

**RESEARCH TASK 07:**

**FINAL RESEARCH REPORT**

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

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## **FINAL RESEARCH REPORT**

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## 01\_STUDIO PROJECT / SITE

### KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

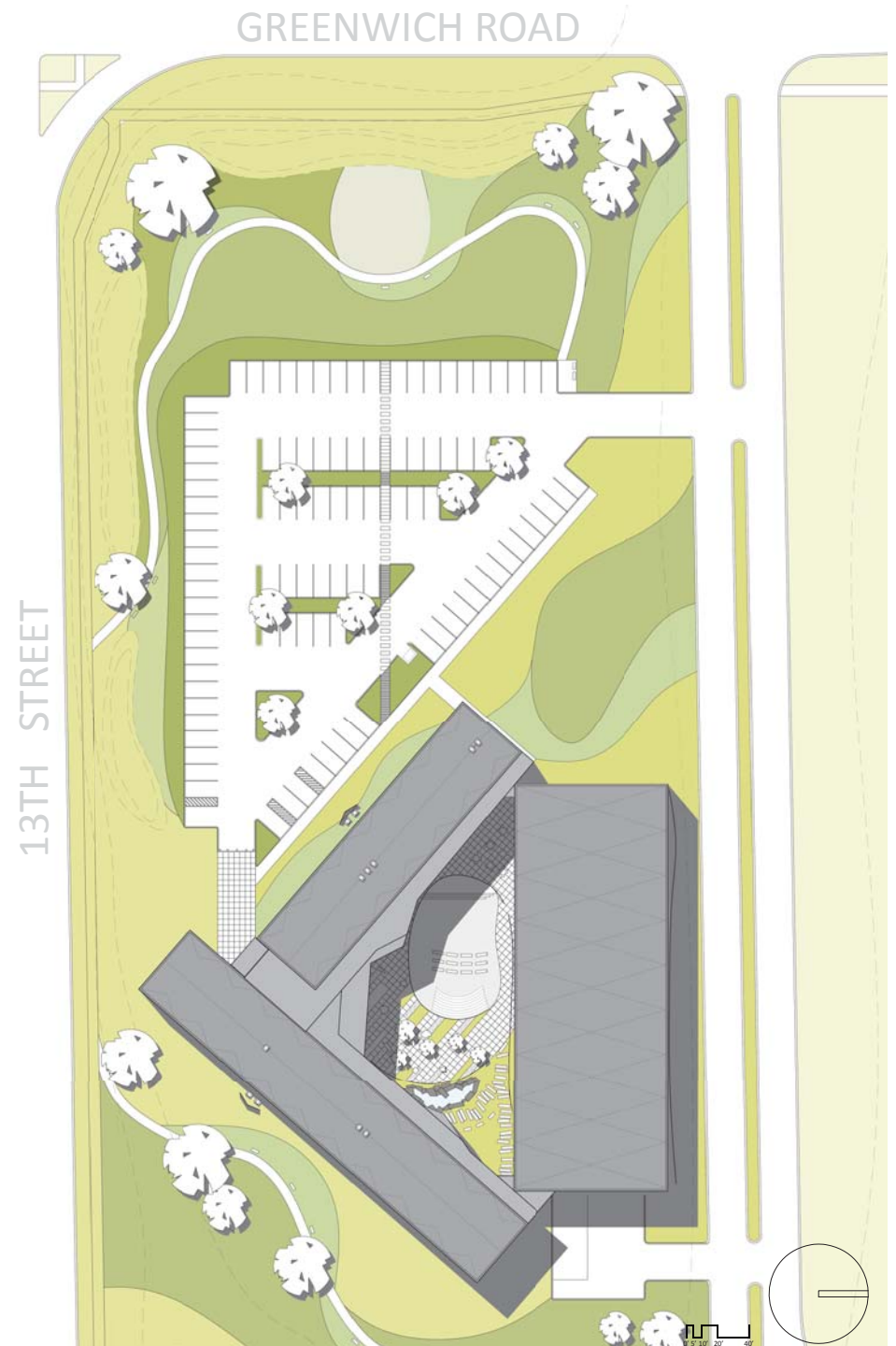
The context of the Energy Center is that of northeastern Wichita on the corner of 13th St. and Greenwich Rd. The site exists in a relatively level field on the northeast corner of the intersection. Close in proximity is Kansas highway 96 and I-35 which acts as the main arterial highway in the area. To the south of the site is the Beech Factory Landing Field which represents part of the major aircraft industry for the greater Wichita area. Also south is a series of commercial and restaurant chains. West of the site is land being used and reserved for office parks.

The context of the Center represents the highest degree of suburban sprawl capable in an area if left unchecked. The office parks, strip mall areas, and neighborhoods in the surrounding context is an adequate representation of what has developed over the past decade in regards to planning and development. With the exception of the Landing Field, the strip mall architecture that has popped up around the area is relatively homogeneous and doesn't adequately represent Wichita's context and region.

The Purpose of this project is to propose a center which can cumulatively house the Kansas Geological Survey (KGS), the Kansas Geological Society (KGSo), and the Kansas Corporation Commission (KCC) all under one roof. Locating these three agencies in one facility is beneficial because it creates a collaborative working environment which provides a unified center for customers.

The building will essentially house the three separate office spaces required by the three agencies, as well as an adjacent warehouse space for the KGS. Each office space will contain workspace for employees, public workspace for customers and filing space for data storage and retrieval. The warehouse will provide a secure and weather protected storage space for rock shavings from well samples, which can be retrieved for research. Included in the building is common space which can be shared and utilized by each agency.

While the center must foster a unified environment for the three agencies, it must also visually and physically separate each agency. This is due to regulatory relationships among the organizations.



## 02 TASK 01 - INTERPRETING THE PLACE TYPE

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL



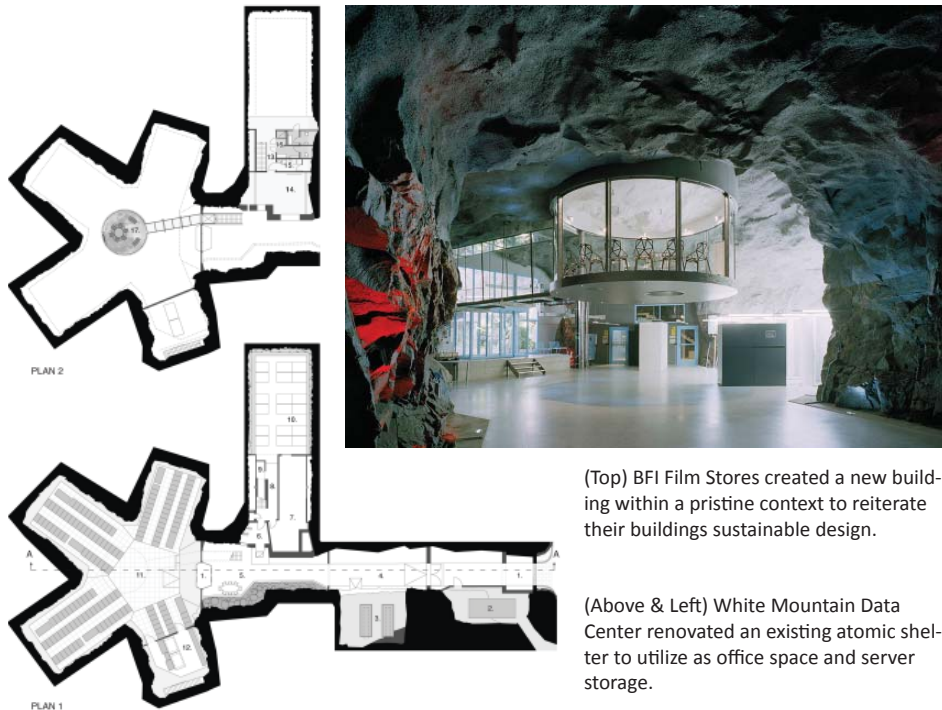
# RESEARCH TASK 01:

## PART B



After examining two precedents of archival and storage facilities, I have come to the conclusion that this place type has defined change and growth within its physical context in two main ways. This place type requires specific environmental needs and constraints depending on what is being stored. One way of meeting these requirements is through the construction of a new facility which has the potential to enliven its surrounding context. Another method is by re-purposing an older structure which meets the specific storage requirements and thus reinvigorating the existing buildings setting.

The first precedent examined is the British Film Institutes (BFI) Acetate and Nitrate Film Stores. In the construction of this facility the BFI decided to consolidate their existing storage locations into one facility instead of renovating an existing building. The building is sited in a wooded area in Warwickshire, England having a relatively rural context. Due to the buildings siting, it doesn't have much of an influence on the urban fabric. However it has the potential to have a detrimental impact on the surrounding physical context due to the facilities intense energy needs. The building utilizes 4 chillers, 4 humidification plants and 12 air handlers to achieve a sub zero storage temperature of -5 degrees Celsius and 35% relative humidity (Cullinan). To counteract these energy needs the building is well insulated and sealed only allowing energy loss of 0.1W/m<sup>2</sup>k and air loss of 0.3m<sup>3</sup>/hr@50pa (Cullinan). The Film Stores also employ a sedum roof, bio-swales to aid in site drainage, and other sustainable construction methods (Meinhold). The incorporation of these sustainable methods has the potential to encourage future developments in the surrounding area to follow suite in building construction and operation. It has also to a degree made up for its development of previously unused land. The BFI Film Stores have become a catalyst for this place type by showing that highly controlled facilities can be achieved in a sustainable manner.



(Top) BFI Film Stores created a new building within a pristine context to reiterate their buildings sustainable design.

(Above & Left) White Mountain Data Center renovated an existing atomic shelter to utilize as office space and server storage.

On the opposite end of the spectrum, when internet provider Bahnhof AB constructed their new data center they re-purposed an old structure for their needs. The White Mountain Data Center, located in Stockholm Sweden, is a re-purposed atomic bomb shelter 30m below the surface (Saieh). Albert France-Lanord Architects took a space that was meant to be a temporary shelter and developed it into habitable space for offices and server halls. Adequate office space was made by creating more space, reinforcing the concrete, and adding systems. Due to subterranean qualities like thermal mass and insulation, the facilities already meet the needs to protect the computer servers. This place type while below grade has added new merit to the idea of renovating an existing space within the context. By identifying the bomb shelter as a facility that already meant much of their needs, Bahnhof avoided significant retrofitting. They took a structure no longer used and reinvigorated it and the context with new meaning and purpose.

# RESEARCH TASK 01:

## PART C



(Above & Right) The use of material and color to showcase the importance of the archives and modern Thai architecture.

(Below & Left) The setting and minimal programmatic design of the facilities.



In previous buildings architects have interpreted the place type of archival and storage facilities as being either open structures which embrace the community and provide usable space, or highly private structures located away from public access and view.

The Royal Archives of Thailand act as a private storage unit for Royal government documents, while also providing usable public meeting space and a library. Architects 49 addressed the design of the building by separating the program into three separate zones; the public, private and secured zones. The expectations of the design are to provide secure storage for government documents while providing a public space. Another expectation was to meet the language of modern Taiwanese architecture. They addressed this by creating an inviting overhang which would “reach forward and receive visitors” (Jett). By introducing large red doors common in Thai palaces, they place an emphasis on the importance of the stored information. Environmental sustainability was also an expectation in the development of the building. This was addressed by orienting the building along the east west axis and thermally insulating the walls to the archive rooms.

LAN Architecture created the EDF archives center with the sole purpose of archiving the company’s industrial records and providing office space. Contextually the building relates to the secure nature of the material being stored by being located in the countryside. The programmatic expectations of the building are to create an appropriate environment for the storage of paper based and microfilm based hardcopies of the companies records. To meet the stringent requirements for the interior environment they started with the massing of the building to minimize the “exchange with its external setting” (Rosenberg). The architects then addressed the minimization of energy consumption by incorporating a double flow ventilation system that recaptures used heat. This reduces the buildings energy consumption to 29kWh/m<sup>2</sup> (Rosenberg).

# RESEARCH TASK 01: PART D



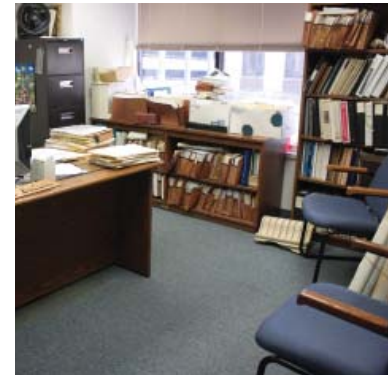
(Above & Above Right) Rock Samples in Processing room and in storage boxes at the Kansas Geological Survey.

(Below & Below Right) The Offices at the Kansas Geological Society with processing, files, and viewing booths.



(Right & Far Right) Offices and hearing room at the Kansas Corporation Commission.

(Below) The site for the project.





## 03 TASK 02 - DEFINING USER NEEDS

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

## RESEARCH TASK 02: PART A: USER GROUP

Our user group of choice is the employees that may eventually inhabit this building. They are made up of three agencies who all work in the same field. These agencies are the client for the project, which is the reason for choosing this user group. We spoke primarily to a single individual in charge of each of office for the informal interview, and we surveyed thirteen employees total from these offices.



### **Kansas Geological Survey**

The Kansas Geological Survey is a state organization founded around the collection of important data on minerals, gases, and geological movement for research purposes. The organization has a location linked with the University of Kansas currently, but could benefit from shared resources with the KGSO and the KCC. On the other hand, an important consideration is that the members of the KGSO could benefit from information known by the KGSU, and create an unfair advantage. This information would need to be kept private and controlled despite the collaboration between the two. The KGSU will also require the largest amount of space of the three for storage.



### **Kansas Geological Society**

The Kansas Geological Society is an organization of Petroleum Geologists and other engineers or scientists who search for natural resources in the state of Kansas. Due to their backing from the oil and gas companies, they would be the primary funding for this building. They will need the second largest storage area, and more office space and other facilities helpful to their research.



### **Kansas Corporation Commission**

The Kansas Corporation Commission is the largest of the three organizations. It generates prices for energy and resources in the state, and has a large number of staff and offices, as well as a hearing room where the Commissioner will make larger decisions between groups.

Five responders were between the ages of 20 and 30. There was one responder for both the 31-40 age group and 41-50 age group. And the largest group was 51 & up with six responders. Six responders were male and seven female. They're job types are varied within the organization.

# RESEARCH TASK 02:

## PART B: SEMI-STRUCTURED INTERVIEW

### **Semi-Structured Interview:**

A semi-structured interview is conducted in-person, with specifically prepared questions asked in a varied order and manner to adapt to the conversation during the interview.

The user group interviewed should be previously familiar with the interview topic, making the discussion easy and comfortable. When conducting the interview, questions should be prepared and practiced in order to naturally include them in the discussion.

### **Our Visit:**

As a studio, we traveled to Wichita to visit the three agencies. During our visit we spoke with employees from each agency, and received a tour of the facilities. We took photographs and asked prepared questions to resolve program issues we were having in our design. Our goal was to discover the needs of each organization. We primarily interviewed Mike Dealy, Rebecca Radford, and Doug Louis, the directors of the three offices.

### **Analysis:**

During our visit, we asked several specific questions about the use of programmed spaces with each agency, specifically, who primarily uses it, the employees or the customers. This information helps to develop adjacencies for easy navigation in the final planned building. For instance, offices are obviously more private, however the energy research room was discovered to be used by employees of the survey only, so it should be located near the survey offices. On the other hand, none of the organizations needed as much security as we thought. From a moral/ethical standpoint, it is important to give the agencies a privacy and separation from one another, but other than certain data files and rock samples, most of the program does not need to be fully locked down.

Another discovery is the importance of some common rooms. The hearing room, for example, is very important. The Kansas Corporation Commission specified that it should be easily accessible from the main customer entrance, and easy to find.

Other adjacencies can be found in the Kansas Corporation Commission with the customer work area near the library and the offices of various work groups near to one another. The Kansas Geological Society also needs a close proximity between the customer work area and library, as well as an area for using both the offices and conference room. The Kansas Geological Survey needs a separation between the offices and the processing room, but an efficient circulation between the drop-off point, processing room, and warehouse.

# RESEARCH TASK 02:

## PART B: INFORMAL INTERVIEW

### **Who are the primary users of your facilities, besides customers, within the building?**

KGS- The primary users are the oil and gas companies who are testing the well samples to determine the location of oil.

KGSo- Users of the Society's offices are mainly from the oil and gas industry who look through the well logs to examine parts of land.

KCC- The main customer use that occurs in the Commission comes from oil and gas execs. However customers also include land owners who may have issues or concerns about the use of their land.

### **Where do they primarily do their research?**

KGS- Some research occurs on site in the energy research room, however most research occurs at separate facilities.

KGSo- The primary locations for customer use are the individual work stations and table seating spread around the front of the log filing cabinets.

KCC- Research only occurs in a customer research room near the library and filing room. However the customers don't have direct access to the files as some are private.

### **How frequently do customers visit? What is their primary reason for visiting?**

KGS- Customers visit anywhere from daily to monthly in frequency and are generally examining well sample cuttings.

KGSo- There are generally five to six customers a day who come to examine the well logs, since not all of the information is located on the Society's website yet.

KCC- Generally 10-15 people visit the Commission per day and it usually is related to the gas and oil industries. However, on monthly hearings, many more people can visit.

### **What spaces are required specifically for customer use?**

KGS- The only spaces set aside for customer usage is the energy research room because tests on the rock samples primarily occur off site.

KGSo- The log file cabinets where well data is stored are needed for customer use as well as the corresponding support tables and research areas.

KCC- There are two main spaces needed for the customer, the hearing room and the research room adjacent to the library.

### **How many people do you have staffed (Full-time, part-time)?**

KGS- There are generally 5-6 people staffed, 3 full-time and 2 part-time.

KGSo- Roughly 10 people are staffed, with 4-5 full-time, and 5-6 part time.

KCC- Around 42 people are staffed, with some employees working mainly in the field. However they are looking to expand.

### **What areas need improved working conditions (better light, ventilation, air conditioning)?**

KGS- The receptionist needs a larger work area near her front desk with ample table space. In the sample processing room a more ordered sense processing 'line' is necessary. They also need a better ventilated area as a significant amount of dust is created. The warehouse space also needs to double in size to allow for future sample archiving.

KGSo- The whole building generally needs natural lighting since it is located in building without windows. The mailing duplication area needs more table work space to handle large documents and individual HVAC controls. They also need room to expand their filing area.

KCC- The open office space needs more access to ambient and natural light. These work spaces also generally need more space. Room for expansion is a main issue as they are currently looking to hire more employees.

**What are your requirements for office space? Is there need for open an individual office layouts?**

KGS- There is only a need for one office combined with a small conference room. The only other open work space needed is for the receptionist.

KGSo- Three individual offices are required as well as a conference room. No open office areas are needed however open work space for customers is.

KCC- A total of 24 individual offices are needed and space for 30 people in an open office work environment. The office spaces need to be congregated around the departments which they work in.

**What existing layouts are important in the design of the new building?**

KGS- The layout and linear flow of the processing room from the drop off area, through the room, and into the warehouse is important.

KGSo- The customer work space needs to be located in close proximity to the files which they access. The mailing duplication room needs a more open and efficient layout as well as to be separated from areas where a quiet work environment is needed.

KCC- The offices and open work space must remain grouped by specific department to allow a cohesive work flow.

**Are there any functions that should be isolated or closed off from the main office space (due to noise, privacy, etc.)?**

KGS- The warehouse needs to be separated because it isn't generally a heated and conditioned space. Also the processing room needs to be separated from the offices as it creates a messy environment.

KGSo- The duplication and mailing center needs to be isolated due to the noise the machinery creates.

KCC- Individual work spaces for the legal and licensing departments need to have their own offices as sensitive material is often the topic of discussion. The filing library must be cordoned off from customers as they don't have access to all of the files and must request access to a certain file.

**Are there specific functions that need to be located near each other? That can be split up?**

KGS- The office and conference room need to be located close together. The processing room needs to have easy access to the warehouse storage for archiving samples.

KGSo- Offices need to be located near the conference room. The individual work space and table seating for customers must be near the files.

KCC- Offices for each particular departments must be located near each other. The customer work space needs to be located near the library. Near the entry, the hearing room should be located for easy customer access.

**What are your primary storage needs within the agency? What specific requirements do you need for storage?**

KGS- Small shelves are needed to store maps and other documents for sale. The primary storage requirements center around the warehouse storage which must have 25 ft. high clearance for storage racks containing well samples.

KGSo- Filing storage is needed for well logs and other data these can be stored in filing cabinets. Also necessary is 10ft. high rack storage for other archived documents and files.

KCC- Secure storage is needed for office supplies. Filing storage is needed for the data held in the library.

**Are there any special security measures needed for storage of information?**

KGS- No immediate security requirements.

KGSo- No immediate security requirements because all data is technically public knowledge.

KCC- Minimal security needed to for storing the documents in the library as not all the information is available to the public.

# RESEARCH TASK 02:

## PART C: SURVEY

### **Survey:**

A survey is conducted in order to evaluate a group of people anonymously through prepared questions. This is not done in person, but might involve handing someone questions to answer, or it might involve an online questionnaire or through a letter or email. It is often helpful in an anonymous survey to ask demographic questions, such as age, gender, and education.

The questions should be clear and concise, with a specific goal in mind. Questions without a goal should be eliminated for the sake of time for both the surveyor and the surveyed. Open-ended questions are a potential tool to receive opinions and qualitative or quantitative responses from responders. Close-ended questions are an effective too for comparing quantitative results, especially with a large number of questions and a need for quick comparisons.

The survey should also explain the purpose of the study and provide general information to the reader. Our introduction to the survey is included below:

The following survey was developed to determine your attitude toward your current work environment. We hope that the findings from this survey will help us to interpret your needs and translate them into a better prospective design for the new Kansas Energy Center. Please think carefully about the following questions. Also, please do not discuss your survey answers with anyone else who may be taking this survey until after it is complete, just to ensure original results. We would like the survey completed by March 1st at the latest. All responses and personal information will be kept confidential. Thank you for participating in this survey and contributing to the future design of the Center.

Sincerely,

Melanie Arthur, Mohammad Ataei, Mahsa Faghan, Sarah Long, Ian McLaughlin, and Jeremy Nelson

### **Analysis:**

Unfortunately, while we have varied responses from the Survey and Society, we only received one response from the largest organization, the KCC. We may have been able to receive more had we given them a longer time or communicated with them better about why this survey is helpful to us and their new office.

From the responses we received, however, there are certainly some similarities and differences that can be recognized. Similarities we found were that most responders use a computer during a large portion of the day, and work at a desk/table.

Also, differing from our impression when visiting the agencies, in the survey, most responders thought they interacted with 10 or more visitors per week, meaning that the building will have a higher volume of visitors than we originally expected.

Responses varied when it comes to preferences on lighting and noise, however privacy was a priority in offices, and most preferred to have some aspect of daylight. The society particularly desired daylit rooms, comparing them to the office they are in currently.

The open-ended questions will help with more specific design decisions, and several of the responders gave helpful in-depth answers about their current conditions and ideal or negative work environments. It will also be helpful to compare ideal work environments with the use of computers or the type of work the responders do.

# RESEARCH TASK 02:

## PART B: SURVEY

### Demographics

Which agency do you work for?	What is your age?	What is your gender?
Kansas Geological Survey	31-40	Female
Kansas Geological Survey	51 & Up	Male
Kansas Geological Survey	51 & Up	Male
Kansas Geological Survey	20-30	Male
Kansas Geological Survey	20-30	Female
Kansas Geological Survey	20-30	Male
Kansas Geological Survey	51 & Up	Female
Kansas Geological Survey	51 & Up	Female

### Multiple Choice

What is the length of your employment?	When do you begin your work day?	Approximately how many hours per day do you spend working on a computer?	When do you end your work day?	Where do you spend most of your time in your current work place?	How many visitors do you interact with in your agency each week?	Where do visitors go in your office?
1-4 years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Public Area (Like Break Area)
5-9 years	5AM-8AM	2-5 hours	4PM-Evening	Working at Desk/Table	3-10 visitors	Personal Office
10 or more years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Public Area (Like Break Area)
0-1 years	5AM-8AM	30+ minutes - 2 hours	4PM-Evening	Sample processing table	Less than 2	Public Area (Like Break Area)
1-4 years	5AM-8AM	2-5 hours	4PM-Evening	Working at Desk/Table	Less than 2	Public Area (Like Break Area)
0-1 years	5AM-8AM	2-5 hours	4PM-Evening	Working at Desk/Table	Less than 2	Conference Area
10 or more years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Personal Office
5-9 years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Conference Area

### How often do you use the following items in your personal work space?

Computer	Filing Cabinet	Printer/Scanner	Recycling Bin	Lamp	Writing Utensil	Telephone
All Day	Once per Day	Multiple times per Day	Once per Day	Never	All Day	All Day
All Day	Less than once per Day	Multiple times per Day	Multiple times per Day	Never	Multiple times per Day	Multiple times per Day
All Day	Multiple times per Day	Multiple times per Day	Multiple times per Day	All Day	All Day	Multiple times per Day
Multiple times per Day	Less than once per Day	Less than once per Day	Once per Day	Never	Multiple times per Day	Never
Multiple times per Day	Never	Multiple times per Day	Once per Day	Never	All Day	Less than once per Day
Multiple times per Day	Multiple times per Day	Multiple times per Day	Once per Day	Never	All Day	Less than once per Day
All Day	Multiple times per Day	All Day	All Day	Never	Multiple times per Day	Multiple times per Day
All Day	All Day	Multiple times per Day	All Day	All Day	All Day	All Day

Kansas Geological Society	51 & Up	Female
Kansas Geological Society	41-50	Female
Kansas Geological Society	20-30	Female
Kansas Geological Society	20-30	Male

10 or more years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Personal Office
5-9 years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Public Area (Like Break Area)
1-4 years	5AM-8AM	2-5 hours	4PM-Evening	Working at Desk/Table	3-10 visitors	Public Area (Like Break Area)
0-1 years	5AM-8AM	5 or more hours	4PM-Evening	Working at Desk/Table	10 or more	Personal Office

Multiple times per Day	Multiple times per Day	Less than once per Day	Less than once per Day	Never	Multiple times per Day	Multiple times per Day
All Day	Multiple times per Day	Multiple times per Day	Multiple times per Day	Never	All Day	Multiple times per Day
All Day	Multiple times per Day	Multiple times per Day	Multiple times per Day	Never	All Day	Multiple times per Day
All Day	All Day	Multiple times per Day	Multiple times per Day	Never	All Day	Multiple times per Day

Kansas Corporation Commission	51 & Up	Male
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10 or more years	5AM-8AM	2-5 hours	4PM-Evening	Working at Desk/Table	3-10 visitors	Personal Office
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Multiple times per Day	Less than once per Day	Never	Once per Day	Never	Multiple times per Day	Multiple times per Day
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How Important are the following items in your ideal working environment?

Natural Light (Window Light, Sky Light)	Task Lighting (Lamp)	Bright Overhead Lighting	Ability to rearrange your workspace	Privacy (Door that can be closed)	Quiet	Individual Temperature Control	Operable Windows	Easy Maintenance and Cleaning	Ergonomic Furnishing	Decorative Furnishing
Important	Not at all Important	Important	Important	Neutral	Neutral	Very Important	Important	Neutral	Very Important	Slight Importance
Neutral	Neutral	Important	Important	Important	Important	Important	Neutral	Important	Important	Important
Important	Very Important	Very Important	Important	Very Important	Very Important	Very Important	Very Important	Important	Very Important	Important
Slight Importance	Very Important	Very Important	Important	Important	Not at all Important	Slight Importance	Important	Important	Neutral	Not at all Important
Important	Neutral	Important	Slight Importance	Not at all Important	Neutral	Important	Important	Important	Neutral	Neutral
Very Important	Neutral	Very Important	Important	Neutral	Neutral	Important	Very Important	Important	Neutral	Not at all Important
Very Important	Not at all Important	Important	Neutral	Important	Important	Very Important	Important	Important	Neutral	Neutral
Very Important	Neutral	Important	Neutral	Important	Neutral	Neutral	Very Important	Neutral	Very Important	Not at all Important

Very Important	Neutral	Important	Neutral	Very Important	Important	Important	Neutral	Important	Important	Important
Very Important	Neutral	Very Important	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Important	Neutral
Neutral	Neutral	Very Important	Very Important	Not at all Important	Slight Importance	Slight Importance	Neutral	Very Important	Neutral	Not at all Important
Very Important	Important	Neutral	Very Important	Neutral	Very Important	Neutral	Very Important	Very Important	Important	Neutral

Important	Not at all Important	Slight Importance	Slight Importance	Important	Neutral	Slight Importance	Not at all Important	Important	Important	Slight Importance
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**Long Answer**

Briefly list your primary duties within your agency in a typical full day.	What about your current working environment would you most like to change?	What is most indispensable to your work environment?
I work a lot with Excel spreadsheets, Word and PDF documents, email, and Internet. Print/Copy/Scan Answer phone Greet visitors	There is no temperature control so it's freezing in the winter and baking in the summer. The building is so small, there is no privacy for phone calls or anything else because everyone can hear everything from every room. The windows are dirty inside and can't be cleaned - also wish they could be opened.	Large desk with plenty of space for spreading out papers. Comfortable, ergonomic chair - which I do not have now and I definitely feel it every day.
Administrative, management, presentations, planning, meetings	poor room and building temperature control, building has very poor insulation and ventilation.	workstation, internet, access to off-site databases via internet, phone, small conference area
Archiving records and samples and making them available to the public, handling public inquiries.	better lighting, better ventilation, bigger work space, dust control in some areas, better loading and unloading options where palletized inventory can be handled with mechanized equipment, more storage space, and bigger and better public service areas.	computers, internet access, good working tables/desks, good lighting, lots of storage space, good public service areas.
Processing rotary well samples, Performing maintenance on damaged boxes that have been filed previously, entering data into database	Maybe just one or two more windows, we only have one in the processing area.	Conveyer belt processing table/air ventilation system.
Enter processed samples into online KGS database-includes printing. Intake and process rotary samples. Shelve library boxes in warehouse. Maintain and review confidentiality of samples. Perform maintenance on library boxes and samples-includes printing. Check in and out boxes-includes printing. Perform daily, weekly, monthly, quarterly, and annual maintenance of facility and vehicle. Occasionally call operators for questions about well samples	More natural light. Better ventilation. Better heating/cooling. More room for drying and processing samples. More room for an extra computer for printing labels.	Ventilation. Plenty of space to process samples. Radio.
I process oil well rotary samples in conjunction with KGS guidelines and procedures. I also perform maintenance on existing rotary samples in order to improve the overall quality of the sample and maintain accuracy of the data. Facility maintenance, which mainly consists of cleaning, is performed on a daily routine. Other tasks include the use of multiple printers, oil well card catalog system, and routine updates to the online database.	I would primarily change the overall quality of the ventilation system within the processing room. This area is very dirty and prone to relatively large amounts of airborne dust particles. I would also increase the overall amount of natural light. A larger area to process oil rotary samples would be a positive addition too.	Work tables, storage, ventilation, printers, adequate lighting, writing utensils, access to drinkable water
Budget review and preparation, reconciling, personnel matters	Office is located near a public area, sometimes it's too loud.	Natural light and lots of storage of files.
supervising employees, answering phone, answering email, assisting co-workers and walk-in patrons, researching well data, entering data, scanning documents, designing web info.	better air circulation, noisy heat pumps in ceiling, one thermostat controlling our space is in a neighboring office down the hall. could use more storage space and more file space in my personal office	Good lighting and ergonomic work environment. 3 of 5 of our shared work stations are walk up height, allowing people to alternate standing and sitting. (We have task oriented workstations and share them). We have several lateral files that are walk up height (3 drawers) arranged back to back that provide excellent work space: one can spread out maps and files.... Others come in to use those spaces regularly.
Managing overall operations. Interacting with members on the phone. providing phone support for digital, on-line library. Scheduling meetings Some schmoozing to donors	We have no natural light - this is very depressing We have bad ventilation and very little temperature control We need humidity control also	Temperature and humidity control Also need lots of storage space for incoming donations to be processed
Entering data, working on the computer in multiple different programs & reasons. Answering phone, processing orders. & interacting with customers via email, face to face & over the phone.	Natural light, horrible unhealthy work conditions. i.e. poor desk / chair arrange continually gives me sore, cramped muscles that I then have to go to Dr for & miss work that I don't get paid for. I have been told by many people that are allergic to mold that they have a terrible reaction in my office. Probably under the carpet as water has leaked under the wall many, many, many, many times.	Computer with internet access as our data base is internet based. Which includes easy access to the machines / printers / scanners I use daily.
Data entry, scanning, printing and copying log/maps for customers	More natural lighting would be nice	We have a lot of static electricity. We are constantly being shocked
Putting files away (such as logs, plotted geos, ACO1s, DSTs, completion cards, and etc.) into the respective cabinets throughout the library. Entering and finding files in our computer database in order to expand and keep the library organized. Copying and scanning files for customers. Handling donations given to us randomly throughout the month, sometimes can be very large and needs use of dollies. I am always running through the files and going back to the computer.	Too cold in some spots and too hot in others. We also need a parking lot so that the members of the library won't have to strain themselves to find a parking spot and feed the meter.	We need plenty of storage. Including the Foundation's material; the basement of our current building is where we keep information that isn't used frequently and hundreds of boxes containing information that we have yet to properly deal with. As much storage as possible would be ideal. Currently we use an easy to access route to the large storage area in the basement and it suits our needs well since the information is not quite ready. We also make frequent use of a counter that our customers use to fill out information for us, the copies and scanners. We also use three other counters for our use only for misc needs, receiving boxes of information and putting orders together.
Personnel work, budget preparation, purchasing, supervisory, staff meetings, planning.	Would like to be separated from SRS.	Door on office for privacy when dealing with personnel issues. Having PC nearby without it taking over whole work area.

Describe conditions that would create an ideal working environment.	Describe conditions that would create a negative working environment.
Individual temperature control, comfortable workstation, natural light through large, operable windows, and a break room. We don't have any sort of break room now so we spend a lot of time in our cars just to "get away."	Noise that would prevent me from hearing callers or visitors clearly. Having no sense of privacy (even though I'm in a public work area, the arrangement allows for zero privacy so I feel like I'm "on camera" all day) A continued lack of temperature control (the building is poorly insulated and the supervisor will not allow me to run a space heater because of the energy cost, even though KU policy allows it)
good lighting, adequate workspace, effective temperature control, use of natural ventilation, low office noise.	poor temperature control, limited work space, poor customer traffic flow in office, the use of dull office color and institutional architecture.
good comfortable personal work space with good computers and internet access; good lighting (natural and man-made); adequate, comfortable, and well-equipped public service areas; lots of readily accessible storage space, and ability to easily process, move, store, and retrieve archived records and samples; ability to easily receive, move, and process incoming and outgoing records and samples; ability to quickly and easily provide records and samples for public access.	Noise, crowding, inadequate storage and work space, inadequate public service areas, inadequate lighting, inadequate accessibility and ability to move and process records and samples.
A couple more windows with an extra workstation that has a label printer. Also, a better radio.	A non-ventilated area without air conditioning and sufficient table space for processing samples.
Good lighting. more windows. At least a 40' long conveyor belt or work table, preferably longer or multiple tables. More storage space for samples waiting to be processed. Plenty of storage space for library boxes and supplies. More room for drying tables for wet samples.	Bad ventilation, bad lighting, no heat/ac, no room to work on samples.
An ideal working environment would consist of ample amounts of natural lighting, a proper ventilation system, access to climate control settings, proper work space, and the adequate amount of computers for all employees.	Negative working environments would consist of no access to climate controls, limited natural lighting, excessive amounts of dirt, etc.
Space that is more modern and upgraded.	More noise, no window, lots of interruptions.
Windows, that open. Control over thermostat. Potential for privacy while also being close to co-workers, some personal space.	Inability to get fresh air, poor lighting, not enough personal filing space. not enough space to store personal items (purse, backpack or portfolio)
Lots of open space for file cabinets and individual work areas for members. Natural light and temp. and humidity control to help preserve paper documents . Also, it is important for us as a staff to be able to see around the library as we have to have a way to control people coming and going as it is a membership only environment.	Noise for sure. No windows!
Real light some where close that at least on an hourly or so basis could be visible is essential to good mental health. Safe healthy ergonomic work area. Including personal work space areas that have proper electrical outlets for required equipment used on a daily basis. Better visual & or some better form of communication for required personal to cover customer access areas. i.e. able to easily see & in one way or the other control unwanted people coming in and / or to know when someone is at the front desk needing help.	Expectations to complete your job with inadequate conditions / machinery / software.
For me the ideal work environment would have lots of windows. I would also love to have a break room with a door so when we are on break we are out of sight	Loud noises are a problem. especially when trying to help a customer on the phone. Temperature control can also cause tension in the work place no one wants to be to cold or to hot!
natural lighting would be great, there are no windows in the library. Flexibility to move the office furnishings around. Easy to use coffee machine, I would like one that can make individual cup and pots of coffee as sometimes i just want one cup and not a pot. We need a parking lot as well. the members have to park their vehicles in the street and keep feeding the meters.	Noise, my workplace is a library. The members should never be bothered. An inaccessible door that cannot handle dollies. Stairs. Bad internet and phone connectivity (current issue).
Currently the offices have little versitility in set up. due to only one set of phone data jacks, can realy only be set up one way. I personally don't have a problem with this, but I know that it is limiting for others, particularly new employees of someone new to a particular area.	Noise, unrealeable or unstable climate control. Public wandering in areas they are not supposed allowed.

## 04 TASK 03 - DEFINING PLACE TYPOLOGY

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

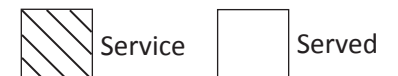
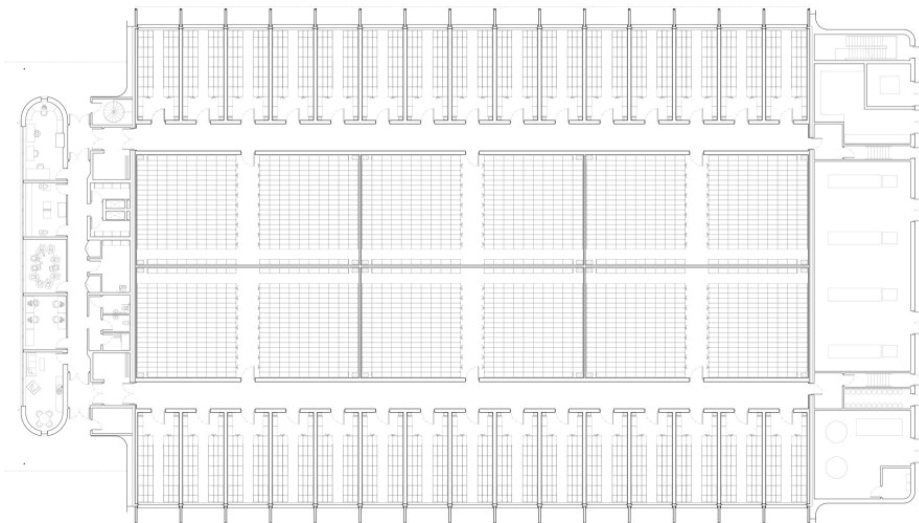
# RESEARCH TASK 03:

## BFI Acetate & Nitrate Film Stores



The first building being analyzed is the British Film Institutes (BFI) Acetate and Nitrate Film Stores located in Warwickshire, England. The stores archive various types of films in highly controlled, sub zero, storage facilities.

The building contains the core attributes associated with this typology of a small office and administration space, with corresponding storage rooms for the film. The unique storage conditions necessary to maintain the film make up the peripheral attributes. The films must be contained in a sub-zero temperature facility and therefore require mechanical systems which make up a large portion of the program. In plan these mechanical 'service' spaces sandwich the archive or 'served' space between the offices and other 'served' program.



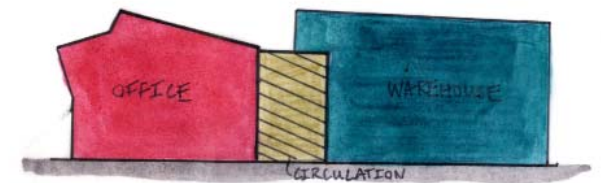
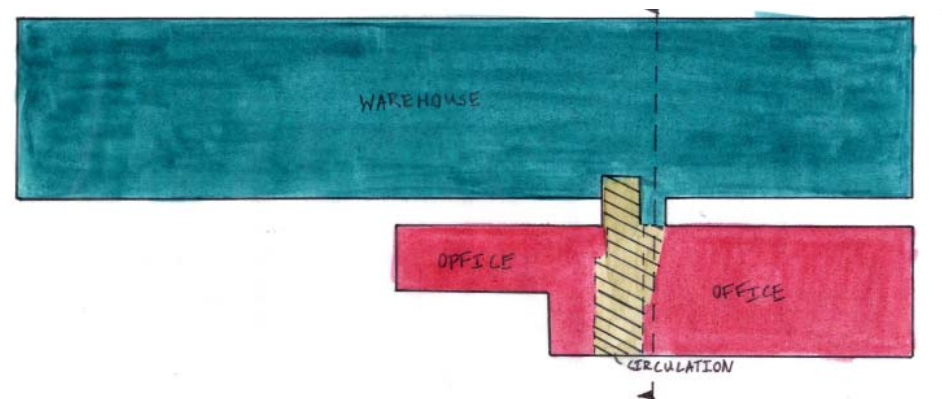
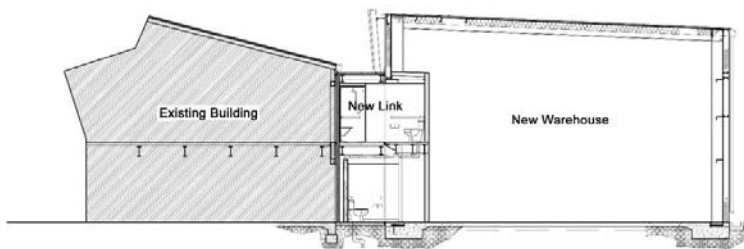
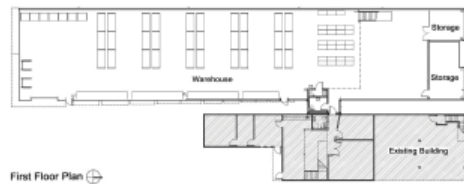
# RESEARCH TASK 03:

## Chapparral Electric Warehouse



The Chapparral Electric Warehouse is set in Albuquerque's historic Sawmill District which houses primarily industrial and manufacturing buildings. The main design intention of the building was to challenge the constructs of what a warehouse looks like and can be.

The building contains the basic core attributes of an archives center with an existing office building on the east, connected to a warehouse on the west. Opportunities for peripheral program occurs because both the offices and corresponding warehouse are two story structures. Unique peripheral program occurs in a conference space located above the warehouse. This is different than the typical layout of the typology because the office and administration attributes start to bleed in the storage space.

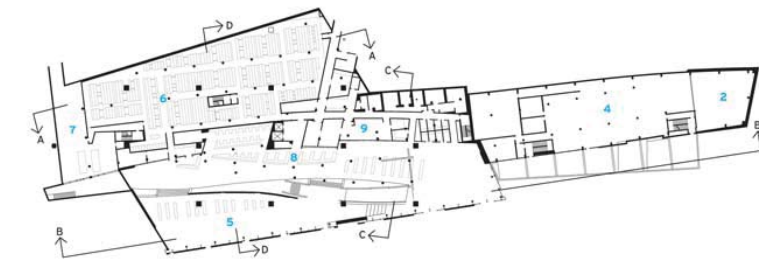


# RESEARCH TASK 03: Galacia Archive & Library (Center of Culture)



The Galician Archive and Library are part of a larger complex of buildings known as the Center of Culture in Santiago de Compostela, Spain. The complex contains a variety of functions including a performing arts center, museum, art center, and the archives. The Archives and library contain open stacks, a rare book archive and reading room.

While this building contains the core attributes of an archives/library, it is lacking the coinciding office space. The secondary space to the archives in this iteration are the reading rooms which are necessary for utilizing the archived material. The main peripheral activities are centered around the building's unique shape and purpose. The building organizes its program in strips with the reading room on the south, then the reference archives and then the archive stacks. This organization seems completely unrelated to the circulation, which enters on the North and then branches out through the middle of the different program.



ARCHIVE PLAN - LEVEL ONE

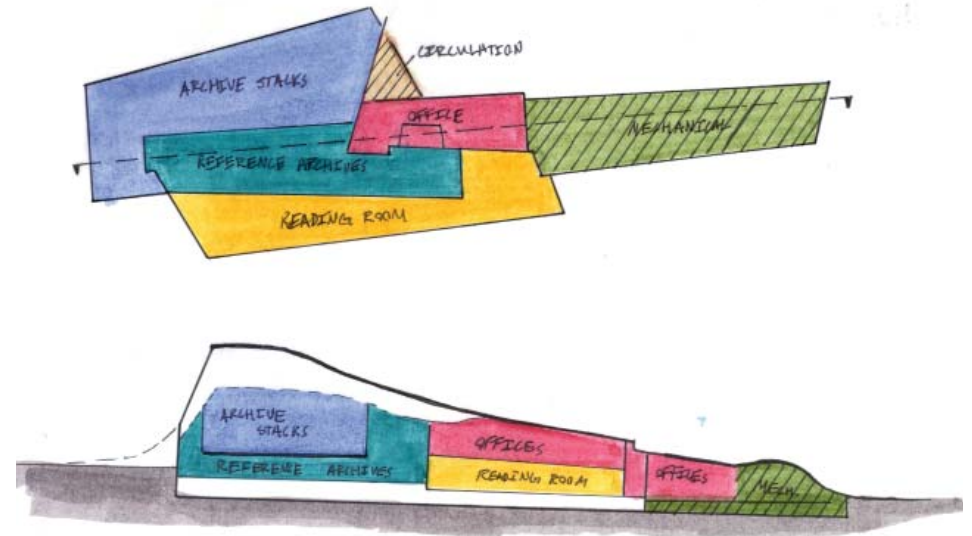
0 30 FT.  
9 M.

- |                           |                         |
|---------------------------|-------------------------|
| 1 CITY OF CULTURE EXHIBIT | 7 MECHANICAL            |
| 2 OPEN TO BELOW           | 8 REFERENCE ARCHIVISTS  |
| 3 ARCHIVE EXHIBITION      | 9 GENERAL CATALOGING    |
| 4 CENTRAL COOLING         | 10 SCHOLARS CENTER      |
| 5 READING ROOM            | 11 ARCHIVE EXHIBIT      |
| 6 ARCHIVE STACKS          | 12 CITY OF CULTURE SHOP |



LIBRARY SECTION A-A

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15 M.



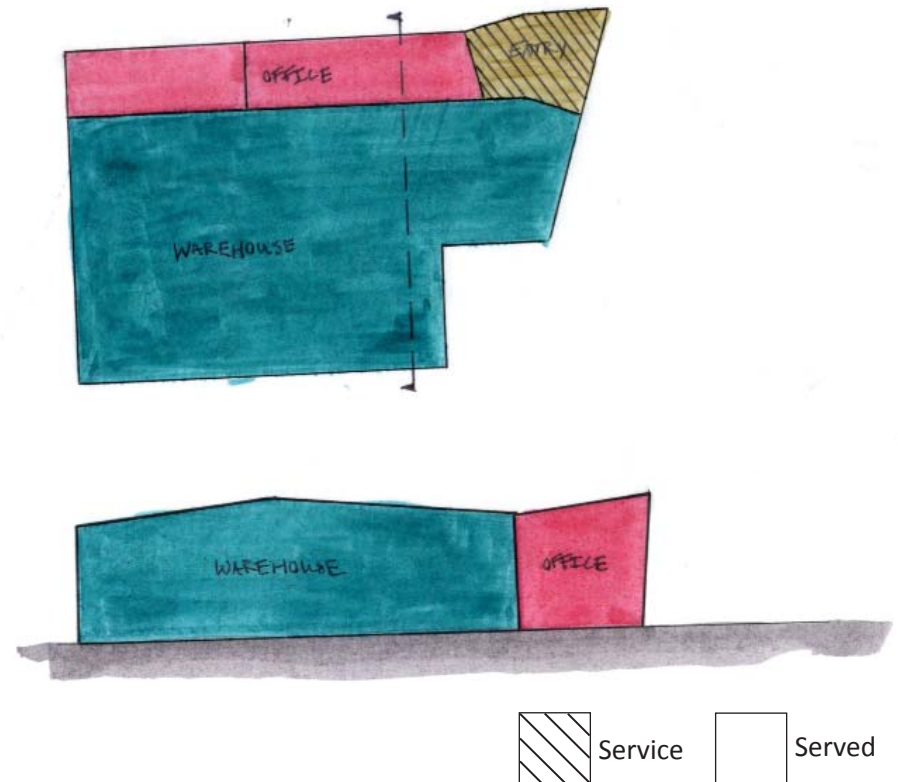
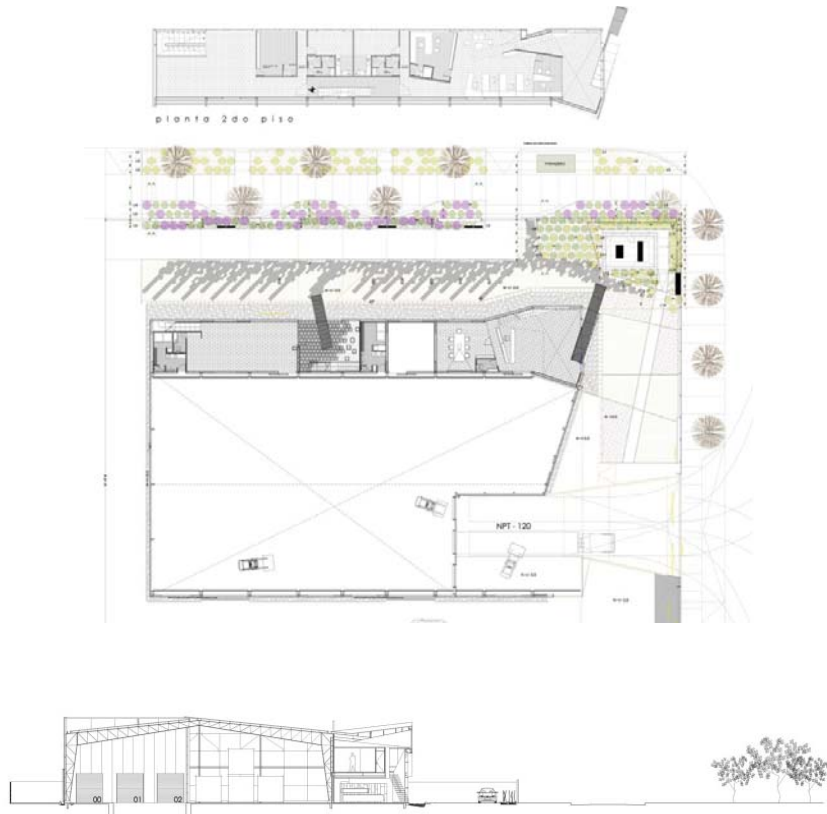
# RESEARCH TASK 03:

## Huanacu Warehouse & Office



The Huanacu Warehouses and Offices were created for a supplier company in the industrial area of Santiago, Chile. The main purpose of the building was to create a warehouse to store and display the products the company is supplying at the time.

Functioning as both a warehouse and administrative office, the building contains the core attributes seen within this typology. On the north of the building is the office block through which you enter. The warehouse is adjacent to the offices making up the south of the building. The peripheral qualities lie not in the layout of the building but in its form work and are evident in sectional images. In an attempt to challenge the image of a warehouse, the architects folded the roof plain and exterior walls to create an undulating form.

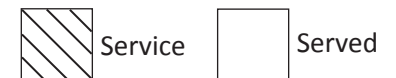
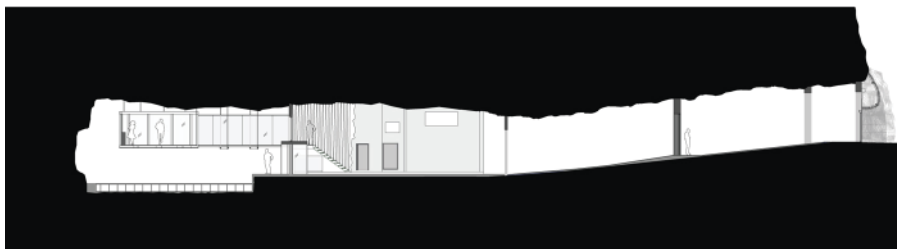
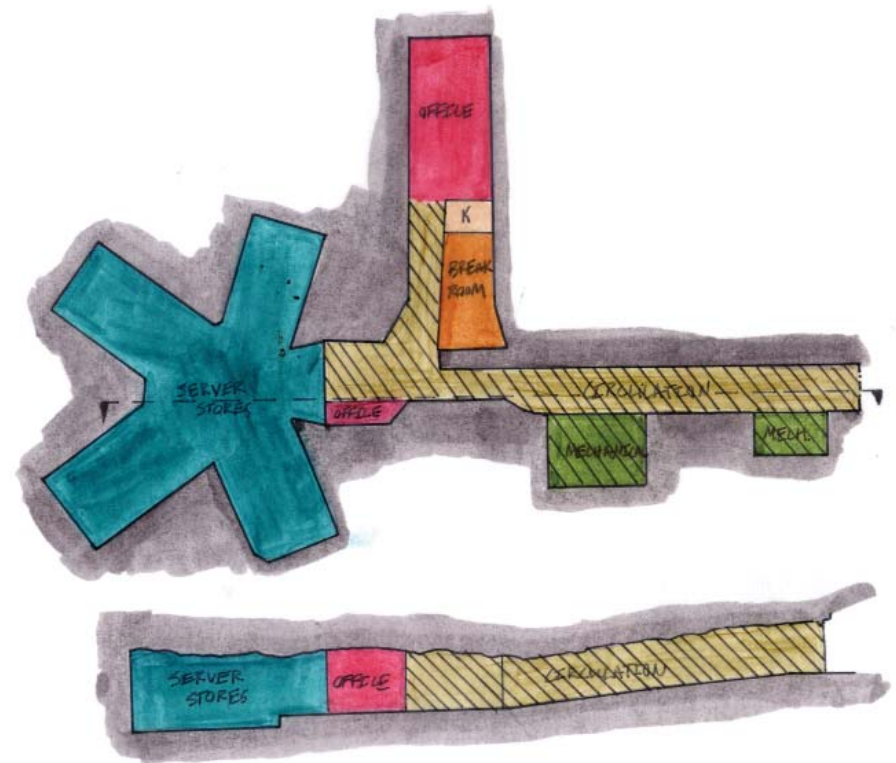
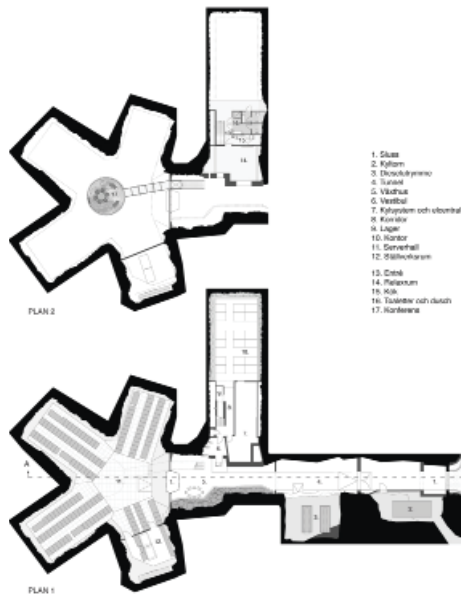


# RESEARCH TASK 03: White Mountain Data Center



Functioning out of a refurbished bomb shelter, the White Mountain Data center is located thirty meters below Stockholm. The space primarily contains servers that store and hold the data. Also included in the buildings design are office spaces and a conference room for the company.

Programmatically the Center contains all the core attributes expected in a archive and storage facility; large open space for storage, office, and administration. However, due to the specific use of space to store non-physical items and it's context, the programmatic diagram is quite different. The basic structure of the core attributes is a long corridor ending in the storage space with offices and other services off the side. The storage space, which houses the servers, spreads out from a central location within the facility. This space holds the key peripheral program within the building, a centrally located and suspended conference room looking out onto the servers.



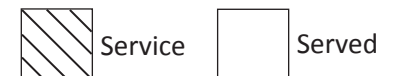
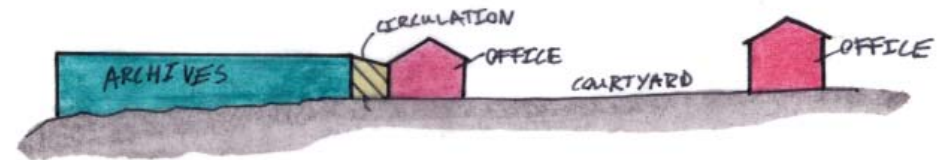
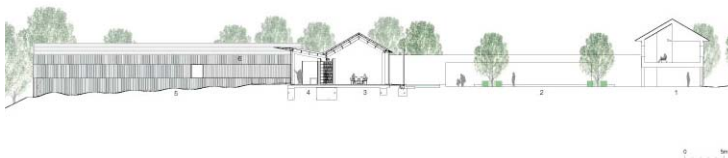
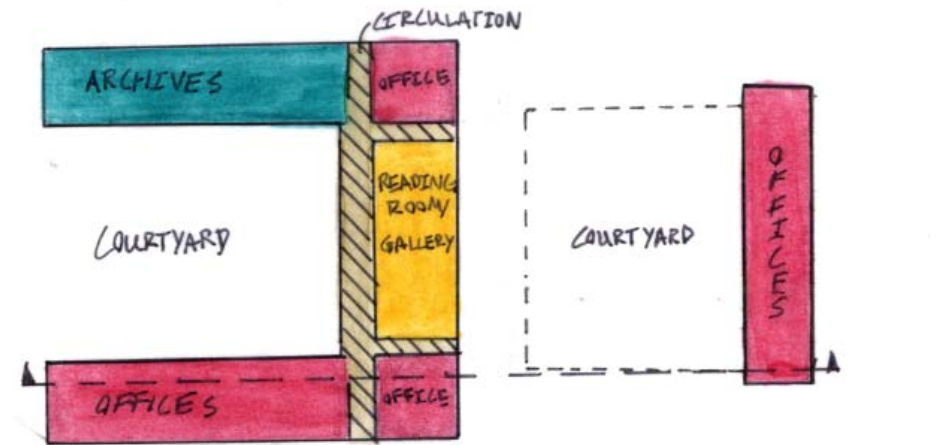
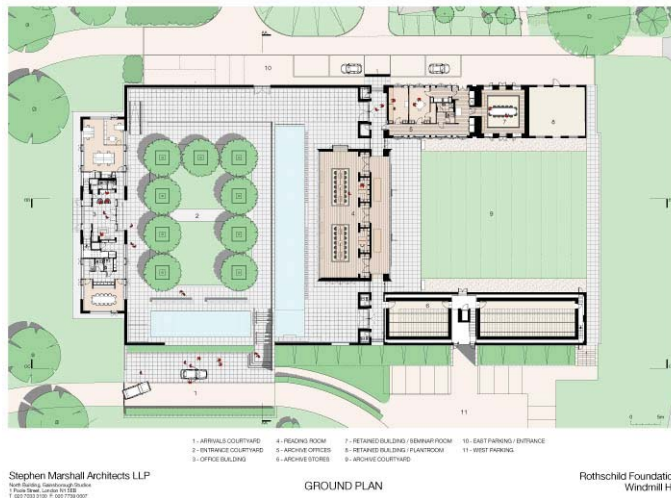


# RESEARCH TASK 03: Windmill Hill



Windmill Hill is a complex of buildings centered around an old manor in Buckinghamshire, United Kingdom. The purpose of the facility is to house the Rothschild Foundation and their corresponding philanthropic work. The building contains offices, a reading room, gallery, and archive space.

The facility contains the typical core attributes of office space and archival space, but because of its scale and use the archival area is significantly reduced in size. Due to the facility's unique layout as a series of connected buildings, it has a different diagrammatic configuration in plan. It appears as a series of linked functions around two main courtyards. The peripheral spaces which make the program of this building unique are the reading room and gallery which are centrally located between the offices. These spaces act as a linking volume between the office and archives in the main building.



# RESEARCH TASK 03:

## Final Analysis

The primary core attributes which arose out of our analysis were the large space generally used to archive and/or store materials, and the office/administration area used to house the company's work force. Depending on what was being stored the archive space was generally an expansive, wall-free, double height space, with some sort of storage system arranged in rows. The office spaces were generally arranged in a strip along a side of the storage, with conference areas and other functions mixed in.

The peripheral attributes changed along with the function and setting of a building. They were generally highlighted features in the design. Examples of peripheral spaces in the analyzed works are; courtyards with buildings around the perimeter suspended and raised conference rooms which look over the archives, and mechanical rooms which maintain strict environments for the archival areas. Many buildings also used aesthetic design as a key peripheral characteristic to set them apart from the general typology.

One consistent pattern emerged out of the combination of these two very different core attributes. This pattern consists of a large archival space fronted by offices. This configuration emerged out of conservation of space and logical design. By locating the offices at the front of the building people generally moved through this space to get to the archives. This acts as a control/buffer point to protect possible sensitive material. Another reason for arranging the program in this manner is it gives the building a definitive front and back. Service space is hidden at the back of the building which may be unsightly while offices are given the best views and environment at the front. Generally these spaces were double story as a means to consolidate offices and to provide adequate storage space and movement for machinery. This double height storage space contributes to the general scale associated with an archives building.

However, because of this configurational patterns simplicity, alterations can be easily made to fit the context and purpose. Scale was a key factor in variations of this typology. Depending on the size and quantity of the items stored, the building could be considerably smaller than what one would think of a traditional storage facility. Context was another key factor in variations of this pattern. Some facilities had to repurpose a context not initially intended for archival buildings. This forced interesting variations in size and shape of the pattern. Whether a precedent looked to conform to its context or break away from it had a great impact on the programmatic layout.

**05 TASK 04 - SUSTAINABLE DESIGN PRINCIPLES**

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

# RESEARCH TASK 04:

## 02 / Urban Agriculture

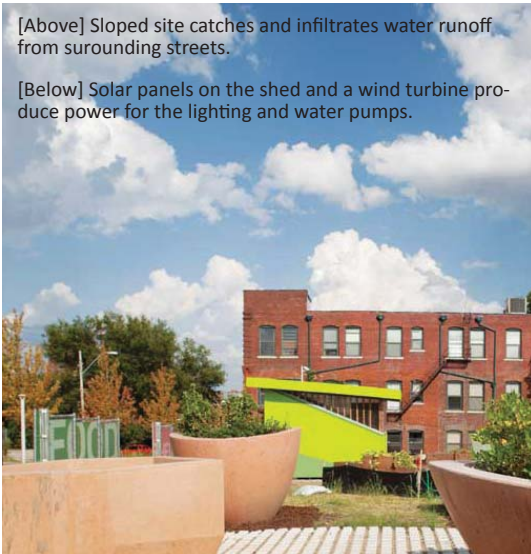


Urban agriculture is defined by the Living Building Challenge as the integration of “opportunities for agriculture appropriate to the scale and density of the project” (McLennan). To determine this, the LBC focuses on the ratio of the building floor area to the size of the site. The smaller the floor area of the proposed building on the site, the greater the amount of land which must be used as agriculture. This method is good for designating land and resources and encouraging self-sufficiency of the buildings tenants. It also provides opportunities for encouraging the occupants to maintain the land and in doing so create a sense of community pride in the place. The LBC provides loose interpretation of where the building and agriculture can occur, allowing for creative solutions to urban development.

While the Challenge focuses mainly on dense urban areas, urban agriculture can increasingly be incorporated into “peri-urban” sites or sprawling and suburban sites (RUAF). The inclusion of agricultural purpose into the site of a suburban building can help to justify the amount of land required by the project. Urban agriculture doesn’t simply have to be confined to food production; it can also include non-food products that are generally “more specialized than rural enterprises... [where] exchanges are taking place across production units” (RUAF). A specific agriculture can arise out of the characteristics of an urban area and create a more specialized land usage and product.

[Above] Sloped site catches and infiltrates water runoff from surrounding streets.

[Below] Solar panels on the shed and a wind turbine produce power for the lighting and water pumps.



The site on 18th and Broadway Blvd. in Kansas City by 360 Architecture, is a prime example of urban agriculture accomplishing more than food production. The site, which covers a city block, integrates storm water management, urban agriculture, sustainable building and renewable energy (360). 18 Broadway (what the site has been named) starts by diverting runoff from 18th and 19th street along Broadway from the sewers to a biofiltration system. This system can cleanse and store up to 40,000 gallons of water at a time (Patton). The stored water is then used to irrigate the garden which provides food for a nearby food pantry. Pumping the water is accomplished with energy created by on-site solar panels. The irrigated garden beds are “expected to yield more than a ton of fresh produce a year” (360). 18 Broadway shows how multiple sustainable principles like water retention, urban agriculture, and educational opportunities can occur within one project.

# RESEARCH TASK 04:

## 02 / Urban Agriculture



[Left] Biofiltration system cleanses and stores water to be reused for irrigation.

[Below & Right] Different plantings produce crops for a local food pantry.



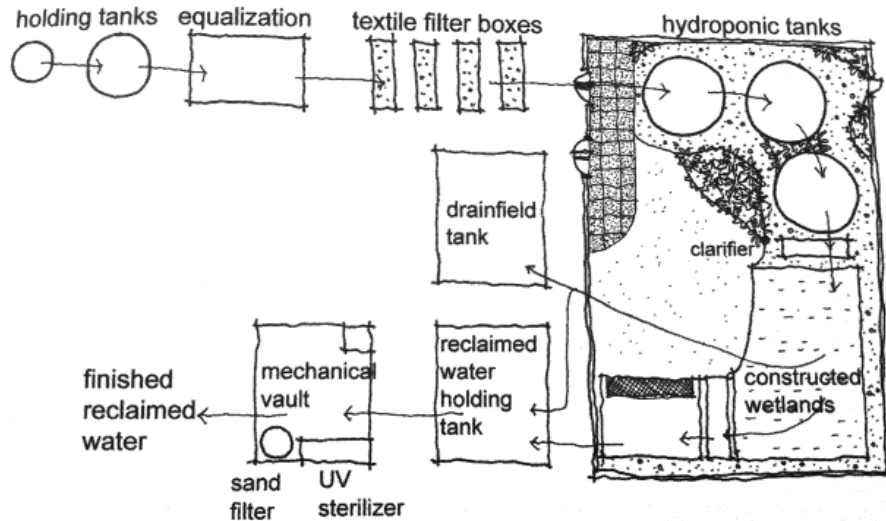
While there may not be much precedence for urban agriculture in office/archival buildings, the conditions are prime for the Kansas Energy Center's site condition. Due to the site's location in a suburban area, there tends to be a large amount of sprawl associated with the surrounding office parks and developments. This large amount of relatively unused land could lend itself to urban agriculture in many ways. The land not occupied by the building and considerable parking spots could be returned to crops at a relatively large scale. Various crops could be planted in and around the site to help mask the parking lot and minimize the building's impact on the land. Low maintenance crops like wheat could also help to absorb some of the runoff from paved surfaces around the site.

A community garden could be planted near the perimeter of the building. Employees and neighboring entities tending to it would provide a sense of pride in place. This would also provide a sense of community and connectivity to an area otherwise separated by sprawl.



# RESEARCH TASK 04:

## 06 / Ecological Waterflow



Ecological water flow is the sixth principle in the Living Building Challenge’s standards. In order to meet this objective, one hundred percent of the storm and building water discharge needs to be addressed. There are two strategies to meet this objective. Onsite management means that the collected water is used to feed the water demands at the site. Offsite management requires that the water be released “through acceptable natural time-scale surface flow, groundwater recharge, agricultural use or adjacent building needs” (McLennan 21). This is a very achievable standard on the living building challenge, and an interesting one for our project’s site. The Wichita Kansas Energy Center and Archives building has a large storage component taking up a great deal of real estate, with surrounding offices and gathering spaces. The site is unclaimed and untouched, and an initiative to think different could be accepted by other new development. The siting gives the space necessary to not rely on expanding the municipal storm sewers for this site, a requirement from ecological water flow, and instead use bio-mimicry to handle water demands.

Living machines, also known as eco-machines, are an active method to engineer a wastewater treatment system specifically for the site. A living machine is designed to process and clean drainage from the building and site through a process of cleaning with natural methods, anaerobic and aerobic tanks filled with bacteria that process pathogens, carbon and other unwanted objects or chemicals in the water (Green 239). The most popular living machine system is called a hydroponic system which uses bacteria, plants, and an overflow wetland to clean water.

The Omega Center for Sustainable Living, designed by BNIM, is an example of a full-functioning, net-zero water living machine system. The system achieves the complete living-building requirements, above and beyond just handling ecological water flow. In order to achieve net-zero water use, the OSCL harvests and uses 16,476 gallons of water each year. This precedent shows how much space a living machine can take up. The four constructed wetlands alone are the size of a basketball court each. On the other hand, they act as educational symbols and provide functional landscaping and views.

The Omega Center’s living system begins with two lagoons inside the building. These lagoons are separated into four cells that separately clean wastewater with plants, snails, fish, and microorganisms. Hanging plants whose roots reach into the water below covers the lagoons. Two anoxic tanks then collect used water from the building. The sludge settles to the bottom where bacteria digests and removes the unwanted solid waste. The water from the anoxic tanks and lagoons then passes into the constructed wetlands using gravity to feed from one to the next. The

[Above] Diagram of hydroponic living machine  
 [Left] Omega Center and completed wetlands  
 [Below] Lagoons inside the Omega Center



# RESEARCH TASK 04:

## 06 / Ecological Waterflow



[Above] Constructed wetlands at the Omega Center

[Below] Rain garden by 360 Architects



constructed wetlands have plants specifically chosen for cleaning the water and thriving in the flooded environment. The final step of the process is a recirculating sand filter underneath the permeable parking lots. This step cleans out any lasting nitrogen, organic matter and particulates using small microorganisms living in the sand and gravel fields (Omega).

The Tyson Living Learning Center is another Living Building Challenge case study that uses a simpler method to at least control runoff and storm water. The sloped, standing, seam metal roof collects water. Porous concrete on the sidewalks allow water to pass through, and a rain garden has been planted in a site depression. The rain garden collects water off the roof and from the site to be cleaned by plants and re-enter the natural ecosystem. The Tyson Center also uses natural planting to reduce the need for irrigation.

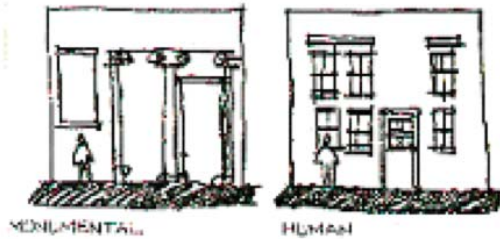
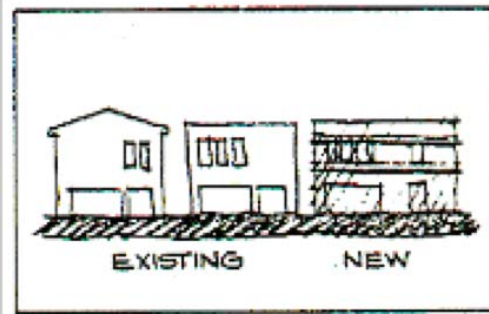
Rain gardens have also been used in non-Living Building Challenge projects, including a new garden by 360 architects at 18th and Broadway in Kansas City, which acts both as a decorative park and a rain garden. Students at the KU even created a rain garden at the Rec Center, which slows water using gravity and landscaping to diminish the amount of storm water entering drains.

For the Kansas Energy Center project, the site receives heavy amounts of rain for parts of the year and drought in others. Snow and freezing also complicates the conditions, and makes for a good situation to react to all seasons, especially saving water in the spring for irrigation in the summer. Since this is a private project, it is important to not let the process take over the main purposes of the building, however the client suggested that they desire the building to be sustainable, and this is an excellent way to act sustainably without offending the customers working in the oil industry. In order to be effective, water during raining seasons needs to be controlled and held in safe flood zones in order to give it time to percolate back into the environment naturally.

The project also includes a large warehouse space with a vast roof that will collect water unless a drainage plan is used. It seems only natural then to plan the drainage in a useful way. Other possibilities on this site include, but are not limited to, permeable parking, a rain garden, a collection tank, an eco-machine (not necessarily to the scale of the Omega Center), a sloped roof designed for rainwater capture, and native planting to reduce the need for irrigation.

# RESEARCH TASK 04:

## 16 / Human Scale + Human Places



[Above & Left] Patterns and Examples of how to incorporate scale at a human level

[Below] Decorative facade on the BBC Wales studios in Cardiff adds scale to a large utilitarian building



Architecture can be looked at as a science as well as an art thanks to Christopher Alexander, who believed that evidence from built work and nature could suggest patterns for creating positive places in which people live. Living Building Challenge Standard 16 is all about creating the positive types of places people thrive in. It stresses the importance of designing for the human rather than the automobile. Maximum and minimum sizes for all paved areas, signs and buildings themselves are required to meet this standard. The human scale in this building could be easily overlooked due to the scale of the archive warehouse. Recognizing strategies to combat this problem will help improve the usefulness and comfort in this building. Archive and storage facilities tend towards non-contextual masses rising from an untreated landscape. This typology easily overpowers human scale and contributes to an inhumane place-type.

According to the architectural compatibility guide, new construction in an open site should avoid a design that uses one singular, rectangular mass. Vast blank building walls facing streets are not ideal as well, despite their widespread use in most urban situations. (5-8). Articulation in situations like an urban setting or a building of extraordinarily large scale is important to make up for the monumental scale, except in rare situations where the monumental is more important. Even then, at times, a contrast can be desirable. If the mass is broken into smaller elements it will improve the human scale even on larger buildings.

An example where human scale is used to “decorate” the façade of a large “shed” is the BBC Wales studios in Cardiff. The project manages to give life to the building despite its form being a “long elevation with only one door,” where transparency also needed to be sacrificed for plot line privacy in productions. FAT architects managed to use a simple, cartoonish skin with frosted glass windows to provide interest and playfulness to the otherwise dull utilitarian building (Moore).

Another, even more subtle method to achieve human scale is through materiality. Human consciousness recognizes architecture via the smallest details, and the most natural materials often excite the senses, especially when approached, and the detail is revealed. “One needs to differentiate surfaces and to articulate subdivisions much more” when around materials lacking natural qualities. An example of this is the TGV station in Avignon, France. The inte



# RESEARCH TASK 04:

## 16 / Human Scale + Human Places



[Above] TGV Station in Avignon, France

[Below] Subtle materiality in the stations walls brings down scale and experience



rior space is a long crescent shape in plan, and soft-triangle-shape in section. Seemingly infinite horizontal lines immediately send the eye to the horizon on each end of the terminal. On closer viewing, however, the natural quality of the material begins to show up, and while monumental from a distance, the up-close experience is no different than a recognizable wood pallet painted roughly white.

Our site is designed entirely for automobile traffic in a suburban area. Through design that incorporates human scale, workers might be encouraged to bike or walk to and from work, around the site, or at least across the street to a neighboring restaurant for lunch. Due to the setting, however, this is not considered as safe or comfortable as getting in the car for every errand, no matter how short. Due to the scale of the archive center, placing the program on the site without thought to scale would be a large shortcoming for the usability and attractiveness of the building to its users.

# RESEARCH TASK 04:

## 20 / Inspiration + Education



[Above] The Tyson Living Center re-landscaped and developed a previous parking lot

[Left] A decorative rain spout draws attention to the Centers sustainable features

[Below] Public tours provide educational opportunities



Based on the Living Building Challenge description, availability of educational material about the operation of a successful design is a key factor. In this design principle of LBC, the building has to be open to the public one day per year to reveal its design solutions and to create direct contact and interaction with the living building to motivate individuals to take action. Letting public interaction occur within the living building is an opportunity not only to educate the public about technology used in the project, but to encourage and teach other designers and facilitators to take action as well.

Tyson Living Learning Center is a true example public education. The Center is located at Tyson Research Center, an environmental field station for Washington University in St. Louis. The site has been transformed from an asphalt parking lot to a native landscaped garden and a central rain garden designed with wildlife in mind. This building has improved the local habitat by introducing a rain garden that eliminates the runoff into a nearby ephemeral streams (ILBI). Other examples of this net zero energy design are photovoltaic panels and trackers mounted on the roof and potable water created by chemical-free rainwater harvesting system. This system eliminates the waste water by using a grey water treatment system and infiltration garden.

Tyson Research Institute is part of Washington University in St. Louis which allows for a variety of educational opportunities for various groups. It is mostly used by the University's architecture students and local school groups (4th – 9th grades) to create exposure to the educational information (ILBI).

The Kansas Energy Center hosts three different agencies which individually provide opportunities for research and education to occur. Each of the entities has rooms associated with the research and study of the material being stored in the building. However none of the current buildings make any grand attempt at providing an enriching educational environment. A design strategy which can further enhance the program would be to create a unified educational space incorporating all three of the agencies and the research and work they are doing. This space could be open to the surrounding community on open-house days in which educational lectures and events could occur. This would present the work field of the agencies to raise interest for students who would not hear about the work otherwise. Due to the requirement of a large parking lot, water management on the site can provide ecological benefits as well as further educational opportunities.

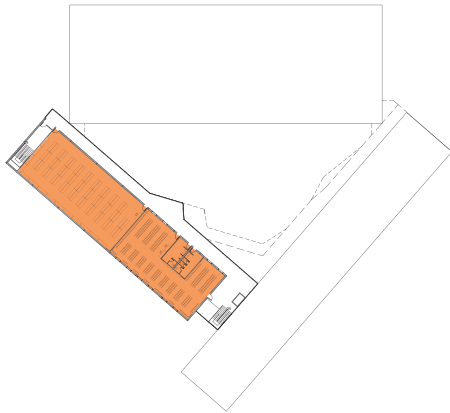
# 06 TASK 05 - DESIGN HYPOTHESIS AND EVIDENCE

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

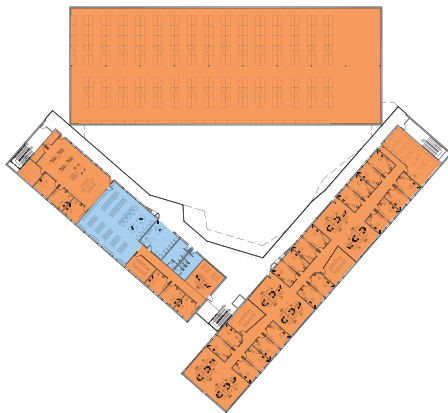
# RESEARCH TASK 05: COMMUNITY ORIENTED FACILITY

(Interpreting Place Type)

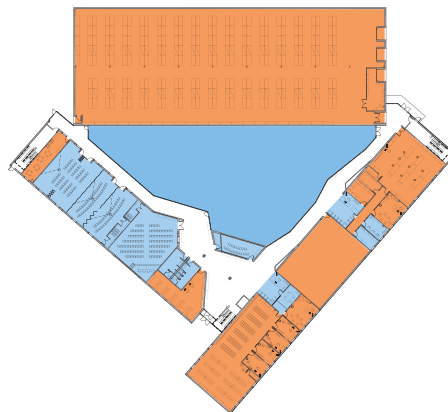
THIRD FLOOR



SECOND FLOOR



FIRST FLOOR



Public  
Private



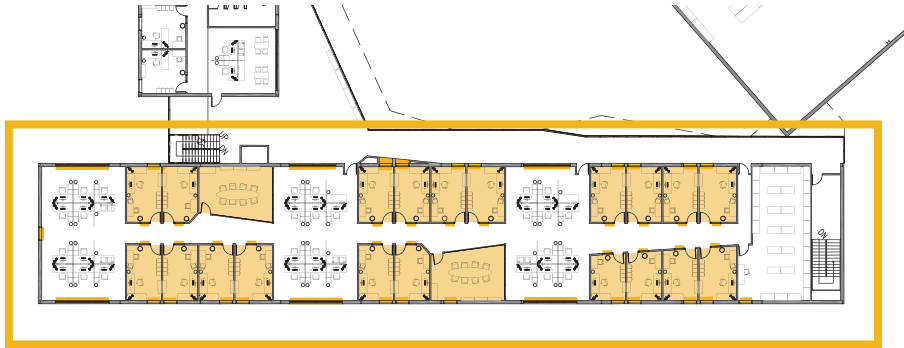
The first design principle is to create a community oriented facility. To do this, design strategies not originally listed in the programmable space and/or multi-functional spaces are often incorporated into the project. These additional design features can be anything from educational displays or a community garden, which encourage neighbors from the surrounding area to be involved with and use the facility. This principle was developed as a way to provide additional uses to a building which may only be used during part of the day or even part of the week. This method also has the opportunity to provide close ties between the building, its occupants, and the community.

This design principle was derived from past studies of architect's societal and contextual interpretations of the archive facility as a place type. Previous iterations of archive facilities have either been highly open spaces which provide usable public facilities, or highly private spaces which are off limits to the public and are often out of public sight. One such example of a community oriented facility studied was the Royal Archives of Thailand. This buildings main purpose is to provide secure storage of public documents. However the archives also provides attractive public meeting spaces and a library for community use.

Within my own design, I focused on keeping the public space located towards the bottom two floors and near the front entrance of the building. To keep a hierarchy of private and public spaces I created two wings of offices and a separate warehouse. The clear separation of the warehouse delineates it as a private space. The entrance of the building is located at the intersection of the two wings to emphasize the main public street within the building. To create privacy within the office suites I located the reception areas off the main hallway and located any public facilities in close proximity to the reception.

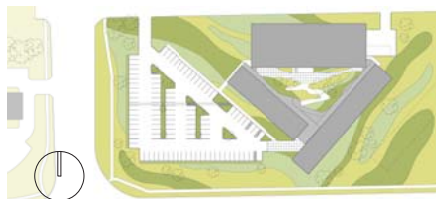
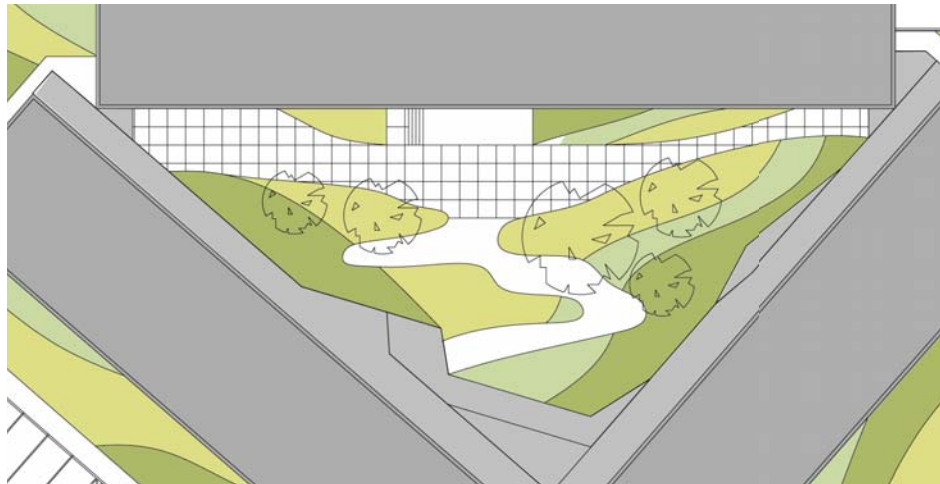
High use spaces open to the public were focused on the ground floor, such as the hearing room and the modular conference room. These two spaces can be used to hold public meetings and other lectures. A non-programmable space I included within the design is an educational room which is located in a prominent area near the entrance and looking out onto the courtyard. The room's purpose is to hold educational lectures and classes for students from local schools. Another added space is the courtyard, which can be enjoyed by both employees and the community as a sort of park space.

# RESEARCH TASK 05: HEALTHY WORK ENVIRONMENT (User Needs)



KCC OFFICE SUITE

- Offices
- Daylight/Ambient Light



Fostering a healthy working environment means that a building is designed with the occupants and more specifically the workers in mind. Many factors contribute to a healthy working environment such as natural lighting, good air quality, thermal qualities and natural ventilation. Creating an appealing work space will not only encourage employees to work there but also increases employee productivity and decreases employee turnover. Within the archive as a place type, their usually exists office and administrative space. While it isn't as pertinent that the actual archival and storage space address these qualities, the office and work space should be designed with the central purpose of developing a healthy and productive work environment.

This principle was derived out of research defining the user group. From interviews conducted with the clients and visits to their current facilities, it was clear that the working conditions were lacking in many areas. From our studio visits, the most common issue with the current facilities was the poor quality of light. The Kansas Geological Society was located on a floor in a building without any windows and therefore no natural daylight. The Geological Survey had issues with air quality within their sample processing room. Thermal qualities and tight working spaces were an issue within the Kansas Corporation Commission.

After the informal interview and office visits, we conducted a survey amongst the three agencies to determine the most important qualities within a work space. The result of the survey determined the qualities they were looking for in a working environment were much the same as the ones they were lacking in their current settings.

Incorporating these findings into my design, I focused first on supplying natural lighting to all the employees. The two office wings are relatively narrow in profile to allow offices to be located along the perimeter of the wall and receive natural lighting throughout the day. Open work stations are located near large glazed windows to ensure light moves through the space.

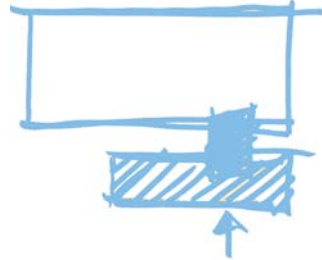
To ensure thermal comfort, a Variable Refrigerant Flow system is used in place of a traditional Direct Exchange system. This allows for simultaneously heating and cooling to occur within the building. So in the case where there are south facing and north facing offices, excess heat from the south offices can be transferred to the north offices and excess cool air can be transferred to the south offices.

Due to the nature of the work the employees are doing, the majority of their work will be on computers. To create a pleasant work environment, I created exterior views and spaces. Each office is designed so it has window with a view out onto the land. This creates a more appealing office environment because the worker can view the passing of time and change in weather. In addition to this, a central courtyard provides space in which workers can take breaks in as well as view from their offices.

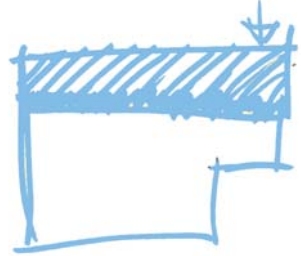
# RESEARCH TASK 05: CHALLENGING TYPOLOGY (Defining Place Typology)



CHAPPARRAL ELECTRIC WAREHOUSE



HUANACU WAREHOUSE & OFFICE



WHITE MOUNTAIN DATA CENTER



KANSAS ENERGY CENTER



Challenging the place typology means to recognize the key features that make the building an archives center and to push the boundaries to make it something more. This can be done by taking the peripheral or core design attributes unique to the project, and exaggerating them or altering them in relation to the context. While the place type is challenged, some primary core attributes necessary for the building's purpose must be kept within relatively tight constraints. Choosing this principle was influenced by the large quantity of relatively homogeneous archive centers and storage facilities in existence. If the basic part of an archival facility can be challenged, it's possible a more rich and diverse space can be created.

The majority of archival place types are designed with the same parti diagram of a small administrative/office space acting as the entrance and fronting the actual storage space. Two prime examples of these from previous work are the Chapparral Electric Warehouse in Albuquerque and the Haunacu Warehouse and Office in Chile. While they vary slightly due to scale, both have small offices fronting a large warehouse space. In these cases the unique feature that challenges the typology exist as the façade treatments.

However, some archival place types are unique in their layout. The White Mountain Data Center, located below Stockholm is a prime example. Due to the buildings context and purpose, the primary attributes are significantly different than a traditional archive facility. The Data Center is located in a converted bomb shelter which creates a unique typology due to the existing features. Another primary attribute contributing to its uniqueness is the storage space. Because computer servers are being stored multiple storage spaces can be used as opposed to one large one.

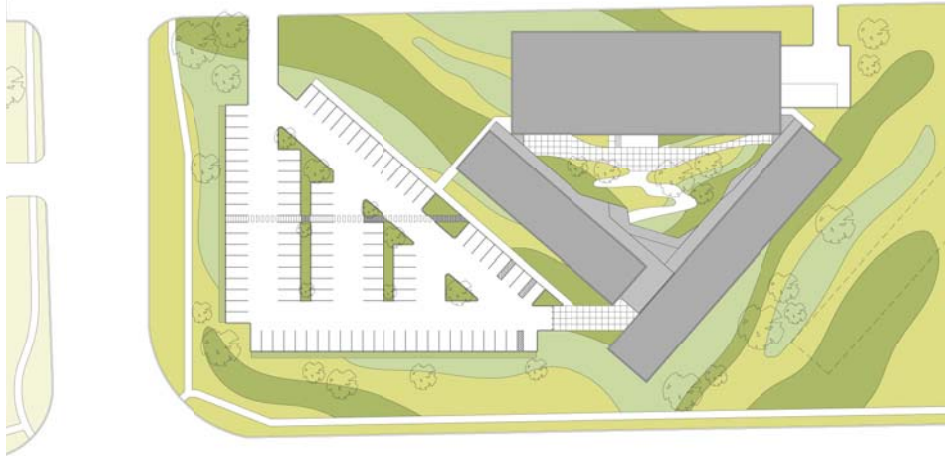
My design intent challenges the basic typology of an archival center, by splitting the buildings mass into three volumes and enclosing a space within. This was influenced largely by the building's context. Due to the suburban nature of the site, I created an inward looking building to accommodate the employees and create a more enjoyable working environment. However the building was required to be open to the community, so at the meeting points of these three volumes a crevice occurs inviting visitors in.

Another attribute specific to this project was the large quantity of administration space required. This allowed the creation of the enclosed space and a kind of pinwheel layout with the courtyard as a focal point. The requirement of a large office space didn't lend itself to the traditional small office block fronting a warehouse.

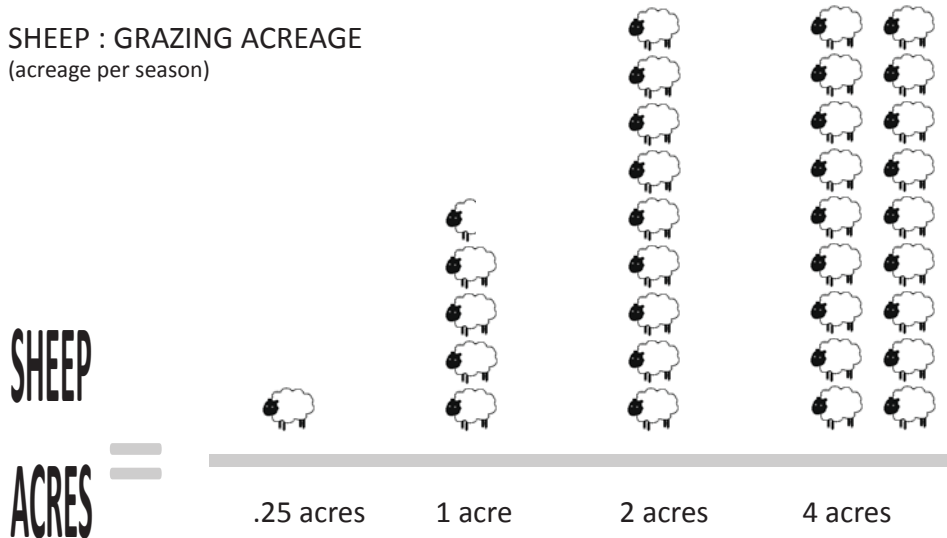
While there are some major differences in layout of my design, the basic parti shares the key attribute of the large warehouse with the typical typology of the archival facility. This is due to many factors relating the building's context and needs. The archived rock samples are stored in cardboard boxes and are therefore highly sensitive to water damage. This requires the warehouse portion of the building to be FEEMA rated to withstand an EF-3 Tornado. To withstand high winds the mass had to be relatively concentrated, so little could be done with the shape and volume of the storage. The storage is also required to have a 25ft. height clearance, further contributing to the mass of the large warehouse.

# RESEARCH TASK 05: SUSTAINABLE SITE USE

(Sustainable Design Principles)



SHEEP : GRAZING ACREAGE  
(acreage per season)



The last design principle is sustainable site use. Key environmental issues such as water runoff, native vegetation, and site maintenance should all be considered when designing a site. Using and designing the site sustainably should not only address the environmental impacts but also the social impacts on the context. In such a suburban setting where the site greatly impacts a large community, the design should also have some value for the people inhabiting and visiting the building. The site should be considered part of the overall building design, and therefore should also strive for sustainability.

As evident in the Living Building Challenge, site usage is a main priority in designing a building. One main principle the LBC focuses on is urban agriculture. They quantify the amount of land used for a project and then create a ratio of the remaining site to be used for urban agriculture. This approach lends itself to a sustainable site because all of the land is being productively used, if not by the building, then for food production. Another key aspect of sustainable site design in the LBC is the management of ecological water flow. Mitigating water runoff helps to retain water on the site and to limit the amount of water running into sewers and directly into waterways.

One of the Kansas Energy Center's intentions for the site is to incorporate native, sustainable plantings into the design. Native prairie grasses, buffalo grass and wildflowers are incorporated into the overall site design to create a pleasing landscape for the community while remaining relatively low maintenance. These plantings are drought resistant and only grow to a certain height so little watering and trimming is necessary.

Another intention of the site design was to utilize the land not occupied by the building for urban agriculture. Urban sheep grazing is used as a means to provide goods for the community while further reducing site maintenance. Not only do the sheep provide wool and milk, but they also eat the grasses and other on site plants reducing the need for mowing. To accomplish this strategy, the sheep would be located in a moveable pen and then periodically moved to the areas of the site that need grazing. Certain areas would be planted with vegetation needing more mowing but also more favorable to the sheep, such as the buffalo grass and wildflowers.

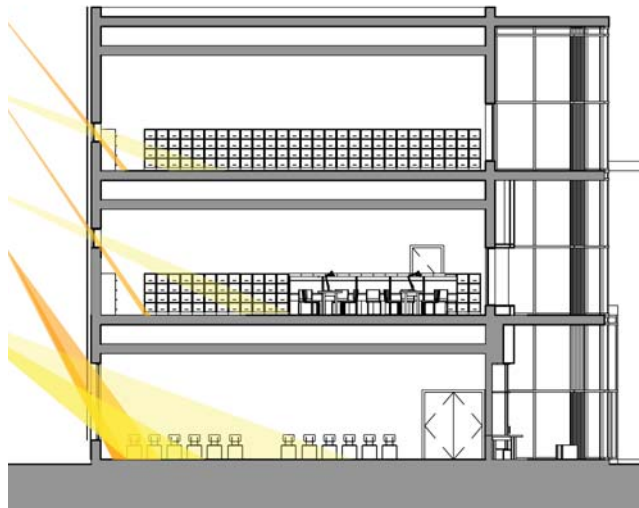
The site for the Center also strives to mitigate water runoff and provide ecological water flow. To accomplish this, pervious concrete is used on areas of the parking lot with low traffic. Whatever water runoff not absorbed is then directed to bio-swales within and surrounding the parking lots perimeter. The bio-swales absorb the water and filter it, preventing it from reaching the storm sewers. The bio-swales also provide an aesthetic quality to the site, partially obscuring the view of the parked cars from the road.

# 07 TASK 06 - DAYLIGHT SIMULATION

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL



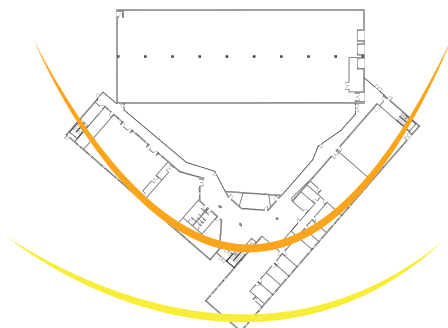
# RESEARCH TASK 06: DESIGN INTENTS/METHODOLOGY



Southwest Section  
Expected Results



Southeast Section  
Expected Results



Sunpath Diagram

■ Summer Sun  
■ Winter Sun

## Design Intent

The overall design intent with the project was to create a well-lit working environment for the three agencies. To accomplish this, the initial program was split into two narrow volumes which are oriented along a distorted east-west axis. The volumes are then extruded vertically, so as to not take up too much space on-site. Further compacting the footprint, the separate volumes are angled to create an interior courtyard closed off by the warehouse to the north. The intent of the narrow volumes was to allow for light to bleed through the building from both the north and south facades. This light would provide ample daylight to the office and work spaces within the building.

To mitigate and control the quantity of direct sunlight entering the building, different window sizes were used in conjunction with different methods of shading appropriate to the needs of the rooms. Different sized windows were paired with an expanded metal screen façade, which partially or completely shades the windows.

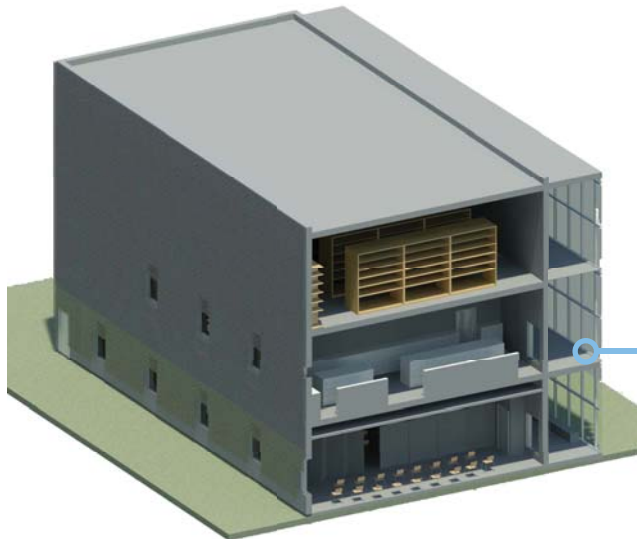
The hearing room and the open work areas utilize large amounts of glazing, with only a small fraction of the top screened from the sun. Since these spaces are larger they require more reflected and ambient daylight to filter spread through the space. Offices and small work rooms allow light in through tall 3'x6' windows which are screened at the top two feet of the window. This decreases the amount of direct sunlight during the summer. Filing and large storage spaces utilize clearstory windows which are completely shaded to allow some natural light to filter into the room.

## Methodology

To test whether or not the combination of the glazing and shading screen has the desired effect on the interior spaces, sections will be cut in Revit to examine the quality of light entering the space. To simulate a variety of glazing techniques used in the building, sectional perspectives will be used to cut through spaces utilizing different strategies. The sections will be cut through the southeast and southwest wings of the building to examine if there is any difference in the quality of light entering the space.

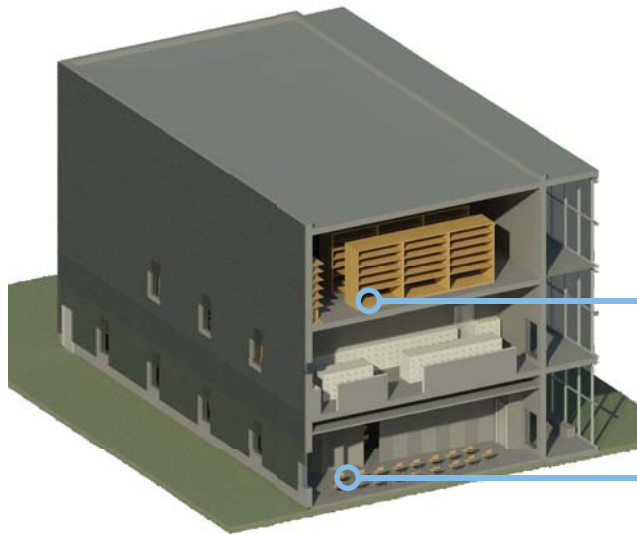
To produce as realistic a simulation as possible, the perspectives will be rendered using the location and light qualities of the actual site in Revit. One drawback of this is that Revit doesn't allow light to reflect off of surfaces and therefore isn't as realistic as an actual mock-up.

# RESEARCH TASK 06: RESULTS



Little direct light coming through north glazing.

Southwest Facade\_ Summer Solstice



Limitations of Revit with light coming through section cut.

Light entering a modular conference room during the winter.

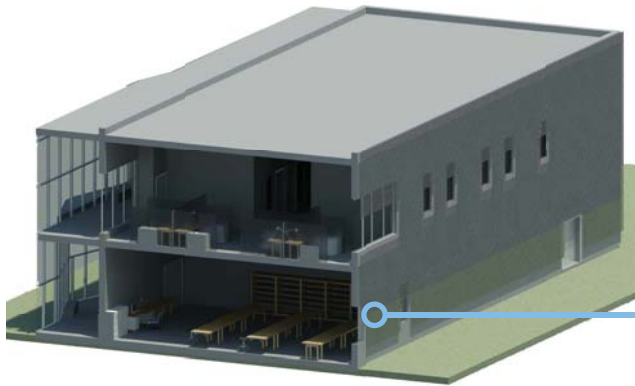
Southwest Facade\_ Winter Solstice

There were some unforeseen issues with the initial methodology, which were unable to be corrected due to the limitations of the program. When the perspectival sections were cut through building, in addition to showing the light let through the windows, light coming through the section cut was also shown. Since there is no way of creating a clear mask over the section which doesn't allow light in but still allows you to view the light coming through the windows, this method will have to suffice. Another issue, as stated before is that Revit doesn't show ambient and reflected light. Due to this the interior space appears quite darker than expected. However despite these two issues, key observations can be made as to the effectiveness of the lighting strategy.

My initial assumptions regarding the orientation of the building were partially correct. The southern façade of the building allows light to permeate through the space, however there was no light shown by my simulation that filtered in through the north façade. This could partially be due to the limitations of Revit; regardless I expected to see some light coming from this side. Another one of my initial hypotheses that was correct was the effectiveness of the screen. Ignoring the light allowed in by the section cut, we can see less direct sunlight is entering the space during the summer compared with the winter.

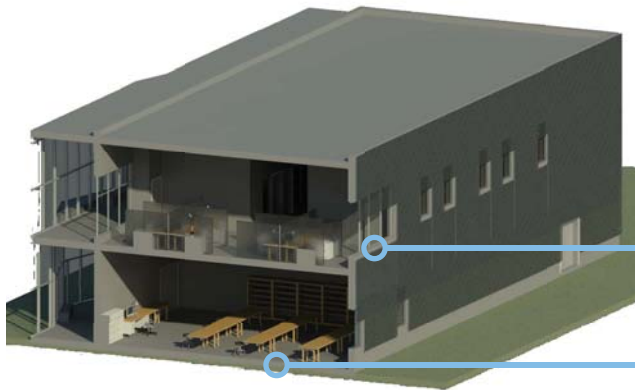
After examining the renderings, some of my initial design intents did not have their desired effect. While the south facing glazing did allow light in, the only area that received significant amounts of natural light were the spaces which had full glazed walls like the hearing room and open work areas. Other areas such as the filing and storage received less daylight than intended. Another result of the simulation was the realization that due to the buildings orientation, the southeast wing would receive more direct light in the morning, and the southwest would receive more direct light in the afternoon. While this isn't readily visible in the simulations which focus solely on the solstices at noon, it can be implied by the buildings orientation.

# RESEARCH TASK 06: CONCLUSION



Minimal light entering the building during the summer.

Southeast Facade\_ Summer Solstice



Large quantities of light entering during the open work space.

Limitations of Revit with light coming through section cut.

Southeast Facade\_ Winter Solstice

One of the main findings which would alter my initial design intent is the small quantity of light entering on the north sides of the building through the curtain wall. A simple solution for this would be to increase the amount of screened glazing on the south side of the building while decreasing the amount of glazing on the north because, according to the simulations, it had little effect on the quality of light in the space.

Another more drastic solution would be to re-organize the program of the building to orient the storage and filing spaces to the north of the building and line the southern façade of the building with office spaces. The south envelope of the building would then have large amounts of glazing to allow light into the work spaces. One problem with this solution is due to the size of the program-able space the building would become long and narrow, taking up a large amount of developable space on the site. This could be solved by creating a multiple story building which would minimize its footprint.

Lastly, a conclusion can be made as to the effectiveness of Revit as a simulation program. While Revit allows you to simulate light in a specific location during a specific time of year, it is inaccurate in showing anything but direct sunlight. This means that Revit could be used more as a tool to simulate the amounts of direct sunlight entering a building.

## 08 CONCLUSION

### KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

Throughout this simultaneous design and research process, various aspects of research influenced the design and final appearance of my building. The initial research regarding place type and precedents of previous warehouses and offices allowed me to view how other designers and architects had addressed the design problem. It also gave me insight into creative and unique methods of addressing certain aspects of the building such as the façade and the how the warehouse and administration spaces join. This portion of research helped to identify certain programmatic characteristics which could be defined as primary and secondary, and how they would interact. Overall, this portion of the research aided in challenging the typology of an office/warehouse building and effectively create a more interesting design.

Researching the client's needs through discussion, interviews, and surveys was helpful in realizing the interior layout and spatial qualities of the building. Certain design requirements were identified through this process, such as a need for natural day lighting and an overall healthy working environment. An unexpected result of this portion of research was the unique qualities of a space which were expected to be incorporated into the design. An example of this was the great need for natural and artificial ventilation in the KGS (Kansas Geological Survey) sample processing room.

Through the examination of sustainable design process, aspects such as sustainable site use and water retention were addressed in the project. This was beneficial because it brought about a more meaningful site design. Another reason why this research was helpful was that it addressed one of the client's main expectations of the building, in sustainable building use and design.

After applying all this gained knowledge and research to the design, it was helpful to re-examine the goals and purpose of the building through the day lighting simulation and defining the design hypothesis. Overall this research was immensely helpful in addressing the functional and experiential qualities expected in a building of this typology. Through the reexamination of the building, a more comprehensive understanding of the design and what was eventually accomplished through the design can be examined.

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# 10 APPENDIX A - LIST OF SURVEY / INTERVIEW QUESTIONS

KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

## Demographics:

Which agency do you work for?

What is your age?

What is your gender?

What is the length of your employment?

## Multiple Choice:

When do you begin your work day?

Approximately how many hours per day do you spend working on a computer?

When do you end your work day?

Where do you spend most of your time in your current work place?

How many visitors do you interact with in your agency each week?

Where do visitors go in your office?

How often do you use the following items in your personal work space?

Computer

Filing Cabinet

Printer/Scanner

Recycling Bin

Lamp

Writing Utensil

Telephone

How Important are the following items in your ideal working environment?

Natural Light (Window Light, Sky Light)

Task Lighting (Lamp)

Bright Overhead Lighting

Ability to rearrange your workspace

Privacy (Door that can be closed)

Quiet

Individual Temperature Control

Operable Windows

Easy Maintenance and Cleaning

Ergonomic Furnishing

Decorative Furnishing

## Long Answer:

Briefly list your primary duties within your agency in a typical full day.

What about your current working environment would you most like to change?

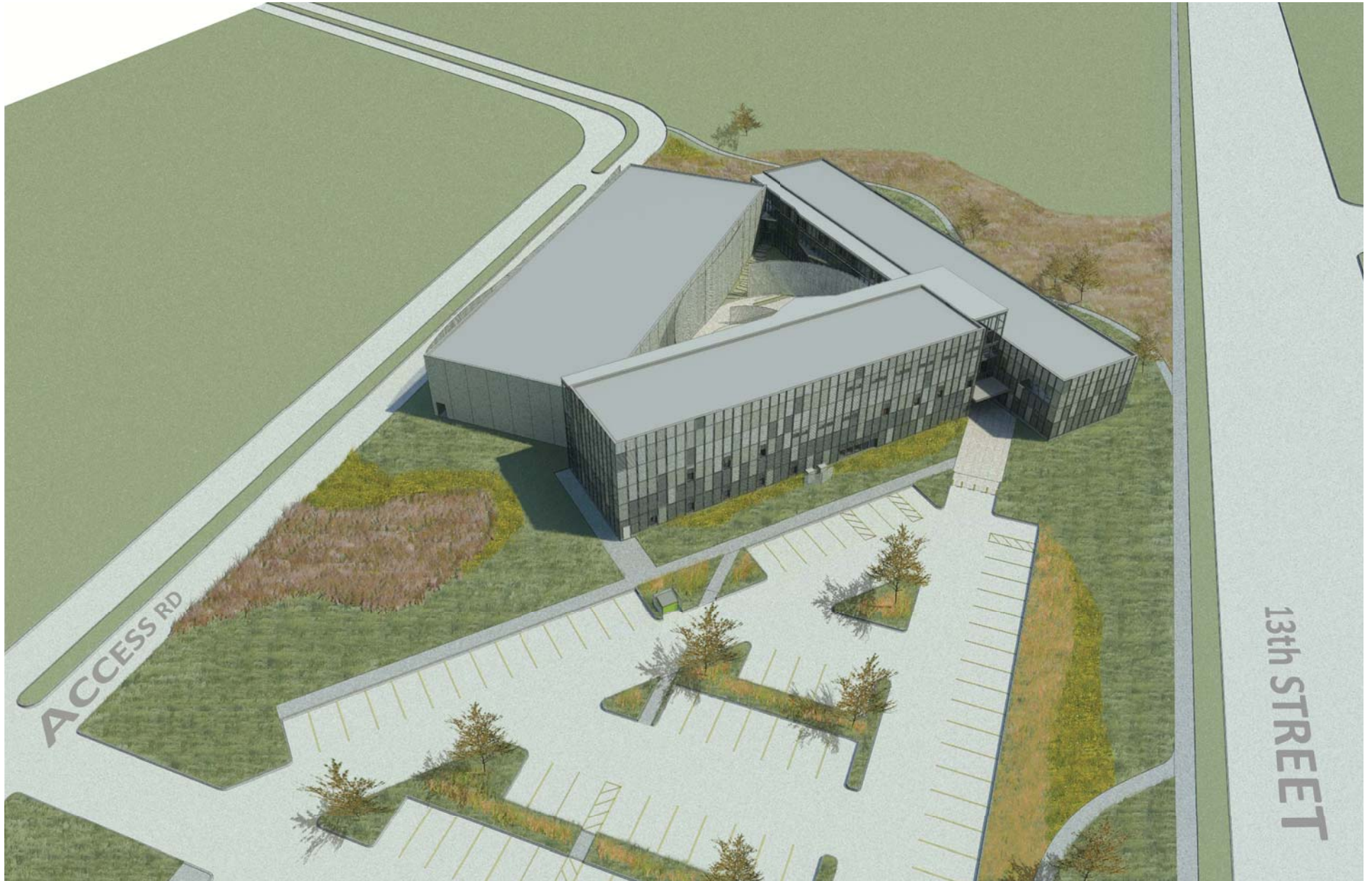
What is most indispensable to your work environment?

Describe conditions that would create an ideal working environment.

Describe conditions that would create a negative working environment.

11 APPENDIX B - STUDIO DESIGN PROJECT IMAGES  
KANSAS GEOLOGICAL ARCHIVES CENTER - CARSWELL

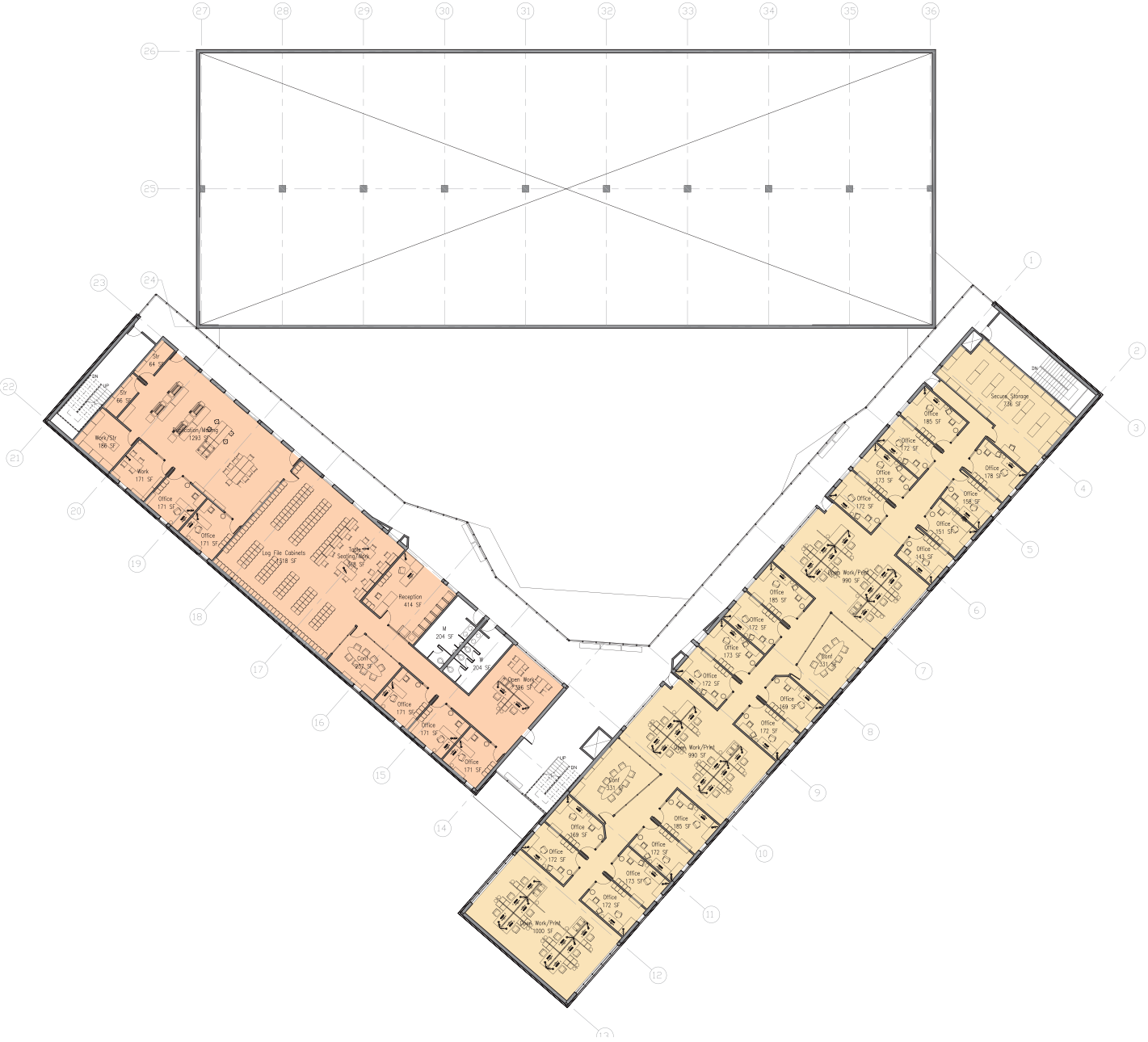
AERIAL PERSPECTIVE



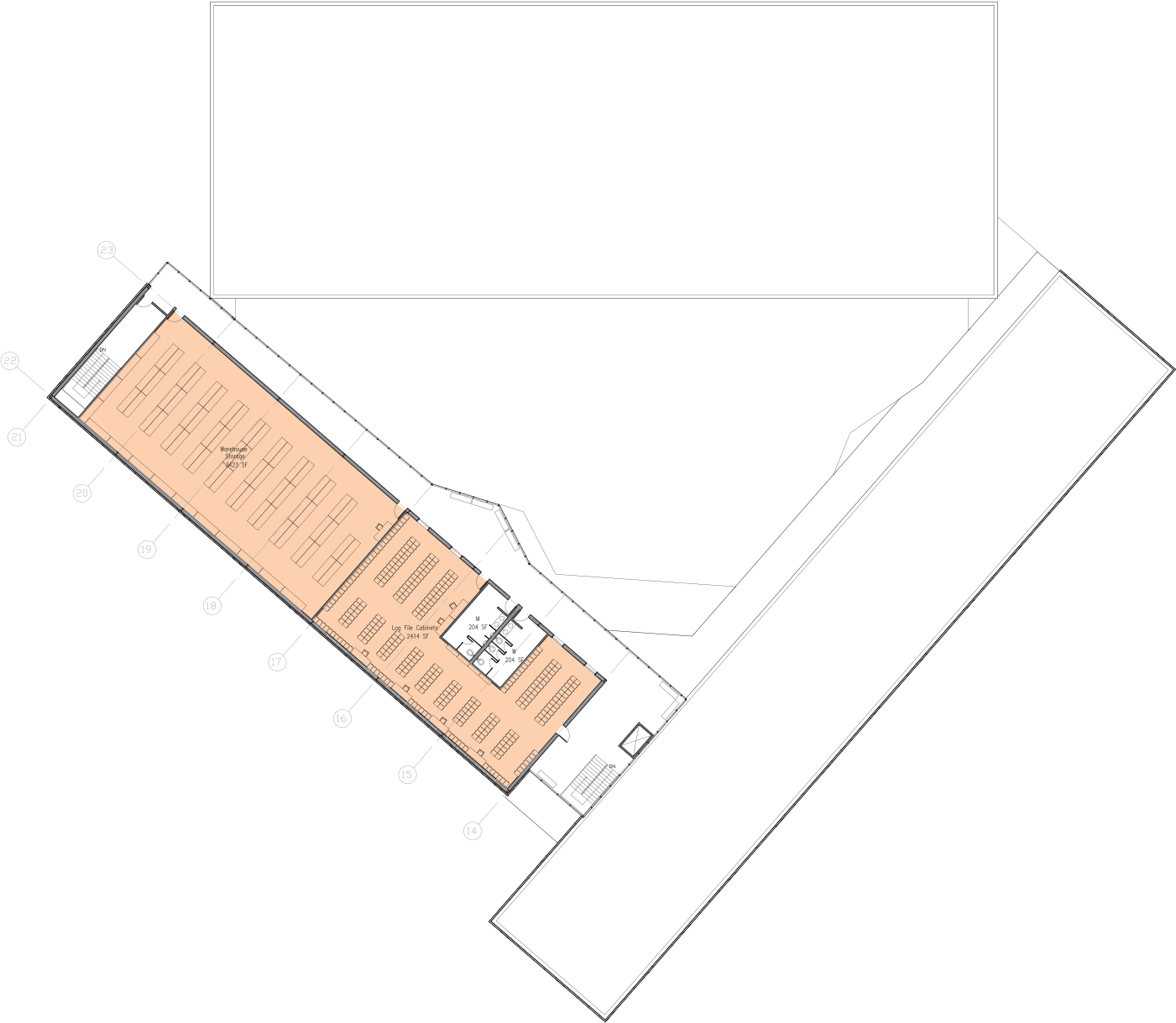




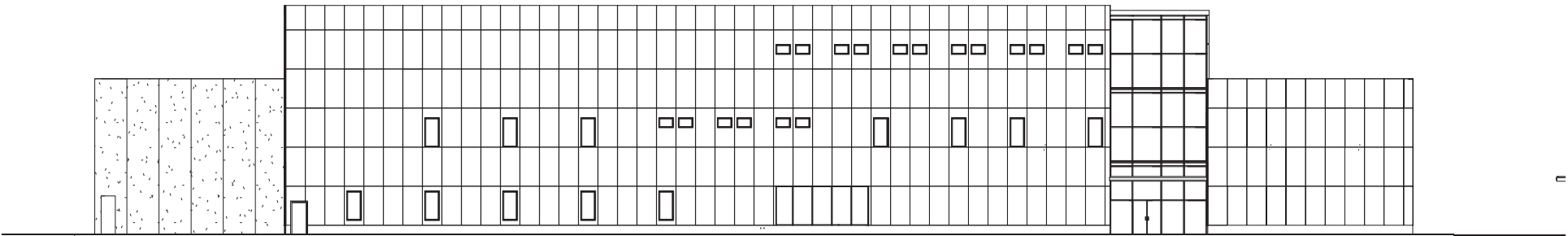
# 11\_ SECOND LEVEL



11\_ THIRD LEVEL



11\_ SECTIONAL PERSPECTIVE / ELEVATION



SOUTHWEST ELEVATION

