and distribution center. Some of the key issues in the sustainability of this facility are lighting, lighting controls, building materials, heating, cooling, recycling and HVAC controls. These issues will help achieve environmental responsibility.

Lighting controls in the new facility will have occupancy sensors and controlled by photocells and all florescences will be compact. All of these controls are used to conserve energy.

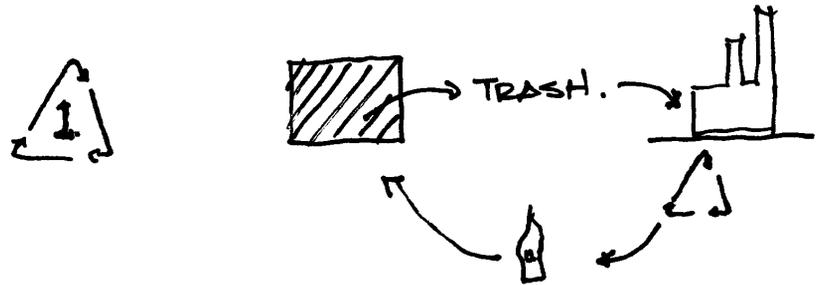


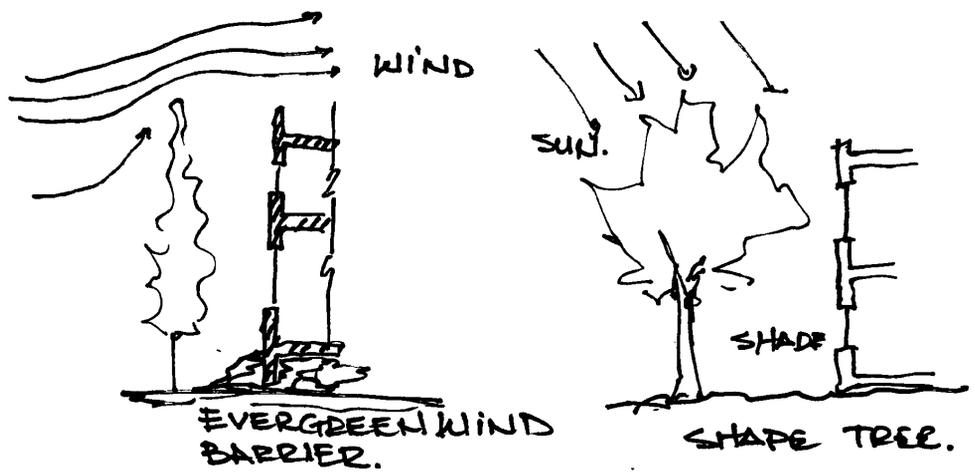
The building materials in this facility like the tile will be post consumer products, the carpet will be fabricated from wool, and the linoleum will be made from flax pine resin cork. This is just some of the concerns with materials in the facility, all others should be given the same care.

Heating and cooling will be achieved with rooftop gas chillers and heaters. If possible the heat should come from natural gas which is a by product of oil pumping.

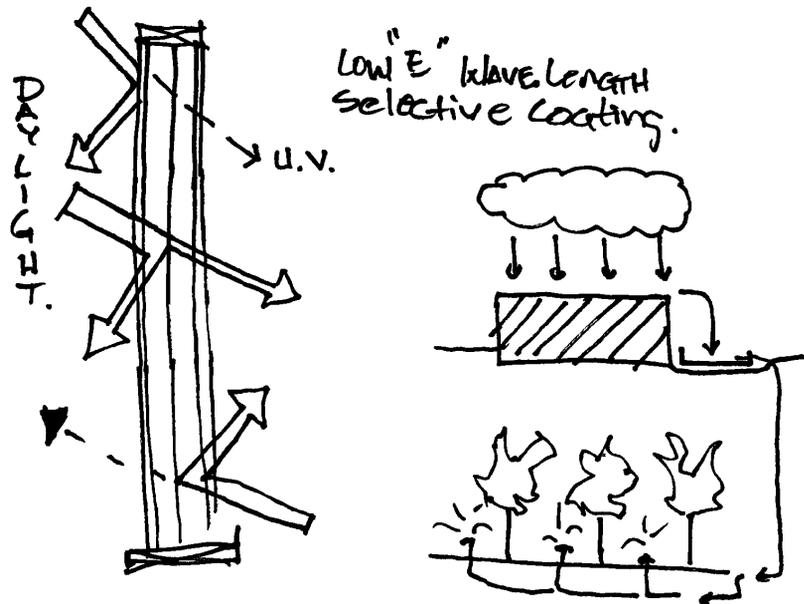


A recycling program is to be incorporated to all parts of the facility. We need to learn as a Nation that even the smallest steps to help ourselves and our environment must be taken.



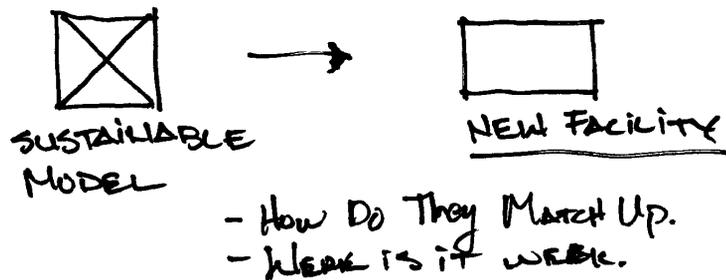


WIND PROTECTION.



The HVAC controls and distribution system in the facility will be controlled by a energy management system with direct digital controls to all VAV boxes and CO-2 sensors.

All of these issues make up parts of the whole. A building which is made sustainable will save the total of the extra cost with in the first year. "... it paid back about in 10 months with 1993 - 1994 technology, one could do better today." (Branch, Mark A. p. 76)



Contextual Issues.

Design Responses.

The contextual issues for the computer sales and distribution center in Lubbock, Texas will directly effect the sustainable aspect of this facility. Everything will be considered from natural environment, sun angles, winds, soil, water table, circulation, transportation, public services and support facilities. All of this information will be used to formulate a sustainable model for the facility and context.

The physical settlement of the area proposed for this building and future residential development with support services is not zoned at this time, but is proposed for a industrial park. (Lubbock Comprehensive Land Use Plan, 1986.) It is my proposal that the site be zoned to meet the needs of the development.

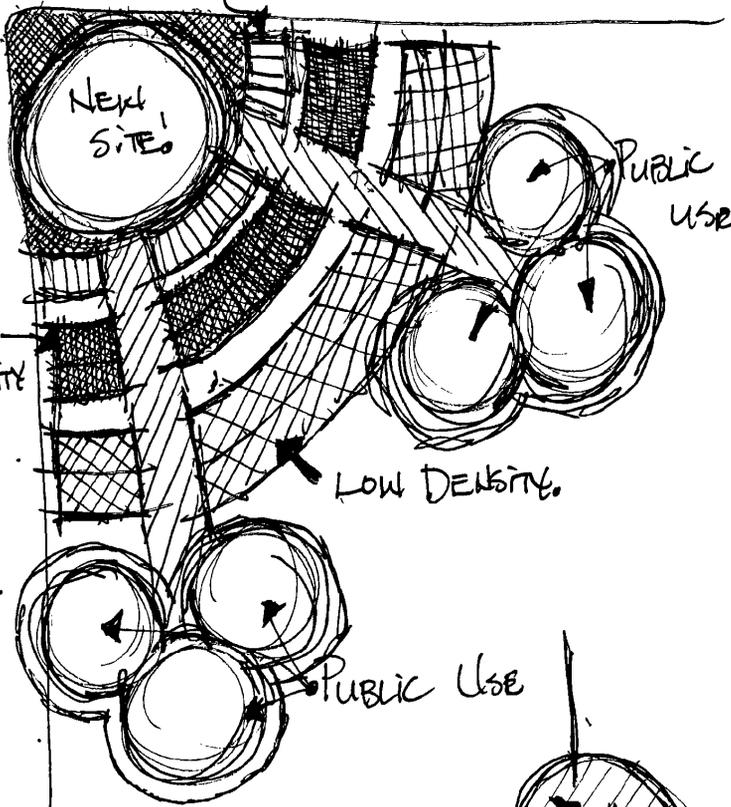
(Proposed Zoning Map.)



T. I.

UNIVERSITY

COMMERCIAL



Next Site

Public Use

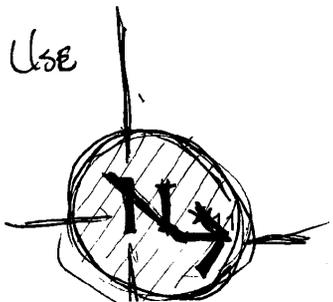
High Density

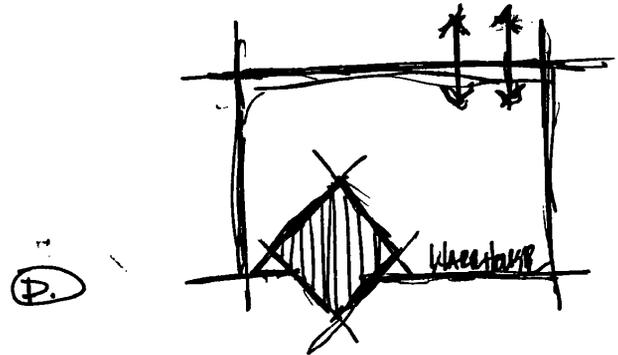
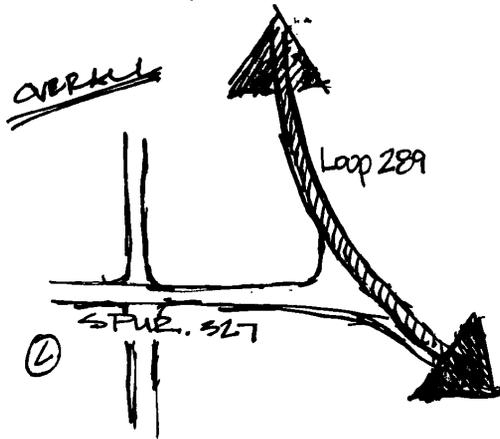
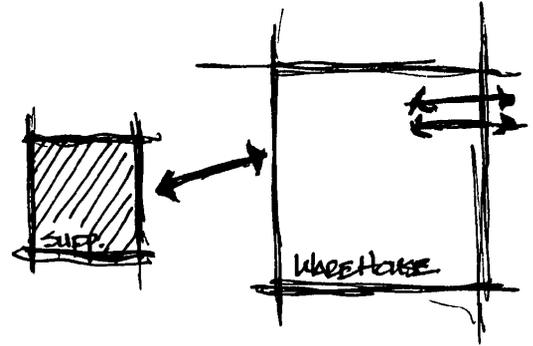
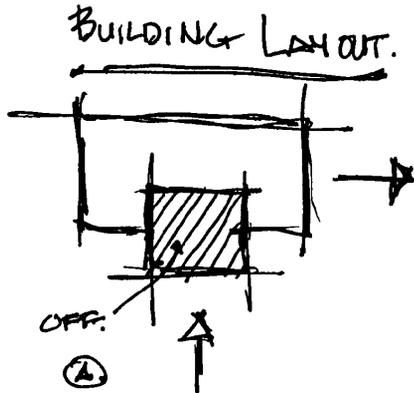
Low Density

Public Use

Loop

COMMUNITY





This zoning will be marketed to the city as a new direction for community growth and sustainable growth as a whole. With all of the residential developing going South, South West, this is an opportunity to distribute the growth throughout the city.

The new facility and community will have a small neighborhood shopping area in compliance with the Comprehensive Land Use Development policies of Lubbock. The Land Use Goals of ensuring that "land use policies provide the most progressive and highest quality environment for living and working," and establishing "Lubbock as a model city in terms of quality of land use, appearance, livability, and positive urban image." (Lubbock Comprehensive Use Plan, 1986.) These are all reasons that Lubbock should be interested in looking at such a project. This project will also comply with the strategy of improving the exposure of the area to the industrial business prospects. This will instill a sense of neighborhood and have unique characteristics within the community.

Location is a big factor along with transportation services available. This is why a context like Lubbock fits like hand and glove with the facility type. Transportation services include

Facility Program Issues.

Design Responses.

The main goal is to design and build a large scale computer sales and distribution center capable of handling the needs of this service facility. The computer sales and distribution center will be located in the same building. The sales / warehouse / distribution center will be located in Lubbock, Texas, just East of Texas Instruments.

The facility should be capable of handling the receiving, storage, assembly and shipping of all materials and equipment, in and out of the facility.

The storage and assembly of all orders will be accomplished by processing of orders through computer inventory checking, verifying and billing with every order. This also falls under the category of HIGH-TECH, HIGH-TOUCH. The requirements for this facility are in two parts. The first is the front end or office area, which will account for 6,750 sq. ft. square foot area for all support of this facility. The second is the warehouse area which will account for 6,475 sq. ft. square foot area for general

warehouse storage of supplies and other materials for the complexes facilities. These areas are to be combined and should function as one. All to create a HIGH-TECH HIGH-TOUCH facility image.

The showroom will be developed around a interactive environment. This is very similar to the A.T.&T. Customer Technology Center in Atlanta were the "intent was to create an information / marketing center for A.T.&T. a place where customers are sold, not in terms of cash transactions but, rather, via compelling demonstrations of the firm's market leadership." (Geran, 1991, p.102) All of this helps A.T.&T. create its "User Friendly" environment, as the expression has it. As in the A.T.&T. project are facility will also be cost efficient throughout but without the sacrificing of any sustainability.

"As more women enter the work force and, with less discretionary time", (McGrath,1992, p. 76) both man and women are turning to Mail order shopping. The sales staff and operator will be trained to expose the client to the product and show them how it can be tailored to their needs. A much higher percentage of our clients will be sold by the catalog, not via demonstration. This will call for the catalog and mailing departments to make all

presentations via visual demonstrations (Catalog), with backup personalized operator support.

The warehouse and distribution center area shall be equipped to receive, handle and ship approximately 2.5 million dollars in costumers orders yearly. This approximation comes from the comparison with Lillian Verhon catalog operation which handles more than 4 million in orders annually. (Russell, 1992, p.76)

The facility and the community functioning as one will only be made possible by the completion of residential development. Just as in Apple's Campbell project, Lamberto Moris says "our task was to prepare a general, flexible space since we didn't know how departmental allocations were going to be made. The concept, he goes on to explain, is one derived from imagery associated with a small city." (Cohen, 1992, p.94.) This is a metaphor but the reference made to the small city is a strong tie to the community which the facility will support and sustain. Moris created the building on the basis of function, in our case, form and function will be effected by a sustainable model for this community.

Space and Space Characteristics.

The facility will be comprised of the following spaces with all intention of the spaces being as adaptable for additional space or technological updating.

A. Office area.

1. Showroom.
2. Administration and management.
3. Phone bank.
4. Computer control and terminal space.
5. Technical support.
6. Public restroom.
7. Education room.
8. Catalog department.
9. Mail room.
10. Employee locker room.
11. Lunchroom.

12. Storage and distribution for office.
13. Janitorial space.

B. Warehouse area.

14. Receiving.
15. Storage.
16. Assembly.
17. Quality control.
18. Shipping.
19. Dock space.
20. Office (controller).
21. H.V.A.C.
22. Service shop.
23. restrooms
24. Janitorial space.
25. Warehouse Space.

Space Analysis.

A. Office area.

1. Showroom.

The Image of product and building is a very important aspect to our client, this is why our showroom will be developed in the High - Tech. High Touch interactive environment. The space should be a continuous experience. This will be accomplished through the use of different ceiling heights, lighting and different wall colors and textures through out the space. All elevations changes will be H. C. accessible

Equipment: Display cases, moveable lighting, display tables.

Users: About 20 people at peak

Area: 900 sq ft

2. Administration and management.

These activities involve managing the whole facility, and establishing policies and regulations. This involves a large degree of privacy and a need for communication and interaction throughout the whole facility.

Users: Director, Assistant Director, Sales personnel (2) Secretary, and Bookkeeping.

Equipment: Desk, computer, copy machine, file and record storage.

<i>Area:</i> Director	200 sq ft
Assistant Director	150 sq ft
Sales person	120 sq ft
	120 sq ft
Secretary	120 sq ft
Bookkeeping	<u>300 sq ft</u>
total	1050 sq ft

3. Phonebank.

The phonebank is the main input end of the operations. Orders are taken in full over the phone by a high touch operator. Then the order is processed through the system. After order is received a technical support staff member is assigned to the client.

Equipment: 5 to 10 incoming lines, same amount of computers, Built in desks.

Users: 5 to 10 operators (room for expansion).

Area: 400 to 500 sq ft

4. Computer control room.

This will be the overall system that controls the ordering process for all operations.

Equipment: Computer, work desk.

Users: One computer controller.

Areas: 150 sq ft

5. Technical support.

The technical support staff on site will handle all questions and concerns of the client. The clients in the local area will also be serviced by this staff. Nationally the service staff will be a sub-contractor until it can be incorporated into the company as whole. Communication through the whole building is a must.

Equipment: 2 to 5 Incoming lines, desks, computers.

Users: Support staff of 2 expandable to 5.

Area: 600 sq ft

6. Public restroom.

All materials should be easy to maintain and clean. Tile is recommended for floor and walls. Artificial lighting is preferred.

Equipment: Sink, mirror, air hand dryer, trash receptacle plumbing fixture, partitions.

Plumbing fixtures: Male, 2 Water closets, 2 Urinals, 2 lav's.

Female, 2 water closets, 2 lav's. 1 drinking fountain.

Users: Public.

Area: 2 at 150 sq ft each.

total 300 sq ft.

source: Manas, 1957, p.7-21

7. Education room.

This should be an open, airy space with ample room to educate our staff on new products and services.

The space should be flexible enough to where it can double as a conference room.

Equipment: Desk, computer, illustration boards, display area, seating for up to 20.

Users: Staff and clients.

Area: 1000 sq ft .

8. Catalog department.

This department is to keep pace with the ever changing computer industry, as the facility makes it part of our services. Its main responsibility will be the catalog and the many support mailings to follow an order.

Equipment: Photo equipment, catalog past-up table, 2 desks, 2 computers, layout table.

Users: Catalog manager, advertising specialist.

Area: 450 sq ft.

9. Mail Room.

The mail room is responsible for all front end office mail. This space will be located near the catalog department and will have access to the shipping area for outgoing pickup.

Equipment: 2 Large sorting tables, desk, computer, storage, postage meter.

Users: 1 mail clerk.

Area: 250 sq ft

10. Employee locker room.

The locker room will be located so both front and back ends of all operations can access equally. This area will have full restrooms and shower facility.

Equipment:

Users: All staff.

Area: 1000 sq ft

11. Lunchroom.

This space involves lunch and or break time space to get away from the office environment and relax with full support services. The area should be highly accessible from both office and warehouse.

Equipment: 3 tables, 12 chairs, sofa, television set, vending machine, full kitchen and prep area.

Users: All Staff

Area: 300 sq ft

12. Storage and distribution for office.

This storage room will house all the supplies needed for day to day operations. All staff will have access and should be central in located.

Equipment: Shelving

Users: All staff

Area: 100 sq ft

13. Janitorial space.

This space should be located near the public restrooms and locker room. All materials used to clean the space will be within. This area will be locked at all times.

Area: 100 sq ft

B. Warehouse Area.

14. Receiving.

This area is intended to unload all materials from towers to the smallest chip, then distribute them through out the facility. This area should be spacious with high a ceiling. The finish surface should be durable and easy to clean. Artificial lighting is recommended for this space. Reverberation and noise should be reduced with the proper acoustical treatment.

Equipment: Dock, exhaust fans, blowers.

Users: Dock supervisor and delivery people.

Area: 400 sq ft

15. Storage.

This area will store all materials before they can be distributed through the facility for proper use.

Equipment: Large shelf space, floor space.

Users: Dock supervisor and deliver people.

Area: 200 sq ft

16. Assembly.

This space is where the physical computer will be assembled and or product packaged. This will stress the high-tech high-touch image of the facility. Each order will be assigned a staff member to see it through this whole process (High- Touch). When that order is shipped it will have the staff members name on it for any further questions. This area will be located near the storage to help with this process.

Equipment: Computer,

Users: Assembly manger, Computer technician.

Area: 550 sq ft

17. Quality control.

This is the last stage before the products are shipped. The quality control division of this company is one of the most important divisions, because of the fact that without a reliable working computer, we can not expect to receive further orders from that client. The final step will be a full check of the complete order, and a call to the customer to double check that order, and confirm the date of expected shipping. This is to located next to shipping.

Equipment: computer, work desk, direct line to assembly

Users: Two quality control technicians.

Area: 300 sq ft

18. Shipping.

This area is intended to for loading of all outgoing materials, and storage of these until the time of shipment. This area has all the same qualities as receiving and should be incorporated into the same area with dual purpose.

Equipment: Dock, exhaust fans and blowers.

Users: Dock Supervisor and delivery people.

Area: 400 sq ft

19. Dock space.

This is space that will be needed for goods that will be transmitted for truck to dock or dock to truck. Keeping this space clear and unobstructed is a must for smooth operations.

Equipment: None (clean flat surface)

Users: Dock supervisor and delivery people.

Area: 200 sq ft

20. Office Controller.

This space will be for the person to oversee the operations of the back end.

Equipment: Desk and computer

User: Controller

Area: 150 sq ft

21. HVAC.

This space will have a central system with thermostat controls as per the climate in Lubbock and all of the requirements of stored materials.

Equipment: Unit heaters, ventilators and thermostat

User: Repair staff

Area: 250 sq ft

22. Service Shop.

All of the repair work traveling through the facility will be brought to the shop for repair. The repair shop will be in the same high-tech high -touch environment as the rest of the facility.

Equipment: Benches, Computers

User: service staff

Area: 475 sq ft

23. Restrooms

All materials are to be easy to maintain and clean. Tile is recommended for the floor and the walls. Artificial lighting is preferred.

Equipment: Sink, mirror, air hand dryer, trash receptacle, plumbing fixtures and partitions.

Male: 2 water closets, 2 urinals, 2 lav's.

Female: 2 water closets, 2 lav's. 1 drinking fountain.

User: Staff

Area: Total 300 sq ft

24. Janitorial space.

The space should be located near the restrooms. All materials used in support of warehouse will be within. This area will be locked at all times.

Equipment: Slop sink and shelves.

Users: Janitor

Area: 150 sq ft

source (manans, 1957, p. 7-21)

25. Warehouse general storage.

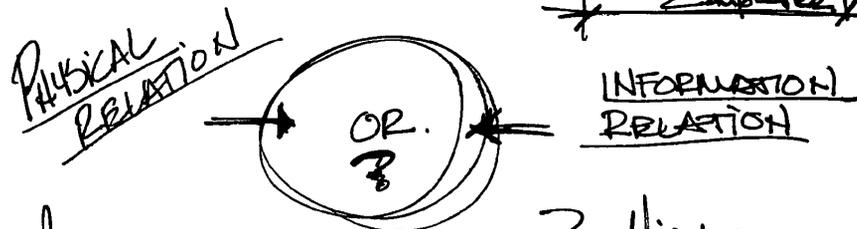
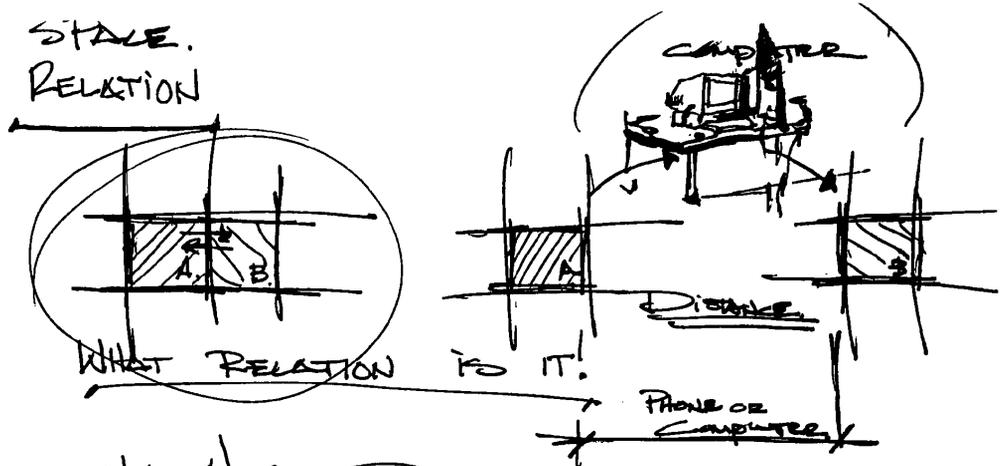
This space is for all materials left on site for future use. The space is usually two stories high.

Equipment: Shelving, forklift and floor space.

User: Staff

Area: 3000 sq ft

A. Total Net Square Footage	=13,125 sq ft
B. Circulation (A. x 25%)	=3,281 sq ft
C. Mechanical (A. + B.) x 5%	=17,226 sq ft
Total Gross Square Footage. (A. + B. + C.)	=33,632 sq ft



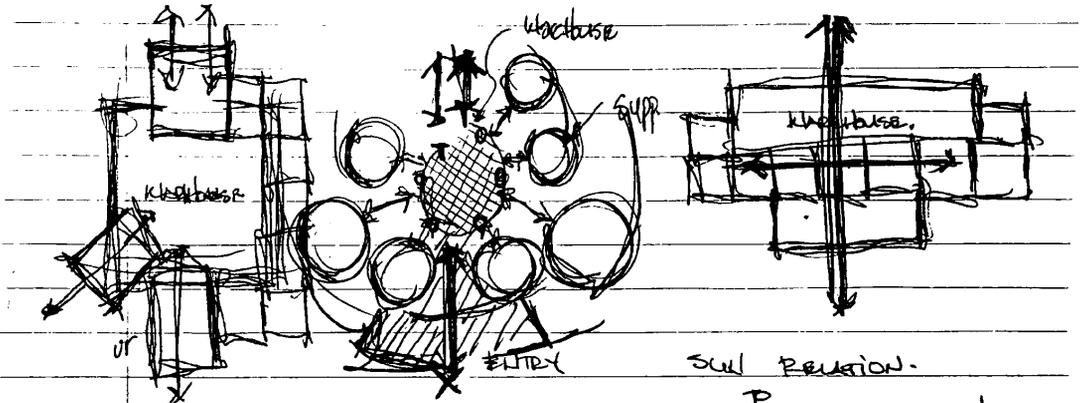
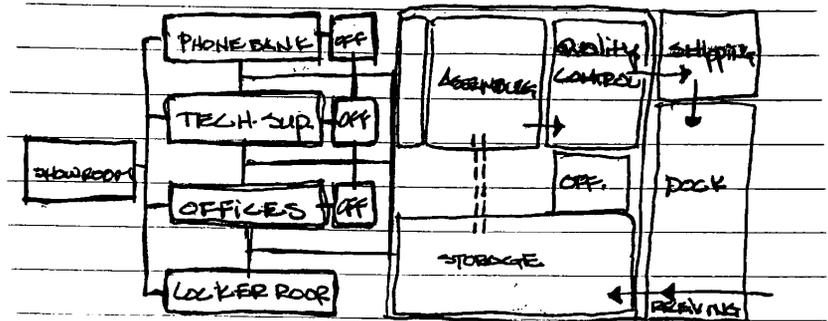
How Do The Species Interact?

What is Needed For This?

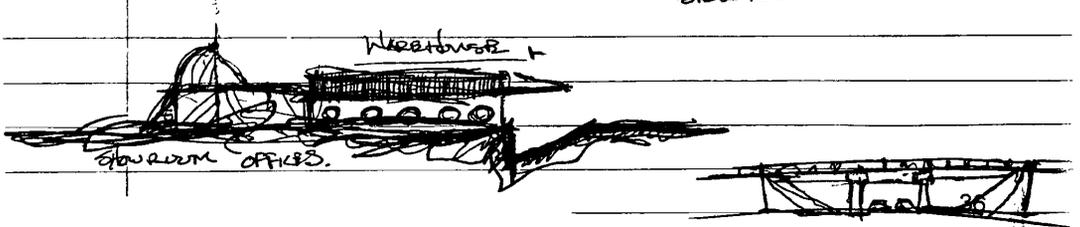
HIGH -

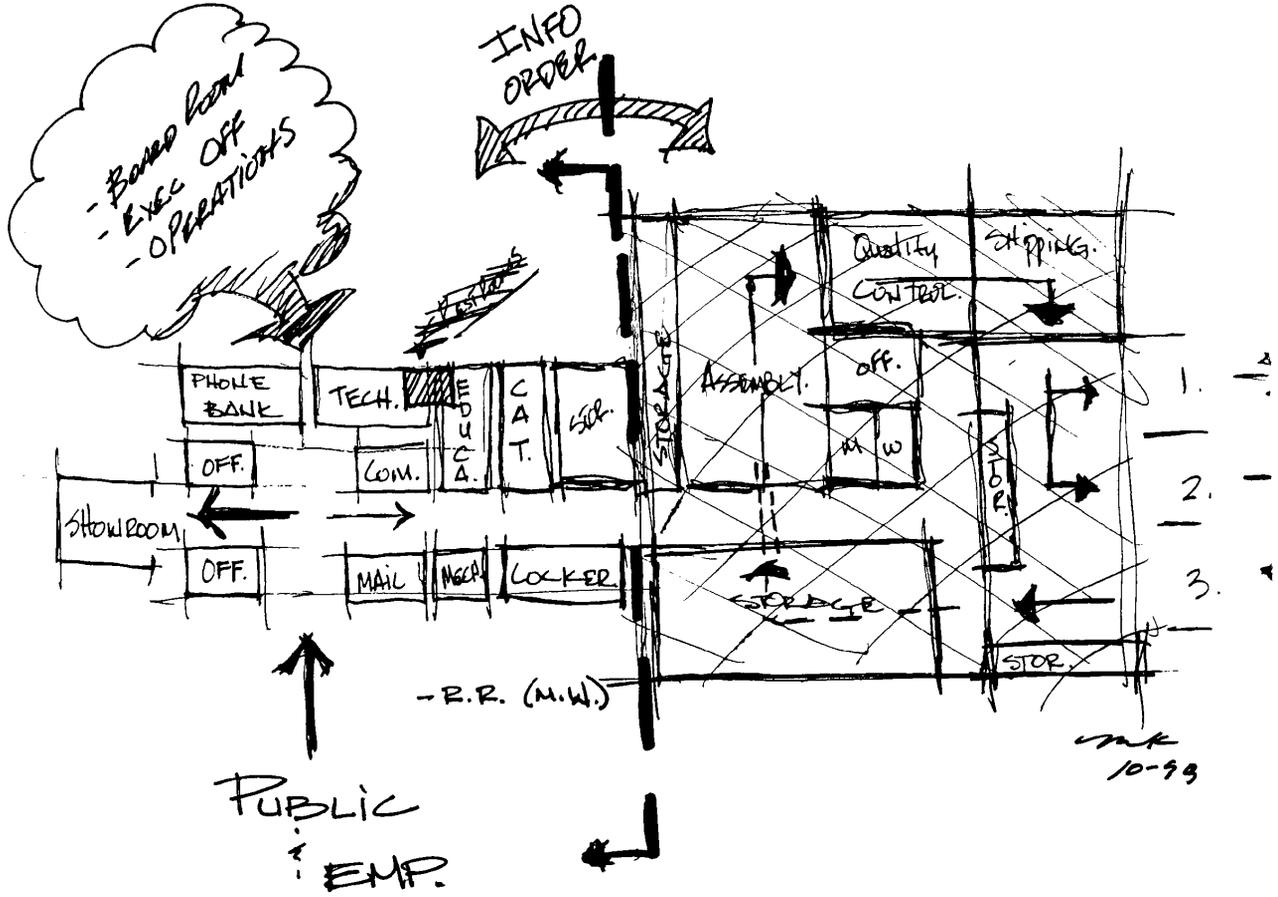
MED. -

LOW -



SUN RELATION.
 TO
 STAIR ROOM OF WAREHOUSE.





Economic Analysis.

The following will indicate the total facility cost, annual project income and payback for the development of the computer sales and distribution center.

Total Building Cost.

The building cost is based on the following criteria:

A. The Gross Building Cost, in dollars per square foot, this is based on the 1992 Manas Assembly Cost Data. p. 512

facility type	average cost	G.S.F	gross total cost.
Warehouse / Office	\$33.90	17,226	\$583,961.40

Therefore , the gross Building Cost = **\$583,961.40**

B. Site Work is based on 5% of the Gross Building Cost.

Therefor, $5\% \times \$583,961.40 = \mathbf{\$29,198.07}$

C. Construction Loan Cost is based on 9% of the Gross Building Cost.

Therefore $9\% \times \$583,961.40 = \mathbf{\$52,556.53}$

D. Land Value is based on 15% of the Gross Building Cost.

Therefore $15\% \times \$583,961.40 = \mathbf{\$87,594.21}$

E. Contingency Cost is based on 5% of the Gross Building Cost.

Therefore $5\% \times \$583,961.40 = \mathbf{\$29,198.07}$

Therefore, the total building cost is:

$$\mathbf{(A+B+C+D+E) = \$782,505.28}$$

Annual Project Income

The space that is leasable is only 50% of the Gross Square Footage of the building.

I. Cost per square foot per year = \$13.50

II. Total leasable area = 8,613 sq ft

Therefore, the income of the project annually is:

$$\mathbf{(I. \times II.) = \$116,275.50}$$

Payback

Payback is the number of years required for the client recoup the cost of the project.

Therefore,

$$\begin{aligned}\text{Payback} &= \text{Initial Cost} / \text{Annual Project Income} \\ &= \$782,508.28 / \$116,275.50 \\ &= \mathbf{7 \text{ Years.}}\end{aligned}$$

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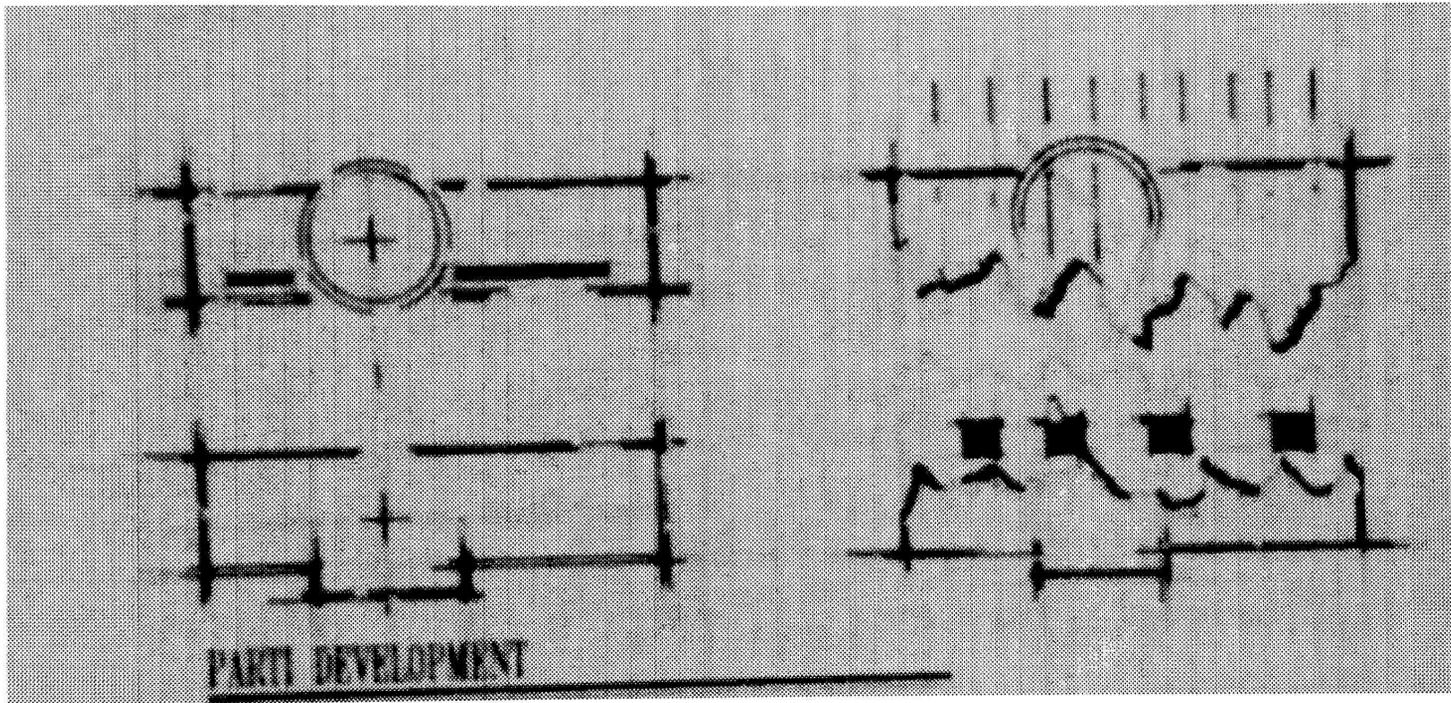
Mark A. Kohl.

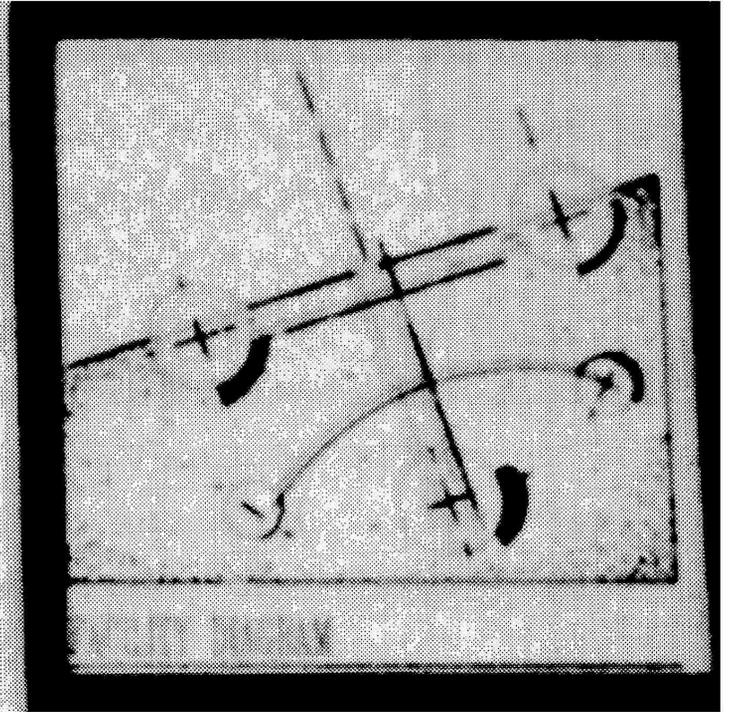
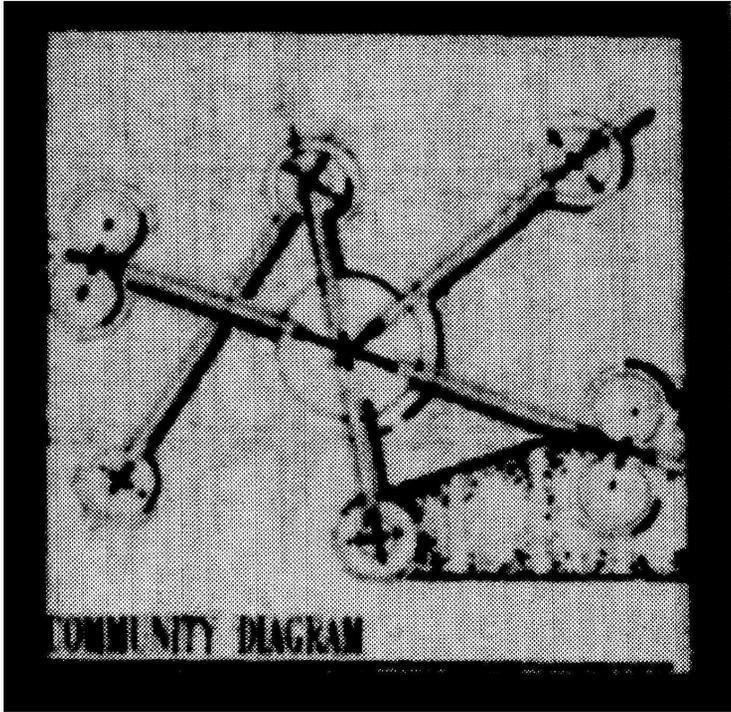
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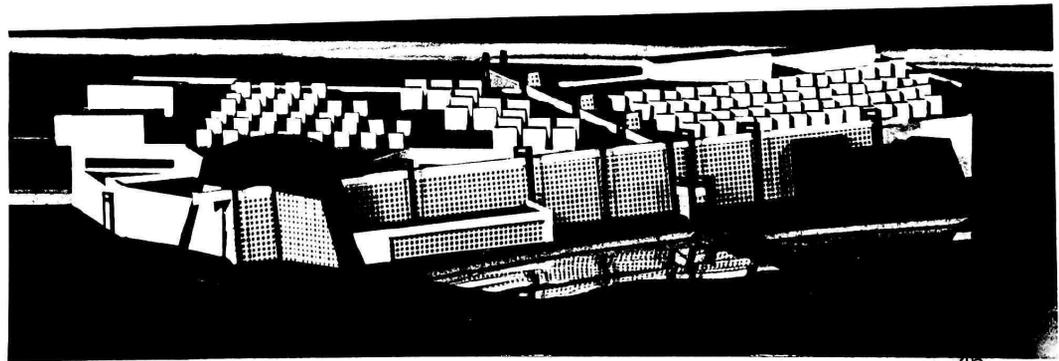
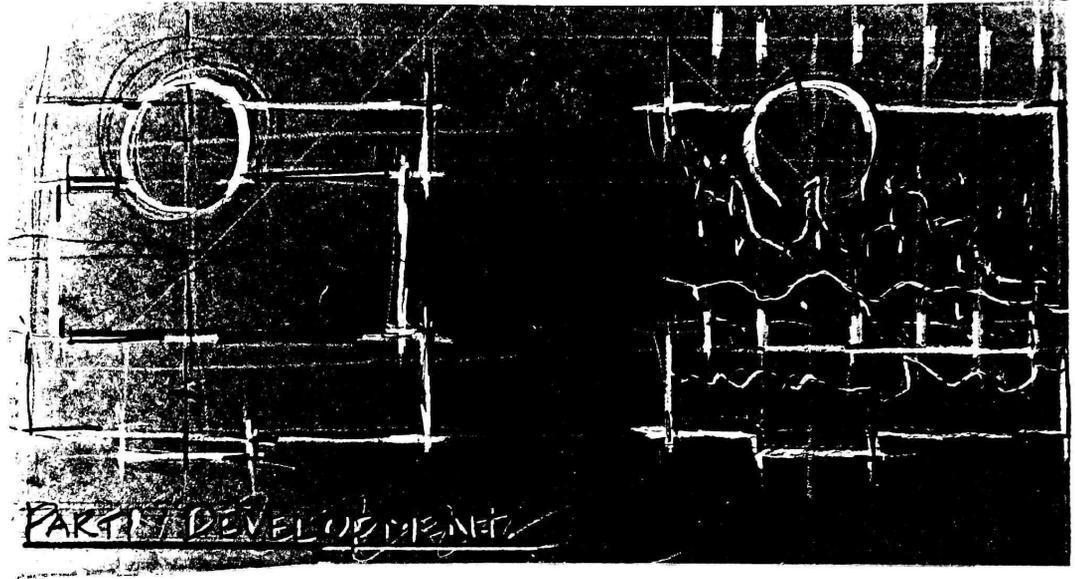
I think the key to improve and understand our community is through the understanding that not much has changed, but things are vastly different. The creation of architecture is better understood when it helps itself. **Therefore I think that an appropriate process for the designing of architecture is with the use of a community as a backdrop through the design process.** This would offer the opportunity to see architecture transform itself into a self-supporting community. By using public spaces as the organizer in both the community and the facility.

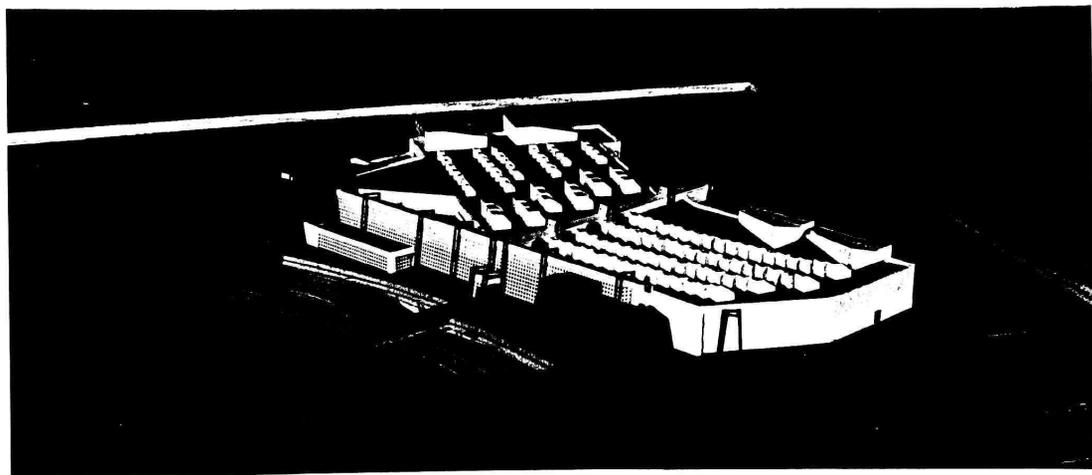
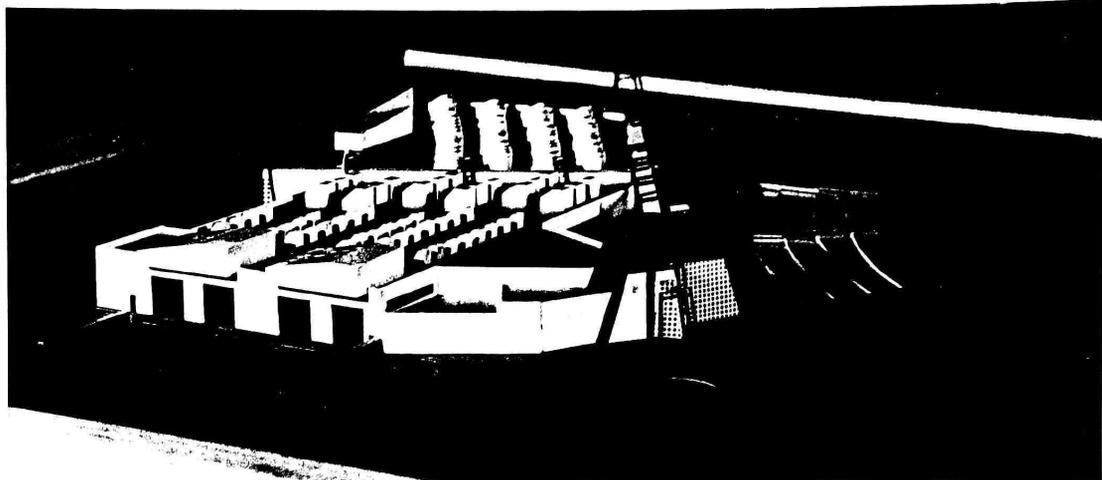
Building Type:

**A Computer Sales and Manufacturing Distribution center,
in Support of a Community.**

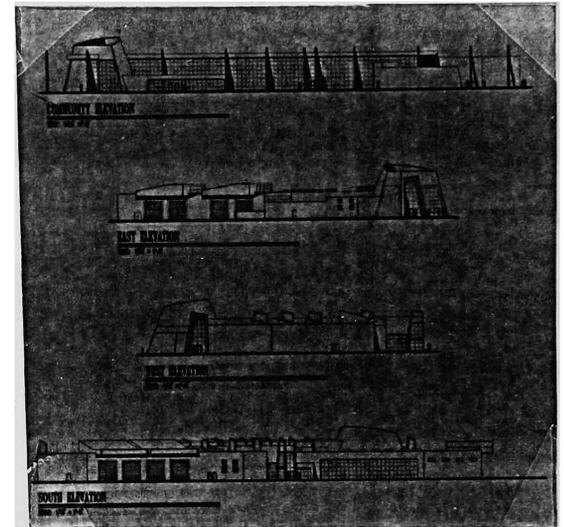
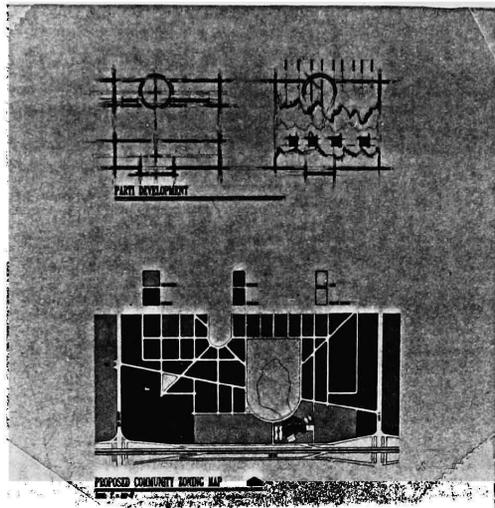
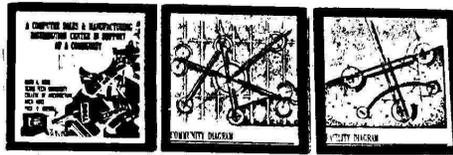


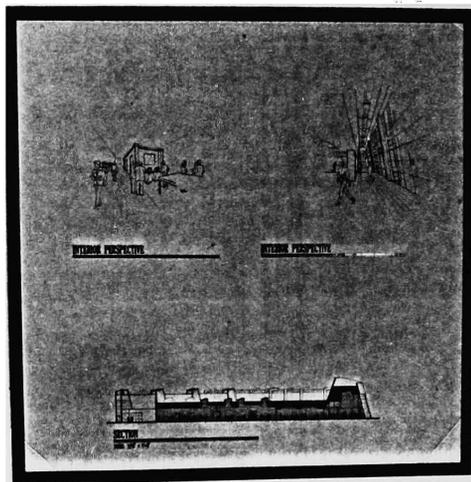
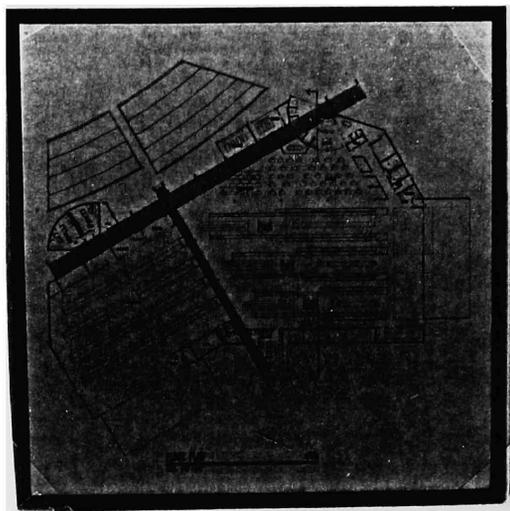


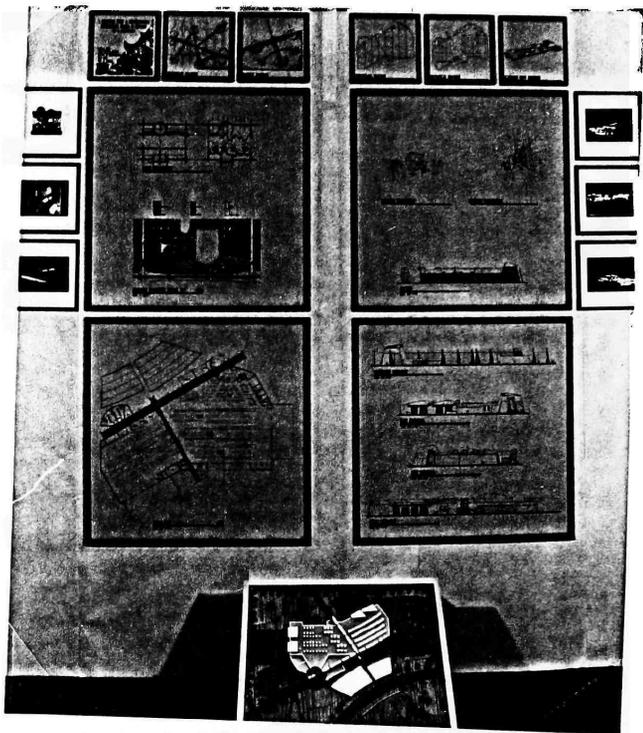






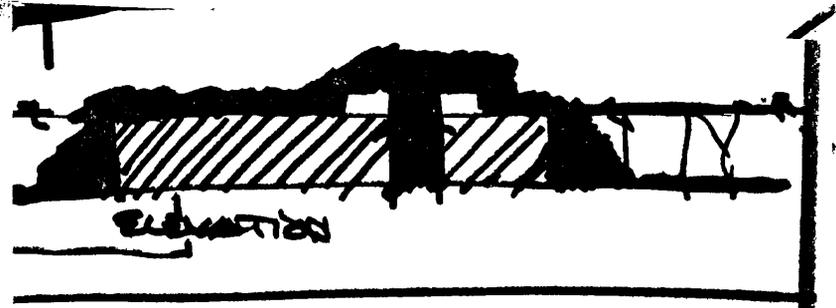
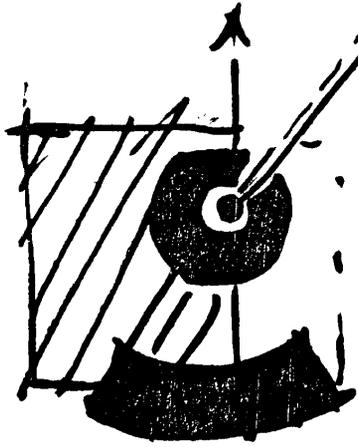
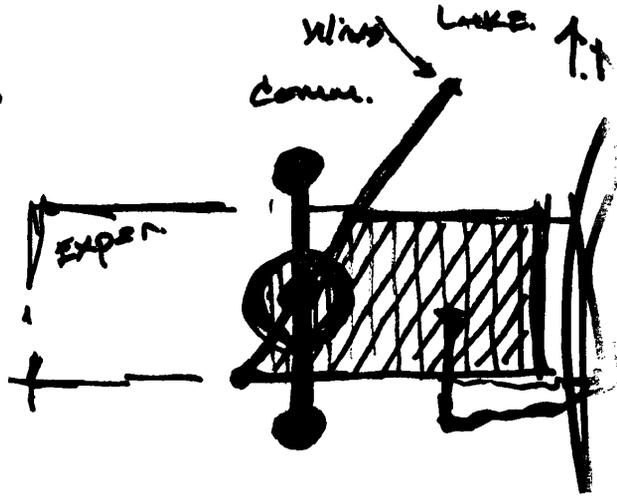
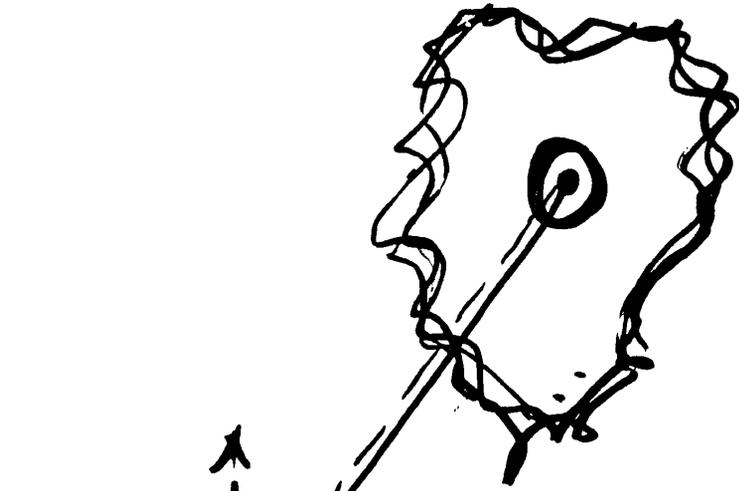
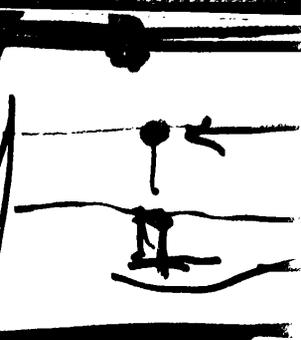




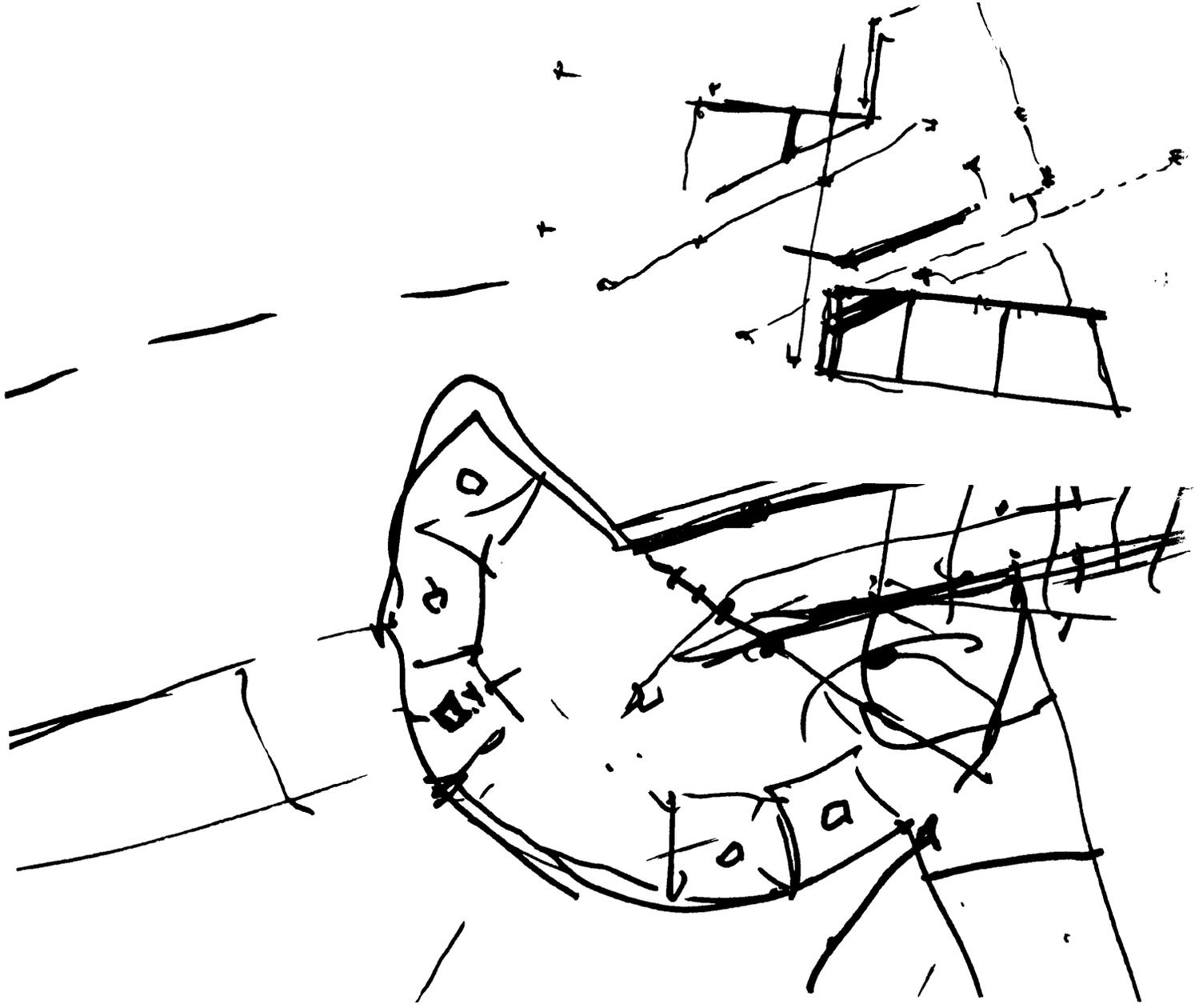


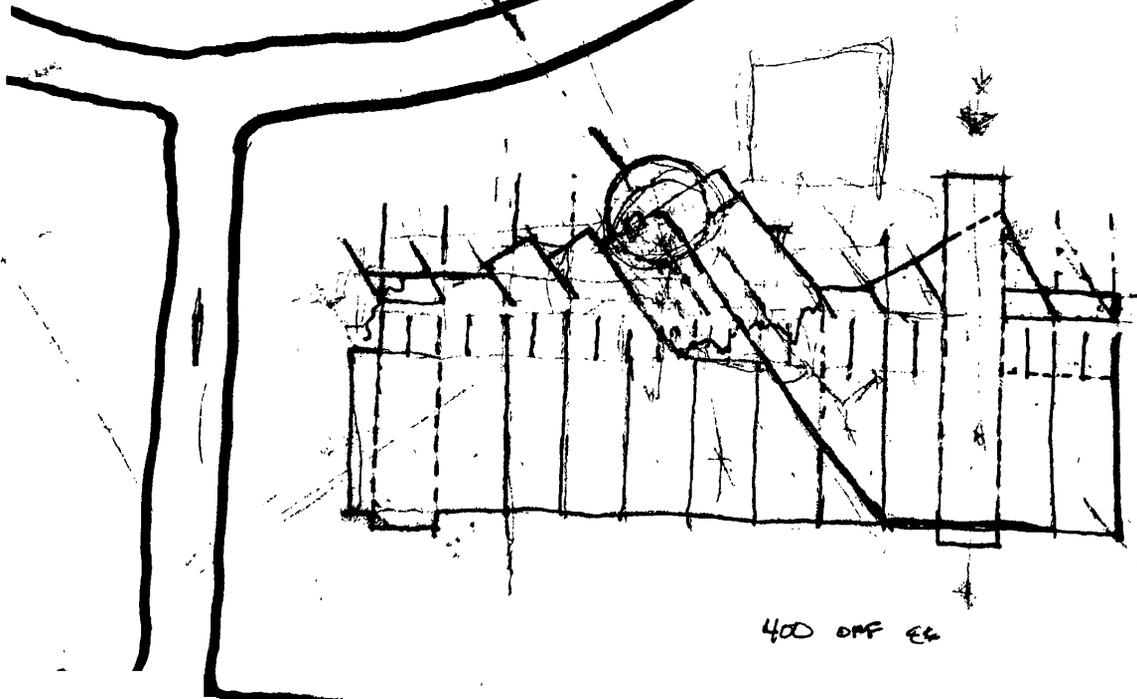
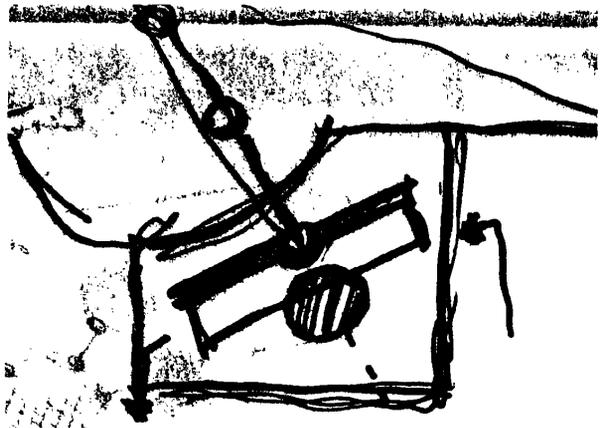


PART 1 SECTION



ELEVATION





400 OFF EG

